

ISSN 2230 9241

Volume 42 • No. 1 • April 2016

RESEARCH BULLETIN



www.icmai.in

The Institute of Cost Accountants of India
(Statutory body under an Act of Parliament)

Mission Statement

The CMA professionals would ethically drive enterprise globally by creating value to stakeholders in the socio-economic context through competencies drawn from the integration of strategy, management and accounting.

Vision Statement

The Institute of Cost Accountants of India would be the preferred source of resources and professionals for the financial leadership of enterprises globally.

ISSN 2230 9241

Volume 42 • No. 1 • April 2016

RESEARCH BULLETIN



www.icmai.in

The Institute of Cost Accountants of India

(Statutory body under an Act of Parliament)

In Association with

NiSM NATIONAL INSTITUTE OF
SECURITIES MARKETS
An Educational Initiative of SEBI

Disclaimer

The Institute assumes no responsibility for any act of copying or reproduction, whether fully or partially, of any write up / research paper which is not the original work of the author. The write up / research papers published in good faith on the basis of declaration furnished by the authors.

All rights reserved. No part of this publication may be used or reproduced in any manner whatsoever without permission in writing from The Institute of Cost Accountants of India.

Price of Single Copy: ₹ **400.00** only

Annual Subscription (for four volumes): ₹ **1200.00 p.a.**

Courier Charges: ₹ **200.00 p.a.** for four volumes

Month of Publication: **April, 2016**

© 2016 The Institute of Cost Accountants of India

Printed and Published by

CMA Avijit Goswami

Chairman - Research, Journal & IT Committee

The Institute of Cost Accountants of India

12 Sudder Street, Kolkata 700016

Foreword

I am pleased to present Research Bulletin, Vol.42, No. 1, April, 2016 issue on the theme topic “Contemporary Issues in Securities Markets”, in association with National Institute of Securities Markets (NISM), an educational initiative of SEBI.

Indian Securities Market have shown incredible growth in the post Liberalization era. It remains one of the most resilient globally and poised to be one of the top destinations for domestic and global businesses to spread out and invest into. As global economy moves for impending recovery, India has shown amazing strength to bounce back with greater stability and sustainability.

Securities Market facilitates the internationalization of an economy by linking it with the rest of the world. This linkage assists through the inflow of capital in the form of portfolio investment. Appropriate investment strategy framework tends towards economic growth of the nation. Apart from providing the medium for channelizing funds for investment purposes, Securities Markets aid in pricing of assets and serve as an indicator of the financial health of the economy. Indian securities markets have witnessed extensive reforms in the post-liberalization era in terms of market design, technological developments, settlement practices and introduction of new instruments. The fluctuations in the Indian market are attributed heavily to cross border capital flows in the form of FDI, FII, etc. In this context, the CMAs can apply Risk Mapping techniques such as Value-at-risk and Sensitivity Analysis to measure the exchange rate risk resulting from a firm’s activities, including the foreign exchange position.

This publication brings you in-depth research insights on a wide range of topics on contemporary issues in securities markets well-written by researchers, academicians and professionals.

I trust you will enjoy reading the Research Bulletin and will find it to be an extremely useful tool to enrich your knowledge base in the various aspects of Securities Market.

CMA P.V. Bhattad

President

The Institute of Cost Accountants of India

Message from the Director, NISM

NISM is pleased to enter into the second year of collaboration with the Institute of Cost Accountants of India, on the heels of the resounding success of the joint seminar in April 2015 and the simultaneous release of the Research Bulletin.

NISM has been constantly engaged in all forms of research: publications, conference papers and project research. In this joint publication, there have been notable contributions on a wide array of contemporary issues.

The year 2015-16 witnessed a revival in the primary market offerings of equity. This is an opportune time for assessing the performance of various IPOs that took place over the past decade. Likewise, the slack period in equity offerings results in brisk activity in new issues of corporate bonds. Today, the securities markets serve as a platform for a wider array of instruments to be traded: Interest Rate Futures constitute an important hedging tool for various stakeholders. The same is also true of currency movements, which can be hedged by using derivatives.

Equity investors need to be clear in their investment goals, including investment time horizons. Dividend announcements by corporations can also be subjected to further analysis, to unravel important economic signals. The roles of SEBI and other market intermediaries are examined closely in two separate papers. At the cutting edge in secondary markets, the rising trends in Algorithmic and High-Frequency Trading give rise to ethical dilemmas and the Fairness-Efficiency tradeoffs.

All of the aforesaid matters are discussed threadbare in the papers contained in this issue. We trust the Research Bulletin and the joint seminar will evoke thought-provoking discussions and stimulate further research on various aspects of securities markets in India, as the country gears up to unleash the start-up wave of entrepreneurship.

We wish the joint seminar all success and look forward to close collaborations in the years to come.

Dr. Sandip Ghose

Director

National Institute of Securities Markets (NISM)

Chairman's Communiqué

I feel privileged to place before you the present volume of Research Bulletin, Vol.42, No. 1, April, 2016 issue on the theme topic "Contemporary Issues in Securities Markets", in association with National Institute of Securities Markets (NISM), an educational initiative of SEBI. Our Research Bulletin mainly highlights on pragmatic research articles and has a much wider reader base consisting of academicians, researchers, industry professionals and practitioners.

I take this opportunity to express my appreciation for my fellow members of the Research, Journal and IT Committee, esteemed members of the Review Board, the eminent contributors, the entire research team of the Institute and National Institute of Securities Markets (NISM) for their earnest effort to publish this volume in time.

This Bulletin comprises of articles on contemporary issues in Securities Markets like Risk-Return Relationship in the Stock Market, REITS, Valuation Models, Stock Market Volatility, Foreign Direct Investment (FDI), Initial Public Offers (IPOs), Role of SEBI in Capital Markets, Exchange Rates, Interest Rate Futures, etc.

The readers are invited to tender their valuable feedback towards enrichment of Research Bulletin.

Suggestions for improvement of this Bulletin shall be highly cherished.

CMA Avijit Goswami

Chairman, Research, Journal & IT Committee

The Institute of Cost Accountants of India

Editor's Note

Greetings!!!

The securities market upholds economic growth. More efficient is the securities market, the better is the promotion effect on economic growth. It is, therefore, indispensable to ensure that our securities market is proficient, transparent and safe. In this regard, SEBI has been working since its inception and would continue to work to continuously improve market design to bring in further efficiency and transparency to market and make available innovative products to meet the varying needs of market participants, while protecting investors in securities. Thus it is our noble endeavour to bring forth the Research Bulletin, Volume 42, No. I, April 2016 issue on the theme topic "Contemporary Issues in Securities Markets", an offering of the Directorate of Research & Journal of the Institute in association with National Institute of Securities Markets (NISM), an educational initiative of SEBI to enhance the knowledge base of readers and help investors in efficient decision-making in their investment mechanism.

We publish both theme based and non theme based articles on the contemporary issues. Inputs are mainly received both from academicians and the corporate stalwarts. Our attempt is to draw attention towards environmental, social, economical and market-related issues, so that the researchers and decision-makers can enrich their knowledge base and can take strategic decisions deliberately.

We are extremely happy to convey that our next issue of Research Bulletin, Vol.42, No. II would be published in July, 2016.

We look forward to constructive feedback from our readers on the articles and overall development of the Research Bulletin. Please send your mails at research.bulletin@icmai.in. We express gratitude to all the contributors and reviewers of this important issue and wish our readers get plenty of academic inputs from the articles.

CMA (Dr.) Debaprosanna Nandy

Director (Research & Journal) & Editor, Research Bulletin

The Institute of Cost Accountants of India

rnj.dpnandy@icmai.in

Research, Journal and IT Committee: 2015-2016

CMA Avijit Goswami

Chairman

CMA Dr. I. Ashok

Member

CMA Sanjay Gupta

Member

CMA Dr. P. V. S. Jagan Mohan Rao

Member

CMA H. Padmanabhan

Member

CMA P.V. Bhattad

President & Permanent Invitee

CMA Manas Kumar Thakur

Vice President & Permanent Invitee

CMA Dr. Debaprosanna Nandy

Secretary, Research & Journal Committee

Director (Research & Journal) & Editor, Research Bulletin

Editorial Board

Prof. Amit Kr. Mallick

Former Vice Chancellor, Burdwan University

CMA Dr. Asish K. Bhattacharyya

Professor & Head, School of Corporate Governance & Public Policy, Indian Institute of Corporate Affairs, New Delhi

Dr. Ashoke Ranjan Thakur

Former Vice Chancellor, Techno India University, West Bengal

Dr. Bappaditya Mukhopadhyay

Professor, Finance & Economics, Great Lakes Institute of Management, Gurgaon

Dr. Dilip Kr. Datta

Director, Sayantan Consultants Pvt. Ltd, Kolkata

Dr. Malavika Deo

Professor, Department of Commerce, Pondicherry Central University, Puducherry

Dr. Nagaraju Gotla

Associate Professor, National Institute of Bank Management, Pune

Dr. P. K. Jain

Professor, Department of Management Studies, IIT Delhi

Dr. Sankarshan Basu

Professor, IIM-Bangalore

CMA Dr. Sreehari Chava

Director, Santiniketan Business School, Nagpur

CMA V. S. Datey

Consultant, Corporate Laws & Taxation, Nashik

Editor: CMA (Dr.) Debaprosanna Nandy

Director (Research & Journal)

Associate Editor: Shri Pradipta Gangopadhyay

Dy. Director (Research & Journal)

Our Contributors in this Issue

Mr. Aman Jain

Financial Management Program, GE India
mail@amanjain.co.in

Mr. Anandaraj Saha

Assistant Professor, Department of Commerce, Haringhata Mahavidyalaya
anandarajsaha@yahoo.com

Mr. A Vadivel

Assistant Professor (Temporary), Department of Economics, Pondicherry University
arjunavadivel@gmail.com

Mr. Bail John Thomas

Faculty of Business, DCSSMAT, Vagamon, Kerala
basiljthomas@gmail.com

Dr. Bhavik Panchasara

GES-II, Assistant Professor, Accountancy Government Arts & Commerce College, Gujarat
bhavikpanchasara@gmail.com

CMA (Prof.) B.N. Swami

Professor in Accounting & Finance, Faculty of Business, University of Botswana,
BONUNS@mopipi.ub.bw

Mr. C. Hariharan

M.Phil Scholar, Management, Department of Commerce and Financial Studies,
Bharathidasan University
harisraj7791@gmail.com

Ms. Elizabeth James

Assistant Professor, Finance Area, National Institute of Bank Management
elizabeth@nibmindia.org

Prof. Esha Gupta

Assistant Prof. in Commerce, SDP College for Women,
esha.saccm@gmail.com

Dr. E. Sulaiman

Associate Professor, School of Management & Business Studies, Mahatma Gandhi University,
sulaim25@yahoo.co.in

Our Contributors in this Issue

Mr. G. Tobedza

Lecturer in Accounting & Finance, Faculty of Business, University of Botswana
gtobedza@desktop.co.bw

Mr. Hruda Ranjan Sahoo

Faculty Member, National Institute of Securities Markets (NISM)
hruda.sahoo@nism.ac.in

Dr. Imlak Shaikh

Assistant Professor, Management Development Institute Gurgaon
imlak786@gmail.com

CMA (Dr.) Jeelan Basha.V

Assistant Professor in Commerce Studies, Government First Grade College
drjeelanbasha@yahoo.co.in

Dr. R. Kasilingam

Reader, Department of Management Studies, Pondicherry University
kasimeena@gmail.com

Mr. Kaleswaran. R

Research Scholar, Department of International Business School of Management
Pondicherry University
rkkaleswaran@gmail.Com

Dr. M. Babu

Assistant Professor, Department of Commerce and Financial Studies, Bharathidasan University
drbabu@bdu.ac.in

Mr. M. Simbarashe

Research Scholar, University of Botswana
simz.19@live.com

Mr. Nitin K Tike

Senior Vice President, CPE Administration & E-Learning Department
National Institute of Securities Markets (NISM)
nitin.tike@nism.ac.in

Ms. Preeti Hazarika

Research Scholar, Dept of Commerce, North-Eastern Hill University
Preetihazarika1987@gmail.com

Our Contributors in this Issue

Dr. Paritosh C. Basu

Senior Professor, NMIMS University School of Business Management
paritosh.basu@nmims.edu

Mr. Pradiptarathi Panda

Research Associate and Ph.D. Scholar, National Institute of Securities Markets (NISM),
pradiptarathi.panda@nism.ac.in

Dr. Praveena S Muley

SSR Institute of Management and Research

Ms. Neha Mahajan

Assistant Professor, S.D.P College for Women
nehamahajan.cute@gmail.com

Mr. S Anandhan

Faculty, Dr. B.R.Ambedkar Govt Law College
anandsuppu@yahoo.co.in

Ms. Shagun Thukral

Ph.D Scholar, Symbiosis International University
shagunthukral@gmail.com

Ms. Sonal Joglekar

PhD Scholar, Symbiosis International University (SIU)
sonalj23@gmail.com

Mr. Sourav Mazumder

Research Scholar, ICFAI University
souravmazumder@rediffmail.com

Ms. Stuti Pandey

PhD Scholar, Symbiosis International University
stuti.pandey.gonda@gmail.com

Mr. Subhendu Kumar Pradhan

Ph.D Research Scholar, Department of Management Studies, Pondicherry University
subhenduam@gmail.com

Mr. Subir Sen

Dean, Globsyn Business School
subir.sen@globsyn.edu.in

Our Contributors in this Issue

CMA Dr. Shivani Inder

Assitant Professor, Chitkara Business School, Chitkara University
shivaniinderchopra@gmail.com

CMA (Dr.) Sunder Ram Korivi

Dean and Professor, National Institute of Securities Markets
sunderkorivi@nism.ac.in

Dr. Praveena S Muley

SSR Institute of Management and Research

Mr.S.Srinivasan

Ph.D Scholar in Management, Department of Commerce and Financial Studies,
Bharathidasan University
ssrinivasanphd87@gmail.co

Dr. Santi. G. Maji

Assistant Professor, Dept. of Commerce, North-Eastern Hill University
sgmaji2010@gmail.com

Ms. Satabdee Banerjee

Faculty, Department of Commerce, Deshbandhu College for Girls
banerjee_satabdi@yahoo.co.in

Mr. Tanmoy Ganguli

Analyst, Decision Sciences, HSBC
gangulitanmoy@yahoo.com

Mr. Vaibhav Singhal

Senior Analyst, Deutsche Bank
vaibhav.singhal.iitbhu@gmail.com

Contents

<i>An Analytical Study on Investor Financial Behaviour</i> Stuti Pandey	27
<i>Analysis of Events Pertaining to Algorithmic and High Frequency Trading in India</i> Sonal Joglekar	36
<i>Asset Valuation: A Synthesis of Existing Literature and New Insights</i> Subir Sen, Sourav Mazumder	45
<i>Can Foreign Direct Investment (FDI) In Indian Power Industry Impact its Stock Market Performance? An Empirical Study</i> Anandaraj Saha, Satabdee Banerjee	53
<i>Efficiency of Emerging and Emerged Capital Markets: An Empirical Study on BRICS and G7 Nations</i> M. Babu, C. Hariharan, S.Srinivasan	61
<i>Event Based Analysis of the Corporate Bond Market in India through a 7i Framework</i> Shagun Thukral	78
<i>Factors Affecting Credit Risk of Indian Banks: Application of Dynamic Panel Data Model</i> Santi. G. Maji, Preeti Hazarika	85
<i>Factors Influencing the Dividend Announcement and Segmentation of Investors: From Investors Perspective</i> Subhendu Kumar Pradhan, R. Kasilingam, Kaleswaran. R	97

Contents

<i>Fund Preference of Mutual Fund Investors</i> E. Sulaiman, Bail John Thomas	107
<i>Interest Rate: Futures and Cash Market Spill-over's in India</i> Hruda Ranjan Sahoo, Pradiptarathi Panda	118
<i>Interest Rate Futures and Market Structure in India</i> Sunder Ram Korivi, Elizabeth James	129
<i>Mobilization of funds by Corporate Enterprises in India: An Empirical Study</i> Jeelan Basha.V	138
<i>Offer for Sale - An Alternative Mechanism for Price Discovery of Equity Share: An Empirical Study in Indian Context</i> Paritosh C. Basu, Aman Jain, Vaibhav Singhal	148
<i>REITs: How far are we from Implementation?</i> Bhavik Panchasara	170
<i>Returns from investment in Initial Public Offers: A Study in Consistency of Returns</i> Nitin K Tike, Praveena S Muley	178
<i>Risk Management for a Commercial Lending Portfolio Using Time Series Forecasting and Small Datasets</i> Tanmoy Ganguli	188

Contents

<i>Role of Intermediaries in a Securities Market</i> Neha Mahajan	203
<i>Stock Market Volatility: A Case Study of the Botswana Stock Exchange (BSE)</i> M. Simbarashe, G. Tobedza, B.N. Swami	213
<i>Testing Efficiency of the Variables in Black Scholes Option Pricing Model: Evidence from Indian Derivatives Market</i> Shivani Inder	223
<i>The Real Exchange Rate Misalignment and Economic Growth in India</i> S Anandhan, A Vadivel	231
<i>The Role of SEBI in Indian Capital Market</i> Esha Gupta	238
<i>The Seasonal Anomalies in the Investors' Fear Gauge Index</i> Imlak Shaikh	247

An Analytical Study on Investor Financial Behaviour

Stuti Pandey

Abstract

The Indian financial market has achieved tremendous growth over the last 15 years, with systems that make it on par with the developed markets. The important feature of developed markets is the growing number of investors and investment avenues. This paper examines financial planning, the impact of various variables on investors in making their investment decision and try to develop conceptual framework based on it.

Key Words

Investment, Investor Awareness, Behavioural Finance, Financial Planning, Demographic Variables, Socioeconomic Variables, Psychological Factors, Sociological Factors

Introduction

Investors seek capital security and good returns on investment. Uncertainty drives the market's price-discovery mechanism. Uncertainty is the second name of risk. All unknown outcomes contain risk, and therein lies the possibility of loss. Risk is inherent in the concept of uncertainty. However, anyone looking for performance must consider risk, for without it, there can be no reward. Smart investors know that uncertainty is where the money is. No uncertainty, no risk; no risk, no possibility of outstanding performance.

Investing in various kinds of financial assets has become a

widespread practice for many people either for accumulation of wealth or for meeting their future financial requirements with the income generated thereon. Now-a-days, a wide range of financial assets are made available to individuals for investment. In the finance area, investment refers solely to the acquisition and administration of securities, which saliently includes stocks, bonds and debentures and warrants that are usually traded in organized financial markets.

These developments have somewhat complicated the process to take a right investment decision that suits the specific objectives of an investor. Most of the investors are not sharp enough to manage their own investments. Generally, investors who are competent to take their investment decisions independently, would depend largely on the information made available in the prospectus, annual reports, financial periodicals, publications of the government, stock exchanges and other institutions. Wealthy investors take the investment advice from the professional investment advisers. However, small investors are not rich enough to consult a professional investment adviser, hence their decisions to invest in any security are largely dependent upon the advice from accessible dealers in securities, bankers and investor-friends.

The research objectives for this paper are:

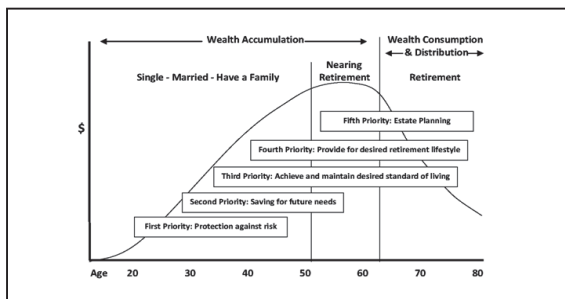
- (i) To classify investor's decision making literature based on scholarly research paper as building blocks of a conceptual framework;
- (ii) To propose a conceptual framework;
- (iii) To outline further research directions.

The rest of paper is organized as follows: the first section will discuss definitions of Investment based on scholarly works; determinants of investor's financial behaviour; and the impacts of factors on financial planning. Based on literature review, the paper will propose a conceptual framework. The last section concludes the paper, provide further research directions based on a synthesis of our findings.

1. Concept of Financial Planning

People's financial needs change throughout their lives. While there is a typical financial life cycle pattern that applies to most people, every family and individual might be faced with unexpected events at any time that are difficult to predict if and when they might occur, and are not planned for in the financial life cycle.

Figure 1 – An Individual's Financial Life Cycle and Corresponding Financial Objectives



Source: *Life cycle of financial planning* by Gail M. Gordon,

University of Wyoming Cooperative Extension Service, 2001

The stage of life in which an investor finds himself, also plays an important role in selecting the components of a particular investment portfolio and demands a strategic focus for disciplined financial planning. These demographic factors play an important role while predicting the expected financial obligation such as child's education, marriage and provision for retirement. In the context of investment decision as a part of financial planning, each stage in the human life cycle has a unique financial objective which needs to be fulfilled, which in turn, plays an important role in credit, saving and investment decisions.

2. Investment

Investment is an opportunity which investor undertakes and forgoes the current usage to obtain some amount in future. Investors in general have appetite to invest in that instrument which may generate maximum return with minimum risk. Definitions for investment vary from investors to investor depending upon his age, income, gender, his risk profile, and his future needs. Investing is a productive activity that provides benefits to society as a whole.

Table 1: Definitions of Investment

Investment Objective	Reference
Investment is done with aim of Capital appreciation.	Radha V (1995)
Investment is done by considering factor of Safety and Regular Return. Equity shares were preferred for their higher rate of return by the investors	Panda K., Tapan N.P. and Tripathi (2007)
Safety and tax savings as the important factors affecting investment in various avenues by the investor and developed strategies for enhancing common investor confidence such as good return, transparency, investor education, guidance etc.	Santi Swarup K (2008)
Salaried employees seek return, safety, liquidity, convenience and affordability and tax benefits as the objective of their investments.	B.B.S.Parihar and K.K. Sharma (2012)
This paper refers to Investment as the concept of deferred consumption, which involves purchasing an asset, keeping funds in a bank account with the aim of generating future returns	Murithi Surya et al (2012)

Cont...

Investment Objective	Reference
The study noticed that return potential and liquidity have been perceived to be most lucrative benefits of investment in mutual funds and the same are followed by flexibility, transparency and affordability	Singh (2012)
Investment avenues depend to a large extent on the investment objectives perceived by investors. Investors differ in their pattern of investment, preferences, perceptions and importantly objectives of investment	P.V.Durga Rao and G.V. Chalam (2013)
Investment is a commitment of a person's funds to derive future income in the form of interest, dividends, rent, premium, pension benefits or appreciation of the value of their principle capital	S. Umamaheshwari and M.Ashok Kumar(2014)

2.1 Investment Avenues

A number of investment avenues are available for the investors. Some of them are marketable and liquid while others are non-marketable; some of them also highly risky while others are almost riskless. People need to choose a proper avenue among them, depending upon specific need, risk preference, and return expected. Investment avenues can broadly be categorised under the following heads: -1) Equity 2) Financial Institution Bonds 3) Corporate Debenture 4) Company Fixed Deposits 5) Bank Fixed Deposits 6) PPF 7) Life Insurance 8) Post Office-NSC 9) Gold/Silver 10) Real Estate 11) Mutual Fund and Others.

The Securities and Exchange Board of India (SEBI) has allowed various categories of investors to invest their excess funds in Indian Stock Markets, such as: Individual or Retail Investors, Foreign Portfolio Investors (FPIs), Domestic Institutional Investors (DIIs), Private Corporate, Non-Resident in Indians (NRIs) etc. Among these the first three categories such Retail Investors, FPIs and DIIs investible surpluses were more than that of others.

Asset Management Companies are striving hard to penetrate different market segments by introducing customized products according to the needs and wants of the customers. There is a need to understand the perceptions of the investors towards such products and which are the primary criteria which usually investor evaluate to invest. Perception varies from person to person, and each person assigns different meaning to the same situation as per his experience. It is commonly presumed that different people perceive the same situation or thing in different ways, due to the past experiences and various

demographic variables like gender, age, etc.

3. Investor Awareness

Generally, decisions about investment are quite crucial for investors, as they are influenced by many factors and have considerations like company goodwill, government policies, economics of sales and the trend in a particular sector, economic and social environment, risk and return, level of earning of the individual, his educational background, marital status and demographic variables etc.

There are a number of factors which influence the investment objective. Following determinants has been arrived after going through extensive literature review related to investor awareness and investment objective.

3.1 The Determinants of Investor Awareness:

3.1.1 Demographic variables :

include age, gender, ethnicity, education, income, marital status, employment status.

3.1.2 Socioeconomic variables:

is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.

3.1.3 Psychological factors:

pertaining to the mind or to mental phenomena, unction of awareness, feeling or motivation

3.1.4 Sociological factors:

lifestyles, buying habits, education level, emphasis on

safety, average disposable income level, attitudes toward saving and investing, attitudes toward customer service and product quality.

3.1.5 Other Factors:

rumours, financial advisers, newspapers and magazines.

3.2 Literature Review

The following literature focuses on finding out various variables which are responsible for investment. The literature tries to cover all investments avenues.

Table 2. Literature Review on Demographic Variables

Sr. No.	Year	Author and Title (Citation)	Findings and Observations
1	2000	Shiller, R. J. (2000). Measuring bubble expectations and investor confidence. The Journal of Psychology and Financial Markets, 1(1), 49-60	The study analyse investors purchasing behaviour on numbers of demographical variable such as gender, age and risk tolerance level of individuals.
2	2006	Kannadhasan, M. (2006). Role of behavioural finance in investment decisions	This paper studies behavioural pattern of retail investors, based on their various dependent variables like gender, age, marital status, educational level, income level, awareness, preference and risk bearing capacity
3	2008	Mittal, M., & Vyas, R. K. (2008). Personality type and investment Choice: An empirical study. The ICFAI University Journal of Behavioral Finance, 5(3), 7-22	This paper classifies Indian investors into different personality types and explores the relationship between various demographic factors and the investment personality exhibited by the investors.
4	2009	Mittal, M., & Vyas, R. K. (2009). Do Women Differ in Their Investment Information Processing Style? Indian Journal of Gender Studies, 16(1), 99-108.	This study stated that men and women differ in their risk and investment styles. Women are more risk averse and prefer low risk fixed income investments.

Table 3. Literature Review on Socioeconomic Variables

Sr. No.	Year	Author and Title (Citation)	Findings and Observations
1	2005	Perry, V. G., & Morris, M. D. (2005). Who is in control? The role of self perception, knowledge, and income in explaining consumer financial behavior. Journal of Consumer Affairs, 39(2), 299-313.	This study suggests that individuals who were more knowledgeable about financial matters generally were more likely to engage in financially responsible behaviour, such as controlling their spending, budgeting and planning for the future
2	2007	Lusardi, A., & Mitchell, O. S. (2007). Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. Journal of Monetary Economics, 54(1), 205-224.	This study showed that financial literacy influences planning behaviour, which, in turn, increases wealth holdings

Cont...

Sr. No.	Year	Author and Title (Citation)	Findings and Observations
3	2008	Guiso, L., & Jappelli, T. (2008). Financial literacy and portfolio diversification.	This study analysed the investment behaviour of one of the largest Italian banks' customers, and found that financial literacy leads to diversification in investment
4	2009	Lusardi, A., & Tufano, P. (2009). Debt literacy, financial experiences, and over-indebtedness (No. w14808). National Bureau of Economic Research	The research also showed a strong relation between literacy and debt related investment avenues.
5	2014	Tripathi, G. (2014). An Empirical Investigation of Investors Perception towards Derivative Trading. Global Journal of Finance and Management, 6(2), 99-104	This paper analyses derivative investment and found income as an important factor

Table 4. Literature Review on Psychological Factors:

Sr. No.	Year	Author and Title (Citation)	Findings and Observations
1	2000	Shanmugham, R. (2000). Factors influencing investment decisions. Indian Capital Markets—Trends and Dimensions (ed.), Tata McGraw-Hill Publishing Company Limited, New Delhi.	The study shows the psychological and sociological factors dominated the economic factors in share investment decisions.
2	2008	Mittal, M., & Vyas, R. K. (2008). Personality type and investment Choice: An empirical study. The ICAI University Journal of Behavioral Finance, 5(3), 7-22	This study focus both on psychology and demographic factors, and found it affects investment decision and play critical role in decision making
3	2011	Wang, L., Lu, W., & Malhotra, N. K. (2011). Demographics, attitude, personality and credit card features correlate with credit card debt: A view from China. Journal of Economic Psychology, 32(1), 179-193.	The research states financial behaviour is significantly related with personality traits
4	2012	Bennet, E., Selvam, M., Vivek, N., & Shalin, E. E. (2012). The Impact of Investor's Sentiment on the Equity Market: Evidence from Indian Stock Market. African Journal of Business Management, 6(32), 9317-9325	This study also analyses the influence of market specific factors on investors' sentiment. The investor's attitude towards investing is influenced by rumours, intuition, herd behaviour among investors and media coverage of the stock.

Table 5. Literature Review on Sociological Factors

Sr. No.	Year	Author and Title (Citation)	Findings and Observations
1	1996	Jambodekar, M. V. (1996). Marketing Strategies of Mutual Funds– Current practices and future directions. UTI-IIMB Centre for Capital Markets Education and Research, Bangalore.	This paper examined the awareness and influencing factor in buying decision of MFs among investors and found that the investors look for safety of Principal, Liquidity and Capital appreciation in the order of importance
2	1996	Sikidar, S., & Singh, A. P. (1996). Financial Services: Investment in Equity and Mutual Funds–A Behavioural Study. Management of Financial Services, Deep and Deep Publications, New Delhi, 136-145	The behavioural aspect of the investors of the North Eastern region and revealed that the salaried and self-employed formed the major investors in mutual fund primarily due to tax concessions
3	2001	Nyhus, E. K., & Webley, P. (2001). The role of personality in household saving and borrowing behaviour. European journal of personality, 15(S1), S85-S103.	This study examined the personality factors like emotional stability, autonomy, and extraversion were important predictors of financial behaviour.
4	2008	Santi Swarup, K. (2008). Role of Mutual Funds in Developing Investor confidence in Indian Capital Markets	This paper identified safety and tax savings as the important factors affecting investment.
5	2011	Saini, S., Anjum, B., & Saini, R. (2011). Investors' awareness and perception about mutual funds. International Journal Of Multidisciplinary Research, 1(1), 14-29.	This study analysed investors seek for liquidity, simplicity in offer documents, online trading, and regular updates through SMS as factors for investment
6	1995	Radha, V. (1995). A study on investment behaviour of investors in corporate securities. Unpublished Doctoral Dissertation, Alagappa University, Karaikudi, Tamil Nadu, India	The study analysed investors relied more on magazines and journals for their investment information. The success of the investment decision made by the investors entirely depended upon the successful performance of industry
7	2012	Parihar, B. B. S., & Sharma, K. K. (2012). An Empirical Study of the Investment Preferences of Salaried Employees. TECHNO-FAME-A Journal of Multidisciplinary Advance Research, 1(2), 39-48	The study consider factors return, safety, liquidity, convenience and affordability and tax benefits for investors financial decision making.

Table 6. Literature Review on Other Factors

Sr. No.	Year	Author and Title (Citation)	Findings and Observations
1	2000	Barber, B. M., Odean, T., & Zheng, L. (2000). The behaviour of mutual fund investors . Unpublished working paper	This paper highlighted three important points for investor's behaviour: 1) Investors buy only those funds that have showed good past performance. 2) Investors are reluctant to sell losing funds and are ready to sell winning fund. 3) Investors are less likely to buy the funds having high transaction fee i.e. brokerage fee, front end load fee. They argued that when purchasing a fund investor exhibit representative heuristic i.e. Investors believe that past performance is overly representative of future performance
2	2000	Shiller, R. J. (2000). Measuring bubble expectations and investor confidence . The Journal of Psychology and Financial Markets, 1(1), 49-60	This paper says investors are more likely to base their investment choices on information received from objective or scientific sources
3	2002	Saraoglu, H., & Detzler, M. L. (2002). A sensible mutual fund selection model . Financial Analysts Journal, 58(3), 60-72.	This study shows that investors believe in hiring broker to make investment decision.
4	2003	Ramasamy, B., & Yeung, M. C. (2003). Evaluating mutual funds in an emerging market: factors that matter to financial advisors . International Journal of Bank Marketing, 21(3), 122-136.	This study also pointed that investor consider financial advisor as an important motivator in the selection of Mutual Funds
5	2007	Panda, K., & Tapan, N. P. (2007). Tripathi. Recent Trends in Marketing of Public Issues: An Empirical Study of Investors Perception . Journal of Applied Finance, 7(1), 1-6.	The study revealed that majority of the investors relied on newspapers as the source of information. Financial journals and business magazines were ranked next to newspapers. "Safety and Regular Return" stood first and second with regard to the factors associated with investment activities.
6	2011	Saini, S., Anjum, B., & Saini, R. (2011). Investors' awareness and perception about mutual funds . International Journal of Multidisciplinary Research, 1(1), 14-29.	The study found that investors are highly influenced by the financial advisors and select funds recommended by them without any analysis.
7	2011	Wang, L., Lu, W., & Malhotra, N. K. (2011). Demographics, attitude, personality and credit card features correlate with credit card debt: A view from China . Journal of Economic Psychology, 32(1), 179-193	The study said financial behaviour is significantly related with personality traits.

4. Conceptual Framework

Based on literature review a conceptual frame has been drawn on financial planning and all variables related to investment decision are identified.

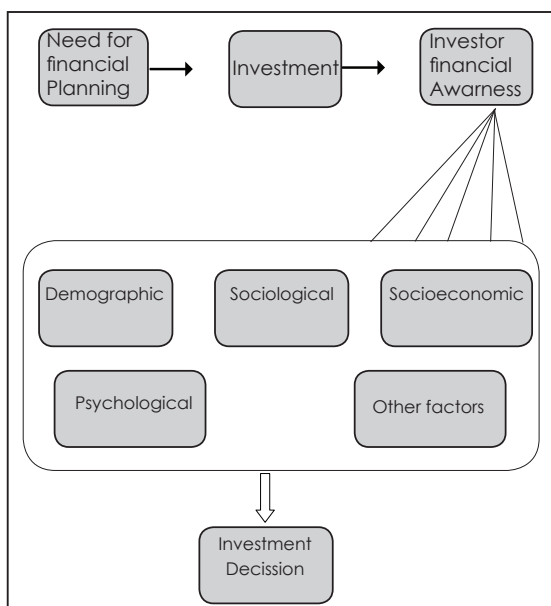
A summary of the research gaps is as follows:

- In the previous research, all variables were not classified.
- Previous contributions to the investment hardly considered behavioural finance.
- The knowledge dimension in previous literature were not explored;
- The environmental uncertainty and product complexity were not addressed in previous literature;

In an attempt to address the above mentioned issues, we have framed a conceptual framework based on our building blocks.

- Input (Need for financial Planning)
- Process (Investment)
- Output (Investment Decision)
- External factors (Variables)

Figure 3: Conceptual Investment Framework



5. Conclusions and Further Research Directions

In the present paper, an attempt is made to synthesize current literature from those research communities addressing Investor awareness issues. The present paper is guided by three research objectives.

In response to first research objective, a systematic literature review is undertaken of current literature covering Investment, Financial planning, Investor awareness and its various variables responsible for it.

An attempt is made to define Investment & investor awareness from various scholars' points of view, further presented in Table no. 1 to 6. The investor awareness literature was further classified as per building blocks of the conceptual framework, as shown in Figure 3.

Building blocks of an Investment framework are classified into four major components such that each set of variables represents input, process, output and external factor of the framework.

After analysis of literature, the synthesis of literature results into a conceptual framework. The conceptual paper is the core of the present paper. The aim of proposing a conceptual framework was to address some of the key variables which were identified through review of current literature.

The framework further considered variables uncertainty on investment decision making and product complexity which were not addressed in past in Investment decision literature.

There is scope for researchers to further explore the impact of various variables on the behavioural finance and effect on Investment decision performance.

The behavioural dimensions of financial planning need further attention. There is a need for a comparison of various investment avenues. The study of the impacts of variables on various investment avenues also needs further investigation.

References

1. Awan, H. M., & Arshad, S. (2012). Factors Valued By Investors While Investing In Mutual Funds-A Behavioural Context. *Interdisciplinary Journal of Contemporary Research in Business*, 4(1), 503.
2. Barber, B. M., Odean, T., & Zheng, L. (2000). *The Behavior of Mutual Fund Investors*. Unpublished working paper.
3. Bennet, E., Selvam, M., Vivek, N., & Shalin, E. E. (2012). *The Impact of Investors' Sentiment on the Equity Market: Evidence from Indian Stock Market*. *African Journal of Business Management*, 6(32), 9317-9325

4. Capon, N., Farley, J. U., & Hulbert, J. M. (1994). *Strategic Planning and Financial Performance: More Evidence*. *Journal of Management Studies, Oxford*, 31, 105-105.
5. De Bondt, W. F., & Thaler, R. H. (1994). *Financial Decision-making in Markets and Firms: A Behavioural Perspective* (No. W4777). National Bureau of Economic Research
6. Farzana, W., Rahman, M. I., & Huda, M. N. (2012). *Behavioral Financing: Demographic Factors and Services of Brokerage Houses in Bangladesh*. *World*, 2(4), 15-33
7. Guiso, L., & Jappelli, T. (2008). *Financial Literacy and Portfolio Diversification*. European University Institute, Department of Economics. EUI Working Paper ECO 2008/31
8. Jambodekar, M. V. (1996). *Marketing Strategies of Mutual Funds—Current Practices and Future Directions*. UTI-IIMB Centre for Capital Markets Education and Research, Bangalore.
9. Kannadhasan, M. (2006). *Risk Appetites and Attitudes of Investors of Retail Investors with Special Reference to Capital Market*. *Management Accountant, Calcutta*. 41(6), 448.
10. Lusardi, A., & Mitchell, O. S. (2007). *Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth*. *Journal of Monetary Economics*, 54(1), 205-224.
11. Lusardi, A., & Tufano, P. (2009). *Debt Literacy, Financial Experiences, and Over-indebtedness* (No. W14808). National Bureau of Economic Research
12. Mittal, M., & Vyas, R. K. (2008). *Personality Type and Investment Choice: An Empirical Study*. *The ICAI University Journal of Behavioural Finance*, 5(3), 7-22.
13. Mittal, M., & Vyas, R. K. (2009). *Do Women Differ in Their Investment Information Processing Style?* *Indian Journal of Gender Studies*, 16(1), 99-108.
14. Murithi, S. S., Narayanan, B., & Arivazhagan, M. (2012). *Investors Behaviour in Various Investment Avenues- A Study*. *International Journal of Marketing and Technology*, 2(7), 164-189
15. Nyhus, E. K., & Webley, P. (2001). *The Role of Personality in Household Saving and Borrowing Behaviour*. *European Journal of Personality*, 15(S1), S85-S103.
16. Panda, K., & Tapan, N. P. (2007). *Tripathi, Recent Trends in Marketing of Public Issues: An Empirical Study of Investors Perception*. *Journal of Applied Finance*, 7(1), 1-6.
17. Parihar, B. B. S., & Sharma, K. K. (2012). *An Empirical Study of the Investment Preferences of Salaried Employees*. *Technoface-A Journal of Multidisciplinary Advance Research*, 1(2), 39-48
18. Perry, V. G., & Morris, M. D. (2005). *Who is in Control? The Role of Self-perception, Knowledge, and Income in Explaining Consumer Financial Behavior*. *Journal of Consumer Affairs*, 39(2), 299-313.
19. Radha, V. (1995). *A Study on Investment Behaviour of Investors in Corporate securities*. Unpublished Doctoral Dissertation, Alagappa University, Karaikudi, Tamil Nadu, India
20. Ramasamy, B., & Yeung, M. C. (2003). *Evaluating Mutual Funds in an Emerging Market: Factors That Matter to Financial Advisors*. *International Journal of Bank Marketing*, 21(3), 122-136.
21. Rao, D. P., Chalam, G. V., & Murty, T. N. (2013). *A Study on the Role of Demographic Factors in Small Investors' Savings in Stock Market*. *Indian Journal of Research in Pharmacy and Biotechnology*, 1(5), 741.
22. Saini, S., Anjum, B., & Saini, R. (2011). *Investors' Awareness and Perception About Mutual Funds*. *International Journal of Multidisciplinary Research*, 1(1), 14-29.
23. Santi Swarup K., (2008). *Role of Mutual Funds in Developing Investor Confidence in Indian Capital Markets*. *South Asian Journal of Socio-Political Studies*, 2(2), 58-60.
24. Saraoglu, H., & Detzler, M. L. (2002). *A Sensible Mutual Fund Selection Model*. *Financial Analysts Journal*, 58(3), 60-72.
25. Shanmugham, R. (2000). *Factors Influencing Investment Decisions*. *Indian Capital Markets—Trends and Dimensions* (ed.), Tata McGraw-Hill Publishing Company Limited, New Delhi.
26. Shiller, R. J. (2000). *Measuring Bubble Expectations and Investor Confidence*. *The Journal of Psychology and Financial Markets*, 1(1), 49-60
27. Sikidar, S., & Singh, A. P. (1996). *Financial Services: Investment in Equity and Mutual Funds- A Behavioural Study*. *Management of Financial Services*, Deep and Deep Publications, New Delhi, 136-145.
28. Tripathi, G. (2014). *An Empirical Investigation of Investors Perception towards Derivative Trading*. *Global Journal of Finance and Management*, 6(2), 99-104
29. Umamaheshwari, S., & Kumar, M. A. (2014). *A Study on Coimbatore-based Salaried Investors' Awareness, Attitude, Expectation and Satisfaction over their Investments*. *International Journal of Research in Business Management*, ISSN (E): 2323-886X, ISSN(P): 2347-4572, 2(8), 49-58. *Impact Journals*.
30. Wang, L., Lu, W., & Malhotra, N. K. (2011). *Demographics, Attitude, Personality and Credit Card Features Correlate with Credit Card Debt: A View from China*. *Journal of Economic Psychology*, 32(1), 179-193.
31. Woerheide, W. (1982). *Investor Response to Suggested Criteria for the Selection of Mutual Funds*. *Journal of Financial and Quantitative Analysis*, 17(01), 129-137.
32. Zhan, M., Anderson, S. G., & Scott, J. (2006). *Financial Knowledge of the Low-income Population: Effects of a Financial Education Program*. *Journal of Society and Social Welfare*, 33, 53.

Analysis of Events Pertaining to Algorithmic and High Frequency Trading in India

Sonal Joglekar

Abstract

A tracing of events from October 2013 up to January 2016 makes interesting reading. While several research papers focus on various aspects of AT/HFT from the perspective of trading opportunities, exchange perspective or the regulatory perspective, this paper attempts a holistic approach, incorporating the events involving various stakeholders including the stock exchanges, regulators, traders, investors and technology providers, under one umbrella, indicating broad trends of events.

The trend in volumes is a rising one, with AT/HFT, settling at around 40% in June 2015, as reported by RBI in its Financial Stability Report. As regards breach of market integrity, there has been 1 instance of annulment and 4 incidents of trading errors, in after the initial introduction of AT/HFT in the Indian markets in 2008. The establishment of clear-cut rules for annulment is a good sign for empowering the exchanges to take timely action for improvement of market integrity. As regards fairness, SEBI is closely monitoring the handing out of colocation facilities. Rapid technological advancement makes regulation complex when facing trading-rule related dilemmas.

A community of practitioners and opinion-leaders specific to AT/HFT in India has emerged, whose representations need to be sought for greater transparency in future policy formulation.

Key Words

Algorithmic Trading, High Frequency Trading, India

Motivation and Objectives

The 140-year old Bombay Stock Exchange (BSE), established in 1875, is one of the oldest in Asia. It was conceived out of the innate trading skills of the business community in commodities trading. The National Stock Exchange of India (NSE) was established in 1990s to be the most technologically advanced exchange in the country and the region. Combined together, the Indian markets have a great legacy to carry forward in terms of market savvy as well as technological savvy.

SEBI's first move in the field of AT/HFT came about in 2008. The first mention about Algorithmic Trading and High Frequency Trading (AT/HFT) in public was made in India in June 2009. Thereafter, there had been a lull in the public discourse until Oct 2013. Since then, there have been several events influencing AT/HFT in India. A tracing of events from October 2013 up to January 2016 makes interesting reading. While several research papers focus on various aspects of AT/HFT from the perspective of trading opportunities, exchange perspective or the regulatory perspective, this paper attempts a holistic approach, incorporating the events involving various stakeholders including the stock exchanges, regulators, traders, investors and technology providers, under one umbrella, indicating broad trends of events. The ultimate objective of such an update is to provide directions for further research relevant to the Indian exchanges.

Review of Literature

Over the last three decades, the financial market processes has undergone vast changes due to technological advancement. One of the developments relates to the use of algorithms to place and execute trades on the exchanges. Initially, this

was thought to be beneficial to the investors for best price availability and speed of execution, but over a period of time, AT has been steadily drawing the eye of the regulators for harming investor interests.

In (Aggarwal& Thomas, 2014), the authors study the AT flagged data from 2009 to 2013 on the NSE and infer that AT improves market quality, transaction costs, reduce volatility and buy-sell imbalance. A study by (Aggarwal et al,2014) points out the effect of imposing restrictive regulations on HFT. They infer that the HFTs alter their trading strategies to reduce the impact of Order to Trade Ratio fee on HFTs. In (Agarwalla et al, 2014), the authors suggest it is easier to detect and punish manipulation rather than to try and prevent it.

The literature reviewed above is exclusively on the Indian markets. It pertains to the effects ofAT/HFT with regard to regulation and market efficiencies. There is currently a lack of literature on the effect of AT/HFT on market participants namely, retail traders and institutional investors. The interplay of AT/HFT with retail traders and institutional investors needs to be studied for evaluating the market fairness for all of the market participants. The attempt of this paper is to look beyond the specific events and regulations and to serve as an update on the current state of AT/HFT in India.

A summary of the literature reviewed has been tabulated below:

Table 1: Literature Review

Sr. No.	Year	Author and Title (Citation)	Findings and Observations
1	2014	Aggarwal, N., & Thomas, S. (2014). The causal impact of algorithmic trading on market quality (No. 2014-023). Indra Gandhi Institute of Development Research, Mumbai, India.	The findings are: 1. AT improves market quality. 2. There are improvements in transaction costs, 3. Volatility and buy-sell imbalance. 4. There are improvements in some but not all depth measures and these are sensitive to the match design.
2	2014	Aggarwal, N., Chakravarty, S., Panchapagesan, V., & Thomas, S. (2014) Do regulatory hurdles on algorithmic trading work? Working Draft presented at NSE-NYU Indian Financial Markets Conference held on the 4 th and 5 th August 2014	The authors review the effect of Order to Trade Ratio fee on HFTs. The HFTs were able to adjust their trading strategies to limit the effectiveness of the regulation.
3	2014	Agarwalla, S., Jacob, J., & Varma, J.(2014) High Frequency Manipulation at Futures Expiry: The Case of Cash Settled Indian Single Stock Futures. Paper presented at SEBI International Research Conference on 27 th and 28 th Jan 2014.	Futures markets are known to be vulnerable to manipulation and despite the presence of a variety of mechanisms to prevent such manipulations, in 2013, SEBI identified a case of alleged manipulation of the settlement price of cash settled single stock index futures based on HFT circuit. The authors suggest it is easier to detect and punish manipulation rather than to try and prevent it.

The major contribution from these papers is, AT/HFT do bring in market efficiency, and it is possible to curb their ill-effects through suitable measures by the stock exchanges and the regulator.

The above-mentioned papers represent the developments in the Indian markets until 2014. Subsequent developments and their impact on aspects such as efficiency and fairness need to be carried out, to bring the subject matter up to date.

Research Questions

Based on the foregoing, the research questions that arise, w.r.t. AT/HFT in India, are:

- Who are the key stakeholders in the process?
- What are the major issues involved?

In order to address these questions, the researchers looked back into the history of AT/HFT in India since 2008, with the objective of presenting data and analysis thereon.

Data

Between June 29, 2009 and January 28, 2016, there were 62 episodes of information on the subject of AT/HFT reported in the Indian news. To perform News Analytics, data is available for parsing from 9 different publications: Business Line (BL), Business Standard (BS), DNA, Economic Times (ET), Financial Express (FE), (The) Hindu, Indian Express (IE), Mint, and the Sunday Guardian (SG). Each of these news events described one or more of 6 types of stakeholders: Stock/Commodity Exchanges, SEBI/RBI, Traders, Investors, Technology Providers and the Media (owing to a defamation suit). It is quite possible that a same event could involve more than one of the aforesaid stakeholders.

Methodology

The data is parsed into 62 rows (one for each event) and 6 Columns (one for each stakeholder) to obtain a 62*6 matrix, i.e. 372 cells. This matrix is digitized into 1 and 0, with 1 representing the presence of that particular stakeholder in a particular event. There are 122 cells marked as '1'. Totals are then taken vertically to identify the stakeholder most influenced by the turn of events.

The highest coverage was on Exchanges (70.97% of events), details tabulated as under:

Table 2: Summary Statistics of News Analysis

Stakeholder	Number and % of 62 Events
Exchanges (BSE, NSE, MCX, NCDEX)	45 (72.58%)
Regulators (SEBI, RBI)	29 (46.77%)
Traders (Brokers)	20 (32.26%)
Investors (Institutional, HNIs)	11 (17.74%)
Media	10 (16.13%)
AT/HFT Technology Providers	7 (11.29%)

Conclusions are drawn from the data structured in the manner described above. The 62 events listed are referred to in order to bring in the context. While parsing the data, care has been taken to present the analysis in a chronological order as far as possible, to facilitate a better tracking and understanding of various events, which are also very technical in nature.

This methodology is replicable for any data set from any other market or jurisdiction.

Analysis and Findings

Stock Exchanges

Stock Exchanges enjoy the status of frontline regulators. Under the Securities Contract (Regulation) Act, 1956, they formulate bye-laws and have oversight over the conduct of members (i.e. stock-brokers) whom they regulate. In turn, Stock Exchanges come under the purview of SEBI. In case of rulings by Stock Exchanges, members have legal recourse to the Securities Appellate Tribunal (SAT).

Activity Levels in AT/HFT

Various estimates place the level of AT/HFT between 30% and 40%, though in some months, a level of 59% has been reached. As on June 2015, the Financial Stability Report of RBI placed the estimate at 40%.

Table 3: AT Statistics on BSE

Month	% of all trades
Dec 2013	18.23
Jan 2014	19.89
Feb 2014	17.73
Mar 2014	19.22
Apr 2014	25.18
May 2014	27.91
Jun 2014	28.73
Jul 2014	28.77
Aug 2014	28.30
Sep 2014	30.09
Oct 2014	29.92
Nov 2014	28.58
Dec 2014	30.82

(Source: BSE)

Subsequent estimates are from various sources. A Business Standard report on January 28, 2015 estimates AT on the NSE to be 38.50% on NSE, with an additional 22.60% from Co-location, taking the total to 61.10%. An Economic Times report of May 23, 2015 estimates AT/HFT levels to rise from the present 40% to 60% by year 2020. As per a Business Standard report dated June 29, 2015, the May 2015 statistics reveal AT to be 15.05% in BSE and 19.83% in NSE, with an additional 24.26% from Co-locations, making the total of AT/HFT 59.14% of turnover. This is almost 60%, close the level of European Exchanges (US market levels are 70% to 80%). The Financial Stability Report of RBI of June 2015 placed the level of AT/HFT volumes at 40% to total volumes in the cash segment (on the BSE plus NSE) in June 2015, as compared to 28% in 2011 (BSE 11%, NSE 15%). This an almost two-fold increase. A report dated July 13, 2015 places the level of AT/HFT at around 33%, as per Business Line. As per a report of September 6, 2015, the share of AT/HFT on the NSE was 30%.

As indicated by the Association of National Exchange Members of India (ANMI), a body of stock-brokers, on September 23, 2015, the 18% of the turnover from stock exchanges came

from AT and 24% from Co-location servers, making it 42% of turnover from sophisticated players. ANMI opines that AT/HFT players enjoy an unfair advantage and have made a representation to SEBI for a level playing field, through speed bumps. On the contrary, institutional brokers feared that any such move to introduce speed bumps may drive FII/FPI business away to Singapore or other markets.

AT provides almost 90% of all messages in the Nifty. In certain stocks, this constitutes 99%, as per Banerjee & Nawn (2015).

The Stock Exchanges, BSE and NSE are a part of 45 of the 62 news events. These developments are described under sub-themes such as (a) Market Integrity (b) Uptick in Volumes and (c) Fairness.

Market Integrity: In October 2013, the major concern was the rising instances of fat-finger trades. A fat-finger trade is one where the employee of the trading firm makes an error while punching in an order, either in the quantity or price, resulting in a potentially huge distortion of the market. Strictly speaking, such aspects do not come directly under the purview of AT/HFT. However, under such circumstances, the positions of traders, especially AT/HFT traders, become vulnerable as their systems work on microscopic price differences. Standard rules for annulment of trade were yet to be framed by SEBI, until 2015. NSE had also equipped itself to halt trade within 20 microseconds, in the event of a severe market distortion. In an earlier instance on October 5, 2012, NSE took 6 seconds to halt trading, but this delay caused further panic selling. In October 2014, NSE was censured by SEBI on its failure to prevent the flash-crash in the Nifty Index Futures which occurred in 2012. In January 2015, there was a sudden 400-point fall in the index futures price. Yet again, when a listed entity, Adani Enterprises, underwent a demerger, there was a distortion in the post-demerger price in June 2015, and the prevailing confusion was exacerbated by AT/HFT trading. In July 2015, SEBI announced the rules for annulment of erroneous trades. In September 2015, NSE introduced mechanisms to prevent self-trade in F&O, and again in respect of member's clients in October 2015; BSE did likewise in January 2016. On October 1, there was an order-matching glitch on the NSE in respect of the IDFC counter. Thus, it is seen that the evolutionary path has not been glitch-free. This could be one of the learnings for other exchanges or markets in India or elsewhere.

Uptick in Volumes : AT/HFT gained greater acceptance and there was a huge pick-up in its activity, especially from June 2014. In August 2014, NSE invited research-based suggestions on the use of high-tech tools. In December 2014, NSE declared its intent to make further investment in high-tech tools. January 2015 saw a further rise in AT/HFT volumes, accompanied by rising number of requests for co-location. In addition, retail investors were also encouraged by exchanges to use Apps to drive their trading processes, helping in raising volumes. The continuing positive trend in AT/HFT was maintained in July 2015, as more participants began to adapt to new technology. Both BSE and NSE continued to pursue high-end technological solutions in furtherance of AT/HFT.

Fairness: In April 2014, attention shifted towards the unfair advantage that HFT traders enjoy. This advantage was accentuated in penny stocks. Such an advantage could possibly have the effect of crowding other traders and investors out of the market, in the opinion of SEBI and also some market participants. This brought to the fore the debate of efficiency versus fairness, brought about by AT/HFT. SEBI had specifically asked exchanges to be fair when offering

co-location facilities to market participants.

In August-September 2015, NSE was involved in a confrontation with the print media, having filed two defamation suits. The media published reports after having received a copy of a whistle-blower's complaint to SEBI, that the exchange had provided unfair advantage to certain HFT players. The High Court ruled in favour of the media.

Commodity Exchanges:

The Exchanges involved are the MCX and NCDEX. These commodity exchanges were regulated by the Forward Markets Commission (FMC), which ultimately got merged with SEBI on September 28, 2015.

Since 2013, FMC had initiated safeguards while permitting AT/HFT. Due to daily price limits and limitations on the Order to Trade Ratio (OTR), the scope for wild swings was limited. Also, AT/HFT was not permitted on mini-contracts. AT/HFT constituted almost 15% to 20% of volumes on the MCX and also the NCDEX. Refer Table 4 below.

Table 4: AT/HFT Statistics on Commodity Exchanges

	NCDEX	NCDEX	MCX	MCX
Month	Turnover, Rs. Crore	% to Turnover	Turnover, Rs. Crore	% to Turnover
Dec 2014	5,301	5.72	21,228.54	24.58
Jan 2015	Cotton	10.20	Crude, Copper, Natural Gas, Silver	3.00
Jul 2015	Cotton (May 2015)	37.00	Crude, Copper, Natural Gas, Silver	30.00
Jan 2015	Mustard	4.82	Aluminium, Gold Lead, Mentha Oil, Nickel, Zinc	10.00
Jul 2015	Mustard (May 2015)	10.21	Aluminium, Gold, Lead, Mentha Oil, Nickel, Zinc	15.00 to 20.00
Jul 2015	3,960	9.44	24,015.41	31.25

(Source: NCDEX and MCX and as compiled by Business Standard Research Bureau)

The table shows that AT/HFT in the two commodity exchanges has risen from 30% to 40% in the 6 months from December 2014 to July 2015. Notably, in the Gold and Silver contracts on the NCDEX, these volumes range from 80% to 90%.

Representation from all stock and commodity exchanges need to be taken into consideration in future policy formulation.

Regulators

There are 29 observations in this category. The three regulators covered in this study are SEBI, RBI and FMC.

SEBI had permitted AT/HFT in 2008, with the introduction of the Direct Market Access (DMA) for institutional clients

of brokers. Lehman in India was the first adapter. However, subsequent development took a backseat owing to the global financial crisis and the resultant turmoil in the Indian markets. This move regained impetus in 2009, till AT/HFT firmly took root in 2013. On October 5, 2012, erroneous orders of a stock-broker resulting in multiple trades for an aggregate value of over Rs.650 crore triggered the circuit breaker. At that time, SEBI issued a discussion paper on annulment. A brief history of annulment and erroneous trades in the Indian markets is tabulated below:

Table 5: Instances of Trade Annulment and Erroneous Trades

Year	Event
	Instances of Trade Annulment
Aug 19, 2002	NSE annuls trades of 14 entities in the stock of Cyberspace on the grounds of fraud and manipulation
Oct 26, 2011	All trades of equity derivatives segment on the BSE were annulled due to the malfunctioning of a trading algorithm of a stockbroker
	Instances of Trading Errors
Oct 26, 2011	A trading algorithm malfunctioned, resulting in a large movement in the Sensex futures, within a span of less than 3 minutes, on the BSE
Apr 20, 2012	An error by a trading algorithm resulted in fall in prices of Infosys futures by 19% on the NSE
Oct 5, 2012	Erroneous orders of Emkay Global resulted in multiple trades for an aggregate value of Rs.650 crore, the Nifty circuit breakers got triggered and trading in the NSE's cash market segment was halted
Feb 1, 2013	Malfunction of a trading software of a stockbroker resulted in erroneous orders in scrips of Tata Motors and UltraTech Cement

(Source: Business Line, July 17, 2015)

In 2013, SEBI's focus was the prevention of erroneous trades and damage control. In July 2015, SEBI took the final step in the matter of annulment of erroneous trades by prescribing the rules, such as the request within 30 minutes, the fee ranging from Rs. 1 lakh to Rs. 10 lakhs, review of transaction or reset in prices. aspects such as setting of upper and lower price limits to the exchanges. The rapidly changing landscape of AT/HFT made regulation very complex, especially in matters related to speed bumps (500 millisecond resting period of orders, batching or randomization) and a two-queue system. Subsequently, in June 2015, SEBI seriously considered introducing speed bumps to bring in fairness.

In 2014, 'Flash Boys', the book by Michael Lewis highlighted the dangers of crowding out by the more powerful players in AT/HFT, and the focus of attention was fairness. In January 2014, SEBI published a background research paper, and in January 2015, a discussion paper on AT/HFT. By April 2015, it was felt that SEBI had been very closely monitoring the aspect of fairness in co-location, but left operational. In the meantime, RBI expressed a concern that a rise in AT/HFT could be destabilizing for markets, and could pose a systemic risk. This was stated in its Financial Stability Report released in end-June 2015, while observing that AT/HFT had risen from 11% to 40% between 2011 and 2015.

FMC had issued broad guidelines for AT/HFT in 2013, which were strengthened thereafter. This was the framework under which MCX and NCDEX operated.

One criticism about SEBI's rule making process was that all market participants are not involved in the discussions. There had been fear about drastic changes in AT/HFT in the form of minimum contract size, minimum resting time of orders, batching-and-randomizing of orders, etc.

In keeping with the trend of literature until 2014, researchers Banerjee & Nawn (2015), opined that AT/HFT is a necessary evil, but, owing to their contribution to the market, especially Proprietary AT players provide liquidity and stability, hence play an important role in markets. Hence, rules need to be carefully framed, in view of the useful role of HFT.

Representation from all regulators needs to be taken in future policy formulation.

Traders

There are 20 observations in this category.

In June 2009, the first set of brokerage firms and proprietary traders made their foray, by resorting to the newly permitted DMA facility permitted by SEBI. Early adopters were: Citigroup Global Markets, Credit Suisse, Geojit BNP Paribas and Noble Group, among others.

Thereafter, until 2013, the major concern for traders was to get over the problem of fat finger errors and erroneous trades. The Emkay Global fat-finger error case is also SAT-settled, with the counter-parties, Inventure and Prakash Shah agreeing for a 50% haircut and settling for the balance 50% of the transaction through the pay-in/pay-out mechanism of NSE. As of now, with the rules formalized by SEBI, annulment of trades is a possibility.

From a risk perspective, erroneous trades, trading halts and bouts of extreme volatility in the markets make the potential for losses deeper, with the presence of AT/HFT. According to NTD Trading, AT/HFT could exacerbate market falls when the Nifty falls below key pivot points, as it happened in early May 2015.

Specific reports of a rise in AT/HFT volumes were made on two occasions: June 11, 2014, and June 30, 2015.

Opinions about the benefits or evils of AT/HFT from the trading community are divided. There are some that find the investment in sophisticated DMA systems (also called Advanced Execution Services = AES) and low-latency Co-location systems to be worthwhile, whereas there are others who opine these to be unfair advantages, especially ANMI, an association of stock brokers. The latter favour speed bumps in some form, to introduce fairness. AT/HFT has also put jobbers out of jobs, through process automation.

Representation from parties, both for and against AT/HFT needs to be examined, in future policy formulation exercises.

Investors

There are 11 observations in this category.

There are some proprietary traders who can be counted among the category of investors. Crossea Capital is one of the largest domestic arbitrageurs using AT/HFT, who are conceptually not against the two-queue system, in the interest of fairness. However, according to another firm, Global Markets Exchange Group, co-location is for time priority. If time-priority is ruled out, the demand for co-location will come down.

JP Morgan, Morgan Stanley, Credit Suisse and Deutsche Bank are the big institutional players. Besides, there are HNIs who make use of AT/HFT.

After the 2013 foray, by the end of April 2014, AT/HFT volumes accounted for one-third of the total trade volumes. A further pick-up in volumes was witnessed in June 2014 and, in January 2015, Foreign Institutional Investors (FIIs) also contributed significantly to the rising volumes.

One peculiar problem that beset the FIIs was the tax uncertainty. An exchange co-located DMA facility could be held by the income tax authorities as a Permanent Establishment (PE) in India and hence, subjected to the Corporate Taxes at 40% and the Minimum Alternate Tax (MAT).

BSE has introduced Self-Trade Prevention Checks (STPC) for institutional investors, such as mutual funds, foreign

institutions, insurance companies and hedge funds. For this purpose, the Income Tax Permanent Account Number (PAN) and the Unique Client Code (UCC) will be linked.

As regards individual investors, a representation was made by a Delhi-based investors' association in October 2015, against AT/HFT, in the interest of fairness. Midas Touch Investor Association had written a letter to Member of Parliament, Veerappa Moily, who is the Chairman of the House Panel on Finance, citing the following apprehensions:

- Lack of transparency in formulation of algo trading framework in 2012
- Inadequate guidelines on physical infrastructure and colocation
- Inadequate safeguards to ensure a level playing field
- Delegation of powers to bourses against the spirit of law
- Processes not as robust as those followed by the SEC of USA.

This representation is by one of the 40-odd investor-associations in the country. The possibility of including such representation in future policy formulation exercises needs to be examined seriously. This would be in addition to other investors such as Domestic and Foreign Institutions and HNIs.

Media

There are 10 observations in this category, all clustered between August-September 2015. The main reason for the Media to be included as a part of these statistics is that they were made a party to a defamation suit by NSE. India Samvad and Moneylife, the two publications, had published reports stating stock exchanges favoured a particular group persons for engaging in AT/HFT. This was based on a letter to SEBI by a whistle-blower, based on which it published the report. Moneylife was able to substantiate the fact that it had sent emails to NSE seeking a clarification, and, in the absence of any response, went ahead with the reportage. NSE filed the defamation suit against Moneylife, heard by the Bombay High Court, which ruled in favour of Moneylife.

Technology Providers

There are 7 observations under this category.

Technology support in the form of hardware and software are extremely crucial to the functioning of stock exchanges, traders and investors, as it was eloquently described by Michael Lewis in Flash Boys.

Omnesys Technologies has a presence in India since 2009. Sophisticated liquidity seeking algorithms deliver better execution serves to institutional investors. However, though technologically India may be at par with some of the developed countries' markets, in India, there are not many listed securities with sufficient liquidity.

Quant Express Technology is another player in the market. **uTrade Solutions** also specializes in algorithms, popular among members of the MCX and NCDEX.

Kotak Securities deploys an algo that executes orders closest to Volume Weighted Average Price (VWAP) or Time Weighted Average Price (TWAP). Institutional investors can invest in similar technologies, according to KSL. Smart Order Routers (SORs) route orders to the exchange that offers the most beneficial price.

Co-location cuts down the execution time to micro-seconds. However, the operating costs could be Rs.30 lakhs to Rs.40 lakhs per annum. In case hiring of a co-location rack on a stock exchange is not feasible, one can also automate between Excel sheets and application programmes, and have these applications rest on the stock-brokers' computer server. **Flex Trader** and **Omnesys Technologies/Thomson Reuters** are some of the technology providers in vogue.

NSE itself is a heavy investor in technology. Of late, **GATElab**, a financial software company, has assisted NSE to set up a low-latency co-location facility. F&O orders can go through in 30 microseconds under this system. NSE forex derivatives segment will also go through this system.

BSE has launched an algorithm trading test environment in partnership with **Symphony Fintech Solutions**. Algorithms in equity, equity derivatives and currency derivative segments can be tested by members free of cost.

Technology has its own hazards, as BSE realized in 2010, when the algo of a Delhi-based broker went into a buy-sell loop and overshot the BSE derivatives turnover by many times its daily average.

Representation from technology providers also needs to be taken into consideration in future policy formulation exercises.

Summary and Concluding Remarks

As a part of the discussion and analysis, several major stakeholders have been identified: 4 Exchanges (Stock and Commodities), 3 Regulators, Traders (Prop and Agency): with views for and against AT/HFT (e.g. ANMI), Investors comprising of Domestic and Foreign Institutions, HNIs, and retail investors through an investors association and 7 Technology Providers.

The trend in volumes is a rising one, with AT/HFT between 30% and occasionally 60% as per statistical data from the stock exchanges, finally settling at around 40% in June 2015, as reported by RBI in its Financial Stability Report.

The major issues are: Market Integrity and Fairness.

As regards breach of market integrity, there has been 1 instance of annulment and 4 incidents of trading errors, in after the initial introduction of AT/HFT in the Indian markets in 2008. The establishment of clear-cut rules for annulment is a good sign for empowering the exchanges to take timely action for improvement of market integrity. This implies a lesser number of such future disputes being taken to SAT.

As regards fairness, SEBI is closely monitoring the handing out of colocation facilities.

Rapid technological advancement makes regulation complex when facing trading-rule related ethical dilemmas: such as, speed bumps (that favour those not technologically advanced), to be balanced with freer price-discovery mechanics (that favour those technologically advanced). This question remains unresolved in this paper, from the extant data and information.

A community of practitioners and opinion-leaders specific to AT/HFT in India has emerged, whose representations need to be sought for greater transparency in future policy

formulation. From a research perspective, this makes it an opportune time for primary research studies.

References

1. Securities and Exchange Board of India (2014). *Background Paper: First International Research Conference-2014 on HFT, Algo Trading and Co-Location*, Mumbai, 27th and 28th January 2014.
2. Aggarwal, N., & Thomas, S. (2014). *The Causal Impact of Algorithmic Trading on Market Quality* (No. 2014-023). *Indira Gandhi Institute of Development Research*, Mumbai, India.
3. Aggarwal, N., Chakravarty, S., Panchapagesan, V., & Thomas, S. (2014). *Do Regulatory Hurdles on Algorithmic Trading Work? Working Draft presented at NSE-NYU Indian Financial Markets Conference held on the 4th and 5th August 2014.*
4. Agarwalla, S., Jacob, J., & Varma, J. (2014). *High Frequency Manipulation at Futures Expiry: The Case of Cash Settled Indian Single Stock Futures. Paper presented at SEBI International Research Conference on 27th and 28th January 2014.*
5. Reserve Bank of India (2015). *Financial Stability Report*, June 2015.
6. Banerjee, Ashok & Samarpan Nawn (2015), *Some Algorithm and Blues: Is High Frequency Trading a Necessary Evil? SEBI Should be Careful in Regulation of the Markets. Economic Times*, Mumbai, October 26, 2015.

Asset Valuation: A Synthesis of Existing Literature and New Insights

Subir Sen

Sourav Mazumder

Abstract

Studies on asset valuation or pricing have long been a mainstay in research on finance. They constitute one of the unique cores of the growing literature in this relatively young discipline. In finance, valuation is the process of estimating the worth of an asset. Assets include investments in marketable securities such as stocks, options, business enterprises, including intangible assets such as brands, patents and trademarks. Valuations are important not only from the point of view of investment analysis, but also includes decisions on merger and acquisition, capital budgeting, financial reporting, determination of tax liability, in litigation, and due diligence among others. Researchers have worked on various genres of valuation models; however, despite over five decades of extensive research in this area, research findings remain inconclusive. This paper argues that one of the plausible reasons behind these ambiguous findings is market efficiency, which has not been explored or addressed adequately. Most importantly existing research has decoupled the two areas as independent and mutually exclusive. The paper opines that integrating the above areas can help explain the inconsistencies in existing findings and simultaneously throw open new insights in this field of study.

Key Words

Asset Valuation, Valuation Models, Market Efficiency, Stock Market

Introduction

A valuation model is a mechanism that uses a series of historical values or forecasts to determine the intrinsic value of a financial asset (*most often a stock*). The intrinsic value is basically an estimate of the value of the stock, what it should be, based on its fundamentals. The market value though may be different in the short term; it is an indication in which direction the market value is likely to move in the medium to long term. It is important, because they are a fundamental source of excess returns for investors and fund managers worldwide. Valuation of stocks is done using various types of models. The first generation models include 'absolute value' models which attempts to determine the present value of a stock's using expected future benefits. According to these models the value of a stock is equal to the present value of future benefits that a stock holder expects to receive in the future. These kinds of models take two general forms: single-period models (Gordon, 1962) or multi-period models such as discounted cash flow models (Miller and Modigliani, 1961). These models rely on financial forecasts rather than historical observations.

However, there is a contentious debate about the financial benefits that should be discounted. Some authors argue earnings, some dividends, and others cash flow from operations. It turns out that, properly defined, these approaches though independent are largely equivalent. One of the major limitations of multi-period models is that future benefits (*at least in theory*) have to be forecast into the indefinite future (Baker and Haslem, 1974). As models become more complex, a point of diminishing returns is reached. To overcome the over dependence on forecasts in its purest form, researchers

follow the constant growth model, where/ it is assumed that the firm will maintain a stable dividend keeping its retention rate constant (Bierman, Downes and Hass, 1972). The more advanced 'relative value' models determine the intrinsic value of a stock based on the observation of market prices of similar class of assets (Whitbeck and Kisor, 1963). They use certain determinants of stock prices and compare them with a market or industry index using multi-variate techniques to arrive at generic models. In recent times complex 'option pricing' models are used for derivatives in complex real time situations where the valuation is derived from an underlying asset. The most common 'option pricing' models are the Black and Scholes (Black and Scholes, 1974) and Lattice models. Despite the evolution and improvements in various genres of valuation models, their forecasting abilities are often debatable. The literature on asset valuation offers some interesting insights.

I: Literature Review

A: Absolute Valuation

Absolute valuation models attempt to find the intrinsic value of a stock based only on fundamentals. Valuation models that fall into this category include the dividend discount model, discounted cash flow model, residual income models and other asset-based models (Gordon, 1962; Walter, 1963, etc). The dividend discount model is one of the basic absolute valuation models. The dividend model calculates the intrinsic value of a stock based on the dividends a company pays to its stockholders. The justification for using dividends to value a stock is that dividends represent the actual cash flows going to a stockholder, thus valuing the present value of these cash flows should give you a value for how much the stock should be worth. Second, it is not enough for the company to just pay dividend; the dividend should also be stable and predictable. What if the company does not pay a dividend or its dividend pattern is irregular?

Further refinements led to absolute valuation model using a firm's discounted future cash flows to value the stock. The advantage of this approach is that it can be used for a wide variety of firms that does not pay dividends, and even for companies that do pay dividends. Absolute valuation models also differ in terms of their time frame under study. In a single period valuation, one needs to forecast the expected dividend and the value of the stock at the end of the year. In a multi-period model the intrinsic value depends on present

value of the infinite streams of dividends the stockholders expects to receive. At this point one might question, why earnings an important parameter not factored in these models. Technically, earnings can be used for one of the two purposes: they can be paid out to stockholders as dividends, or they can be ploughed back for future reinvestments. If they are reinvested, they are likely to increase future earnings and hence future dividends. Therefore, discounting future earnings leads to duplication and therefore should be avoided.

B: Relative Valuation

While absolute value models are widely accepted in the academic fraternity because of its rigor; they are seldom used by practitioners (Bing, 1971). Researchers value stocks by applying a close surrogate of earnings multiple (usually price to earnings or simply P/E multiple). The approaches to the establishment of the P/E multiple covers a wide range. Most researchers use historical P/E multiple of stocks or the historical P/E multiple of a stock or panel data across a particular industry or a market proxy (usually an index). Another distinctive approach is to list and discuss a set of factors that are perceived to affect P/E multiples, but leaving the weighing and often explicit definition of these factors to the researchers individual perspective (Graham, Dodd, and Cottle, 1962). Cross sectional regression analysis is used to define the weights on a set of hypothesized determinants of a stock's price over a period of time. At the more generic level multi-variate regression analysis is applied on a set of stocks of relating the P/E multiple to more than one variable.

One of the earliest empirical studies to use this approach was (Whitbeck Kisor, 1963). According to this model the P/E multiple of a stock was related to its earnings, payout policy, and risk. Accordingly, the relationship was defined as: $P/E \text{ multiple} = 8.2 + 1.5 (\text{earnings growth rate}) + 6.7 (\text{dividend payout}) - 0.20 (\text{variation in growth rate})$. This equation represents an estimate at a point in time of the simultaneous impact of the three independent variables on the dependent variable. The beta coefficients represent the weight that market places on each variable at that point in time. The signs represent the direction of the impact of weight variable on the P/E multiple. It is important to note that that the weights and signs are dynamic and are likely to vary across time as well as across contexts. The overall explanatory power of the model was quite high, given that fact that the signs are consistent with existing theory and common financial ac-

men. An equation, such as this, can be used to arrive at the theoretical P/E multiple for any stock by substituting the values of the independent variable forecasts. Such findings can be used for investments decisions to go long or short on a particular stock. There are indications that interests in such models have increased off-late. Every conceivable variable and combination has been tried (Bower and Bower, 1969; Gruber, 1971; Malkiel and Cragg, 1970) for predicting stock outcomes with varying degrees of success.

C: Option Valuation

The Black and Scholes (1973) or its extended Black, Scholes and Merton model is a pioneering model for valuation of options. From the model, one can derive the intrinsic value of the price of a European-style option. The authors derived a stochastic partial differential equation, which estimates the price of an option over a period of time. The key idea behind the model is to hedge the option by buying and selling the underlying asset in just the right way and, as a consequence, to eliminate risk. This type of hedge is called 'delta hedging' and is the basis of more complicated hedging strategies such as those engaged in by investment banks and hedge funds. The

model popularized options trading and legitimized scientifically the activities of the Chicago Board Options Exchange and other options markets around the world. It is widely used, although often with adjustments and corrections, by options market participants. Many empirical tests have shown that the valuations based on this model is 'fairly close' to observed prices, although there are well-known discrepancies such as the 'option smile'.

II: Methodology

In an attempt to study the effectiveness of valuation models in the Indian context, we tested the Whitbeck Kisor (1963), a relative valuation framework covering a time frame from (1995-2013) using the BSE-100 index as a benchmark for the sampling frame. Two independent regression approaches were used to model P/E as a function of a) EPS growth rate b) Dividend growth rate c) Standard deviation in EPS. In the first approach, the regression run was carried out on stand-alone year-on-year basis and in the second approach on a moving 10 (ten) year time period using panel data. The findings of the regression estimates are given below:

Table I: Results of regression estimation with P/E as the dependent variable^a

	Model			
	(1995)	(2001)	(2007)	(2013)
EPS (%)	-0.05 (0.88)	-0.02 (0.98)	-0.02 (0.37)	-0.62 (0.99)
DPS (%)	+0.01 (0.16)	+0.07 (0.98)	-0.11 (0.31)	-0.95 (0.98)
EPS (σ)	+0.04 (0.36)	+0.13 (0.80)	-0.20 (0.83)	0.17 (0.43)
Constant	26.05 (1.00)	10.30 (1.00)	27.15 (1.00)	49.52 (1.00)
Std error of estimate	16.99	11.60	17.92	78.88
Model Indices				
Adjusted R-square	0.097	0.24	0.05	0.26
F – Value	1.14 (0.65)	2.69 (0.95)	1.09 (0.64)	10.35 (1.00)
N	42	62	72	92

^a $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (significance levels based on two-tailed tests)

^a Unstandardized regression coefficients reported; heteroscedasticity-consistent standard errors were used to compute t-statistics, which are in parentheses.

Table II : Results of regression estimation with P/E as the dependent variable^a

	Model			
	(1995-2004)	(1998-2007)	(2001-2010)	(2004-2013)
EPS (%)	+0.01 (0.73)	-0.01 (0.82)	-0.01 (0.96)	-0.05 (0.99)
DPS (%)	+0.01 (0.35)	+0.01 (0.31)	+0.01 (0.44)	-0.01 (0.39)
EPS (σ)	+0.01 (0.34)	+0.01 (0.56)	-0.01 (0.34)	-0.01 (0.27)
Constant	16.78 (1.00)	17.93 (1.00)	17.93 (1.00)	25.09 (1.00)
Std error of estimate	23.29	23.17	14.81	35.94
<u>Model Indices</u>				
Adjusted R-square	0.01	0.01	0.01	0.01
F - Value	0.50 (0.68)	0.82 (0.29)	1.55 (0.20)	2.97 (0.03)
N	500	561	708	797

+p < .10, * p < .05, **p < .01, *** p < .001 (significance levels based on two-tailed tests)

a Unstandardized regression coefficients reported; heteroscedasticity-consistent standard errors were used to compute t-statistics, which are in parentheses.

III: Research Gaps

Every conceivable variable and combination of variables has been tried and tested, but the results are far from encouraging. The beta coefficients of the independent variables are inconsistent, weak and also insignificant. The overall explanatory power of the model also very poor. Whitbeck and Kisor (1963) have reported an ability to outperform a randomly selected portfolio; Bower and Bower (1970) and Malkiel and Cragg (1970) concluded the failure of their models to lead to excess returns. A common element across all valuation models is that they are effective in explaining stock prices at a *point in time* but not *across time*. This defeats the very purpose for which valuation models are designed for; they have not been effective enough in choosing under-over valued stocks. The differences may be attributed to various factors rooted in methodology, time periods under study, or the researcher's access to efficient set of forecasts. The limitations broadly identified in extant research are as follows:

- *Investor behavior* or preferences itself changes over a period of time, especially in emerging markets like India

where the capital market is in a very nascent stage. With changes in investment behavior, the weight on each variable is likely to change.

- Estimates of the independent variables like growth and dividends change.
- Even when a model explains a high fraction of the difference in stock prices, there are stocks that have market prices that that lie significantly above or below their theoretical prices and continue to do so for a long duration of time. Economists usually refer to this to as *firm effects*. These are probably due to the persistent influences that are a not captured in the models (Bower and Power, 1970).
- The same logic applies to *industry* and *economy* effects too. Stock prices in reality are influenced by industry as well as broad economic factors. By ignoring such variables from valuation models from the model, the explanatory power reduces.

IV: New Insights

Fama and French (2004) argue that the failure of CAPM in empirical tests implies that most assumptions of the model are invalid, including that of market efficiency. One of the major implications of the failure of valuation models to explicitly analyze issues relating to excess returns is 'market efficiency'; which has not been explored or addressed adequately. One of the dominant themes in finance literature since the 1960s has been the concept of efficient capital market (Fama, 1991). Capital market efficiency refers to stock prices fully reflecting all available information at a point time. This is a very strong hypothesis. A necessary condition for investors to have an incentive to trade until prices fully reflect all available information is that cost of information acquisition and transaction is negligible. Since these costs are clearly positive, a more realistic definition of market efficiency is that prices reflect information until the marginal cost of acquiring information and trading is less than the marginal benefits derived from it. While cost of trading in stocks has become negligible worldwide due to substantial increases in volumes, the same cannot be said for cost of acquiring information. While how fast information is incorporated in a stock or 'informational efficiency' has been the major area of concern in testing market efficiency, an issue that has not been addressed adequately is whether the information is correctly incorporated or not referred to as 'market rationality'. Market rationality refers to the ability of investors to logically analyze available market information and identify the potential impact it might have on a stock. This issue assumes more importance in the case of capital markets because of the complexities involved compared to most other product markets and has serious implications for the Indian context.

V: Market Efficiency

The efficient market hypothesis has been classified in extant literature into three distinct categories: a) *Weak*, b) *Semi-strong*, and b) *Strong form*. These classifications were originally suggested by Fama (1988).

Weak form tests whether all information contained in the historical prices fully reflected in current prices. Semi-strong form test whether publicly available information reflected in the current prices. Finally, strong form of market efficiency tests if all the information, public and private are fully reflected

in current prices.

The efficient market hypothesis has strong implications for security analysis. If future return can't be predicted from past return, then, trading rules based on examination of sequence of past prices are worthless. If the semi-strong of the hypothesis is supported by empirical evidence, then trading rules based on publicly available information are suspect. Finally, if the strong form tests show efficiency, then the value of security analysis itself would be doubted.

VI: CAPM

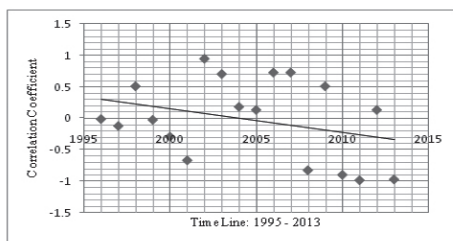
The Capital Asset Pricing Model (CAPM) and its variants including the Single Index Model though not purely a valuation model, it inherently helps in the assessment of expected return of stocks. The model enables to determine a theoretically appropriate required rate of return of an asset, if that asset is to be added to an already well-diversified portfolio, given that asset's non-diversifiable risk. The model takes into account the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk), often represented by a measure beta (β). Beta measures the sensitivity of a stock vis-à-vis the market or its close proxy, as well as the expected return of the market and the expected return of a theoretical risk-free asset. The model suggests that an investor's cost of equity capital is determined by its beta (Fama, 1968; Sharpe, 1964). Despite the refinements to more modern approaches to asset pricing and portfolio selection such as Arbitrage pricing theory, CAPM still remains popular due to its simplicity and utility in a variety of situations. However, empirical studies in the US as well as in India conclude that the results are dichotomous.

In the late 1970s, CAPM came under severe criticism as striking inconsistencies of the model was reported. These inconsistencies underlined the fact that firm characteristics such as firm size, book-to-market value, P/E multiple, and prior return performance have more explanatory power in explaining cross-sectional variation in returns.

Studies revealed not only disturbing for CAPM but also for the efficiency of the Indian capital market, a critical insight for new research in this field. Our own findings from BSE-100 stocks over a time frame from (1995-2013) reflects a negative slope of -0.0370 between risk and return, clearly reflecting that CAPM does not hold in India. The scatter plot superimposed

by a line of best fit below shows the negative slope.

Figure I



VII: Findings

We did a test run of predictability to assess the weak form of market efficiency in India. The average monthly return of BSE Sensex and NSE Nifty was calculated from July 1995 to Dec 2013. The correlation coefficient in parity with extant research findings was observed to be +0.8398. Data patterns revealed the lowest monthly returns was observed in March, highest in July and second highest in November. The reason behind the troughs was traced to year ending apprehensions, while peaks with declaration of financial results and the celebration of 'Samvat' in the broking community. Therefore, it is possible to earn additional returns by selling prior to March and buying before July or November irrespective of the market condition. This contradicts with the weak form of efficiency which states the movement of the market is purely random and does not show any pattern.

Subsequently, we also performed event studies to test the semi-strong form of market efficiency. Under this test, ten sample firms were selected from various industries covering the time frame 1995-2013. For each firm a particular date was been identified on which there was an surprise announcement (e.g. bonus, stock split, rights or substantial increase in the dividend pay-out, etc) which was considered as day 0 (zero). Then the period of study selected was date of surprise announcement date +/- 30 days (event period) and daily return was calculated vis-à-vis BSE-100. Then individual day's abnormal return was added to compute the Cumulative Abnormal Return (CAR) and average CAR was computed for all the sample firms in our study. To satisfy the condition for semi-strong form of efficiency, abnormal return can be theoretically observed on the date of announcement, but not other days. In our test, abnormal positive returns were observed on the entire period from -30 till +30. This clearly shows that the Indian capital

market fails to satisfy the test of semi-strong form of efficiency on the grounds of informational asymmetry.

This test for strong form is similar to the test performed under the semi-strong test. While the day 0 (zero) is considered as the date on which there was substantial increase/decrease in trading volume of shares trying to assess if the insiders can generate excess return. Studies were conducted on the movement of share price of ten selected firms around day 0 and CAR was calculated and plotted. The graph fails to generate a pattern, though certain spikes were observed. Thus the test for strong form of efficiency remains inconclusive.

VIII: Conclusion

The Indian capital markets have witnessed multi-fold reform over the last two decades. The opening up of the markets for FIIs, foreign and private mutual funds, introduction of derivatives and electronic trading, replacement of archaic CCI with SEBI, etc have all played a significant role in boosting stock market volumes and efficiency by and large. However, as far as our market efficiency studies go, the Indian stock markets can be considered far from being efficient by any developed country standards, despite substantial progress in economic liberalization. Going by existing literature, most valuation studies assume efficient markets. It is therefore but logical that valuation models holds good in most efficient markets in the West and also plays a key role in investment decision making. However, our own tests to study the robustness of Whitbeck Kisor Model and CAPM in India fail to generate conclusive evidence in India. The issue may not be of the validity of the models *per se* or its customization, but that of market efficiency. Till such market efficiency is enhanced, valuation studies will be a futile exercise in most emerging markets, including India.

References

1. Ansari, Valeed A. "Capital Asset Pricing Model: Should we stop using it?," *Vikalpa*, Vol.25, No.1, January March 2000, pp. 55-64.
2. Banz, R (1981). "The Relation between Return and Market Value of Common Stocks," *Journal of Financial Economics*, Vol 9, pp 3-18.
3. Banz, Rolf W."The Relationship Between Return and Market Value of Common Stock," *Journal of Financial Economics*, 9 (1981), pp. 318.
4. Barua, S.K, 1981, *The Short-Run Price Behavior of Securities: Some Evidence on Efficiency of Indian Capital Market*, *Vikalpa*, April, Vol.6,No.2, pp.93-100.
5. Barua, S.K. and V.Ralghunathan, 1987, *Inefficiency and Speculation in the Indian Capital Market*, *Vikalpa*, July-September, Vol.12, No.2, pp.53-58.
6. Barua. S.K and V. Raghunathan. 1990, *Soaring Stock Prices: Defying Fundamentals*. *Economic and Political Weekly*, November17, Vol.25, No.46: pp.2559-61.
7. Basu, S (1977) "Invest performance of common stocks in relation to their price-earnings ratios" *The Journal of Finance*, Vol.XXXII. No.3-June, pp 663-682.
8. Bierman H Jr (1982) "Toward a constant price-earnings ratio" *Financial Analysts Journal*, pp. 62-65.
9. Bierman, H Jr. (1974), 'The Implications to Accounting of Efficient Markets and the Capital Asset Pricing Model', *The Accounting Review*, pp. 557-562.
10. Bierman, Harold, Downes, David and Hass, Jarome. "Closed-Form Price Models," *Journal of Financial and Quantitative Analysis*, VII, No.3 (June 1972), pp.1797-1808.
11. Bing, R (1971) "Survey of Practitioners' Stock Evaluation methods", *Financial Analysts Journal*, 27, No 3, pp 55-69.
12. Birau, R "Efficient Capital Market", *Research Article*, Faculty of Economics and Business Administration, University of Craiova, Craiova, Romania
13. Bitar, A (2012)"Decomposition of Earnings-to-Price Effect" *International Journal of Economics and Finance* Vol.4, No.1. pp. 229-234.
14. Black, Fischer, and Scholes, M "The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns." *Journal of Financial Economics*, 1, No1 (May 1974), pp.4-22.
15. Boness, J, Chen, A and Jatusipitak S. (1972) "On relations among stock price behavior and changes in the Capital Structure of the firm" *Journal of Financial and Quantitative Analysis*. VII, No 4. pp 1967-1982.
16. Bower, R and Bower,D(1969) "Risk and Valuation of common stock" *Journal of Political Economy*, 77, No 3, pp.349-362.
17. Davies, Peter Lloyd, and Canes, Michael. "Stock Prices and the Publication of Second-Hand Information," *Journal of Business*, 51, No.1 (Jan. 1978), pp. 43-56.
18. Dodd, Peter, and Ruback, Richard. "Tender Offers and Stockholders' Returns," *Journal of Financial Economics* 5, No 3 (Dec. 1977), pp. 351-375.
19. Elton, Edwin J., Gruber, Martin J., Das, Sanjiv, and Hklarka, Matt. "Efficiency with Costly Information: A Reinterpretation of Evidence from Managed Portfolios," *Unpublished Manuscript*, New York University, 1990.
20. Emery, J. (1974) "Efficient Capital Markets and the Information content of Accounting Numbers," *Journal of Financial and Quantitative Analysis*, IX, No 2, pp. 139-149.
21. Estep, P (1989) "A new method for valuing common stock" *Financial Analysts Journal*, 41, No.6 pp.26-33.
22. Fama, Euene, and Kenneth French, (2004), "Capital Asset Pricing model : Theory and Evidence " *Journal Of Financial Economics* 18(3), pp. 25-46
23. Fama, E (1970) "Efficient Capital Markets: A review of Theory and Empirical Work" *Journal of Finance*, XXV, No.2, pp.383-417.
24. Fama, E., Fisher, L., Jensen, M. and Roll, R. (1969) "The Adjustment of Stock Prices to new Information" *International Economic Review*, 10, No.1, pp.1-21.
25. Finnerty, J. (1976) "Insiders and Market Efficiency," *Journal of Finance* Vol XXXI, No 4, pp.1141-1148.
26. Finnerty, J. (1976) "Insiders' Activity and Inside Information: A Multivariate Analysis," *Journal of Financial and Quantitative Analysis*, XI, No.2, pp. 205-215.
27. Firth, Michael. "The Information Content of Large Investment Holdings," *Journal of Finance*, XXX, No 5 (Dec. 1975), pp. 1265-1281.
28. Foster, E (1970) "Price-Earnings Ratio and corporate growth," *Financial Analysts Journal*, 26, No1, pp. 96-99.
29. Good, W (1972) "Valuation of Quality-Growth Stocks", *Financial Analysts Journal*, 28, No 4, pp, 47-59.
30. Gordon, Myron *The Investment, Financing, and Valuation of the Corporation* (Homewood, Ill.:Richard D. Irwin, 1962).
31. Graham, B, Dodd, D., and Cottle, S. *Security Analysis Principles and Techniques*, 4th ed. (New York : McGraw-Hill, 1962).
32. Grier, Paul, and Albin, Peter. "Non-Random Price Changes in Association with Trading in Large Blocks," *Journal of Business*, 46, No 3 (July 1973), pp. 425-433.
33. Grossman, S and Shiller, R. (1981) "The Determinants of the Variability of Stock Market Prices," *American Economic Review*, 71, No.2, pp. 222-227.
34. Grossman, S. (1976) "On the efficiency of Competitive Stock Markets where trades have diverse information," *Journal of Finance* Vol XXXI No2, pp. 573-585.
35. Gruber, Martin J. *The Determinants of Common Stock Prices* (University Park, Pa.: Pennsylvania State University Press, 1971).
36. Gupta, M (1976) "Money Supply and Stock Prices: A Probabilistic Approach." *Journal of Financial and Quantitative Analysis*, IX, No. 1, pp. 57-68.
37. Gupta, O P and Sehgal, Sanjay (1993). "An Empirical Testing of Capital Asset Pricing Model in India," *Finance India*, Vol 7, No 4, December, pp 863-874.
38. Hamburger, M and Kochin, L (1972) "Money and Stock Prices: The Channels of Influence," *The Journal of Finance*, XXVII, No 2, pp. 231-249.
39. Jaffe, Jeffrey. "Special Information and Insider Trading," *Journal*

- of Business, 47, No.3 (July 1974), pp.410-428.
40. Kraus, Alan, and Stoll, Hans. "Price Impacts of Block Trading on the New York Stock Exchange," *Journal of Finance*, XXVII, No.3 (June 1972), pp. 569-588.
 41. Leroy, Stephen F., and Porter, Richard D. "The Present-Value Relation: Tests Based on Implied Variance Bounds," *Econometrica* (1981), pp. 555-574.
 42. Lorie, James, and Neiderhoffer, Victor. "Predictive and Statistical Properties of Insider Trading," *Journal of Law and Economics*, 11 (April 1968), pp. 35-53.
 43. Madhusoodanan, T P (1997). "Risk and Return: A New Look at the Indian Stock Market," *Finance India*, Vol 1, No 2, June, pp 285-304.
 44. Maheshwari, G.e. and K.R. Vanjara, 1989, *Risk Return Relationship: A Study of Selected Equity Shares, in Stock Market Efficiency and the Price Behaviour (the Indian Experience)*, Edited by O.P Gupta, First Edition, Anmol Publication, New Delhi, pp. 335-52.
 45. Malkiel, Burton, and Cragg, John. "Expectations and the Structure of Share Prices," *American Economic Review*, LX, No 4 (Sept 1970), pp. 601-617.
 46. O.P. Gupta, First Edition, 1989, Anmol Publication, New Delhi, pp.203-18.
 47. Obaidullah, M., 1991 "The Distribution of Stock Returns-Chartered Financial Analyst, November 1991.
 48. Obaidullah, M., 1991a, *Earnings, Stock Prices & Market Efficiency: Indian Evidence*, *Securities Industry Review*, *Journal of the Singapore Securities Research Institute*, October.
 49. Obaidullah, M. "Stock prices adjustment to half-yearly earnings announcement –A test of market efficiency," *Chartered Accountant*, Vol.38, (1990),pp. 922-924.
 50. Rao, N. Krishna, 1988, *Stock Market Efficiency: The Indian Experience*, Paper presented at 'National Seminar on Indian Securities Markets: Thrusts and Challenges', Organized by the Department of Commerce, University of Delhi, South Campus, March 24-26,1988. Reproduced in *Stock Market Efficiency and the Price Behaviour (The Indian Experience)*.
 51. Robichek, A. and Bogue, M (1971) "A note on the behavior of expected price/earnings ratios over time" *The Journal of Finance*, Volume 26, Issue 3, pp: 731-735.
 52. Roll, R. and Ross, S.A. (1994), "On the Cross-Sectional Relation between Expected Returns and Betas", *Journal of Finance*, Vol.49, Issue 1, pp 101-121.
 53. Shiller, Robert J."Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?" *American Economic Review* (June 1981), pp.421-436.
 54. Shiller, Robert J."Theories of Aggregate Stock Price Movements," *The Journal of Portfolio Management* (Winter 1984), pp. 28-37.
 55. Srinivasan, N. P and M.S. Narasimhan, 1988, *Testing Stock Market Efficiency Using Risk-Return Parity Rule*, *Vikalpa*, April-June, Vol.13, No.2, pp. 61-66.
 56. Srinivasan. R (1997). 'Security Prices Behaviour Associated with Right-Issue related Events', *The ICAI Journal of Applied Finance*, Vol 3, No.3,pp.71-81.
 57. Stickel, Scott E. "The Effect of Value Line Investment Survey Rank Changes on Common Prices of," *Journal Financial Economics*, 14, No 1 (March 1985), pp.121-144.
 58. Varma, Jayant Rama, 1988, *Asset Pricing under Parameter Non-stationarity*, FPM Thesis, Indian Institute of Management, Ahmedabad.
 59. Whitbeck, V. and Kisor, M. (1963) 'A new tool in investment Decision Making', *Financial Analysts Journal*, pp. 55-62.
 60. Yalwar, Y B (1988). "Bombay Stock Exchange: Rates of Return and Efficiency," *Indian Economic Journal*, Vol 35, No 4, April-June, pp 68-121.

Can Foreign Direct Investment (FDI) in Indian Power Industry Impact its Stock Market Performance? An Empirical Study

Anandaraj Saha
Satabdee Banerjee

Abstract

The Indian power sector has been undergoing a momentum change in the recent time. The Central Government has also decided to take major steps to provide power supply even in the remote villages of India. Not only in consumption side, but also Indian power sector has also performed well in production of power and electricity in India. Since the opening up of the economy, this sector has been performing well. Presently Indian Govt. has allowed hundred percent FDI in power sector. The study aims to address the debating issue whether FDI has improved the power sector stock market performances or vice versa. The study found that although power sector equity markets primarily provided the impetus to FDI, but in long-run FDI flows in equity market has impact on the stock market performance of power sector stocks.

Key Words

FDI, Granger Causality, Impulse Response, Power Sector, Stationary, VAR, VECM

Introduction

One of the most striking developments that have occurred in the global economic landscape is the unprecedented growth

of foreign direct investment (FDI) during the last two decades. This spectacular growth of global FDI has made it a vital component of development strategy in both developed and developing nations. Policies are being designed in order to stimulate FDI inflows, as the host countries consider the inflow of FDI as one of the key ways in filling up the vacuum between the domestically available supplies of savings, foreign exchange, government revenue and human capital skills, and the desired level of these resources necessary to achieve growth and development targets (Todaro and Smith, 2003).

It is really important to note that the economic impact of FDI is dependent of what form it takes. This includes the type of FDI, sector, scale, duration, location of business, density of local firms in the sector and many other secondary effects. FDI might serve as not only a way of doing money, but also a way of acquiring a certain control, both economical and political, in the host country. It is favourable to economic welfare only if appropriate conditions like adequate absorptive capacity and human capital, a capacity of domestic businesses to confront and hold out foreign competition, abundance of projects and market gaps that cannot be filled up by home producers, exist in the host economy. To explore such divergent dimensions of FDI, multifarious studies are being conducted, few of which are being enumerated as follows in Indian sectoral context:

Survey of Literature

The ASSOCHAM Report (2012) shared India's experience with

FDI. It elaborated on the overall Indian scenario with regard to FDI. An assessment of global FDI had also been provided there along with India's sectoral analysis. Telecommunication, Automobile, IT/ ITes sectors were given special emphasis on, whereas Pension Funds and Civil Aviation were identified as potential sectors for inflow in near future. Finally, it had made few policy suggestions in bringing India to a level playing field with other emerging economies.

The National Council of Applied Economic Research (2009) had conducted quite an elaborate study aiming at providing a detailed understanding of the spatial and sectoral spread of FDI-enabled production facilities in India and their linkages with the rural and suburban areas. The data of 351 FDI firms with 1,171 plants spread over 275 cities have been used to gauge the current economic performance of these plants during the period of April 2006 to March 2008. The indicators included FDI equity, net fixed capital, output, employment, value added, output-capital ratio and FDI sectoral intensity.

Aggrawal, Singla and Aggrawal (2012) in their paper tried to study the need of FDI in India, to exhibit the sector-wise and year-wise analysis of FDI in India, to rank the sectors based upon highest FDI inflows. They observed that at the sectoral level, FDI had helped to raise the output, productivity and employment in some sectors especially in service sector of India. Indian service sector is generating the proper employment options for skilled worker with high perks. On the other side banking and insurance sector helped in providing the strength to the Indian economic condition and developed the foreign exchange system in country. So, they concluded that FDI always helps to create employment in the country and also supports the small scale industries and helps the country to put an impression on the global scale through liberalization.

In their paper, Azhar and Marimuthu (2012) attempted to make an analysis of FDI in India and its impact on growth. It focused on the determinants and needs of FDI, year-wise analysis, sectoral analysis and sources of FDI and its reasons.

Research Problem in the Context of Gap

Though a huge number of literatures are available on the various aspects of FDI in India, no study could be found on how FDI has been impacting the stock market performance of power sector of India. Hence, the present study aspires to

identify whether FDI inflows in Indian power sector have any long run and/or short run causal relationship in respect to the stock market performance of the power industry.

Objectives of the Study

Extensive literature review found that no study has been made so far that throws some light on the causal relationship between FDI and development of Indian power sector. As a result, this study is an exclusive attempt that will try to focus upon the relationship between FDI and Indian power sector. The study aims to resolve the long-standing question and debate as to whether FDI can influence Indian power sector or vice-versa, and if it can, then what is the pattern of such influence and how long will it last.

Research Methodology

Rationale of the Study-

For the purpose of the empirical study, two variables have been used. One variable represents equity stock market parameter of Indian power sector and another variable replicates FDI inflows in power sector. The justification of using such variables for this study is that the power sector is regarded as one of the most vital components for the infrastructural development of any country, India being no exception to this. The Indian power sector has been undergoing a momentous change in the recent years, redefining the industry stance. Sustained economic growth continues to drive power demand in India. The focus to attain 'power for all' has paced up capacity addition across the nation. Moreover, there is heightened competition on both market side as well as supply side (fuel, logistics, human power and finances). It is reported that there is positive investment climate in Indian power sector. India ranks 5th in electricity production and 110th in per-capita consumption of electricity in the world. The energy deficit in India has reduced from 9.5 per cent in 2010-11 to 4.5 per cent in 2013-14 (Jagtap, 2015). The Indian power sector is monitored mainly by the Ministry of Power. The three major segments or components of power sector are generation, transmission and distribution. Due to the opening up of the economy, the sector has witnessed higher investment flows than envisaged. The Ministry of Power has sent its proposal for additional 76,000 MW of power capacity in the 12th Five Year Plan (2012-17) and has set a target of adding 93,000 MW during the 13th Five Year Plan (2017-2022) to the Planning Commission. [Corporate Catalyst

(India) Pvt. Ltd., 2015].

It is being anticipated that increased foreign direct investment (FDI) in Indian power sector would heighten the performance and prospects of the sector. From January 2000 to March 2015, the power sector of India has been able to draw an FDI of USD 96.23 bn. which is 3.85 per cent of the total FDI inflows in India. Presently, 100% FDI is allowed in this sector via the automatic route of approval.

Selection of Variables and Period of Study-

The dependent variable for the study is the monthly closing logged values of S&P BSE Power Index (LBSEPOWER) for the period of January 2007 to February 2015, extracted from the BSE website. The monthly logged value of the FDI equity inflows in the Indian power sector (LFDIPOWER) has been considered as the independent variable, collected from the website of Department of Industrial Policy and Promotion (DIPP) for the same period. The choice of the data period (2007-2015) is entirely dependent on the availability of data. The monthly sectoral data on Indian FDI is available from DIPP from the year 2007 onwards. So data period is restricted from 2007 to 2015.

Empirical Analysis

Descriptive Statistics-

Table 1 exhibits that, during the sample period under study, higher mean was observed in case of LFDIPOWER. LFDIPOWER has also shown higher value in terms of risk between the variables as measured by standard deviation (S.D.). Moreover, the skewness is negative in case of LFDIPOWER. However, the skewness of dependent variable LBSEPOWER is positive. The Jarque-Bera test however indicates the acceptance of normality of LBSEPOWER, but rejects the normality of LFDIPOWER at 1 per cent level of significance.

Table 1: Descriptive Statistics

	LBSEPOWER	LFDIPOWER
Mean	7.748095	12.27628
Median	7.702915	12.48214
Maximum	8.422630	13.05562

	LBSEPOWER	LFDIPOWER
Minimum	7.234610	10.74377
Std. Dev.	0.266440	0.668454
Skewness	0.302608	-0.804210
Kurtosis	2.399011	2.389346
Jarque-Bera	2.970522	12.08632
Probability	0.226443	0.002374
Observations	98	98

Test of Stationarity-

In analysis of cointegration, test of non-stationarity of the time series data is considered as the precondition. Two or more non-stationary time series are said to be cointegrated if a linear combination of the variables is found stationary. The other condition is that all series should be integrated in the same order i.e. I (d), where d is the order of integration. For stationarity analysis, Augmented Dicky-Fuller (ADF) and Philip-Perron (PP) Unit Root tests have been conducted. Augmented Dicky & Fuller (ADF) (Said and Dicky, 1984) unit root test is based on the following equations:

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \sum_{i=1}^k \alpha_i \Delta Y_{t-i} + \varepsilon_t \dots \dots \dots (1)$$

(considering only Intercept i.e. C)

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^k \alpha_i \Delta Y_{t-i} + \varepsilon_t \dots (2)$$

(considering both Intercept and Trend i.e. C and T)

Where, Y_t = Natural logarithm of variables LBSEPOWER and LFDIPOWER; D is the first difference operator; t is time trend term, k denotes the optimal lag length and ε_t is the white noise disturbance term. However the result of the above test is highly dependent on the lag selection. Schwarz Information Criteria (SIC) is considered for selection of lag length (k). In this respect, the automatic criterion has been considered. In addition to ADF Test, Philip Perron (PP) unit root test is also used as an alternative nonparametric model. The results of the Unit Root test have been shown in Table 2.

Table 2: Unit Root Tests

			LFDIPOWER	LBSEPOWER
At Levels	ADF	Intercept	-1.620033 [1] (0.4685)	-1.830967 [0] (0.3636)
		Intercept + Trend	-2.025215 [1] (0.5800)	-2.381545 [0] (0.3868)
	PP	Intercept	-1.738193 [13] (0.4090)	-1.990428 [2] (0.2906)
		Intercept + Trend	-2.842826 [2] (0.1860)	-2.563146 [2] (0.2980)
At First Differences	ADF	Intercept	-15.67267[0] (0.0001)*	-8.395927 [0] (0.0000)*
		Intercept + Trend	-15.71326 [0] (0.0000)*	-8.360799 [0] (0.0000)*
	PP	Intercept	-20.05201 [8] (0.0001)*	-8.367272 [2] (0.0000)*
		Intercept + Trend	-23.68508 [10] (0.0001)*	-8.330807 [2] (0.0000)*

Figures in [] represent Lag Lengths based on SIC in case of ADF Test and Bandwidth based on Newey-West in case of PP Test, * Indicates the statistical significance level of one per cent; Figures () represent MacKinnon (1996) one sided p values.

Table (2) suggests that the null hypothesis of the existence of a unit root cannot be rejected in respect of both the variables at levels and hence all the variables are non-stationary in both models, with linear trend including both intercept and time trend. However, they are stationary in first difference forms; as the test statistics in both ADF and PP tests are significant at 1 per cent level. Therefore, all the variables are found to be integrated of order one as they are stationary at their first difference. In other words, all the variables are I (1).

Test of Cointegration-

There are several approaches to test the cointegration between or among the variables. Here two popular approaches have been used on the study variables.

1. Single Equation Residual Based Engle and Granger (EG) Cointegration Test:

Engle and Granger (1987) provided a very simple test to determine the existence of cointegrating relationships. According to them, if two variables (say, Y_t and X_t) are individually I(1) and the residual ($\hat{\epsilon}_t$) obtained from the long-run Ordinary Least Square (OLS) equation (formed using Y_t and X_t) is I(0), then it can be concluded that Y_t and X_t are cointegrated in long-run. However, if $\hat{\epsilon}_t$ is not I(0), then it can be concluded that they are not cointegrated. The EG test (Table 3) shows that null hypothesis of no cointegration between the variables (considering both variables as dependent one by one) cannot be rejected. Hence it can be resolved that there is no cointegrating relationship between LBSEPOWER and LFDIPOWER.

Table 3: Engle & Granger Cointegration Test

Dependent variable	No. of Lags	Tua statistic	Prob.*	Z Statistic	Prob.*
LBSEPOWER	0	-2.238312	0.6677	-9.545882	0.6687
LFDIPOWER	1	-1.897224	0.8170	-8.435223	0.7430

The equation consists deterministic trends and constant; Lag selection is automatic based on Schwarz Criteria. No. of stochastic trends in asymptotic distribution is 2.* represents MacKinnon (1996) p values.

However, referring to the drawbacks of this test, the study attempts to check the cointegration between the variables using another more advanced multivariate system generated techniques. In this respect Johansen's cointegration model based on Vector Autoregression (VAR) has also been used to confirm the fact of cointegration between LBSERPOWER and LFDIPOWER.

2. Johansen Test of Cointegration:

As the both test variables have been found to be integrated of the same order i.e. I(1), hence Vector Autoregressive

(VAR) approach based Johansen & Juselius (1988, 1990) cointegration test has been carried out to find out whether there exists any long-run cointegrating relationship between the variables. It is to be mentioned here that the efficiency of an ideal VAR model depends on the number of lags selected. Since Johansen cointegration test is based on VAR framework, before running the test, initially the VAR model has been tested at lag 2 considering the test variables at level. But after running lag selection criteria test it has been found that the ideal lag should be 8 according to AIC (Akaike Information Criteria) and FPE (Final Prediction Error) criteria, as shown in table 4.

Table 4: Lag Order Selection

No. of lags / Criteria	2	3	5	7	8	9	10	11
AIC	-3.150357	-3.106265	-3.140972	-3.194935	-3.228624*	-3.161084	-3.120124	-3.099388

At the selected lag 8, although the model passes the VAR Residual Serial Correlation LM Test, but it fails to pass the VAR White Heteroskedasticity tests and normality test. Therefore the model at lag length 8 is rejected due to the fact it does not qualify the diagnostic test. After several trial and error processes, the optimum leg length selected is 9 as per AIC, at which the model passes both the criterion (i.e. serial correlation and heteroskedasticity) but it fails to qualify normality criteria. However, it is to be mentioned

here that normality is a desirable condition in time series analysis and not a necessary condition. The cointegration or linkages between the selected variables have been tested at the optimum lag of 9 under AIC. As depicted in table 5, under lag 9 the model qualifies the diagnostics tests (autocorrelation and heteroskedasticity) and null hypotheses of no residual serial correlation and homoskedasticity are accepted both at 5 per cent level of significance. But the null hypothesis of normality is rejected at 1 per cent level of significance.

Table 5: Diagnostic Tests

Diagnostic Tests	χ^2 Statistics	Probability	Findings
Jarque-Bera Test	3337.325	0.0000	Non-Normal
VAR Residual Serial Correlation LM Tests Lagrange Multiplier Test	7.549916 (9)	0.1095	No serial correlation
VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)	127.3544 (9)	0.0985	Homoskedastic

The Johansen-Juselius cointegration test (table 6) indicates that null hypothesis of no cointegration is rejected at 5 per cent level of significance as per both Trace Test and Max-Eigen value Test. Since both the tests are giving the same result, the Johansen Model tested here is the ideal one. The Johansen Cointegration Test has shown that there exist two cointegrating equations

between the test variables. As there are 2 cointegrating equations, it can be stated that, there is at least 1 cointegrating equation. In the presence of at least one cointegrating relationship between the variables, there exists a long-run cointegrating relationship between them. That means, in the long-run both the variables share the common shock.

Table 6: Johansen's Bivariate Cointegration Test

Bivariate Cointegration between LFDIPOWER and LBSEPOWER (With Lags 9)							
Hypothesized No. of CE (s)	Eigen value	Trace Statistics	Critical Value	Prob.	Max-Eigen Statistic	Critical Value	Prob.
None, $r = 0$	0.169654	22.53756	15.49471	0.0037*	16.36031	14.26460	0.0230**
At most 1, $r \leq 1$	0.067789	6.177252	3.841466	0.0129**	6.177252	3.841466	0.0129**

Both Trace Test and Max-Eigen value Test indicate 2 cointegrating equ (s), at the 0.05 level. * and ** indicate rejection of null hypothesis of no cointegration at 0.01 and 0.05 level respectively; p-values are MacKinnon- Haug-Michelis (1999) p- values.

Short-run Causal Relationship- Block Exogeneity Test

Since the variables are integrated in long-run, it is also required to test that whether there exists any short-run causal relationship between the variables. In the presence of long-run cointegrating relationship between the variables, the short-run causal relationship has been tested using Vector Error Correction Model (VECM). So, next the VECM is implemented. The short-run causality has been tested using Granger Causality/ Block Exogeneity Test based on VECM. Table 7 shows that the null hypothesis of no short-run causality running from FDIPOWER to BSEPOWER is accepted at 5 per cent level of significance; however the same is rejected at the same level of significance for short-run causality running from BSEPOWER to FDIPOWER. This implies that in short-run, FDIPOWER cannot influence BSEPOWER, but BSEPOWER can impact FDIPOWER. The result also supports many economic literatures that FDI is attracted by the performance of stock market returns.

Table 7: VECM Granger Causality/ Block Exogeneity Test

Variables	χ^2	df	Probability
D(LFDIPOWER) → D(LBSEPOWER)	12.80454	9	0.1717
D(LBSEPOWER) → D(LFDIPOWER)	18.28344	9	0.0320*

* Indicates rejection of null hypothesis of no causality at 5 per cent level of significance. The variables are at first difference

Impulse Response Function (IRF) Test-

To find out the impact of one standard deviation (S.D.) shock to the variables, next the Impulse Response Function (IRF) test has been conducted on the VECM.

Table 8: Impulse Response Function Test

One S.D Shock to LFDIPOWER			One S.D Shock to LBSEPOWER	
Period (Month)	Responses by ↓		Responses by ↓	
	LFDIPOWER	LBSEPOWER	LFDIPOWER	LBSEPOWER
1	0.120929	0.000000	0.037487	0.086218
2	0.038311	0.003591	0.034708	0.093373
3	0.040623	-0.012382	0.023576	0.085672
4	0.022140	-0.028512	0.024709	0.090805
5	0.027751	0.013980	0.043529	0.094893
6	0.014847	0.010407	0.047905	0.102608
7	0.014856	-0.005847	0.033287	0.092206
8	0.015097	0.023840	0.005194	0.094858
9	0.035201	-0.000623	0.012715	0.086282

Cholesky Ordering: LFDIPOWER LBSEPOWER

As shown in table 8, considering both LFDIPOWER and LBSEPOWER as endogenous variables, it has been found that, in response of one S.D. shock to LFDIPOWER, LBSEPOWER becomes negative on the third, fourth, seventh and ninth month; whereas, in response to one S.D. shock to LBSEPOWER, LFDIPOWER though fluctuates, but remains positive all along.

Conclusion

In a nutshell, the study reveals that during the period of study, there exists no long-run cointegrating relationship between the study variables depicted by Engle and Granger test. However an opposite view has been obtained from the Johansen test results which suggest a long-run cointegrating relationship between FDI and BSE Power. Remembering the supremacy of VAR based Johansen Model over the single equation residual test based Engle and Granger Model, the study adopts the conclusion given by Johansen test.

The result of the VECM based Granger Causality test is more

interesting. Most probably it answers the long-standing questions of many experts and economists. Many are of opinion that FDI equity flows in Indian power sector will have positive impact on it. However the study supports the contradictory view such that FDI equity flows are attracted by the stock market performance in related power sector. That means, the study reveals that in short-run, if Indian power sector companies perform well and if their performances can create any positive impact in the stock market, then FDI inflows get attracted to the power sector just like a magnet is attracted to a piece of iron and start coming in the power sector. In other words, in the short-run, FDIPOWER cannot influence BSEPOWER, but BSEPOWER can impact FDIPOWER.

However the results of IRF test gives the caution that after getting an entry in power sector, FDI can impact Indian power sector to a great extent. The outflows of FDI can create turbulence in Indian stock market as it is generally regarded that stock market is very sensitive regarding such issues. Although inflows and outflows are to some extent controlled by

the Central Government, but Government should carefully observe the impact on the Indian stock markets before giving any permission of repatriation or to withdraw the FDI, specifically in Indian power sector. Therefore it can be stated that although FDI equity flows in power sector get attracted by stock market performance, but it can create some impact or turbulence in Indian economy if it is not taken care of properly.

References

1. Aggarwal, S., Singla, A., & Aggarwal, R. (2012). *Foreign Direct Investment in India*. *International Journal of Computational Engineering & Management*, 15 (5), 93-105.
2. Azhar, S., & Marimuthu, K. (2012). *An Overview of Foreign Direct Investment in India*. *Excel International Journal of Multidisciplinary Management Studies*, 2 (1), 202-214.
3. *Corporate Catalyst (India) Pvt. Ltd. (2015). Power and Energy Industry in India*. New Delhi: Corporate Catalyst (India) Pvt. Ltd.
4. Jagtap, P. (2015, April 6). *Power Industry in India*. Retrieved September 25, 2015, from <http://praveen2999.blogspot.in/2015/04/power-industry-in-india.html>
5. *National Council for Applied Economic Research (2009). FDI in India and its Growth Linkages*. Ministry of Commerce & Industry, Govt. of India, Department of Industrial Policy and Promotion. New Delhi: National Council for Applied Economic Research.
6. *The Associated Chambers of Commerce and Industry of India (2012). India's Experience with FDI: Role of a Game Changer*. New Delhi: The Associated Chambers of Commerce and Industry of India.
7. Todaro, Michael P. and Smith, Stephen C. 2003. *Economic Development*. Pearson. p. 639.

Efficiency of Emerging and Emerged Capital Markets: An Empirical Study on BRICS and G7 Nations

M. Babu

C. Hariharan

S. Srinivasan

Abstract

The study proposes to investigate the stock markets linkages between BRICS and G7 nations' during the study period from April 2004 to March 2014. GARCH (1, 1) Model examined the daily returns of sample indices BSE SENSEX, FTSE/JSE TOP 40, IBOVESPA, RTS INDEX, SSE COMPOSITE (BRICS) and CAC 40, FTSE 100, FTSE MIB, GDAXI, NIKKEI 225, NYSE COMPOSITE, S&P TSX COMPOSITE (G7) and found them to be volatile. Results of Johansen Co Integration Test found that BRICS and G7 nations' stock market indices were co integrated and there was long run relationship between BRICS and G7 stock indices. VECM results showed some BRICS indices to experience short run relationship with G7 indices. Results of Granger Causality Test found only one bidirectional relationship between RTS INDEX and FTSE MIB while FTSE/JSE TOP 40 recorded unidirectional relationship with NYSE COMPOSITE and S&P TSX COMPOSITE, followed by NIKKEI 225 and IBOVESPA, SSE COMPOSITE and CAC 40, FTSE MIB and SSE COMPOSITE. The overall results revealed both long run and short run linkages between BRICS and G7 nations' stock market indices during the study period. International investors could use the opportunity for portfolio diversification, at both long run and short run periods, in BRICS and G7 stock markets as the long run and short run relationship existed in BRICS and G7 stock markets during the study period.

Key Words

BRICS, G7, Indices, Integration, GARCH (1, 1) Model, Johansen Co Integration Test, Vector Error Correction Model and Granger Causality Test.

JEL Classification

F15, F21, F36, G15.

Introduction

In the present world which is influenced by substantial liberalization and growing multilateral relations among economies, the study of inter linkages among stock markets enjoys very high relevance. Stock markets, being an important vehicle in facilitating the capital formation and movement, have gained unparalleled importance. Due to this fact, researchers worldwide have shown keen interest in the area of the inter linkages of stock markets.

Inter linkages among stock markets have important implications for the macroeconomic policies of a nation as well. Over the time, the economies are opening up as most of them are on the path of liberalization, leading to interlinked economies. Increased movement of capital in and out of the economies, both on the short run and the

long run basis, started happening at an exuberantly large scale. Stock markets are one of the institutions through which capital movement occurs. Such capital flows impact the foreign exchange reserves and the foreign exchange rates. Changes in the foreign exchange rates bring about changes in the trade competitiveness and trade relations, leading to a change in the balance of payment position of an economy. All these are important aspects that need consideration for policy making. In addition to the above points, the level of stock market inter linkage with others is an important determinant of the contagion effect that an economy will face from the rest of the world. If the stock market of an economy is highly linked with other markets, then there is a fear of high contagion effect of the happenings in the rest of the world through the stock market route. The knowledge of this area of finance can equip the policy makers to take better decisions. Therefore, this study aims at investigating the relationship and linkage between BRICS and G7 countries stock markets.

Review of Literature and Design of the Study

The various research works, related to linkages of international stock markets, undertaken by earlier researchers, enhance the validity of this study. **Ranjan Dasgupta (2014)** examined the short and long run integration and linkages of Indian stock markets with BRIC stock markets, by using Johansen Co integration Test and Granger Causality Test. The study found that Indian stock markets recorded co movement with Brazilian, Russian and Chinese stock markets during the study period from January 2003 to December 2012. **Amitesh Kapoor and Harendra Singh (2013)** investigated the integration of Asian stock exchanges. The study examined the stock market co-movement between Indian and South Asian countries. Augmented Dickey Fuller (ADF), Co-integration and Granger Causality Tests were applied to the data. A stochastic trend was noticed in the long-term behavior of stock market. **Srinivasan Palamalai, Kalaivani M. (2013)** examined the stock market integration among major stock markets of emerging Asia-Pacific economies, viz. India, Malaysia, Hong Kong, Singapore, South Korea, Taiwan, Japan, China, and Indonesia. Johansen and Juselius Multivariate Co Integration Test, Granger Causality/Block Exogeneity Wald Test, based on the Vector Error Correction Model (VECM) approach and Variance Decomposition analysis, were used to investigate the dynamic linkages between markets. The results of Granger Causality/Block Exogeneity Wald Test, based on VECM and

variance decomposition analysis, revealed the stock market interdependencies and dynamic interactions among the selected emerging Asia-Pacific economies. **I-Chun Tsai (2012)** used the data of six Asian countries (Singapore, Thailand, Malaysia, the Philippines, South Korea, and Taiwan) to estimate the relationship between stock price index and exchange rate. The results provided negative relation between stock and foreign exchange markets. **Li Liu, Jieqiu Wan (2012)** made an attempt to analyze the co-movement of Shanghai stock market and China Yuan (CNY) exchange rates by using cross-correlation analysis, structural co integration and nonlinear causality test. From the analysis, it was concluded that there was long run and causal relationship between Shanghai stock market and Chinese Yuan (CNY/ USD) exchange rates during the study period. **Searat Ali and Babar Zaheer Butt (2011)** investigated the co movement of Pakistanis Equity Market with the markets of India, China, Indonesia, Singapore, Taiwan, Malaysia, Japan, USA and UK by using co integration test. The results found that Pakistanis stock market did not record co movement with UK, USA, Taiwan, Malaysia and Singapore stock markets. **Gurcharan Singh and Pritam Singh (2010)** examined the linkages of the two leading emerging markets i.e. Chinese and Indian markets with developed markets. Using daily data from January 2000 to December 2009, the stock market indices of China, India, United States, United Kingdom, Japan and Hong Kong were examined. Correlation Test, Granger Causality and the Co- Integration Test and Error Correction Model were employed. It was found that Chinese and Indian markets were correlated with all four major markets. **Countries Yaser A. Alkulaib (2007)** investigated the lead/lag relationship between the MENA countries and regions by using Correlation, Co Integration Test, Granger Causality Test. They found no market causality or spillover from one country to another in the North Africa region. **S. Venkata (2006)** examined the co integration between Indian stock markets and seven developed countries, namely, Switzerland, France, Germany, Japan, UK, USA and South Korea and seven developing countries, namely, Indonesia, Malaysia, Taiwan, Argentina, Israel, Brazil and Mexico. Co Integration Test, Granger Causality Test, Variance Decomposition Analysis and Vector Error Correction Model were used. The results proved that Indian stock market index was influenced by most of the developed countries as well as the developing countries. **Jian Yang and Moosa M. Khan (2003)** examined whether long run integration between the United States and many international stock markets, has strengthened over time, after

the impact of abolition of capital control on these markets and the 1987 international stock market crash. Empirical results found that there existed no long-run relationship between most of these markets and the United States markets. There was no marked change in the degree of integration between any of these stock markets and the United States, after the abolition of capital control or the 1987 international stock market crash. **Kevin James Daly (2003)** investigated the static and dynamic interdependence of the stock markets of Indonesia, Malaysia, the Philippines, Singapore, Thailand, and the advanced stock markets, namely, Australia, Germany, and the United States. Using data from 1990 to 2001, the paper used both correlation and co-integration analysis to describe the behavior of the above markets. The results evidenced no significant increase in the integration between the Southeast Asian stock markets during the post-crisis period.

Though these reviews obviously examined co movement between emerging and emerged stock markets, many of the existing researchers does not take BRICS and G7 stock markets for analyzing the co movements between these two regional stock markets. Hence, this study proposes to analyze the stock market co movements between BRICS and G7 nations.

(i) Statement of the Problem

In the recent years, national economies are closely linked with each other. New information which comes up in one country, affects not only the returns and volatility of local stock market but also affects the returns and volatility of stock markets in other countries. During 2013, the BRICS lagged behind other countries, with their slowing economies, inflation problems and highly concentrated stock market, dominated by state-controlled enterprises. G7 nations were also exposed to risks which included problems for the US housing market, tighter credit, high commodity prices and rising inflation. These issues affected the international stock markets. The present study aims to examine the inter linkages between BRICS and G7 countries stock markets.

(i) Need for the Study

This study will provide useful information to investment practitioners, policy makers, etc, by providing knowledge on the relationship between BRICS and G7 countries' stock markets. Understanding the linkages and integration between these stock markets, is crucial for policy makers and fund managers in their investment decision and risk management.

This study can provide ideas to investors who wish to consider their investment in BRICS and G7 countries, and it would help stock markets to take advantage of their rapid growth in order to enhance portfolio return. By knowing the relationship between markets, it can help investors to hedge the risk in their international portfolio. Hence an effort has been made to understand stock market linkages between BRICS and G7 countries' stock markets.

(iii) Objective of the study

- To examine whether the BRICS and G7 countries' stock markets index daily returns are normally distributed during the study period.
- To evaluate whether the BRICS and G7 countries' stock markets index daily returns are stationary during the study period.
- To examine the volatility of BRICS and G7 countries' stock index daily returns during the study period.
- To find out the long run relationship between BRICS and G7 nations' stock markets daily returns during the study period.
- To find the short run relationship between BRICS and G7 nations' stock markets daily returns during the study period.
- To analyse the causal relationship between BRICS and G7 countries' stock markets daily returns during the study period.

(iv) Hypotheses of the study

The following Null Hypotheses were framed to test the objectives.

- NH₀₁**: BRICS and G7 countries' stock market index daily price returns are not normally distributed during the study period.
- NH₀₂**: The daily index returns of BRICS and G7 stock markets are not stationary during the study period.
- NH₀₃**: There is no significant volatility in the daily index returns of BRICS and G7 countries' stock markets during the study period.
- NH₀₄**: There is no long run relationship between daily index return of BRICS and G7 countries' stock markets during the

study period.

NH₀₅: There is no short run relationship between daily index returns of BRICS and G7 countries' stock markets during the study period.

NH₀₆: There is no causal relationship between daily index returns of BRICS and G7 countries' stock markets during the study period.

Methodology

a) Sample Selection

Inter linkages between emerging and emerged countries' stock markets were considered for this study. The BRICS countries

: were taken as the sample, representing the emerging nations.
 : The emerged countries were represented by the G7 nations.
 : Thus Brazil, Russia, India, China, South Africa (BRICS) and
 : Canada, France, Germany, Italy, Japan, UK, US (G7) countries
 : were considered. The top stock markets from these countries
 : were selected on the basis of domestic market capitalization
 : data extracted from the World Federation of Exchanges.
 : Major indices listed in the official websites of respective
 : stock exchanges were considered for the analysis. Further,
 : major sample indices were also verified in the website of
 : investingonline.com. After careful scrutiny from the official
 : website of respective stock exchange and the website of
 : investingonline.com, the sample indices were selected. The
 : names of major index are given in **Table – 1**

Table – 1 LIST OF SAMPLE INDICES

	NAME OF THE COUNTRY	STOCK EXCHANGE	INDEX
BRICS (Emerging Countries)	BRAZIL	BM&F Bovespa	IBovespa Index
	RUSSIA	Russia Trading System	RTS Index
	INDIA	Bombay Stock Exchange	S&P Sensex Index
	CHINA	Shanghai Stock Exchange	SSE Composite Index
	SOUTH AFRICA	Johannesburg Stock exchange	FTSE/JSE all share Index
G7 (Emerged Countries)	CANADA	Toronto Stock Exchange	S&P/TSX Composite index
	FRANCE	Euronext paries	CAC 40
	GERMANY	Frankfurt Stock Exchange	GDAXI
	ITALY	Borsa Italiana	FTSE MIB
	JAPAN	Tokyo Stock Exchange	Nikkei 225
	UK	London Stock Exchange	FTSE 100 Index
	US	New York Stock Exchange	NYSE Composite index

Source: Data collected from the World Federation of Exchanges, investingonline.com and official websites of stock exchanges.

b) Data Collection

This study was mainly based on secondary data. The daily closing prices of stock indices were used for analyzing the stock market linkages between BRICS and G7 countries' stock markets. BRICS and G7 countries' stock markets indices daily prices were collected from Yahoo finance and FTSE official website and other data were collected from various books, journals and websites.

c) Period of Study

These studies covered ten years from April 2004 to March 2014, for the analysis of inter linkages between BRICS and G7 countries' stock markets.

Results and Discussion

The results of descriptive statistics for daily returns of BRICS and G7 stock markets are displayed in **Table – 2**. This Table examines mean, standard deviation, skewness, kurtosis and Jarque-Bera for BSE SENSEX, FTSE/JSE TOP 40, IBOVESPA, RTS INDEX and SSE COMPOSITE (BRICS) and CAC 40, FTSE 100, FTSE MIB, GDAXI, NIKKEI 225, NYSE COMPOSITE, S&P TSX COMPOSITE (G7) during the study period April 2004 to March 2014. Among the BRICS nations' indices, the highest mean return was recorded in BSE SENSEX (0.000681), with the standard deviation of 0.016175. FTSE/JSE TOP 40 INDEX recorded the second highest mean return of 0.000674, with the lowest standard deviation of 0.013931. SSE COMPOSITE witnessed a mean return of 0.000196, with the standard deviation of 0.016514. IBOVESPA recorded the second highest standard deviation of 0.018023, with the mean return of

0.000485. The lowest mean return was recorded by RTS INDEX (0.0000494), with the highest standard deviation of 0.022235. According to skewness test, BSE SENSEX, IBOVESPA and RTS INDEX returns were positively skewed, with values of 0.194415, 0.16149, 0.922427 respectively but FTSE/JSE TOP 40 INDEX (-0.018877) and SSE COMPOSITE INDEX (-0.132124) were negatively skewed during the study period. All the sample indices returns of BRICS stock markets witnessed leptokurtic distribution as the kurtosis values were greater than three. Among the G7 nations' stock market indices, NYSE COMPOSITE INDEX recorded the highest mean return of 0.000275, with the standard deviation of 0.013563. The second largest mean return was recorded by S&P TSX COMPOSITE INDEX (0.000267), with the lowest standard deviation of 0.011761, followed by the FTSE 100 INDEX mean return at 0.000226, with the standard deviation of 0.011919. NIKKEI 225 recorded the highest standard deviation of 0.015722, with mean returns of 0.000221, followed by FTSE MIB and CAC 40, with high standard deviation of 0.015449 and 0.01426 respectively, with the mean return of 0.0000281 and 0.000183. Negative mean return was recorded in GDAXI index at 0.000252, with the standard deviation of 0.013814 during the study period. CAC 40 index, FTSE 100 INDEX, FTSE MIB, GDAXI returns were positively skewed but NIKKEI 225, NYSE COMPOSITE INDEX, S&P TSX COMPOSITE INDEX returns were negatively skewed during the study period. The sample indices returns of G7 stock markets were leptokurtic as the kurtosis value was greater than the three. The Jarque-Bera test clearly showed the sample index daily returns of BRICS and G7 nations' stock markets to be normally distributed during the study period from April 2004 to March 2014.

Table – 2 Results of Descriptive statistics for sample indices daily returns of BRICS and G7 countries' stock markets

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
BRICS INDICES					
BSE SENSEX	0.000681	0.016175	0.194415	12.34458	9020.584
FTSE JSE TOP 40	0.000674	0.013931	-0.01887	6.624118	1386.359
I BOVESPA	0.000485	0.018023	0.16149	9.167342	3936.41
RTS INDEX	0.000049	0.022235	0.922427	15.90244	17872.41
SSE COMPOSITE	0.000196	0.016514	-0.13212	6.682543	1430.114

Cont...

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
G7 INDICES					
CAC 40	0.000183	0.01426	0.245431	10.6078	6330.186
FTSE 100	0.000226	0.011919	0.043897	12.24574	9290.076
FTSE MIB	0.000028	0.015449	0.116281	9.027274	3882.275
GDAXI	-0.00025	0.013814	0.164745	9.64453	4717.202
NIKKEI 225	0.000221	0.015722	-0.33945	11.14403	6834.453
NYSE COMPOSITE	0.000275	0.013563	-0.16588	13.6696	11945.81
S&P TSX COMPOSITE	0.000267	0.011761	-0.50118	13.55288	11985.92

Source: Data collected from yahoo finance and FTSE computed from E Views 7

The results of test of normality, using Kolmogorov-Smirnov and Shapiro-Wilk Tests for the daily returns of sample indices of BRICS and G7 nations, during the study period from April 2004 to March 2014, are presented in the **Table - 3**. The prob. values for all sample indices of BRICS and G7 nations were <0.001, which was less than 0.05. Hence the results were statistically significant. These results proved that the BRICS and G7 nations' stock market indices daily returns were normally distributed in the study period. Hence the Null Hypothesis, H_{01} "The BRICS and G7 countries' stock market index daily price returns are not normally distributed during the study period", is Rejected.

Table - 3 Results of Normality Test for BRICS and G7 nations' stock market indices daily returns

BRICS and G7 Indices	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BRICS INDICES						
BSE SENSEX	0.076	2475	<0.001	0.924	2475	<0.001
I BOVESPA	0.057	2475	<0.001	0.944	2475	<0.001
RTS Index	0.103	2475	<0.001	0.876	2475	<0.001
SSE Composite	0.074	2475	<0.001	0.952	2475	<0.001
FTSE/JSE Top 40	0.055	2475	<0.001	0.958	2475	<0.001
S&P/TSX Composite	0.097	2456	<0.001	0.886	2456	<0.001
G7 INDICES						
CAC 40	0.078	2456	<0.001	0.921	2456	<0.001
GDAXI	0.088	2456	<0.001	0.92	2456	<0.001

Cont...

BRICS and G7 Indices	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
G7 INDICES						
FTSE MIB	0.084	2456	<0.001	0.926	2456	<0.001
Nikkei 225	0.068	2456	<0.001	0.928	2456	<0.001
FTSE 100	0.088	2456	<0.001	0.903	2456	<0.001
NYSE Composite	0.107	2456	<0.001	0.875	2456	<0.001

Source: Data collected from yahoo finance and FTSE computed from SPSS 17
df – degrees of freedom

The Augmented Dickey Fuller Test and Phillips-Perron Test results, for daily returns of BRICS nations' sample indices, during the study period from April 2004 to March 2014, are presented in the **Table – 4**. Augmented Dickey Fuller Test statistic values for sample indices of BRICS nations' stock markets, namely, BSE SENSEX (-46.56921), FTSE/JSE TOP 40 INDEX (-50.24227), IBOVESPA INDEX(-50.42415), RTS INDEX(-45.05102), SSE COMPOSITE INDEX(-49.96953) and G7 nations stock market indices, namely, CAC 40 (-33.22623), FTSE 100 INDEX (-26.06543), FTSE MIB (-50.92903), GDAXI (-50.30337), NIKKEI 225 (-51.83306), NYSE COMPOSITE INDEX (-39.58426), S&P TSX COMPOSITE INDEX (-23.50265) were less than the test critical value at 1%, 5% and 10%. Phillips-Perron Test statistics values of BRICS and G7 nations stock market indices were also less than the test critical value at 1%, 5% and 10% level. Both the tests confirmed that BRICS and G7 nations' stock markets sample indices daily returns were stationary. Hence the Null Hypothesis H_{02} , **"The daily index returns of BRICS and G7 stock markets are not stationary during the study period"**, is Rejected.

Table – 4 Results of Augmented Dickey-Fuller Test and Phillips-Perron Test for BRICS and G7 countries' Stock markets sample indices daily returns

BRICS and G7 Indices	Augmented Dickey-Fuller test statistic (T-statistics)	Phillips-Perron test statistic (T-statistics)	Test critical values:		
			1% level	5% level	10% level
BSE SENSEX	-46.56921	-46.46832	-3.432799	-2.862508	-2.56733
FTSE JSE TOP 40	-50.24227	-51.03327	-3.432739	-2.862481	-2.567316
I BOVESPA	-50.42415	-50.85341	-3.432797	-2.862507	-2.56733
RTS INDEX	-45.05102	-45.05203	-3.432747	-2.862485	-2.567318
SSE COMPOSITE	-49.96953	-49.99716	-3.432754	-2.862488	-2.56732
CAC 40	-33.22623	-54.49792	-3.432662	-2.862447	-2.567298
FTSE 100	-26.06543	-54.0033	-3.432668	-2.86245	-2.567299

Cont...

BRICS and G7 Indices	Augmented Dickey-Fuller test statistic (T-statistics)	Phillips-Perron test statistic (T-statistics)	Test critical values:		
			1% level	5% level	10% level
FTSE MIB	-50.92903	-51.02479	-3.432711	-2.862469	-2.56731
GDAXI	-50.30337	-50.37302	-3.432714	-2.86247	-2.56731
NIKKEI 225	-51.83306	-51.93483	-3.432819	-2.862517	-2.567335
NYSE COMPOSITE	-39.58426	-55.49443	-3.432757	-2.862489	-2.567321
S&P TSX COMPOSITE	-23.50265	-52.87044	-3.432717	-2.862472	-2.567311

Source: Data collected from yahoo finance and FTSE computed from E Views 7

Table – 5 shows the results of GARCH (1, 1) model for BRICS and G7 nations' stock market indices daily returns. The sum of co efficient value of ARCH (1) and GARCH (1) for BRICS indices, BSE SENSEX (0.98488), FTSE/JSE TOP 40 (0.9873), IBOVESPA (0.977), RTS INDEX (0.97912), SSE COMPOSITE (0.99048) and G7 nations stock market indices, CAC 40 (0.9885), FTSE 100 INDEX (0.99198), FTSE MIB (0.99891), GDAXI (0.98741), NIKKEI 225 (0.98592), NYSE COMPOSITE INDEX (0.98828), S&P TSX COMPOSITE INDEX (0.98951) was close to one and there was significant difference at 1%, 5% and 10% level. The results clearly indicate that BRICS and G7 indices daily returns were volatile. Among the BRICS and G7 nations' stock market indices, the FTSE MIB experienced high volatility when compared to other indices during the study period from April 2004 to March 2014. Hence the Null Hypothesis H_{05} "There is no significant volatility in the daily index returns of BRICS and G7 countries' stock markets during the study period", is Rejected.

Table - 5 Results of GARCH (1, 1) Model for BRICS and G7 countries' Stock markets sample indices daily returns

INDICES	Coefficient	α	β	$\alpha + \beta$
BRICS INDICES				
BSE SENSEX	0.0000044	0.10318	0.8817	0.98488
FTSE JSE TOP 40	0.0000023	0.09172	0.89558	0.9873
I BOVESPA	0.0000065	0.07394	0.90306	0.977
RTS INDEX	0.0000098	0.12445	0.85467	0.97912
SSE COMPOSITE	0.0000025	0.04697	0.94352	0.99048
G7 INDICES				
CAC 40	0.00000231	0.08903	0.89947	0.9885
FTSE 100	0.00000118	0.09585	0.89613	0.99198
FTSE MIB	0.00000098	0.08253	0.91638	0.99891
GDAXI	0.00000233	0.08562	0.90179	0.98741
NIKKEI 225	0.00000382	0.11173	0.87419	0.98592
NYSE COMPOSITE	0.00000154	0.085	0.90328	0.98828
S&P TSX COMPOSITE	0.00000101	0.07509	0.91442	0.98951

Source: Data collected from yahoo finance and FTSE computed from E Views 7

The results of co integration test, using Johansen co integration test, for BRICS and G7 nations' stock market indices, during the study period from April 2004 to March 2014, are exhibited in **Table – 6**. The Trace Statistics and Max-Eigen Statistics values of Johansen co integration test for BRICS and G7 nations' stock market indices were greater than the critical value at 5% level (0.05). Therefore, the results indicate that all the sample indices of BRICS nations stock markets namely, BSE SENSEX, FTSE/JSE TOP 40, IBOVESPA, RTS INDEX and SSE COMPOSITE were co integrated with G7 nations' stock markets indices - CAC 40, FTSE 100, FTSE MIB, GDAXI, NIKKEI 225, NYSE COMPOSITE, and S&P TSX COMPOSITE, during the study period and these results confirmed that BRICS stock indices enjoyed long run relationship with G7 stock indices. Hence Rejected the Null Hypothesis NH_{0a} , "There is no long run relationship between daily index return of BRICS and G7 countries stock markets during the study period",

Table - 6 Results of Johansen Co-Integration test for BRICS and G7 Nations' Stock Markets Indices

BRICS and G7 Indices	Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
BSE SENSEX and G7 indices					
CAC40	None	1059.949	15.49471	557.7526	14.2646
	At most 1	502.1968	3.841466	502.1968	3.841466
FTSE 100 INDEX	None	1020.265	15.49471	545.2182	14.2646
	At most 1	475.0473	3.841466	475.0473	3.841466
FTSE MIB INDEX	None	1027.334	15.49471	531.4318	14.2646
	At most 1	495.9021	3.841466	495.9021	3.841466
GDAXI	None	1002.155	15.49471	523.8207	14.2646
	At most 1	478.3339	3.841466	478.3339	3.841466
NIKKEI 225	None	1002.743	15.49471	532.6152	14.2646
	At most 1	470.1277	3.841466	470.1277	3.841466
NYSE COMPOSITE INDEX	None	1043.844	15.49471	545.9627	14.2646
	At most 1	497.8814	3.841466	497.8814	3.841466
S&P TSX COMPOSITE INDEX	None	1022.278	15.49471	522.6113	14.2646
	At most 1	499.6668	3.841466	499.6668	3.841466
FTSE JSE TOP 40 and G7 indices					
CAC40	None	1141.713	15.49471	585.8021	14.2646
	At most 1	555.9108	3.841466	555.9108	3.841466
FTSE 100 INDEX	None	1092.986	15.49471	570.8756	14.2646
	At most 1	522.1105	3.841466	522.1105	3.841466
FTSE MIB INDEX	None	1102.118	15.49471	570.8172	14.2646
	At most 1	531.3005	3.841466	531.3005	3.841466

Cont...

GDAXI	None	1089.849	15.49471	573.0989	14.2646
	At most 1	516.7505	3.841466	516.7505	3.841466
NIKKEI 225	None	1061.663	15.49471	577.4989	14.2646
	At most 1	484.1643	3.841466	484.1643	3.841466
NYSE COMPOSITE INDEX	None	1118.482	15.49471	573.8906	14.2646
	At most 1	544.5913	3.841466	544.5913	3.841466
S&P TSX COMPOSITE INDEX	None	1112.336	15.49471	581.3413	14.2646
	At most 1	530.9947	3.841466	530.9947	3.841466
I BOVESPA and G7 indices					
CAC40	None	1081.32	15.49471	589.3116	14.2646
	At most 1	492.0083	3.841466	492.0083	3.841466
FTSE 100 INDEX	None	1043.289	15.49471	524.5557	14.2646
	At most 1	518.7328	3.841466	518.7328	3.841466
FTSE MIB INDEX	None	1047.394	15.49471	534.7548	14.2646
	At most 1	512.6391	3.841466	512.6391	3.841466
GDAXI	None	1024.458	15.49471	522.6849	14.2646
	At most 1	501.7735	3.841466	501.7735	3.841466
NIKKEI 225	None	1026.494	15.49471	548.5925	14.2646
	At most 1	477.9018	3.841466	477.9018	3.841466
NYSE COMPOSITE INDEX	None	1058.401	15.49471	539.9863	14.2646
	At most 1	518.4151	3.841466	518.4151	3.841466
S&P TSX COMPOSITE INDEX	None	1045.893	15.49471	528.3272	14.2646
	At most 1	517.5655	3.841466	517.5655	3.841466
RTS INDEX and G7 Indices					
CAC40	None	980.5236	15.49471	557.8373	14.2646
	At most 1	422.6863	3.841466	422.6863	3.841466
FTSE 100 INDEX	None	945.9306	15.49471	522.1891	14.2646
	At most 1	423.7415	3.841466	423.7415	3.841466
FTSE MIB INDEX	None	954.7036	15.49471	534.322	14.2646
	At most 1	420.3816	3.841466	420.3816	3.841466
GDAXI	None	936.1079	15.49471	518.0266	14.2646
	At most 1	418.0813	3.841466	418.0813	3.841466

Cont...

NIKKEI 225	None	920.5284	15.49471	502.3728	14.2646
	At most 1	418.1556	3.841466	418.1556	3.841466
NYSE COMPOSITE INDEX	None	963.4967	15.49471	540.6727	14.2646
	At most 1	422.824	3.841466	422.824	3.841466
S&P TSX COMPOSITE INDEX	None	941.015	15.49471	519.4642	14.2646
	At most 1	421.5508	3.841466	421.5508	3.841466
SSE COMPOSITE and G7 indices					
CAC40	None	967.9538	15.49471	583.1756	14.2646
	At most 1	384.7782	3.841466	384.7782	3.841466
FTSE 100 INDEX	None	915.8638	15.49471	517.1435	14.2646
	At most 1	398.7203	3.841466	398.7203	3.841466
FTSE MIB INDEX	None	928.2926	15.49471	534.807	14.2646
	At most 1	393.4856	3.841466	393.4856	3.841466
GDAXI	None	902.1025	15.49471	502.8708	14.2646
	At most 1	399.2317	3.841466	399.2317	3.841466
NIKKEI 225	None	900.5987	15.49471	505.0244	14.2646
	At most 1	395.5743	3.841466	395.5743	3.841466
NYSE COMPOSITE INDEX	None	938.6139	15.49471	539.9477	14.2646
	At most 1	398.6661	3.841466	398.6661	3.841466
S&P TSX COMPOSITE INDEX	None	919.3888	15.49471	533.0734	14.2646
	At most 1	386.3154	3.841466	386.3154	3.841466

Source: Data collected from yahoo finance and FTSE computed from E Views 7

Table – 7 represents the results of Vector Error Correction Model, for determining the short term dynamics between BRICS and G7 stock markets indices, during the study period from April 2004 to March 2014. The co efficient values of Vector Error Correction Model for BSE SENSEX and G7 indices, FTSE JSE TOP 40 and G7 indices, I BOVESPA and G7 indices, RTS INDEX and G7 Indices, SSE COMPOSITE and G7 indices, reveal that all sample indices of BRICS nations' witnessed short run relationship with S&P TSX COMPOSITE as the values of coefficient were higher than the significant value of 0.05, followed by NYSE COMPOSITE which recorded short run relationship with BRICS indices, with the exemption of SSE COMPOSITE. FTSE 100, FTSE MIB and GDAXI experienced short run relationship with FTSE/JSE TOP 40. IBOVESPA, RTS INDEX and SSE COMPOSITE recorded short run relationship with NIKKEI 225. Rest of the BRICS indices recorded short run relationship with some G7 indices during the study period. It is to be noted that there was short run relationship between BRICS and G7 stock markets indices. Hence the Null Hypothesis NH_{05} "There is no short run relationship between daily index returns of BRICS and G7 countries stock markets during the study period", is Rejected.

Table – 7 Results of Vector Error Correction model for daily returns of BRICS and G7 countries' stock markets indices.

BRICS and G7 INDICES	Co efficient	Standard Error	T - Statistics
BSE SENSEX and G7 indices			
CAC 40	5.27649	-0.1671	31.5857
FTSE 100 INDEX	4.64965	-0.146	31.8427
FTSE MIB	-4.5274	-0.151	-29.98
GDAXI	-2.549	-0.0921	-27.682
NIKKEI 225	-1.6591	-0.0651	-25.484
NYSE COMPOSITE INDEX	2.769	-0.1037	26.7105
S&P TSX COMPOSITE INDEX	2.24246	-0.0876	25.5994
FTSE JSE TOP 40 and G7 indices			
CAC 40	-2.4526	-0.0792	-30.967
FTSE 100 INDEX	5.48168	-0.1703	32.1975
FTSE MIB	0.73082	-0.0367	19.9058
GDAXI	0.56735	-0.0368	15.4003
NIKKEI 225	-0.0863	-0.0299	-2.886
NYSE COMPOSITE INDEX	0.50453	-0.0395	12.7765
S&P TSX COMPOSITE INDEX	0.18788	-0.0396	4.74196
I BOVESPA and G7 indices			
CAC 40	-4.5443	-0.1461	-31.109
FTSE 100 INDEX	4.5301	-0.1435	31.575
FTSE MIB	-0.7344	-0.0424	-17.314
GDAXI	-0.5127	-0.0427	-12.006
NIKKEI 225	0.10753	-0.0372	2.89407
NYSE COMPOSITE INDEX	0.36049	-0.0461	7.81435
S&P TSX COMPOSITE INDEX	0.64183	-0.0535	11.9996
RTS INDEX and G7 Indices			
CAC 40	-87.982	-2.7163	-32.39
FTSE 100 INDEX	-10.555	-0.3251	-32.463
FTSE MIB	10.9742	-0.3576	30.6866
GDAXI	-14.239	-0.4669	-30.497
NIKKEI 225	83.0709	-2.7891	29.784

Cont...

NYSE COMPOSITE INDEX	4.04733	-0.1464	27.6439
S&P TSX COMPOSITE INDEX	10.0784	-0.337	29.9095
SSE COMPOSITE and G7 indices			
CAC 40	-4.9503	-0.1541	-32.119
FTSE 100 INDEX	-16.608	-0.507	-32.755
FTSE MIB	-15.134	-0.4926	-30.724
GDAXI	6.30018	-0.21	30.0002
NIKKEI 225	9.83034	-0.3324	29.5755
NYSE COMPOSITE INDEX	-12.776	-0.424	-30.132
S&P TSX COMPOSITE INDEX	22.4652	-0.7468	30.0842

Source: Data collected from yahoo finance and FTSE computed from E Views 7

The results of Granger Causality Test, for BRICS and G7 nations' stock market indices, during the study period from April 2004 to March 2014, are presented in the **Table – 8**. F statistic value of FTSE/JSE TOP 40 revealed that there was unidirectional relationship with NYSE COMPOSITE and S&P TSX COMPOSITE, followed by NIKKEI 225 and IBOVESPA, SSE COMPOSITE and CAC 40, FTSE MIB and SSE COMPOSITE and only RTS INDEX experienced bidirectional causal relationship with GDAXI as F statistics values were greater than three and probability values were less than 0.05. It is to be noted that some BRICS stock markets indices enjoyed causal relationship with G7 nations' stock market indices during the study period. Therefore, the Null Hypothesis NH_{06} , "There is no causal relationship between the BRICS and G7 countries' stock markets index returns during the study period", is Rejected.

Table – 8 Results of Granger Causality Test for daily returns of BRICS and G7 countries' stock market sample indices

Null Hypothesis	F-Statistic	Prob.	Accepted / Rejected the Null Hypothesis
CAC 40 does not Granger Cause BSE SENSEX	0.72723	0.4833	Accepted
BSE SENSEX does not Granger Cause CAC 40	0.17109	0.8428	Accepted
FTSE 100 does not Granger Cause BSE SENSEX	2.52303	0.0804	Accepted
BSE SENSEX does not Granger Cause FTSE 100	0.05051	0.9507	Accepted
FTSE MIB does not Granger Cause BSE SENSEX	0.51068	0.6002	Accepted
BSE SENSEX does not Granger Cause FTSE MIB	1.65762	0.1908	Accepted
GDAXI does not Granger Cause BSE SENSEX	1.21737	0.2962	Accepted
BSE SENSEX does not Granger Cause GDAXI	1.4319	0.2391	Accepted
NIKKEI 225 does not Granger Cause BSE SENSEX	1.15799	0.3143	Accepted
BSE SENSEX does not Granger Cause NIKKEI 225	2.27956	0.1025	Accepted
NYSE COMPOSITE does not Granger Cause BSE SENSEX	2.86582	0.0571	Accepted
BSE SENSEX does not Granger Cause NYSE COMPOSITE	0.51315	0.5987	Accepted

Cont...

Null Hypothesis	F-Statistic	Prob.	Accepted / Rejected the Null Hypothesis
S&P TSX COMPOSITE does not Granger Cause BSE SENSEX	0.55736	0.5728	Accepted
BSE SENSEX does not Granger Cause S&P TSX COMPOSITE	0.52938	0.589	Accepted
FTSE\JSE TOP 40 does not Granger Cause CAC 40	0.38686	0.6792	Accepted
CAC 40 does not Granger Cause FTSE JSE TOP 40	0.43592	0.6467	Accepted
FTSE JSE TOP 40 does not Granger Cause FTSE 100	0.36584	0.6936	Accepted
FTSE 100 does not Granger Cause FTSE JSE TOP 40	0.41592	0.6598	Accepted
FTSE JSE TOP 40 does not Granger Cause FTSE MIB	2.9583	0.0521	Accepted
FTSE MIB does not Granger Cause FTSE JSE TOP 40	2.78046	0.0622	Accepted
FTSE JSE TOP 40 does not Granger Cause GDAXI	0.7371	0.4786	Accepted
GDAXI does not Granger Cause FTSE JSE TOP 40	1.37791	0.2523	Accepted
FTSE JSE TOP 40 does not Granger Cause NIKKEI 225	0.80312	0.448	Accepted
NIKKEI 225 does not Granger Cause FTSE \JSE TOP 40	0.3424	0.7101	Accepted
FTSE\JSE TOP 40 does not Granger Cause NYSE COMPOSITE	4.67512	0.0094*	Rejected
NYSE COMPOSITE does not Granger Cause FTSE/JSE TOP 40	0.75428	0.4705	Accepted
FTSE JSE TOP 40 does not Granger Cause S&P TSX COMPOSITE	0.97501	0.3773	Accepted
FTSE JSE TOP 40 does not Granger Cause S&P TSX COMPOSITE	4.77024	0.0086**	Rejected
IBOVESPA does not Granger Cause CAC 40	1.82293	0.1618	Accepted
CAC 40 does not Granger Cause INDEX	1.81458	0.1631	Accepted
IBOVESPA does not Granger Cause FTSE 100 INDEX	0.89012	0.4107	Accepted
FTSE 100 does not Granger Cause IBOVESPA	0.975	0.3773	Accepted
IBOVESPA does not Granger Cause FTSE MIB	0.38136	0.683	Accepted
FTSE MIB does not Granger Cause IBOVESPA	1.05343	0.3489	Accepted
IBOVESPA does not Granger Cause GDAXI	0.21105	0.8097	Accepted
GDAXI does not Granger Cause IBOVESPA INDE	0.12143	0.8857	Accepted
IBOVESPA does not Granger Cause NIKKEI 225	1.4772	0.2285	Accepted
NIKKEI 225 does not Granger Cause IBOVESPA	3.43111	0.0325*	Rejected

Cont...

Null Hypothesis	F-Statistic	Prob.	Accepted / Rejected the Null Hypothesis
IBOVESPA does not Granger Cause NYSE COMPOSITE	1.94463	0.1433	Accepted
IBOVESPA does not Granger Cause NYSE COMPOSITE	2.71804	0.0662	Accepted
IBOVESPA does not Granger Cause S&P TSX COMPOSITE	0.06814	0.9341	Accepted
S&P TSX COMPOSITE does not Granger Cause I BOVESPA	0.70314	0.4951	Accepted
RTS does not Granger Cause CAC 40	1.50715	0.2217	Accepted
CAC 40 does not Granger Cause RTS	1.05808	0.3473	Accepted
RTS does not Granger Cause FTSE 100	0.29877	0.7418	Accepted
FTSE 100 does not Granger Cause RTS	2.0549	0.1283	Accepted
RTS does not Granger Cause FTSE MIB	0.31564	0.7293	Accepted
FTSE MIB does not Granger Cause RTS	0.69297	0.5002	Accepted
RTS does not Granger Cause GDAXI	5.02015	0.0067**	Rejected
GDAXI does not Granger Cause RTS	4.41796	0.0122*	Rejected
RTS does not Granger Cause NIKKEI 225	1.36838	0.2547	Accepted
NIKKEI 225 does not Granger Cause RTS	0.65939	0.5173	Accepted
RTS does not Granger Cause NYSE COMPOSITE	0.38462	0.6808	Accepted
NYSE COMPOSITE does not Granger Cause RTS	1.26671	0.2819	Accepted
RTS does not Granger Cause S&P TSX COMPOSITE	1.12651	0.3243	Accepted
S&P TSX COMPOSITE does not Granger Cause RTS	0.34655	0.7072	Accepted
SSE COMPOSITE does not Granger Cause CAC 40	8.42981	0.0002**	Rejected
CAC 40 does not Granger Cause SSE COMPOSITE	0.48783	0.614	Accepted
SSE COMPOSITE does not Granger Cause FTSE 100	0.42171	0.656	Accepted
FTSE 100 does not Granger Cause SSE COMPOSITE	1.20697	0.2993	Accepted
SSE COMPOSITE does not Granger Cause FTSE MIB	0.2009	0.818	Accepted
FTSE MIB does not Granger Cause SSE COMPOSITE	4.40083	0.0124*	Rejected
SSE COMPOSITE does not Granger Cause GDAXI	0.15331	0.8579	Accepted

Cont...

Null Hypothesis	F-Statistic	Prob.	Accepted / Rejected the Null Hypothesis
GDAXI does not Granger Cause SSE COMPOSITE	0.4288	0.6513	Accepted
SSE COMPOSITE does not Granger Cause NIKKEI 225	2.52558	0.0802	Accepted
NIKKEI 225 does not Granger Cause SSE COMPOSITE	0.71741	0.4881	Accepted
SSE COMPOSITE does not Granger Cause NYSE COMPOSITE	0.92628	0.3962	Accepted
NYSE COMPOSITE does not Granger Cause SSE COMPOSITE	1.25499	0.2853	Accepted
SSE COMPOSITE does not Granger Cause S&P TSX COMPOSITE	0.40087	0.6698	Accepted
S&P TSX COMPOSITE does not Granger Cause SSE COMPOSITE	1.08179	0.3391	Accepted

Source: Data collected from yahoo finance and FTSE computed from E Views 7

**= significant at 1% Level

* = significant at 5% Level

Summary and Conclusion

This study investigated the stock market linkages between BRICS and G7 stock market indices during the study period from April 2004 to March 2014. Descriptive Statistics, Kolmogorov–Smirnov Test (K–S test), Augmented Dickey Fuller Test, Phillips – Perron Test, GARCH (1, 1) Model, Johansen Co Integration Test, Vector Error Correction Model and Granger Causality Test were used to analyze the stock market linkages. Kolmogorov –Smirnov Test (K–S test) revealed that the all the sample indices daily price return of BRICS and G7 countries' stock markets were normally distributed. The Augmented Dickey Fuller Test and Phillips – Perron Test found out that the sample indices of BRICS and G7 nations' stock markets daily returns attained stationarity at the level difference. BRICS and G7 nations' stock market indices daily price return were volatile. SSE COMPOSITE, FTSE MIB and GDAXI indices were highly volatile compared to other indices. The co integration test between BRICS and G7 stock markets sample indices revealed that the sample indices of BRICS stock markets, namely, BSE SENSEX, FTSE/JSE TOP 40 INDEX, IBOVESPA, RTS INDEX and SSE COMPOSITE were co integrated with G7 nations' stock market indices, namely, CAC 40, FTSE 100 INDEX, FTSE MIB, GDAXI, NIKKEI 225, NYSE COMPOSITE INDEX and S&P TSX COMPOSITE INDEX. It further indicated long run relationship between these indices. Short run relationship was found between BRICS and some G7 stock indices except BSE SENSEX. RTS index. GDAXI was the only

index which exhibited bidirectional relationship among the BRICS and G7 stock indices. Unidirectional relationship was noticed between NIKKEI 225 and FTSE/JSE TOP 40 INDEX, S&P TSX COMPOSITE INDEX and FTSE/JSE TOP 40 INDEX, NIKKEI 225 and IBOVESPA INDEX, SSE COMPOSITE INDEX and CAC 40 INDEX, FTSE MIB and SSE COMPOSITE INDEX. From the empirical analysis, the study found BRICS and G7 stock markets indices to have experienced both long run and short run linkages, but some indices did not record short run linkages during the study period from April 2004 to March 2014. It can be concluded that international investors could gain long run and short run benefits from these indices and hence investors are advised to exploit the portfolio diversification opportunity in the long run and short run period.

References

1. *Amitesh Kapoor and Harendra Singh (2013), Stock Market Co-Integration: An Investigation of South Asian Countries, ACADEMIA, Vol. 3, No. 10, pp. 19 – 31.*
2. *Gurcharan Singh and Pritam Singh (2010), Chinese and Indian Stock Market Linkages with Developed Stock Markets, Asian Journal of Finance & Accounting, Vol. 2, No. 2, pp. 21-39*
3. *Heikki Lehkonen (2014), Timescale-dependent stock market co movement: BRICs vs. developed markets, Journal of Empirical Finance, No. 28. pp. 90 – 103.*
4. *I-Chun Tsai (2012), The relationship between stock price index and exchange rate in Asian markets: A quantile regression approach, Journal of International Financial Markets,*



- Institutions & Money*, 22, pp. 609–621.
5. Jagroop Kaur (2012), Are the Stocks Exchanges Interlinked: A case of Islamic Countries & US, *BIZ & Bytes- A quarterly journal of Management & Technology*, Vol.1, No.4, pp. 128 – 137.
 6. Jian Yang and Moosa M. Khan (2003), Increasing Integration between the United States and Other International Stock Markets? A Recursive Cointegration Analysis, *Emerging Markets Finance & Trade*, Vol. 39, No. 6, pp. 39-53.
 7. Johansen, S. and K. Juselius (1990). Maximum Likelihood Estimation and Inference on Co integration with application to the demand for money, *Oxford Bulletin of Economics and Statistics*, Vol. 52, No. 2, pp - 169-210.
 8. K. Malarvizhi and M.Jaya (2012), An Analytical Study on the movement of NIFTY Index and Exchange rate, *IJMT*, Vol.2, No.7, pp.274-282.
 9. Kui Fan, Zudi Lu and Shouyang Wang (2009), Dynamic Linkages between the China and International Stock Markets, *Asia-Pacific Finan Markets* Vol.16, pp.211–230.
 10. Kevin James Daly (2003), Southeast Asian Stock Market Linkages: Evidence from Pre- and Post-October 1997, *ASEAN Economic Bulletin*, Vol. 20, No. 1, pp. 73-85.
 11. Leonidas Sandoval Junior, Italo De Paula Franca (2012), Correlation of financial markets in times of crisis, *Physica A* 391, pp.187–208.
 12. Li Liu, Jieqiu Wan (2012), The relationships between Shanghai stock market and CNY/USD exchange rate: New evidence based on cross-correlation analysis, structural co integration and nonlinear causality test, *Physica A*, No. 391, pp. 6051–6059.
 13. Małgorzata Doman and Ryszard Doman (2013), Dynamic linkages between Stock Markets: The Effects of Crises and Globalization, *Port Econ J* Vol. 12, PP. 87–112.
 14. M. Kabihassan (2001), Short run and long run dynamic linkages among International Stock Markets, *International Review of Economics and Finance*, Vol.5, No. 4, pp. 387-405.
 15. M.V. Subha and S. Thirupparkadal Nambi. (2010), A study on Co integration between Indian and American stock markets, *Journal of Contemporary Research in Management*, Vol. 7, No. 3, pp. 105 - 113.
 16. Ranjan Dasgupta (2014), Integration and Dynamic Linkages of the Indian Stock Market with BRIC – An Empirical Study, *Asian Economic and Financial review*, Vol. 4, No. 6, pp. 715 – 731.
 17. Sangeeth Singh and Gagan Deep Sharma (2012), Inter linkages between stock Exchanges: A Study of BRIC nations, *International Journal of Marketing, Financial Services & Management research*, Vol.1, No. 3, pp. 1 to 17.
 18. Searat Ali and Babar Zaheer Butt (2011), Co movement between Emerging and Developed Stock Markets: An Investigation through Co integration Analysis, *World Applied Sciences Journal*, Vol. 12, No. 4, pp. 395-403.
 19. Srinivasan Palamalai, Kalaivani M. (2013), Stock Market Linkages in Emerging Asia-Pacific Markets, SAGE Open electronic copy available at <http://sgo.sagepub.com/content/3/4/2158244013514060>
 20. Yaser A. Alkulaib (2007), Dynamic Linkages among Equity Markets in the Middle East and North African, Electronic copy is available at: <http://ssrn.com/abstract=979342>

Event Based Analysis of the Corporate Bond Market in India through a 7i Framework

Shagun Thukral

Abstract

A well functioning and efficient corporate bond market is necessary for any economy. While most developed markets like the US have one in place, emerging economies are slowly realizing the importance of one. The need was especially highlighted post the Asian currency crisis in the late 1990s. India, a predominantly bank based economy, has been taking numerous measures to deepen its corporate bond markets over the last decade. The Patil Committee Report published in 2005, brought to light the various areas in which the regulators, RBI and SEBI, needed to concentrate to increase the traded volumes in this market. Some of the areas brought out by this report were the lack of demand and supply of bonds, weak infrastructure, lack of retail participation etc. This paper seeks to establish through the 7i Framework of the RBI, the strides the market has already made in this regard and the possible areas that still need a push. The researchers have relied on the published news reports pertaining to the corporate bond markets in India to collect data on the issuances for the calendar year 2015 as well as other material information concerning the markets. These have been discussed in detail to identify which of the 7i's is the focus area for policy development and where there remains further room for action.

Key Words

Corporate Bond Markets, Indian Corporate Bond Markets, 7i Framework

Background and Context

The credit markets in India are heavily reliant on the banking system as the corporate bond markets contribute only 21% of the total financing in contrast to developed economies where this is almost 80% (Sengupta and Anand, 2014). This dependence on banks has created significant strain on the banks' balance sheets, rising non-performance assets and lack of funds for small and medium enterprises. (Korivi and Rachappa, 2012; Korivi and Tandon, 2013).

The focus on developing a corporate bond was felt soon after the Asian Crisis of 1997-99 where although India remained insulated to some extent on account of strict capital controls, other South-East Asian economies suffered a currency crisis. A high-level Committee under the leadership of Dr. R.H. Patil was set up to study the factors constraining the development of corporate bond markets in India. The Committee presented its findings in December 2005 post which the government and regulators focused their attention to developing this market.

Several policy initiatives, high level committees and regulatory changes have resulted in a positive impetus to the flagging corporate bond market in India. One of the prominent areas where the corporate bond market was considerably lacking was the weak financial infrastructure. The Patil Committee report (2005) as well as Raghavan et al, (2014) pointed out that the transparency, reliability and timeliness of information was missing in the Indian corporate bond markets. One of the reasons for this was perhaps the Over the Counter (OTC) nature of the market, small number of institutional investors, no trading, reporting or settlement platforms, counterparty risk etc.

With the setting up of the Wholesale Debt Market on the national stock exchanges (NSE and BSE), some of these constraints have been done away with leading to an improvement in the financial infrastructure of the markets. Trades must now be reported within minutes of its conclusion as well as settled through the exchange. However, counterparty risk still remains as there is no settlement guarantee.

Another area of concern identified was the lack of demand and supply of corporate bonds. Demand is concentrated in the hands of large institutional players like mutual funds and insurance companies that have strict regulatory requirements on credit quality. Moreover there is a crowding out by the large issuances by the government bonds. Retail participation is minimal and investment by Foreign Investors is regulated and limited to USD 51 Bn. Luengnaruemitchai and Ong (2005), pointed out that the lack of innovative debt instruments as well as derivative instruments also been a factor in the under-developed nature of this market. On the supply side, corporate prefer to access the banking system, especially the companies with lower credit quality that do not find investors. Also the issuance costs like stamp duties sometimes act as a hindrance to issuers.

However, the data collected and analysed in this paper suggests that we are seeing an uptick in the issuances. Measures like introduction of repo in corporate bonds, renewed interest and trading in the interest rate futures on the NSE are creating the required environment for a push in the development of the corporate bond markets.

The structure of this paper is as follows: **Section 1** briefly reviews the existing body of literature identifying the various issues and challenges plaguing the Indian Corporate Bond markets. **Section 2** discusses the RBI's 7i Framework explaining what each of the 'i's entails and the current status of each of them. **Section 3** looks at the data collected through newspaper articles for calendar year 2015 within RBI's 7i Framework to determine which of the 7i's are lagging and require further attention. **Section 4** summarizes the findings and arrives at the conclusions.

Section 1 : Literature Review

India has inherently been a bank-based economy, unlike developed market economies like that of the United States of America or the United Kingdom. Various studies on the superiority of either financial system show that while neither is better than the other, a financial system with both a well developed bond market and a stable banking system allows for diversity in the financial system (Eichengreen, 2006). Herring and Chitusripitak (2000), pointed out that if there is an absence of a well developed bond market, interest rates would not be market determined and there would be inefficiencies in the system in measuring cost of capital and savings.

The importance was further highlighted during the Asian Crisis of 1997-98, where it was felt that the presence of an efficient and developed bond market may have reduced the extent of the crisis. The early 2000s saw most Asian economies focus on developing the corporate bond markets. The Korean example would be one to emulate which emphasized on the government bond market so that there would be a strong benchmark

for the corporate market. The infrastructure was reformed with electronic trading, clearing and settlement processes. Moreover, the securitization market was also developed along with credit enhancement mechanisms to increase liquidity (Park, 2008)

In India too, similar attempts were made through policy initiatives and improvements in infrastructure. A high level committee headed by Dr. R.H Patil was set up in 2005 to submit their findings on the factors constraining the development of the corporate bond markets in India.

The committee found that a strong infrastructure with strong regulations and a well functioning government bond market were imperative for giving an impetus to the corporate bond markets. Luengnaruemitchai and Ong (2005) also voiced similar opinions where they stated that a liquid sovereign bond market serves as benchmark for pricing corporate securities along with the fact that a strong legal framework would go a long way in promoting this market. The lack of this, pointed out Khanna and Vattoril (2012), has been one of the reasons that market hasn't developed as expected, specifically when it came to sound bankruptcy laws and tax regimes. Lack of transparency, timeliness of information and a small investor base also contributed to the lethargic condition of the corporate bond markets. (Raghavan *et al.*, 2014).

Another area highlighted by the committee was that pertaining to the credit assessment process. This included credit rating, credit enhancement processes, structured assets.

While all the above mentioned areas deal with systemic issues that need to evolve, there also exists an inherent mismatch on the demand and supply of corporate bonds in India. Demand is driven by insurance companies, mutual funds and retirement funds like pension and provident funds. Retail participation is almost negligible and restricted to a few NBFC issues. Investment by Foreign Portfolio Investors (FPI) is regulated by the RBI and is limited to USD 51 Bn. Therefore, the number of players is extremely small and narrow. Other than the mutual funds, the maturity and risk profile of the investors is skewed towards long term and low risk. In contrast, the supply is concentrated to public sector financial institutions and NBFCs where maturity is typically less than 10 years. As a result liquidity in the market is poor.

Lack of innovative debt-instruments or related derivative instruments have also largely affected the growth of the Corporate Bond markets in India (Luengnaruemitchai and Ong, 2005; Mitra, 2009). Development of a Credit Default Swaps has acted as a catalyst for price discovery of corporate bonds in the US markets. However, in case of India, a strong and liquid bond market should be the backdrop for such breakthroughs (Patil, 2005; Shim and Zhu, 2010).

High issuance costs along with differential stamp duty and TDS laws are also some of the reasons that have impeded the development of corporate bond markets in India (Raghavan

and Sarwono, 2012; Khan, 2012; Patil, 2005).

Section 2: RBI's 7i Framework for a Vibrant Debt Market

Based on the factors highlighted so far, the Deputy Governor of RBI, Shri HR Khan has, on numerous occasions and platforms, spoken about a "7i Framework" for the development of corporate bond markets in India. These 7 I's encompass all the relevant and critical components that are important for a well functioning and vibrant market. These are as follows:

1. Investors
2. Issuers
3. Instruments
4. Infrastructure
5. Intermediaries
6. Incentives
7. Innovation

We will now discuss each of these components in detail as envisioned by the RBI in their discussions.

Investors

As mentioned earlier, the investor base in the corporate debt market is narrow and limited to banks, insurance companies, provident funds, Primary Dealers (in a small way) and pension funds. The current investment guidelines for most of these entities are stringent and require a large part of their portfolios be invested in either government securities or high-quality corporate bonds. As a result there is a reluctance to invest in low-rated papers. There is a case for allowing banks to provide credit enhancement to such low rated instruments as they have access to bank finance. However, this will result in an increase in the risk of the banking system. In a recent address by Shri HR Khan (Oct 2015), he has stated the need for liberalizing the investment guidelines for the regulated entities to allow for more active participation. He also made a case for allowing them to invest in certain interest rate derivatives like interest rate swaps, repos and credit default swaps.

Participation of retail investors in the corporate bond market also needs to be encouraged. While their role is currently miniscule, there has been an uptick in their activity when it comes to tax-free bonds issued by infrastructure activity. It was also found that public issues of NBFCs offering high coupons, were oversubscribed. The framework by RBI suggests issuing zero coupon bonds with clear tax norms and having a quota for retail investors to encourage participation from this segment.

Issuers

The RBI points out that some of the reasons that the Indian financial system continues to be heavily dependent on the banking system is on account of ease of access, lack of credit risk mitigation, no sound bankruptcy framework and absence of interest from long term investors like insurance companies.

In addition, public sector undertakings and banks dominate the issuances with 95% of them being privately placed. (SEBI). There is a concentration of ratings in AA or higher with maturities in the 2 to 5 year segment. Moreover, issuance costs like stamp duties, transfer costs also deter companies in tapping the bond markets.

To overcome these issues, the RBI has suggested the re-issuance of existing bonds with the same ISIN code. This will help increase liquidity and reduce cost of issuances. However there seems to be some resistance on this front.

There is also talk of enabling a municipal bond market although this is largely dependent on an active corporate bond market. Currently there is very little interest in this segment and almost no secondary market trading.

Instruments

Trading in the corporate bond market is highly concentrated in plain vanilla fixed coupon bonds. Although a lot of innovation in structures has come to the market, it finds limited demand on account of issues like prices, valuation, liquidity etc. Instruments like corporate bond repo, credit default swaps, interest rate futures, structured assets, etc have long been permitted by the regulators but have seen limited trading.

The lack of interest in corporate bond repo has been attributed to the non-signing of the Global Master Repo Agreement as well as the fact that two of the biggest investors –insurance companies and mutual funds – are not permitted to lend in the repo market.

Similarly with CDS, there are several restrictions on regulatory and exposure norms that currently does not make it viable for banks to trade in these securities. These norms are being relooked at along with increasing participation from other players.

Investment Guidelines for insurance and pension funds may also be relaxed to allow investment in Municipal Bonds.

Infrastructure

The government bond market has grown leaps and bounds as the RBI enhanced the market infrastructure to create an efficient, transparent and robust system. This included an electronic bidding system for primary issuances, DvP-III mode of settlement, RTGS, online trading platform-NDS and NDS-OM and guaranteed settlement through CCIL.

However the same level of infrastructure is yet to be achieved for corporate bonds. Few steps have been taken. For eg. The clearing houses of stock exchanges now have a transitory pooling account facility for the settlement of OTC trades in the bond market on a DvP-1 basis. This takes away counterparty risk to some extent.

The NSE has set up an online trading platform for privately placed bonds however it hasn't picked up on account of high

margins, penalties and absence of DvP-III settlement like in the case of government bond markets. There is a need to set up an online trading platform for corporate bond repo as well. The corporate bond markets are also heavily reliant on the credit assessment of rating agencies. Improvement in their disclosure and transparency norms will also help the market. This is specifically important given the role of these agencies in the 2008 crisis as well as recent events of defaults in India.

In terms of infrastructure and framework, the one area that needs immediate attention is reform of bankruptcy law to ensure that there is streamlining and resolution of insolvency case in an accelerated manner.

Intermediaries

The role of intermediaries in the corporate bond markets is limited to merchant bankers, brokers and rating agencies. There is an absence of a market making scheme- like Primary Dealers in the government bond segment - which results in low liquidity in the secondary markets. The RBI has suggested that the stock exchanges maybe able to work with regulators to provide such a facility in this segment.

Incentives

One of the reasons attributed by corporate for preference of bank credit over the markets, is the complexity of stamp duty and other issuance costs. The RBI has suggested the rationalizing of stamp duty laws in order to incentivize issuers to tap the corporate bond markets. Moreover there remains disparity between investors on tax laws pertaining to TDS and withholding tax where insurance companies and mutual funds are exempt. There is also a need to relook at the tax provisions of securitized debt and the SPVs to allow for more issuances in this segment.

Recently (March 2015), the RBI has issued a discussion paper on restricting the exposure of a large corporate to the banking system. This will necessitate that corporate access both banks and the markets for the funding requirements.

Innovation

Innovation in financial markets needs to be done while ensuring an adequate risk management system is in place to deal with these innovative products. There have been some strides made in this regard to meet the needs of issuers as well as investors. Some of the suggestions of the RBI on this regard are the introduction of Partial Credit Enhancements (PCE) by banks to improve ratings of certain issuances. A bond index can also be developed to serve as a benchmark although this has met with a lot of challenges.

Section 3 : Data Collection and Methodology

Data pertaining to corporate bond markets is mainly aggregated data available with SEBI, RBI, NSE BSE, Primedatabase, Bloomberg etc. This data primarily comprises of total issuances

as well as investments by various category of investors. In order to get a much granular level of data, we have decided to look at data in the form of press releases which are published in the leading financial dailies for the calendar year 2015. All news items pertaining to the corporate bond markets have been considered. The newspapers that have been considered are as follows (in alphabetical order):

1. BusinessLine
2. Business Standard
3. DNA
4. Economic Times
5. Financial Express
6. Hitvada
7. Hindustan Times
8. Indian Express
9. Live Mint
10. Times of India

In the calendar year 2015, assuming a total of 365 days, adjusting for weekends and public holidays, there are about 250 working days. Against this, the researchers have collected 253 published news reports. This is a little over 100% of information hit, or in simple words, there is some news pertaining to the corporate bond market published every day. (Annexure 1)

We have assessed the published information in each newspaper report keeping the RBI's 7i Framework in mind. Each piece of news has embedded within it potentially 7 aspects of the bond market – Investors, Issuers, Intermediaries, Instruments, Infrastructure, Incentives and Innovation. This information is classified under the respective head. This is not mutually exclusive, implying that each piece of news item will have at least 1 classification and a maximum of 7 classifications (only 1 per head for 1 piece of news).

Of the 255 published news reports collected by us, we have a total of 481 classifications under all 7 heads of the 7i Framework. The assumption is, that of the 7i's, some of the areas are getting more attention and focus in terms of development, while others may have been pushed into the background. Through this study, we will be able to identify the lagging areas of development and bring them into the forefront.

A brief summary of the analysis done by us shows, that out of the 481 classifications made by us, 195 (or 40.5%) of these pertain to Issuers whereas only 9 or 1.9% of these pertain to infrastructure.

We will now look at this information at a further granular level

to get a better understanding of data.

Investors

The total classifications under the head of Investors is 102 or 21.2% of the total information captured. A study of the press releases under this category pertains broadly to the following:

(a) increase in the limit of investment allowed to foreign portfolio investors from the current level of \$51 Bn. This is a positive for the market as it increases the investor base. The FPIs have been increasing their exposure and are close to exhausting their limits.

(b) Banks can now invest in Infra Bonds – this will add another player in this segment as banks were not permitted earlier.

(c) Large Issuances of Tax Free Bonds by infrastructure companies saw oversubscription and huge interest from retail participants include HNIs and movie stars! This indicates a demand from retail players when incentives are offered.

(d) Mutual Funds, especially JP Morgan MF came under significant distress after default on its assets highlighting credit risk for investors

(e) RBI allowed FPIs to invest in distressed assets.

(f) Power Bonds –bonds issued by Discoms – are seeing strong investor demand. This is a positive for the markets.

Issuers

The total classifications under the head of Issuers is 195 or 40.5% of the total information captured. A study of the press releases under this category pertains broadly to the following:

(a) As is the case every year, 2015 also saw large issuances by PSUs like PFC, PGC, REC IRFC, etc. In addition some of them were also allowed to issue tax free bonds which saw high investor interest.

(b) Apart from the PSUs, banks tapped the market to raise money for their capital requirements through Tier-II bonds, Perpetual Bonds as well as Additional Tier 1 Capital bonds under Basel 3 Norms.

(c) The year also saw several small players tapping the bond markets like Equitas, Muthoot Capital, Oberoi Realty, etc

(d) NTPC issued debentures as bonus payments

(e) Vodafone raised a massive 7700 Crores from the markets through bonds for the first time to refinance its debt.

(f) HDFC raised Rs. 5000 Crores via Warrants and NCDs

(g) Yes Bank became the first bank to issue Green Bonds.

(h) Amtek Auto defaulted on its debentures causing severe distress in the markets.

(i) The total corporate bond issuances during Apr-Nov 2015 was 2.55 lakh crores, a 3.2% increase over the previous year

Instruments

The total classifications under the head of Instruments is 49 or 10.2% of the total information captured. A study of the press

releases under this category pertains broadly to the following:

(a) Introduction of new instruments such as Green bonds, Additional Tier 1 Capital bonds

(b) Issue of bonus debentures by NTPC

(c) Repo in corporate bonds to be used to improve liquidity

(d) Continued use of Tier 2 and Perpetual Bonds by banks to meet their capital requirements.

The lack of concentration of information in this area suggests that the market still prefers plain vanilla coupon bonds. More should be done to bring out different instruments to meet the requirements of different category of investors and issuers.

Infrastructure

The total classifications under the head of Infrastructure is 9 or 1.9% of the total information captured. A study of the press releases under this category pertains broadly to the following:

(a) SEBI is trying to promote online sales of bonds and has plans of unveiling an electronic platform

(b) SEBI is setting up a framework to improve transparency and impact reporting for Green bonds

This area is one of the laggards. An improvement in this could lead to further development of markets.

Intermediaries

The total classifications under the head of Intermediaries is 32 or 6.6% of the total information captured. A study of the press releases under this category pertains broadly to the following:

(a) The main intermediaries are merchant bankers that help in loan syndication and bond issuances. Axis Bank was the leading bank in this area. There isn't information about merchant bankers for every report on issuers

(b) The Government announced the setting up of a bond guarantee entity which will provide to credit enhancement

(c) The role of rating agencies once again came into question after they failed to downgrade Amtek Auto prior to its default.

(d) IIFCL launched "credit enhanced infra bonds" with Ireda being the first beneficiary

Incentives

The total classifications under the head of Incentives is 12 or 2.5% of the total information captured. A study of the press releases under this category pertains broadly to the following:

a. Incentives to banks to issue and invest in Green bonds and Infra Bonds by way of lower capital requirements

b. Easier tax norms necessary to promote investment in corporate bonds

Innovation

The total classifications under the head of Innovation is 82 or 17.0% of the total information captured. A study of the press releases under this category pertains broadly to the following:

- a. Innovation has been driven by the introduction of new category of bonds like Green Bonds, Infra Bonds, Junk Bonds and Vulture Funds, Tax Free Bonds, etc
- b. Credit enhancement through a bond guarantee entity as well as by IIFCL

Section 4 :Summary and Conclusions

A molecular look at the data discussed above suggests that while there remain several areas of work, especially in terms of development of infrastructure, regulators and market participants have made large strides in the last year towards the development of the markets. To summarise these developments:

1. Large number of issuances in the year – aggregate data by SEBI suggests that total issuances during the year were Rs. 4.8 lakh crores which is 38% over calendar year 2014. Some big names like Vodafone accessed the market for the first time including several small issuers which is a good sign for the markets.
 2. Significant innovative instruments to meet the requirements of issuers and investors were seen during the year. Especially tax free bonds that caught the fancy of retail investors and Green Bonds that were issued by banks could play a big role in the time to come.
 3. Power Bonds that were announced, maybe a great way to reduce stress of these loans from the books of banks as well provide funding to much starved discoms that are currently suffering from the lack of funds.
 4. Providing credit enhancement through a government owned Bond Guarantee Fund will be a great way for lower rated companies that currently do not see much demand in the bond markets, to access the investors.
 5. With IIFCL providing the first steps in credit enhancement for infra companies, will make it easier for project finance to raise funds through the bond markets.
 6. By allowing banks to issue and invest in Infra Bonds, helps to fund the large infrastructure financing need of the country without disrupting the asset-liability requirements of the banks.
 7. Increasing participation of FPIs in the corporate bond markets would also help in increasing the investor base. The RBI has already permitted FPIs to invest in Vulture Funds.
- Some of the areas that still need attention are as follows:

1. On the regulatory front, a sound bankruptcy framework is the need of the hour. The laws need to be updated and strengthened to allow for faster resolution of such cases.
2. The tax regime that allows for differential rates for different category of investors for interest income on bonds also needs to be rationalized. This creates arbitrage possibilities and inefficiencies in the system. This also

- includes the withholding tax paid by foreign investors.
3. The issuance costs in terms of stamp duty and transfer duties on issue of corporate bonds vary greatly from state to state. This serves as a hindrance for issuers who then prefer accessing banks for funds.
4. While several significant steps have been taken by SEBI to allow for online trading platforms for corporate bonds, the high costs associated with this such as margins and penalties, have kept institutional investors away. Bringing trading online along with settlement guarantees like in the case of the NDS system for government bonds would help stimulate the market.

In conclusion, the recent studies and push from RBI and SEBI have ensured that the corporate bond markets are moving in the right direction. The 7i Framework outlined by Mr. HR Khan of the RBI has helped dissect and identify the problem areas to a narrower frame, that can allow government and regulators to take steps in the appropriate areas.

It is hoped that this paper serves as a base for more empirical work as the Indian corporate bond market further develops.

References

1. Eichengreen, B. (2006), "Asian bond markets: issues and prospects", BIS Papers No. 30, available
2. at: www.bis.org/arp/conf_0403.pdf (accessed 11 October 2014).
3. Herring, R.J. and Chatusripitak, N. (2000), "The case of the missing market: the bond market and
4. why it matters for financial development", ADB Institute Working Paper 11, available
5. at: http://siteresources.worldbank.org/DEC/Resources/84797-1251813753820/6415739-1251814028691/herring_chatusripitak.pdf (accessed 12 October 2014).
7. Khan, H.R. (2012), "Towards Vibrant Debt markets – A 7i Framework", RBI Monthly Bulletin April 2012-, available at: https://rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=13132 (accessed 01 January 2016).
8. Khan, H.R. (2012), "Corporate debt market – developments, issues & challenges", BIS Central
9. Bankers' Speeches – FICCI Annual Conference on Capital Markets, available at: www.bis.org/review/r121016g.pdf (accessed 12 October 2014).
11. Khan, H.R. (2015), "Corporate Bond Markets in India: A Framework for Further Action", RBI Speeches –FICCI CAPAM-2015, Mumbai 27 October 2015, available at: https://www.rbi.org.in/Scripts/BS_SpeechesView.aspx?Id=980 (accessed 01 January 2016).
12. Khanna, V. and Vattoril, U. (2012), "Developing the market for corporate bonds in India", NSE
13. Working Papers, 6, available at: www.nseindia.com/research/content/WP_6_Mar2012.pdf (accessed 10 October 2014).
- 14.

15. Korivi, S.R. and Rachappa, S. (2012), "Indian corporate bond market: an issuer's perspective", *International Economics & Finance Journal*, HSBC School of Business, Shenzhen, Peking University, Vol. 22 No. 2, July-December.
16. Korivi, S.R. and Tandon, P. (2013), "Structure of the Indian corporate bond market: a post-2005 view", *International Economics & Finance Journal: (IEFJ)*, Vol. 8 No. 1, pp. 101-115.
17. Luengnaruemitchai, P. and Ong, L.L. (2005), "An anatomy of corporate bond markets: growing pains and knowledge gains", IMF Working Paper WP/05/152, available at: www.imf.org/external/pubs/ft/wp/2005/wp05152.pdf (accessed 10 October 2014).
18. Mitra, A. (2009), "Why corporate bond market in India is in Nelson's low level of equilibrium trap for so long?", NSE India, available at: www.nse-india.com/content/press/NS_mar2009_2.pdf
19. Park, J. (2008), "Bond market development: the experience of the Republic of Korea", UNESCAP Working Paper, available at: www.kdevelopedia.org/mnt/idas/asset/2013/06/25/DOC/PDF/04201306250126873077523.pdf#.VhPum_mqqk0 (accessed 14 October 2014).
20. Patil, R.H. (2005), "Report of high level expert committee on corporate bonds and securitization", Patil Committee Report, available at: <http://finmin.nic.in/reports/Report-Expert.pdf> (accessed 12 September 2014).
21. Raghavan, S., Sahoo, A., Hait, A. and Ghosh, S. (2014), "A study of corporate bond market in India: theoretical and policy implications", *Development of Economic and Policy Research*.
22. Reserve Bank of India, available at: <https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/DR40040314FS.pdf> (accessed 15 December 2014).
23. Raghavan, S. and Sarwono, D. (2012), "Corporate bond market in India: lessons from abroad and road ahead", *International Journal of Trade Economics and Finance*, Vol. 3 No. 2.
24. Sengupta, R. and Anand, V. (2014), "Corporate debt market in India: lessons from the South African experience", *Indira Gandhi Institute of Development Research, Mumbai*, WP-2014-029, available at: www.igidr.ac.in/pdf/publication/WP-2014-029.pdf
25. Shim, I. and Zhu, H. (2010), "The impact of CDS trading on the bond market: evidence from Asia", BIS Working Papers No. 332, available at: www.bis.org/publ/work332.pdf (accessed 11 October 2014).

Annexure 1 : News Summary on Corporate Bond Markets in India Calendar Year 2015

Sr. No	Month	Issuer	Investor	Instrument	Intermediary	Innovation	Incentive	Infrastructure
1	January	12	8	2		3	2	
2	February	15	4	6		9	3	
3	March	17	12	9	4	6	1	
4	April	9	5			7	2	
5	May	6	5	2	1	1		
6	June	16	2	1		1		
7	July	9	4	4	3	6	1	
8	August	5	1		2	1	1	2
9	September	40	19	4	12	16	1	
10	October	25	12	8	6	6	1	1
11	November	6	8	3	1	5		4
12	December	35	22	10	3	21		2
	Total	195	102	49	32	82	12	9
	Grand Total	481						

Source: Copyright: © Sunder Ram Korivi, NISM

Factors Affecting Credit Risk of Indian Banks: Application of Dynamic Panel Data Model

Santi. G. Maji

Preeti Hazarika

Abstract

This paper has tried to address the factors affecting the credit risk of Indian banks considering the dynamic nature of credit risk. The results of the distribution of credit risk over the years show significant changes. To address this dynamic nature of credit risk, we have employed the dynamic panel data regression model. The results indicate that there is lag impact of credit risk which positively influences the current risk. The results also indicate that profitability, bank capital and growth in GDP are negatively associated with credit risk for all the banks. On the other hand, loan loss provision has a positive influence on the credit risk. However, significant differences in results are found between public sector and private sector banks.

Key Words

Credit Risk, Profitability, Bank Size, Bank Capital, Liquidity Risk, Dynamic Panel Data Model, Indian Banks

1. Introduction

Risk management of banks has emerged as one of the focal points for the academicians and the practitioners in recent times due to the banking crisis observed in different countries (Rime, 2001; Stephanou and Mendoza, 2005; Maji and De,

2015). In order to promote the soundness and stability of the banking system, the Basel Committee on Banking Supervision at the international level and the apex bank of different countries have initiated many reformative steps in both developed and emerging economies. However, the banks and the regulatory bodies all over the world are still in search of appropriate policy measures to reduce the risk of banks and financial institutions. All over the world the banks and financial institutions play significant role for the development of economy in general and for the expansion of credit need in emerging economies in particular due to weak capital market (Tang, 2006; Saci et al., 2009). Sound financial health of banks is, thus, crucial for the development of emerging economies.

Indian commercial banks play significant role for the development of Indian economy. As per the economic survey report 2013-14, India has the second fastest growing services sector with its CAGR (compound annual growth rate) at 9.0 per cent during 2001 to 2012. It is also evident from the report that India has witnessed a credit boom in terms of bank lending over the last decade, with the share of credit-GDP has increased from 35.5 percent in 2000 to 51 percent in 2013. At the same time, the high NPAs of Indian banks are an alarming factor for the stability and growth of Indian banks. Several measures have been undertaken to minimise NPAs of Indian banks, such as setting up of Board for Industrial and Financial Reconstruction (BIFR), Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI), The Debts Recovery Tribunal (DRTs), The One

Time Settlement Policy (OTS) etc, however none of them has proved fruitful (Samir and Kamra, 2013). Some researchers have tried to address the credit risk of Indian banks (Singh, 2011; Singh and Gupta, 2013; Bhaskar, 2014; Naresh and Rao, 2015), but the studies are theoretical in nature.

Among the empirical studies in india, some researchers have examined the credit risk and bank capital employing simultaneous equation model (Nachane *et al.*, 2000; Dash & Ghosh, 2004; Maji and De, 2015). The researchers have observed that risk and capital of Indian banks are inversely associated. There are a few studies that examine the factors affecting credit risk of Indian banks. For instance, a study conducted by Rajaraman *et al.*, (1999) on inter-bank variations in NPAs of Indian commercial banks suggests that improvement in the enforcement environment is required for enhancing the performing efficiency of domestic banks in some regions. Gupta and Jain (2010) has examined the factors affecting the problem loans of Indian private sector banks and suggest that continuous attention on problem loans is necessary for improving the health of banks. Another empirical study carried out by Thiagarajan *et al.*, (2011) on Indian commercial banks indicates a positive lagged impact of nonperforming assets on the current year. The result also indicates that there is a significant inverse relationship between the GDP and the credit risk for both public and private sector banks. In another study Maji and Dey (2012) find inverse association between size and credit risk of Indian banks, but fails to disentangle any significant association between capitalization and credit risk of Indian banks.

However, a comprehensive study on the factors affecting credit risk considering both public sector and private sectors banks of India during Basel I and Basel II period is scanty. Further, in response to the global financial crisis, the Basel Committee on Banking Supervision (BCBS) has introduced the BASEL III norms to further strengthen the stability of banking sector by incorporating the capital conservation buffer and the countercyclical buffer (BIS, 2010). In India, BASEL III guidelines have been issued by the Reserve Bank of India¹ in May, 2012, applicable to commercial banks operating in India from January, 2013 and need to be implemented fully within March 31, 2019. BASEL III has widened the scope of credit risk in the banking sector with the introduction of minimum leverage ratio and the liquidity coverage ratio along with the revised minimum capital requirement level (Jayadev, 2013).

Since the implementation of Basel III guidelines is at the initial stage in India, there is no any empirical study, to the best of existing knowledge, that examines the factors affecting the credit risk of Indian banks considering Basel III norms. Further, empirical study is also limited to address the dynamic nature of credit risk. To address these research gaps, the present effort is a modest attempt to examine empirically the factors affecting the credit risk of Indian commercial banks. To address the dynamic nature of credit risk, we have employed dynamic panel data regression model that captures the lag impact of credit risk.

The rest of the paper is organized as follows: Section 2 presents the review of literature. Section 3 is devoted for data and methodology used in this study. Section 4 presents the results and discussion, followed by concluding remarks in section 5.

2. Review of Literature and Development of Hypotheses:

Extant literature indicates several factors that affect the risk of banks. Researchers have investigated this issue in both developed and emerging economies. In most of the cases the researchers have used credit risk as the indicator of bank risk. This is because credit risk is the oldest risk of all types of risks faced by the banks and which arises from the core banking activity of lending to the customer (Maji and Dey, 2012). In this paper we also concentrate on the credit risk as the indicator of bank risk. The theoretical relationship and empirical studies relating to the various factors that affect credit risk are discussed briefly.

2.1 Bank profitability and risk:

Many researchers have studied the relationship between bank profitability and risk. Credit risk measured by non-performing assets or loans (NPAs) reduces the interest spread, which in turn reduces the profit levels of banks. According to Gestel and Baesems (2008) a small number of defaulters might cause large quantum of loss for the bank. Theoretically, thus, an inverse association between bank risk and profitability is expected. Empirical evidences, however, show contradictory results. A study conducted by Ara *et al.*, (2009) in the context of commercial banks in Sweden has found a positive relationship between profitability and credit risk. Similar results are found by Afriyie and Akotey (2011) for the banks

in the Brong Ahafo Region of Ghana. The results revealed that there exists a positive relationship between non-performing loans and profitability of rural banks in Ghana. This result is supported by the fact that rural banks in Brong Ahafo Region of Ghana do not follow any effective institutional measures for managing credit risk. Banks charges higher interest rate on loans given to other customers in order to shift the cost of loan default. Likewise in case of banks in Nigeria, Kolapo *et al.*, (2012) has also observed that credit risk is positively related to profitability.

On the other hand, some researchers have found negative association between bank risk and profitability. A study conducted by Achou and Tengue (2007) in Qatar banking system showed that better credit risk management increases the bank profitability. Another study on Nigerian banks reveals an inverse relation between profitability and the credit risk (Nawaz *et al.*, 2012). Ruziqa (2013) have examined the impact of credit risk on the financial performance of conventional banks in Indonesia. The results indicate that credit risk and profitability of banks in Indonesia are inversely associated. Noman *et al.*, (2015) have used a two-step GMM (Generalized Method of Moments) to investigate the effect of credit risk on profitability of the banking sectors of Bangladesh for the period 2003-2013. Their result indicates that the relationship between NPAs and profitability is negative.

However, a study conducted by Kithinji (2010) on Kenyan banking industry has failed to disentangle any significant relationship between non-performing loans and profitability. Similarly, Bayyoud and Sayyad (2015) confirms no relationship between credit risk and profitability in the commercial and investment banks of Palestine during the study period 2010-2014. Although the empirical evidences provide mixed results, based on the theoretical expectation, we develop the following hypothesis for empirical testing in Indian context:

H₁: There is an inverse association between profitability and credit risk.

2.2 Bank capital and risk:

The association between bank capital and risk have been investigated all over the world by different researchers using absolute measure of the variables as well as considering the changes in capital and risk. The Basel Committee on Banking Supervision has recommended minimum risk-based capital

standard to reduce the risk of banks. Consequently, large number of countries including India has implemented the Basel norms and at present capital adequacy ratio (CAR) is considered an important yardstick for measuring bank stability (Rime, 2001; Maji and De, 2015). The empirical studies, however, provide contradictory results. A study conducted by Besanko and Kanatas (1996) has found that the regulatory capital fails to reduce bank risk and does not promote bank stability. Similar results are observed by Matutes and Vives (2000), Mingo (2000) and Altunbas *et al.*, (2007). The findings of these studies indicate that adequate capital alone is not sufficient to improve the solvency of banks. Interestingly, Agoraki *et al.*, (2011) have found a direct negative association between capital adequacy and credit risk, but observed that bank stability increases with the increase in market power.

In US and Europe, a large number of studies indicate that banks determine the capital and risk decisions simultaneously (Shrieves and Dahl, 1992; Jacques and Nigro, 1997; Rime, 2001; Van Roy, 2008; Biekpe and Floquet, (2008); Godlewski, 2005; Athanasoglou, 2011). Employing simultaneous equation model, Shrieves and Dahl (1992) have observed a positive relationship between capital and risk in US banks. In contrast, Jacques and Nigro (1997), using the same methodology, have observed inverse association between change in capital regulation and risk level in case of US commercial banks. In contrary, Rime (2001) did not find any significant impact of the changes in banks capital on bank's risk-taking. Another study was conducted by Godlewski (2005) using the same methodology in emerging economies has concluded that the regulatory, institutional and legal factors play a very important role for running a healthy banking system which drives banks to hold excess capital cushion in order to meet regulatory requirement and also to signal financial strength.

In India context, there are very limited empirical research relating to the association between bank capital and risk. A study have conducted by Nachane *et al.*, (2000) on Indian public sector banks using the model developed by Shrieves and Dahl (1992) have found inverse association between bank capital and risk. In another study on Indian public sector banks, Das and Ghosh (2004) have investigated the relationship between absolute level of capital and risk. The study found a simultaneous relationship between capital and risk and the variables are negatively associated. However,

employing dynamic panel regression Ghosh et al., (2003) have not observed any significant relationship between capital and risk of Indian public sector banks. Similar results are found by Maji and Dey (2012). In spite of mixed results observed by the earlier researchers, the negative association between bank capital and risk is more pronounced in emerging economies. It is, thus, hypothesised that:

H_2 : Bank capital and credit risk are negatively associated in India.

2.3 Bank size and risk

Many researchers have investigated empirically the theoretical arguments on the relationship between bank size and bank risk-taking. Theory says there exist a negative relationship between size and bank risk. The reason for such a relationship is justified by the opportunities of large banks to diversify risk. Large banks are expected to have lower risks because of more diversifiable portfolios that they are capable of holding. Many researchers have conducted studies in this respect and have found that there is a negative relationship between bank risk and bank size (Saunders *et al.*, 1990; Chen *et al.*, 1998; Maji and Dey, 2012). The studies conclude that large banks are more skilled in risk management and have also better diversification opportunities.

On the other hand, a study done by Weib *et al.*, (2014) shows evidence that size may not be a persistent determinant of systemic risk in past crises. Similarly, the findings of Lopez-Espinosa *et al.*, (2013) indicate bank size is not a prominent contagion factor among large international banks to influence the bank risk. Literature says that large banks are greater sufferer of recent global financial crisis and distress of these banks has caused damage to the real economy. Therefore, large banks are considered to be of systemic importance (De Jonghe, 2010). Some empirical study supports “*too-big-to-fail hypothesis*” (Claessens *et al.*, 2011; Farhi and Tirole, 2012; Stein, 2013). Due to their moral hazard behaviour, large banks take on excessive risk in the expectation of government bailouts. However, based on theoretical proposition; the following hypothesis is formulated for empirical testing in Indian context:

H_3 : There is a negative relationship between size and risk in Indian banking sector.

2.4 Liquidity and Risk:

Liquidity risk is the risk which shows the possible inability of bank to meet its financial obligations which if not look upon can eventually lead to bank failure. According to the insolvency theory, a bank fails when the value of bank assets fall and becomes less than its liabilities. In most cases the value of assets fall due to credit risk resulting from non-performance of loans. It is observed that during the recent financial crisis majority of commercial bank failures were partly caused jointly because of liquidity risks and credit risks (Imbierowicz and Rauch, 2014). Theory says that, there is a positive relationship between liquidity risk and credit risk and they contribute jointly to bank instability. Many empirical studies have supported this view (Bryant, 1980; Diamond and Dybvig, 1983; Nikomaram *et al.*, 2013; Imbierowicz and Rauch, 2014). Literature indicates liquidity risk and credit risk are closely related, especially with regard to borrowers’ defaults and massive fund withdrawals. The relationship between these two factors of risk has a direct bearing on bank stability. Accordingly we formulate the fourth hypothesis as follows.

H_4 : Liquidity risk and credit risk are positively associated.

2.5 Loan loss provisions and risk:

Literature shows that critical assessment of financial system stability can be done by an important factor called loan loss provision (LLP). It is considered to be a key contributor to fluctuations in the profitability and capital positions of banks, which has an effect on credit supplied by the bank to the economy (Beatty and Liao, 2009). Every bank has to keep aside a portion of their capital as reserve for loans that are subject to default by the borrowers. The lower LLP ratio indicates lower amount of NPAs of the bank. Some studies have identified the loan loss reserve as a contributing factor to the risk level of a bank (Berger and DeYoung, 1997; Cebenoyan and Strahan, 2004). Ivicic *et al.*, (2008) investigated the impact of various macroeconomic and bank-specific variables on bank insolvency risk in 7 CEE countries from 1996 to 2006 using z-score. The study indicates that rise in loan loss provisions have negative impact on bank stability. Thus, the next hypothesis of this study is:

H_5 : Loan loss provision and bank risk are positively associated.

2.6 Growth in GDP and bank risk

There are many studies which concentrated on the level of

NPAs and the GDP growth all over the world. Theoretically there exist a negative relationship between the GDP growth and the NPAs. A strong positive growth in real GDP leads to greater income in the hands of borrowers which in turn help in more repayment of loans on time. This ultimately results in reduction in the level of NPAs. But when the economy is in downturn with low GDP, the resultant effect will be increase in the level of NPAs. Makri, *et. al.*, (2014) have investigated the factors affecting NPA on banking system of 14 Eurozone countries using GMM estimation for the period 2000 to 2008. Their finding indicates a significant negative relationship between growth in GDP and NPAs. Similarly, the study on the determinants of NPA in case of Guyanese banking sector from 1994 to 2004 conducted by Khemraj and Pasha (2009) reveals that GDP growth is inversely related to non-performing loans. Another study done on commercial banks of Italy, Greece and Spain for the period of 2004-2008 reveals that improvement in the real economy of these countries helps in reduction of non-performing loans (Messai and Jouini, 2013), which is consistent with the theoretical view. In contrast, a study done in Nigeria during the period 1995-2009 indicates significant and positive relationship between real GDP and Non-performing loans (Murumba, 2013). This may be due to underutilization of credit facilities in productive activities by the customers. In Indian context, empirical results are consistent with the theory. The researchers have found significant negative relationship between the growth in GDP and NPA (Das and Ghosh, 2007; Ramanadh and Rajesham, 2013). Thus, the last hypothesis of this study is:

H₆: There is a negative association between growth in GDP and credit risk in Indian commercial banks.

3. DATA AND METHODOLOGY

3.1 Data and Study Period:

This study is based on secondary data on Indian commercial banks collected from 'Capitaline Plus' corporate data database and annual reports of the respective banks for a period of 15 years from 1999-2000 to 2013-14. As on 31st March, 2014, there are 41 commercial banks listed in the BSE (of them 12 are also listed in the NSE). Standard Chartered Bank is excluded from the sample because it is the only foreign banks listed in India. The final sample, thus, consists of 40 commercial banks out of which 24 are public sector banks and 16 are Indian private sector banks. The initial year of 1999-2000 is considered in

this study because the Reserve Bank of India (RBI) in its mid-term review of Monetary and Credit Policy in October 1998, raised the minimum capital adequacy ratio (CAR) to 9 per cent as compared to the international standard of 8 per cent and banks were advised to achieve this 9 per cent CAR level by March 31, 2000. Further, the study period also covers the outcomes of the second phase of Banking Sector Reforms which was initiated in 1998.

3.2. Measurement of Variables:

Dependent variable: credit risk (CR)

Credit risk considered to be the oldest of all risks faced by banks. It mainly arises when the borrower or the counterparty default in meeting the financial obligation. In other words, credit risk arises due to non-recovery of loans and advances from the bank's borrower. To measure the credit risk researchers have generally used the ratio of non-performing loans to total loans and advances (Berger and De Young, 1997; Fungalova and Solanko, 2008; Maji and De, 2015). Ratio of total loans to total assets and the ratio of provision for loans to total assets are also used by researchers [Rahman *et.al* (2009) and Eng and Nabar (2007)]. However, we define the credit risk in this study as the ratio of NPAs to total loans and advances.

Explanatory Variables:

Profitability (ROA): Extant literature indicates that return on assets (ROA) is a commonly used measure of bank profitability (Ara *et al.*, 2009; Maji and De, 2015). We define profitability as the ratio between operating profit and total assets.

Bank Size (SIZE): Bank size is defines as the natural log of total assets. The natural log is used in order to normalize the data.

Bank Capital (CAR): The definition of capital given by regulator is used in this study to measure bank capital. The regulatory capital, known as capital to risk assets ratio (CAR), is defined based on the guidelines of the Basel accords.

$$CAR = \frac{(\text{Tier I Capital} + \text{Tier II Capital})}{(\text{Risk Weighted Assets})}$$

Loan Loss Provision (LPP): Following the extant literature (Cebenoyan and Strahan 2004; Beatty and Liao, 2009) we

define LPP as the ratio of loan loss reserve to gross loans.

Liquidity Risk (LR): The most common way of measuring liquidity risk is the ratio of total loans to total deposits (Kosmidou et al., 2005). This definition is used in this study.

Growth in GDP (GGDP): The growth in GDP is used as macroeconomic variable. We have collected the growth in GDP data during 2000-2014 from the RBI database and Economic Survey reports.

3.3. Empirical Model

Credit risk measured by the share of NPAs in total advances at a specific point 't' depends on its past realization. To capture this dynamic nature of credit risk, we have used the dynamic panel data model. The general form of this model is:

$$y_{it} = \gamma y_{it-1} + x'_{it} \beta + \alpha_i + v_{it}(i); i=1, \dots, N(\text{individuals}) \text{ and } t=1, \dots, T(\text{time})$$

Where, x_{it} are the regressor which are exogeneous in nature, α_i is the fixed individual effects and v_{it} is uncorrelated across time and individuals with zero mean and constant variance.

Although, the extant literature indicates that bank risk and bank capital are simultaneously related in many cases, in this study we assume that bank capital is exogenous variable. Thus, the specific dynamic panel data model employed in this study is:

$$CR_{it} = \gamma CR_{it-1} + ROA_{it} \beta_1 + SIZE_{it} \beta_2 + CAR_{it} \beta_3 + LPP_{it} \beta_4 + LR_{it} \beta_5 + GGDP_{it} \beta_6 + \alpha_i + v_{it} \dots (\text{Model 1})$$

We have employed the Generalized Method of Moments (GMM) (Hansen, 1982) to estimate the coefficients. The GMM estimators are unbiased and hence, the results are tenable (Arellano and Bond, 1991). We have used the AR (1) and AR (2) tests for checking the serial correlation and Sargan test for verifying the validity of the instrument subsets.

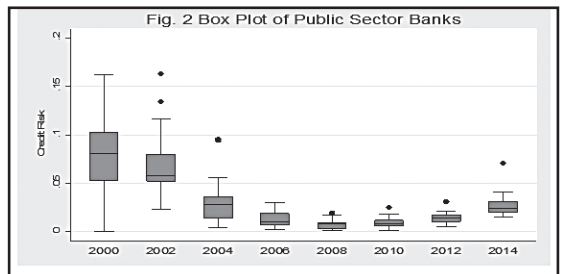
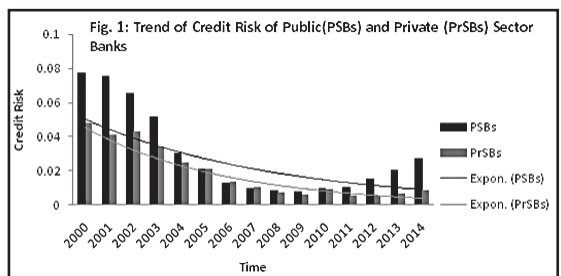
4. Results and Discussion

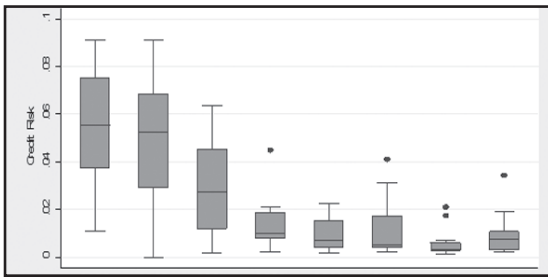
4.1 Distribution of Credit Risk

We have used the column bar chart to see the distribution of the mean values of credit risk over the years for both public sector banks and private sector banks. We have also fitted the exponential trend line for better comparison. The results are shown in figure 1. A look into the figure reveals that there is a significant change of mean credit risk for both the bank groups over the years, specifically with respect to public sector banks. The mean value of CR for public sector banks is found to be

very high during 1999-2000 to 2002-03. Then it has declined gradually up to 2008-09 and has increased thereafter. In case of private sector banks, the mean values of CR are found to be low throughout the study period as compared to the mean values of public sector banks. For private sector banks, the values of CR also show a declining trend up to 2008-09 and remained more or less constant thereafter.

However, the mean values cannot provide the real picture of the distribution. For obtaining more clear distribution of the CR for both the bank groups, we have used the box plots. The results of box plots for selected years (with a gap of one year) are shown in figure 2 and figure 3 respectively for public sector and private sector banks. It is evident from figure 2 that there is significant change in the median values of CR over the periods. For instance, the median value of CR in 2004 is found to be considerably low as compared to that of in 2000. Further, the position of median within 1st and 3rd quartiles clearly indicates that the distribution of CR is not symmetric for almost all the years. Similar results are found for private sector banks (fig. 3). The plots show significant change in median values specifically up to 2006 and the distribution of CR is skewed for almost all the years. The results of box plots for both the banks, thus, clearly demonstrate the dynamic nature of credit risk and justify the use of dynamic panel data model.





4.2 Results of Dynamic Panel Data Model

We have employed the model 1 for all banks during the study period as well as segregating the banks into public sector and private sector. Table 1 shows the results of model 1. The coefficient estimates of δ is positive and significant for all banks and also separately for both public sector and private sector banks. This implies that CR of Indian banks has its past realization, i.e. lag impact, which influences current CR positively. This is very crucial for reducing the financial health of the banks. The estimated coefficient of ROA is negative and significant for all. The inverse association between CR and ROA indicates that both public sector and private sector banks can improve their profitability by reducing the level of NPAs. This is consistent with the theoretical view and the findings of Achou and Tengue (2007); Nawaz et al. (2012); Ruziqa (2013) and Noman et al. (2015). However, contradictory results are found regarding the impact of bank size (SIZE) on CR. While the association is found to be positive and significant for public sector banks, no significant association is observed in case of private sector banks as well as for the combined data. This implies that size has no significant impact on bank risk for the Indian commercial banks as a whole. But the significant and positive influence of SIZE on CR in case of Indian public sector banks reveals that large public sector banks have higher level of NPAs. The reason may be due to the responsibility of public sector banks to fulfil certain social obligations like lending in priority sector. This is, however, not true for Indian private sector banks and hence, size of bank is not a significant factor for credit risk. This is consistent with the findings of Lopez-Espinosa et al., (2013) and Weib et al. (2014).

The coefficient estimate of CAR is negative and significant for the combined data and for the banks included in the public sector groups. But no significant association is found between CAR and CR for Indian private sector banks. The results indicate that the regulatory capital is an effective tool for reducing the bank risk in case of Indian public sector banks. However, bank capital fails to promote bank stability for Indian private sector banks. The results, thus, support both the views of the earlier researchers. On the other hand, the estimated coefficient of LPP is positive for all but not significant for private sector banks. The theory says that the higher the NPAs the more would be the provision for loan loss. Since it is evident from the movement of CR over the years that the level of CR was low for Indian private sector banks as compared to public sector banks, the insignificant association between CR and LPP in case of public sector banks justifies the same. Contradictory results are also found relating to the influence of LR on CR. While the association is found to be positive and significant for public sector banks, insignificant negative relationship is observed in case of private sector banks. The theory states that both LR and CR have a direct impact and jointly reduces the financial health of banks. The findings of this study in case of public sector banks support the outcome of earlier researchers (Nikomaram et al., 2013; Ejoh et al., 2014; Imbierowicz and Rauch, 2014). But the LR has no impact on CR for private sector banks may be due to lower level of CR. Finally, the influence of microeconomic variable i.e. growth in GDP has a significant negative impact on CR for both public sector and private sector banks. This implies that when economy is growing, income level of consumers also increases, which in turn increases the capacity of the borrowers to repay the loan timely. The results support the findings of Khemraj and Pasha (2009) and Messai and Jouini (2013).

The test for AR (2) is insignificant for all cases. Thus, the null hypothesis i.e. there is no serial correlation, cannot be rejected. Similarly, the result of Sargan test is not significant. This indicates the validity of the instrument subsets. The observed results are, therefore, reliable.

Cont...

Table 1: Results of Two Step GMM Dynamic Panel Data Model

Variables	All Banks		Public Sector Banks		Private Sector Banks	
	Coefficient	Z stat.	Coefficient	Z stat.	Coefficient	Z stat.
Constant	-0.005**	-2.093	-0.010***	-5.633	-0.001	-1.170
CR _{t-1}	0.457***	5.575	0.450***	4.245	0.521***	2.728
ROA	-0.672***	-4.209	-1.056***	-3.184	-0.452*	-1.668
SIZE	0.017	1.530	0.048***	4.757	0.003	0.651
CAR	-0.029*	-1.890	-0.056**	-2.159	0.002	0.118
LPP	0.292**	2.003	0.497**	2.202	0.343	1.099
LR	0.001	0.855	0.001*	1.841	-0.001	-0.850
GGDP	-0.003***	6.314	-0.002***	-4.591	-0.002***	-2.730
Test for AR(1)	z = -1.995**		z = -1.655*		z = -1.814*	
Test for AR(2)	z = 0.512		z = 0.216		z = -0.294	
Sargan Test	36.671		18.081		11.250	
Wald Test	336.908***		258.811***		181.946***	

Notes: Dependent Variable: CR; ***, **and * indicate significant at 1%, 5% and 10% level respectively.

Results during two sub-periods

Reserve Bank of India (RBI) in its mid-term review of Monetary and Credit Policy in October 1998 raised the minimum capital adequacy ratio (CAR) to 9 per cent as compared to the international standard of 8 per cent with effect from March 2000. In February 2005, RBI issued the first draft guidelines on Basel II implementations in which an initial target date for Basel II compliance was set for March 2007 for all commercial banks. Again, in July 2013 The RBI has issued a circular² relating to the implementation of Basel III proposal in Indian banking sector with in March, 2019. Keeping in view to the guidelines of RBI relating to the implementations of revised Basel I and Basel II norms, we have divided the study period into two sub-periods: period I from 2000-2007 and period II from 2008-2014 to see whether there is any change in Indian banks regarding the influence of selected factors on bank risk. The period I is basically the revised Basel I period and period II is the Basel II period (last year of this study is also considered under Basel II). The results of model 1 relating to these two sub-periods are shown in table 2.

The coefficient of CR_{t-1} is positive and significant during 2000 -2007. This indicates the influence of the lag of CR. But insignificant association is found during 2008-2009.

This implies that during this period there is no significant impact of the lag value of CR. Although, during 2012-2014 the quantum of credit risk has shown an increasing trend for public sector banks, it was very low for private sector banks during this sub-period. This is a sign of improvement in the financial health of Indian banks during this period. ROA has a negative impact on CR for both the periods. Bank size is found to have positive and significant influence on bank risk during the Basel I period (2000-2007). But during the Basel II period the influence of bank size is insignificant. The impact of CAR is negative for both the sub-periods, but significant during 2000-2007 only. Similarly, the positive impact of LPP is significant during the revised Basel I period only. The estimated coefficient of LR is positive and significant during the first sub-period. During the Basel II period no significant association is found between LR and CR. However, the impact of GGDP on credit risk is negative and significant for both the sub-periods. The results, thus, reveal that during the period 2000-2007 all the explanatory variables have significant impact on credit risk of Indian banks. But during the period 2008-2014 only ROA and GGDP are significantly associated with credit risk. The results of AR (2) and Sargan test advocate in favour of the reliability of the results.

Table 2: Results of Two Step GMM Dynamic Panel Data Model

Variables	During 2000-2007		During 2008-2014	
	Coefficient	Z stat.	Coefficient	Z stat.
Constant	0.000	-0.264	0.004	1.609
CR _{t-1}	0.687***	7.950	0.008	0.053
ROA	-1.088***	-4.213	-0.812***	-2.997
SIZE	0.015***	4.564	-0.015	-1.395
CAR	-0.113**	-2.140	-0.006	-0.796
LPP	0.277**	2.315	0.056	1.052
LR	0.005***	22.857	-0.006	-0.347
GGDP	-0.002***	-2.966	-0.001***	-2.806
Test for AR(1)	z = -2.654***		z = -1.317	
Test for AR(2)	z = 0.138		z = -1.231	
Sargan Test	16.852		20.665	
Wald Test	711.725***		84.866***	

*Notes: Dependent Variable: CR; ***, **and * indicate significant at 1%, 5% and 10% level respectively.*

5. Concluding Remarks

The present study empirically explores the factors influencing the credit risk of Indian commercial banks encompassing listed public sector and private sector banks. The movement of CR for public and private sector banks indicates a notable reduction in the CR over the years during 2000-2009. Interestingly, after 2009 the CR of public sector banks has shown an increasing trend. In case of private sector banks it has increased slightly. The results of box plots reveal the significant changes of median values for both the bank groups. To address the dynamic nature of CR, we have employed the dynamic panel data model. But the results of regression model fails to reveal the reasons for the behaviour of the CR of Indian banks during the Basel II period as all the explanatory variables except two (ROA and GGDP) are insignificantly associated with CR. This need to be investigated further using some internal information.

However, the results of model 1 for all banks during the study period indicate that lag impact of CR is positively associated with the current CR; ROA, CAR and GGDP are inversely associated with credit risk. Thus, the results support the hypotheses H₁, H₃, and H₆. On the other hand, LPP is positively associated with CR and supports the hypothesis H₅. Interestingly no significant association is found regarding the impact of SIZE and LR on credit risk. The results, thus, fail to support

H₂ and H₄. In case of public sector banks the results support hypotheses H₁, H₃, H₄, H₅ and H₆. On the other hand, for private sector banks only hypotheses H₁ and H₆ are supported by the results. Nevertheless, the lag impact of CR is positive for all the cases during the study period.

The findings of the present study would help decision makers in several ways. First, the average credit risk of Indian public sector banks is found to be higher as in comparison to private sector banks during the study period. There is, thus, an urgent need for Indian banks specifically for public sector banks to reduce the credit risk. The inverse association between CR and CAR implies that regulatory capital is an effective tool for Indian public sector banks to reduce risk. Second, the extant literature indicates that the liquidity risk and credit risk jointly contributes as a major cause of bank failure. The observed positive association between LR and CR for public sector banks demonstrates the need of enhancing bank liquidity by reducing the non-performing assets. Third, the increasing trend of credit risk in recent times is an alarming factor for Indian banks. Management of credit risk entails efficient management of lending activities from the loan origination phase to the servicing of accounts phase through proper identification of any possible threats and responding to them in a suitable way throughout the duration of the loan agreement. To perform all these activities efficiently, skilled human resources with high

degree of imaginative mind and professional experience are required. A study conducted by National Skill Development Corporation of India also argue in a similar vein that the key success factor for banks and financial institutions of India is the deployment of skilled human resources. Finally, the observed negative impact of profitability on credit risk indicates that a bank can improve the financial soundness by enhancing the quality of assets. This is possible by reducing the lag impact of credit risk, which in turn reduces the provision for loan loss and improves the productivity of bank resources. However, the study is limited to Indian banks only. Considering this limitation, the present study suggests further study on this aspect considering data from some emerging economies including India.

References

1. Achou, F. T. and Tegnuh, N. C. (2007). *Bank Performance and Credit Risk Management*. Master Degree Project School of Technology and Society. University of Skovde Press.
2. Afriyie, H.O. and Akotey, J.O. (2011). *Credit Risk Management and Profitability of Rural Banks in the Brong Ahafo Region of Ghana*. *European Journal of Business and Management*. 5(24). pp.24-33.
3. Agoraki, M. K., Delis, M.D. and Pasiouras, F. (2011). *Regulations, competition and bank risk-taking in transition countries*. *Journal of Financial Stability*. 7. 38-48.
4. Altunbas, Y., Carbo, S., Gardener, E. P. M. and Molyneux, P. (2007) *Examining the Relationships between Capital, Risk and Efficiency in European Banking*. *European Financial Management*. 13. 49 – 70.
5. Ara, H., Bakaeva, M. and Sun, J. (2009). *Credit Risk Management and Profitability in Commercial Banks in Sweden*. Master thesis. University of Gothenburg.
6. Arellano, M. and S. Bond (1991). *Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations*. *Review of Economic Studies*.
7. Athanasoglou, P. P. (2011). *Bank capital and risk in the South Eastern European region*. Bank of Greece Working Paper. 137.
8. *Bank for International Settlements (BIS): Basel III Accord: the New Basel III Framework, BIS, December 2010*.
9. Bayyoud, M. and Sayyad, N. (2015). *The Relationship between Credit Risk Management and Profitability between Investment and Commercial Banks in Palestine*. *International Journal of Economics and Finance*. 7(11). 163-169.
10. Beatly, A and Liao S, (2009). *Regulatory capital, Loan loss provisioning and procyclicality*. <http://www.kellogg.northwestern.edu/accounting/papers/beatly.pdf>
11. Berger, A. N. and De Young, R. (1997). *Problem loans and cost efficiency in commercial banking*. *Journal of Banking and Finance*. 21. 849-70.
12. Besanko, D. and Kanatas, G. (1996). *The Regulation of Bank Capital: Do Capital Standards Promote Bank Safety?* *Journal of Financial Intermediation*. 5. 160-183.
13. Bhaskar, P. J. (2014). *Credit Risk Management in Indian Banks*. *International Journal of Advance Research in Computer Science and Management Studies*. 2. (1). 309-313.
14. Biekpe, N. and Floquet, K. (2008). *The relationship between capital structure and risk in emerging market banks*. *Banks and Banks Systems*. 3 (1). 63-74.
15. Bryant, J. (1980). *A Model of Reserves, Bank Runs and Deposit Insurance*. *Journal of Banking and Finance*. 4(4). 335-344.
16. Cebenoyan, A. S. and Strahan, P. E. (2004). *Risk management, Capital structure and Lending at Banks*. *Journal of Banking and Finance*. 28. 19-43
17. Chen C, Steiner T. & Whyte, A. (1998). *Risk-taking behavior and management ownership in depositors institutions*. *Journal of Financial Research*. 2. 1-16.
18. Claessens, S., C. Pazarbasioglu, L. Laeven, M., Dobler, F. Valencia, O., Nedelescu, and K. Seal. (2011). *Crisis management and resolution: Early lessons from the financial crisis*. IMF Staff Discussion Note 11/05.
19. Das, A. and Ghosh, S. (2004). *The Relationship between Risk and Capital: Evidence from Indian Public Sector Banks*. Retrieved from <http://128.118.178.162/eps/io/papers/0410/0410006.pdf>.
20. De Jonghe, O., 2010, "Back to the basics in banking? A micro-analysis of banking system stability," *Journal of Financial Intermediation*. 19 (3). 387-417.
21. Diamond, D. W. and Dybvig, P. H. (1983). *Bank Runs, Deposit Insurance, and Liquidity*. *The Journal of Political Economy*. 91(3). 401-419.
22. Ejoh, N. O., Okpa, I. B., & Egbe, A. A. (2014). *The impact of credit and liquidity risk management on the profitability of deposit money banks in Nigeria*. *International Journal of Economics, Commerce and Management*. 2 (9). 1-15.
23. Eng, L.L. and Nabar, S. (2007). *Loan Loss Provisions by Banks in Hong Kong, Malaysia and Singapore*. *Journal of International Financial Management and Accounting*. 18 (1). Retrieved from <http://cid.bcrp.gob.pe/biblio/Papers/Renzo/loan.pdf>.
24. Farhi, E., and Tirole, J. (2012). *Collective Moral hazard, maturity mismatch and systemic bailouts*. *American Economic Review*. 12 (1). 60-93.
25. Fungacova, Z. and Solanko, L. (2008). *Risk-taking by Russian Banks: Do location, Ownership and size matter?* Bank of Finland, Institute for Economies in Transition (BOFIT), Discussion Papers 21.
26. Gestel, T.V. and Baesens, B. (2008). *Credit Risk Management Basic Concepts: financial risk components, rating analysis, models, economic and regulatory capital*, Oxford University Press.

27. Ghosh, S., Nachane, D.M., Narain, A. and Sahoo, S. (2003). Capital requirements and bank behavior: an empirical analysis of Indian public sector banks. *Journal of International Development*. 15 (2). 145-156.
28. Godlewski, C. (2005). *Capital Regulation and Credit Risk Taking: Empirical Evidence from Banks in Emerging Market Economies*. Economics Working Paper Archive at WUSTL. 0409030.
29. Gupta, P.K. & Jain, A. (2010). Factor Modelling for Indian Private Sector Banks' problem Loans, International Conference on Applied Economics (ICOAE), 261-271.
30. Hansen, L. (1982). Large Sample Properties of Generalized Method of Moments Estimation, *Econometrica*. 50 (3). 1029-1054.
31. Human Resource and Skill Requirements in the Banking, Financial Services & Insurance Sector (2022) – A Report– by National Skill Development Corporation, Available from www.nsdindia.org/pdf/bfsi.pdf.
32. Imbierowicz, B. and Rauchii, C. (2014). The Relationship between Liquidity Risk and Credit Risk in Banks. *Journal of Banking and Finance*. 40. 242–256.
33. Ivičić, L., Kunovac D., and I. Ljubaj. (2008). Measuring Bank Insolvency Risk in CEE Countries. Croatian National Bank Working Paper.
34. Jacques, K. and Nigro, P. (1997). Risk-based capital, portfolio risk, and bank capital: A simultaneous equations approach. *Journal of Economics and Business*. 49. 533-547.
35. Jayadev, M. (2013). Basel III implementation: Issues and challenges for Indian banks. *Indian Institute of Management Bangalore (IIMB) Management Review*. 25. 115-130
36. Khemraj, T. and Pasha, S. (2009). The determinants of non-performing loans: An econometric case study of Guyana. Retrieved on May 9, 2011 from https://mpr.ub.uni-muenchen.de/53128/1/MPRA_paper_53128.pdf
37. Kithinji, A. M. (2010). Credit Risk Management and Profitability of Commercial Banks in Kenya. School of Business, University of Nairobi, Kenya.
38. Kolapo, T. F., Ayeni, R. K. and Oke, M. O. (2012). Credit risk and commercial banks' performance in Nigeria: A panel model approach. *Australian Journal of Business and Management Research*. 2 (2). 31 – 38.
39. Kosmidou, K., Tanna, S., Pasiouras, F., (2005). Determinants of profitability of UK domestic banks: panel evidence from the period 1995–2002. *Economics, Finance and Accounting*. Applied Research Working Paper Series.
40. Lopez-Espinosa, G., Rubia, A., Valderrama, L., and Anton, M. (2013). Good for one, bad for all: Determinants of individual versus systemic risk. *Journal of Financial Stability*. 9. 287-299
41. Maji, S. G. and De, U. K. (2015). Regulatory capital and risk of Indian banks: a simultaneous equation approach. *Journal of Financial Economic Policy*. 7 (2). 140 – 156.
42. Maji, S.G. and Dey, S. (2012). Credit and insolvency risk of Indian commercial banks: do size and capitalization matter. *JM International Journal of Finance*. 2 (1). 47-59.
43. Makri, V., Tsaganos, A. and Bellas, A. (2014). Determinants of Non-Performing Loans: The Case of Eurozone. *PANOECONOMICUS*. 2. 193-206.
44. Matutes, C. and Vives, X. (2000). Imperfect competition, risk taking, and regulation in banking. *European Economic Review*. 44. 1-34.
45. Messai, A. S. and Jouini, F. (2013). Micro and Macro Determinants of Non-performing Loans. *International Journal of Economics and Financial Issues*. 3(4). 852-860.
46. Mingo, J.J. (2000). Policy implications of the Federal Reserve study of credit risk models at major US banking institution. *Journal of Banking and Finance*. 24. 15-33.
47. Murumba, Inekwe. (2013). The Relationship between Real GDP and Non-performing Loans: Evidence from Nigeria (1995 – 2009). *International Journal of Capacity Building in Education and Management (IJCBE)*. 2(1). Website: <http://www.rcmss.com>
48. Nachane, D.M., Narain, A., Ghosh, S. and Sahoo, S. (2000). Capital Adequacy Requirements and the Behaviour of Commercial Banks in India: An Analytical and Empirical Study. Development Research Group, Study No. 22, (RBI: Mumbai).
49. Naresh, C. & Rao, B.R. (2015). Credit Risk Management Practices of Indian Commercial Banks. *International Journal in Management and Social Science*. 3 (1). 89-94.
50. Nawaz, M., Munir, S., Siddiqui, S.A. Tahseen-Ul- Ahad, Afzal, F., Asif, M. and Ateeq, M. (2012). Credit Risk and the Performance of Nigerian Banks. *Interdisciplinary Journal of Contemporary Research in Business*. 4 (7). 49-63.
51. Nikomaram, H., Mehdi, T., and Khalili, D.S. (2013). The relationship between liquidity risk and credit risk in Islamic banking industry of Iran. *Management Science Letters*. 3. 1223-1232.
52. Norman, A. H. M., Pervin, S., Chowdhury, M.M & Banna, H. (2015). The Effect of Bank Specific and Macroeconomic Determinants of Banking Profitability: A study on Bangladesh. *International Journal of Business and Management*. 10 (6). 287-297.
53. Rahman, A., Ibrahim, M. and Meera, A.K.M. (2009). Lending Structure and Bank Insolvency Risk: A comparative study between Islamic and Conventional Banks. *Journal of Business and Policy Research*. 4. 189-211.
54. Rajaraman, I., S.Bhaumik and N.Bhatia (1999): NPA variations across Indian commercial banks: some findings, *Economic and Political Weekly*, 34, 16-23.
55. Ramanadh, K. and Rajesham, Ch. (2013). Bank Credit, Economic Growth and Non-performing Assets- An Analysis of Indian Commercial Banking. *Journal of Commerce and Accounting Research*. 2 (3). 19-30.
56. Rime, B. (2001), Capital requirements and bank behavior:

- Empirical evidence for Switzerland. Journal of Banking and Finance.* 25. 789-805.
57. Roy, V. P. (2008). *Capital Requirements and Bank Behavior in the early 1990s: cross-country evidence. International Journal of Central Banking.* 4 (3). 29-60.
 58. Ruziqa, A. (2013). *The impact of credit and liquidity risk on bank financial performance: the case of Indonesian Conventional Bank with total asset above 10 trillion Rupiah. International Journal of Economic Policy in Emerging Economies.* 6 (2). 93-106.
 59. Saci, K., Giorgioni, G., and Holden, K. (2009). *Does financial development affect growth? Applied Economics.* 41(13). 1701-1707.
 60. Samir & Kamra, D. (2013). *A Comparative Analysis of Non-Performing Assets (NPAs) of Selected Commercial Banks in India. Opinion.* 3 (1). 68-80.
 61. Saunders, A., Elizabeth S. and Nikolaos, G. T. (1990). *Ownership Structure, Deregulation, and Bank Risk Taking. Journal of Finance.* 45 (2). 643-654.
 62. Shrieves, R. and D. Dahl (1992). *The relationship between risk and capital in commercial banks. Journal of Banking and Finance.* 16 (2). 439-457.
 63. Singh, A. & Gupta, P. (2015). *Measures for Identifying and Controlling Risks in Indian Commercial Banks. The International Journal of Management.* 2 (3). 14-18.
 64. Singh, N. (2011). *A Comparative Study of Risk Parameters of Banks in India. IJMT.* 19. (2). 14-151.
 65. Stein, Jeremy, 2013. *Regulating Large Financial Institutions. Speech at the "Rethinking Macro Policy II," conference, International Monetary Fund, Washington, D.C.*
 66. Stephanou, C. and Mendoza, J. C. (2005). *Credit Risk Measurement under Basel II: An Overview and Implementation Issues for Developing Countries. World Bank Policy Research Working Paper.* 3556.
 67. Tang, D. (2006). *The effect of financial development on economic growth: evidence from the APEC countries, 1981-2000. Applied Economics.* 38(16). 1889-1904.
 68. Thiagarajan, S., Ayyappan, S., & Ramachandran, A. (2011). *Credit Risk Determinants of Public and Private Sector Banks in India. European Journal of Economics, Finance & Administrative Sciences.* 34. 147-153.
 69. Weib, G., Bostandzic, D., and Neumann, S., (2014). *What factors drive systemic risk during international financial crises? Journal of Banking and Finance.* 41. 78-96.

Foot Note

¹RBI, Master Circular No.DBOD.BP.BC.2/21.06.201/2013-14 dated July 1, 2013.

²Master Circular DBOD.No.BP.BC.2 /21.06.201/2013-14 dated July 1, 2013 on Basel III Capital Regulations by RBI.

Factors Influencing the Dividend Announcement and Segmentation of Investors: From Investors Perspective

Subhendu Kumar Pradhan

R. Kasilingam

Kaleswaran. R

Abstract

The study is attempted to find out factors determine the dividend announcement. For this purpose, mean analysis is used to identify the most and least factors. Primary data is taken in this analysis. Data is collected by using structured questionnaire from individual investors who are invested in equity market. Statistical tools such as exploratory factor analysis is used to reduce the number of factors and make the factors more meaning full, cluster analysis is used to segment the investors and discriminate analysis is used to check the validity of the segmentation of investors. The study finds that liquidity and solvency position are important determinants of dividend announcement. In addition to, factor analysis is segregated the nine statements into four meaningful factors such as profitability, liquidity management and environment. The study also finds that the investors are classified into three clusters such liquidity cluster, high positive cluster and management cluster and there is a significant difference among such clusters. Finally it concludes that liquidity cluster, high positive cluster and management cluster are correctly classified with 100 percent, 96.6 percent and 83.6 percent respectively and overall classified by 96.6 percent.

Key Words

Dividend Announcement Decision, Segmentation of Investors, Validity of Segmentation

Introduction

The dividend refers to a part of the profit distributed by the company amongst the shareholders. Dividend decision is an important financing decision of a company. The company needs to decide the portion of the profits which are paid as dividend and portion which are ploughed back in the firm for future investment. So there is an inverse relationship between retains earning and payment of dividend. Hence it is very competitive and conflict for financial manger to decide the use of net earnings of the company.

Dividend policy determines the amount of the dividend and its effect on the firm value. Miller and Modigliani (1961) conclude the payment of dividends does not affect the value of the firm and it is irrelevant to firm value in perfect market situation. This theory is supported by the Lack and Scholes (1974), Miller and Scholes (1982) and Kaleem and Salahuddin (2006). Lintner (1956) says that dividend decision is depended up on the current earnings and past dividend. Forecasted earnings, existing earnings and present dividend rate all have impact on the targeted ratios and it is relevant to firm value. This theory is supported by the Fama and Babiak (1968) studied in US firm, Baker et al. (1985), Baker and Powell (1999), Brav et al. (2005), Naeem and Nasr, (2007), Ahmed and Javaid, (2009), Kanwer, (2002). The company what ever decision will take that must be full fill the objective of the shareholders wealth maximisation. This objective guides to dividend payout policy and retain earnings for potential growth in the near future of the company.

There are many factors (internal and external) which are considered for deciding the dividend announcement. These factors are profitability and liquidity position, management effect and environmental factors etc. Many researcher carry out the work on factors determine the dividend announcement are; Pourheydari, O. (2009) explains stability of cash flow, the availability of profitable investment opportunities, and stability of Profitability are the most important determinants of a firm's dividend policies. Baker and Powell (1999) includes 20 influencing factor on the dividend and suggest that the most of companies are considered factors such as the current position, expected future earning and continuity of the past dividend policy for deciding the dividend announcement. Khan al.(2011) concludes the decision making process of Pakistan is similar to the USA and other developed market. He suggests that the past trend of dividend don't influence the current dividend decision. Company consider only the current earnings and liquidity position while deciding the dividend.

Bhattacharyya, N. (2007) finds that there is a negative relationship between the dividend and managerial type (productivity). Kimie al. (2011), Ownership concentration is associated with significantly lower dividends in proportion to earnings as well as relative to book equity and there is established an endogenous relation between ownership concentration and dividend payout. Vishny (1986) explains that large shareholders have the incentives to monitor management and hence contribute to curb the extraction of private benefits, which are having the positive impact on firm value. Tobias al. (2011), Dividend relevant phenomenon to inflation and there is a positive effect on the dividend announcement. He suggested to the company should consider the inflation for dividend decision because it may helps to increase nominal value of company earnings. Soter al. (1996) proves that the changing economic environment has significant influence on dividend decision. Perrettial. (2013) concludes that firm size, growth opportunities, and the mix of earned and contributed capital partially explain the observed dividend policies for ADR firms. So this study carries out to identify the factors which influence the dividend announcement from the investor's point of view and segment its investor's opinion.

Objective

- To find out the least and most influencing factors of the dividend announcement
- To segment the investors based on opinion about factors determined the dividend
- To check the validity of segmentation of investors opinion about factors determined the dividend

Research Methodology

This study is a descriptive in nature and primary data analysis. The primary data is collected from the individual investors who are invested in the equity shares. The structured questionnaire approved and recommended by financial expert is used for data collection. The respondents are chosen on the basis of multistage random sampling method. Area of study is covered major cities in the state of Odisha (Bhubaneswar, Cuttack, Berhampur, Bhadrak, and Kendrapada) and sample size is 444 used for analysis. The statistical method such as frequency, mean, Factor analysis, cluster analysis and discriminate analysis are used to analyse the data. The factor analysis is used to reduce the number of factors and make the variable more meaning full by combining a set of variables into the construct. The cluster analysis is used to segment the investor's perceptions about the factors determinate the dividend announcement. Initially two step cluster method was used to identify the natural number of cluster automatically in present data set. Based on number of clusters, k means method is used for segmentation. Discriminate analysis used to test the validity of investors segmentation.

Analysis and Discussion

Mean Analysis is used to find out the most and least influencing factors of the dividend announcement. For this, nine statements are taken for the analysis and asked to individual investors to give their opinion in five point scale where 1 represent least influencing and 5 represent most influencing factor. Mean value is given for all factors and also ranked it in the below table1. High mean value indicates higher level of influence and vice versa.

Table 1: Mean analysis of Factors influencing the Dividend announcement

Factors	Mean value	Rank
Liquidity position of the company	4.17	I
Solvency position of the company	4.02	II
Return on capital employed (ROCE)	3.77	VI
Return on equity (ROE)	3.78	V
Past history of dividend	3.87	IV
Management of company	3.97	III
Price earning (PE) of the company	3.44	VIII
Rate of Inflation prevailing in the country	3.35	IX
Expected retained earnings	3.52	VII

Table 1 show the mean analysis of factors influencing the dividend announcement, Mean value is highest for liquidity position of a company and followed by solvency position of a company while mean value is lowest for rate of inflation prevailing in the country and followed PE of the company and expected retained earnings. It can be conclude that the liquidity and solvency position of a company are most important determinant considered by the company while deciding the dividend announcement.

Factors Analysis

Generally the factor analysis is used for two purposes either to reduce the number of factors or to identify the theoretically meaningful dimension. Here the factor analysis is used to reduce the number of factors. So the Principle component method is more appropriated for extraction. There are many criteria followed for deciding the number of factors such as latent root criteria (factors with Eigen value greater than 1), a prior criterion (predetermined factors), percentage of variance, Scree test and heterogeneity of the respondents. Here prior criterion is followed for deciding the number of factors and Varimax is used for rotation because it gives clearest separation of the factors than the other rotation methods.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.680
Bartlett's Test of Sphericity	Approx. Chi-Square	1.339E3
	Df	36
	Sig.	.000

KMO measure of sampling adequacy is explained whether the present data is useful for the factor analysis or not. If KMO value is higher than the 0.50 which indicates that present data can be used for the factor analysis. Above table 2 shows the KMO value is .680 which is higher than the 0.50. So the factor analysis can be run by using present set of data. Bartlett's test of Sphericity is used to test the adequacy of correlation matrix. If the significant value is less than 0.05 which means there is a significant relation among the variables. From the above table, the significant value of Bartlett's test of Sphericity is lesser than 0.05. So it can be concluded that present data set are significantly correlated each other and fit for factor analysis.

Table 3: Total Variance Explained by Factors

Factor	Eigen value	% of Variance	Cumulative %
1	3.345	37.168	37.168
2	1.517	16.860	54.028
3	1.011	11.228	65.256
4	.919	10.216	75.472
5	.711	7.895	83.367
6	.545	6.054	89.422
7	.473	5.251	94.672
8	.290	3.223	97.895
9	.189	2.105	100.000

Generally the number of factor is extracted based of the Eigen value criteria. Eigen value of those variables is lesser than 1 to be disregarded and Eigen value of those variables is greater than 1 to be considered for further analysis. If the Eigen value is greater than 1 which indicates that more common variance is explained by that particular factor than the unique variance. There are other methods which can also be used to decide on the number of factors, some of which may generally be more satisfactory than Eigen value criteria (Fabriger et al, 1999), (Wood, Tataryn & Gorsuch, 1996). Here, number of factors is extracted based on the requirement of the study.

Table 3 shows the number of factors extracted and percentage of variance explained by the factors. Total variance explained by three factors whose Eigen value are greater than 1 is 65.256 percent but the researcher is taken four factors for making the study more realistic and meaning full with explain of 75.472 percent total variance. First factor explains 37 percent of total variance while second, third and fourth factor explains with approximately 17 percent, 11 percent and 10 percent respectively. The remaining five factors explains the approximately 25 of variance. Therefore it can be concluded that a model with four factors are sufficient to represent the nine statements which will determine the announcement of dividend of the company.

Table 4: Rotated Component Matrix

Variable name	1	2	3	4
Return on equity (ROE)	.929			
Return on capital employed (ROCE)	.875			
Expected retained earnings	.585			
Management of company		.837		
Past history of dividend		.826		
Rate of Inflation prevailing in the country			.907	
PE of the company			.644	
Liquidity position of the company				.943
Solvency position of the company				.474

The rotated component matrix presents the correlation between the variables and factor. The value of correlation coefficient of the variable is also called the factor loading. Variable with high factor loading indicates that particular variable is highly represented by the respective factor. Table 4 reveals the four factors are extracted after varimax rotation of nine statements. First factor consist of three variables such as return on equity, return on capital employed and expected retained earnings. All these three statements are relating to the profitability of a company. So this factor can be called as profitability. Second factor consist of two variables such as management of the company and past history of dividend and these two variables are relevant to the management of a company. So it can be called as management factor. Third factor consist of two variables such as rate of Inflation prevailing in the country and PE of the company. These two variables are related to uncontrollable macro factor of the company. So it is called as environmental factor. Fourth factor consist of two variables such as liquidity position and solvency position of the company. These two variables are indicated to the financial position of the company. Here based upon the factor loading the fourth factor's name is given because liquidity position of the company is having high factor loading and highly represent the corresponding factor. So the fourth factor is called as liquidity.

Table 5: Frequency Analysis of Factors Influencing the Dividend

Factor \ Scale	1-2.5		2.5-3.5		3.5-5	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Profitability	31	7.0	145	32.7	268	60.4
Management	22	5.0	118	26.6	304	68.5
Environmental	76	17.1	213	48.0	155	34.9
Liquidity	12	2.7	104	23.4	328	73.9

Table 5 shows the frequency and percentage of different factors. The Mean value of each factor is measured in three point scale for easy to interpret the factors. So, the mean range 1- 2.5 is treated as disagree, the mean range 2.5-3.5 is treated as agree and the mean range 3.5-5 is treated as strongly agree.

Profitability

Profitability is an important factor which influences the dividend announcement of a company. The company judge profitability parameters such as return on the equity capital, return on the capital employed and expected earning etc. while making the dividend decision. High profitability and growth company may follow the regular and consistency dividend policy. So it is most important consideration for deciding the dividend announcement. From frequency analysis table 5, it shows that 60.5 percent investors are strongly agreed while 32.7 percent investors are moderately agreed that the profitability influences the dividend announcement of the company. Moreover 7.0 percent investors are disagreed that the profitability is not an important consideration while making dividend decision. Thus it can be concluded that profitability is one of the important factor that influence the dividend announcement.

Management

Management is an important factor which influences the dividend announcement. A company can be treated as sound and healthy depends upon the good and effective management practices. Sound company only can earn a good return and it may fulfil the investor's desire by distributing the surplus profit in the form of dividend. Above table 5 shows that 68.5 percent investors are strongly agreed while 26.6 percent investors are

moderate agreed that management influence the dividend announcement. Furthermore 5 percent investors do not agree that management influences the dividend decision. Therefore it can be concluded that management is also important consideration for dividend announcement.

Environment effect

Environment is also another important factor which influences the dividend announcement. Environment factors such as change in PE ratio, inflation, market fluctuation and change in government policy which may have direct and indirect affect on profit of the company so as to company could not fulfil the shareholders interest. From table five, it interprets the 48 percent investors are moderately agreed where as 34 .9 percent are strongly agreed that environmental factors influences the dividend announcement. Besides the 17.1 percent investors says that management is not as a factor to influence the dividend announcement and some other factors may influence the announcement. So it can be concluded that the management is having the moderated influence on dividend decision.

Liquidity

Liquidity position of a company is a most important factor which influences decisions of the cash dividend. Though a company has sufficient profit to pay the dividend, it may not have the sufficient cash to pay dividend. So availability of cash and sound financial position are very essential for taking dividend decision. From table 5 indicates the 73.9 percent investors are strongly agreed while 23.4 percent are moderately agreed that liquidity position of a company which influence the dividend announcement. However only 2.7 percent investors are disagree that liquidity position of a company does not

affect the dividend announcement. Thus it can be concluded that the liquidity is having strongly influence on dividend decision.

Segmentation of Investors Opinion

The cluster analysis is used to segment the cases similarities or dissimilarities (J.P. Verma 2013). Here the investor’s opinion can be segmented based on the factors influence on the dividend announcement using the cluster analysis. K-mean cluster is used for the analysis.

Table 6: Final Cluster Centres and ANOVA of different factors of dividend announcement

Factor	Cluster			F	Sig.
	1	2	3		
Profitability	3.54 (II)	4.15(I)	2.28 (III)	229.270	.000
Management	3.28(III)	4.32 (I)	4.19 (II)	177.852	.000
Environmental Factors	2.97 (III)	3.89 (I)	2.65 (II)	139.634	.000
Liquidity Position	3.68 (II)	4.51(I)	3.64 (III)	111.752	.000
Average	3.37	4.22	3.19		
Number of cases	165	224	55		
Percentage	37.16	50.45	12.39		

Table 6 shows the mean value of three clusters and their corresponding factors. Mean value is also ranked the each cluster in each factor. In the first cluster the mean value is highest for the liquidity position of the company. So this cluster can be called as liquidity cluster. It is noted that 37.16 percent of investors say the liquidity position highly influences the dividend announcement. In second cluster, mean value of each factor is higher than other two clusters and mean value is also closed to each factor. So this cluster can be called as high positive cluster. This cluster indicates 50.45 percent investors are strongly agreed that all factors are highly positive influenced to the dividend announcement decision.

In cluster three, mean value is highest for management and mean value is also far too each factor. So this cluster can be called as management cluster. This cluster clears the 12.39 percent investors are strongly agreed that the management is a most important factors which influences the dividend announcement. Therefore it can be concluded that more than fifty percent investors strongly agree that all factors are having

highly positive influence on the dividend announcement. Hence it can be concluded that all factors are important determinant considered by company.

Above table 5 also shows F value of each factor. F value indicates that there is existed a significant difference among the cluster with corresponding factors. The significant value of each factor is less than 0.05 which means that there is a significant difference among the cluster. So it can be concluded that all factor are sufficient and significantly contributed to each clusters such as liquidity, high positive and management.

Reliability Classification

Factors determined the dividend is classified into three clusters based on the investor’s responses. These three clusters are liquidity, high positive and management cluster. The discriminate analysis is used to test the reliability of segmentation and its stability across the sample units. For this analysis, the factors such as profitability, Management,

Environment and liquidity position are taken as independent variables and three clusters such as liquidity, high positive and management are taken as dependent variables or categorical variables.

Table 7: Tests of Equality of Group Means of the different factors

Factor	Wilks' Lambda	F	df1	df2	Sig.
Profitability	.490	229.270	2	441	.000
Management	.554	177.852	2	441	.000
Environment	.612	139.634	2	441	.000
Liquidity Position	.664	111.752	2	441	.000

Table 7 shows the Wilks' Lambda, F statistics and its degree of freedom and significant value. Wilks' Lambda is the ratio of within-groups sum of squares to the total sum of squares. Small value Wilks' Lambda indicates greater discriminatory ability of the function. This means there is a strong group differences among mean values of the factors. From the

above 7, the Wilks' Lambda is very small for all factors and its ranges from .490 to .664. So, all factors are important for classification of cluster. The F statistic is a ratio of between-groups variability to within-groups variability. The significant is less than 0.05 for all factors which means group mean differences are significant.

Table 8: Eigenvalues

Function	Eigen Value	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-square	Sig.
1	1.912 ^a	71.5	.810	.195	719.222	.000
2	.764 ^a	28.5	.658	.567	249.404	.000

The Eigen value indicates the portion of variance explained. It is a ratio between-groups sum of squares to the within-group sum of squares. A large Eigen value is associated with a strong function and more of the variance in the dependent variables is explained by the function. Number of discriminate functions is depended on the number of clusters. Number of discriminate function is equal to g-1. Here g is the number of clusters. From the table 8, there have two functions. First function is having high Eigen value and greater than 1 which means that the variability among the clusters is highly explained by the first function. The canonical correlation measures the association between two functions and four factors. The co-efficient of canonical correlation is high for both the functions. This indicates that there is an existed high correlation between two functions and the three factors. The value of Wilks' Lambda is .195 for first function and is .567 for second function while the Chi-square value is 719.222 for first function and is 249.404 for second function. The significant value of the two functions is less than 0.05 which indicates that there is a group mean difference between the

two functions.

Table 9: Structure Matrix

Factors	Function	
	1	2
Profitability	.643*	-.572
Environmental Factors	.575*	-.013
Liquidity Position	.509*	.117
Management	.462	.722*

*. Largest absolute correlation between each variable and any discriminate function

Structure matrix shows the correlation of each factor with each discriminate function. It is popularly used because it is more accurate than the standardised canonical discriminate function coefficients. Pearson correlation coefficient in structure matrix is called structure coefficient. It also called as discriminate loading. A Predictor variable with high discriminate loading

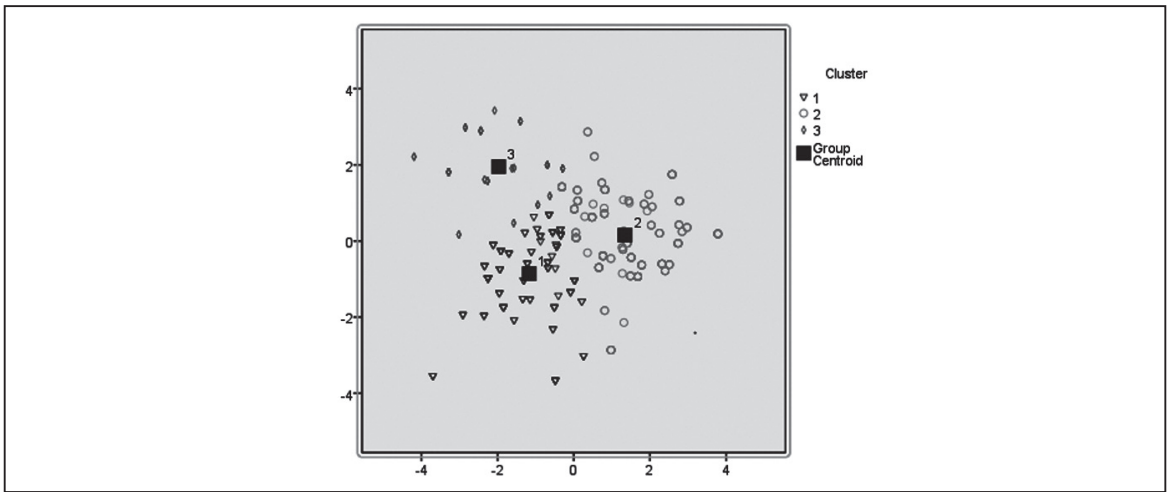
indicates that predictor variable is strongly associated with discriminate function. From the table 9, the discriminate loading is highest for profitability in first function and is also highest for management in second function which indicates these two variables are highly associated with their corresponding function. Moreover the variables marked asterisk indicates that these variables are largest

associate with the function. Such Predictor variables are profitability, environment, Liquidity position in first function and Management is in second function. So two functions can be written in equation form

$$Z1 = .643 * Profitability + .575 * Environment + .509 * Liquidity$$

$$Z2 = .722 * Management$$

Figure 1: Group Centroids of Clusters of Dividend Determinants



The mean value of the discriminate score of each group is called group centroids. Cases with scores near to a centroid are predicted as belonging to that group. The above group centroids diagram 1 show all the three clusters are distinctive clusters having different group centroids and different mean values. The cluster members are aligned separately from other group members. This shows that there is no error of cluster classification. So it can be concluded that there is existed a strong variation among the three discriminate groups.

Table 10: Classification Result

		Cluster	Predicted Group Membership			Total
			Liquidity	High positive	Management	
Original	Count	Liquidity	165	0	0	165
		High positive	7	217	0	224
		Management	7	2	46	55
	%	Liquidity	100.0	.0	.0	100.0
		High positive	3.1	96.9	.0	100.0
		Management	12.7	3.6	83.6	100.0

96.4% of original grouped cases correctly classified.

Classification result is used to assess to how the cases are well classified into the groups. The classification table shows that rows are the observed categories of the dependent and the columns are the predicted categories. When prediction is perfect all cases will lie on the diagonal. The percentage of cases on the diagonal is the percentage of correct classifications. Table 10 shows the 100 percent (165 cases) of liquidity cluster are correctly classified. In case of high positive cluster, 96.6 percent (217 cases) are correctly classified while only 3.1 percent (7 cases) are wrongly classified. So it is included into liquidity segment. In Management segment, 83.6 percent (46 cases) are correctly classified while only 16.3 percent (9 cases) are not classified. So it is included 12.7 percent into liquidity and 3.6 percent into high positive segment. Therefore it can be concluded that the segmentation of investor's opinion based on dividend determinants are correctly classified by 96.6 percent.

Implication of the Study

Following points are given below stating the usefulness of the research study for company, Policy maker and the investors.

For company and policy maker

1. The study may help to the company to take proper the dividend announcement decision based upon the performance parameter.
2. As an investors point of view it helps to the company to identify which parameters brings trust to the investors so that they will invest for future dividend.
3. It helps to company to know the behaviour of market and reaction of the investors from prior to post announcement.
4. It helps to company to know the which segment of the investors agree that the factors are having the significant influence on dividend decision of the company and which segment of the investors are giving more importance to a particular factor while making the investment decision.
5. Based upon the investors perception the company may change their dividend policy

For investors

1. It helps to the investors to compare the each performance

parameter of a company with another company so as to take a good investment decision.

2. Investors can easy to analysis the behaviour of the market as well the stock price during the announcement of the event as a result to find the suitable investment.
3. Segmentation of the investors of the factors determined the dividend, the investors may compare how their perception is differs from others and how it is influence the dividend decision.

Conclusion

This research is dedicated to find out the factors determined the dividend announcement decision in the investor's point of view. For this purpose, the mean and factor analysis are used. Other analysis such as cluster and discriminate analysis are also used to segment the investors and to check the validity of such segmentation. This study can be concluded that the liquidity and solvency position of the company are important factors considered by the company to decide the dividend announcement. In the factor analysis nine statements are used to extract the factors. The four factors such Profitability, Management, Environment and Liquidity are extracted based upon prior criteria with 75 percent of variance. From the factor analysis, it can be concluded that investors agree that the profitability, management and liquidity are strongly influenced to the dividend announcement and environment is moderate influenced to dividend announcement.

In cluster analysis the investors are segmented into three clusters such as liquidity cluster, high positive cluster and management cluster. It can be concluded that the 50.7 percent of investors are strongly perceived that there is a strongly positive influenced of all factors on the dividend announcement decision. It is also concluded that there a significant difference among the cluster and all factors are contributed significantly for the segmentation. The discriminate analysis can be concluded that 100 percent of liquidity cluster, 96.6 of high positive cluster and 83.6 percent of management cluster are correctly classified. Overall it is correctly classified by the 96.6 percent of the investors opinion based on the dividend determinates. Therefore this study would be strongly assist to corporate for supervising the security market and help to the investors to make the intelligent investment decision.

Reference

1. Anand, M. (2004). Factor influencing dividend policy decisions of corporate India. *The ICAI Journal of Applied Finance*, 10(2), 5-16
2. Baker, H.K. and Powell, G.H. (2000). Determinants of corporate dividend policy: a survey of NYSE firms. *Financial Practice and Education*, 10(1) 7-18
3. Baker, H.K., and Farrelly, G.E. (1988). Dividend achievers: a behavioral look. *Akron Business & Economic Review*, 19(1), 79-92
4. Baker, H.K., Farrelly, G.E., and Edelman, R.B. (1985). A survey of management views on dividend policy. *Journal of Financial Management*, 14 (3), 78-84
5. Baker, H.K., Powell, G. E. (1999). Dividend policy issues in regulated and unregulated firms: a managerial perspective. *Managerial Finance*, 25 (6), 1 – 20.
6. Baker, H.K., Veit, E.T., and Powell, G.H. (2001). Factors influencing dividend policy decisions of NASDAQ firms. *The Financial Review*, 36(3), 19-37
7. Basse, T. and Reddemann, S. (2011). Inflation and the dividend policy of US firms. *Managerial Finance*, 37 (1), 34 – 46
8. Khan, N.U., Burton, B.M., and Power, D.M. (2011). Managerial views about dividend policy in Pakistan. *Managerial Finance*, 37(10), 953 – 970.
9. Nalinaksha Bhattacharyya, N. (2007). Good Managers Invest More and Pay Less Dividends: A Model of Dividend Policy. *In Issues in Corporate Governance and Finance*, Published online, 91-117
10. Nguyen, K.H.P. (2011). Ownership concentration and dividend policy in Japan. *Managerial Finance*, 37 (4), 362 – 379
11. Park, K.S., Lee, E., and Lee, I. (2003). Determinants of dividend policy of Korean firms (in Korean). *Korean Journal of Finance*, 16(2), 195-229
12. Patro, D.K. (2000). Return behavior and pricing of American depository receipts. *Journal of International Financial Markets, Institutions and Money*, 10(1), 43-67
13. Perretti, G. F., Allen, M. T., and Weeks H. S. (2013). Determinants of dividend policies for ADR firms. *Managerial Finance*, 39 (12), 1155 – 1168.
14. Pourheydari, O. (2009). A survey of management views on dividend policy in Iranian firms. *International Journal of Islamic and Middle Eastern Finance and Management*, 2(1). 20 – 31
15. Shleifer, A. and Vishny, R. (1986). Large shareholders and corporate control. *Journal of Political Economy*, 9(4), 461-88.
16. Skinner, D.J. (2008). The evolving relationship between earnings, dividends, and stock repurchases. *Journal of Financial Economics*, 87 (3), 582-609
17. Soter, Brigham, and Evanson. (1996). The dividend cut, heard round the world the world: The case FPL. *The journal applied corporate finance*, 9(1), 4-15

Fund Preference of Mutual Fund Investors

E. Sulaiman
Bail John Thomas

Abstract

Financial market in India offers wide variety mutual fund products to the retail investors to satisfy their requirements, financial goals and risk tolerance level. It is very difficult to offer one type of fund to satisfy all the requirements of investors. Retail investors are heterogeneous in terms of their socio-economic/demographic profile, preferences, and beliefs. The mutual fund preference of investors mainly depends on the investment objectives, and risk appetite of the investors. It has been observed that wrong selection of mutual fund/schemes will not satisfy the requirements of the investors. The present study aims to analyse scheme/fund preferences of mutual fund investors; and examine the relationship of fund/scheme preferences of the mutual fund investors with their investment objectives, and risk perception. The investigation has been done with the help of primary data collected from sample mutual fund investors. The study found that most of the mutual investors select funds/schemes without considering the investment objectives and risk appetite of the investors.

Key Words

Mutual Fund Schemes, Fund Preference, Investment Objectives, Risk Perception

1. Introduction

A Mutual Fund is a trust that pools the savings of a number of investors who share a common financial goal. The investors buy units of a particular mutual fund scheme that

has a defined investment objective and strategy. A mutual fund is the most suitable investment avenue for the retail investors as it offers an opportunity to invest in a diversified, professionally managed portfolio at a relatively low cost. The success of mutual fund products is essentially the result of the combined efforts of competent fund managers and alert investors. A competent fund manager analyse investor behaviour and understand their needs and expectations, to gear up the performance to meet investor requirements. To gain a better understanding of the relations among individual investors' decision-making, the processes leading to these decisions and investment performance are taken in to consideration.

2. Statement of Problems

Nowadays an increasing number of investors are relying on mutual funds as investment and retirement vehicles. At the retail level, investors are unique and are a highly heterogeneous group. Hence, designing a mutual fund product and expecting a good response will be futile. The latent heterogeneity among the investors in terms of their preferences and beliefs form the underlying drivers of their behaviour. Identification of the most influencing factors on investors' behaviour affects the future policies and strategies of Asset Management Companies. It also helps the regulatory bodies to make the required legislations and the additional procedures needed in order to satisfy investors' desires, and to give more support to market efficiency. In this context, the present study is very useful and relevant to examine the fund/scheme preferences of mutual fund investors, and to analyse the influence of investment objectives, and risk appetite of the investors on fund selection.

3. Data and Methodology

The study applies descriptive as well as an empirical research design based on the survey method. The survey data collected from 400 sample mutual fund investors in Kerala through a structured questionnaire. The qualitative variables were measured in five point *likert-type* scales. The risk perception of the investors has been measured in ten point *Likert type* scale and classified it in to the three groups viz., low risk group, moderate risk group, and high risk group. A pilot survey was conducted to assess the reliability and validity of the questionnaire. In order to ensure the convergent validity of the instruments, confirmatory factor analysis of each item in the scale is checked with the help of coefficient called *Bentler-Bonett* Fit Index. The universe of the study consists of individual investors (retail investors excluding high net worth individuals) of mutual fund products hailing from the state of Kerala. The survey was conducted during the year 2014. The sample size required for the study has been arrived on the basis of minimum required sample size table and power analysis. Accordingly 400 sample mutual fund investors were selected for the intensive study. Simple random sampling was used for this purpose. Statistical Package for the Social Sciences is used to analyze the data. The fund preferences of mutual fund investors with their investment objectives were analysed with the help of *Friedman's* test. The dependence of fund/scheme preferences of mutual fund investors with risk perception were tested with *chi-square*.

4. Review of Literature

Over the past two decades, mutual funds have been the focal point of an increasing number of research studies being conducted in the field of finance. The basic issues of research focused by majority of these studies have been performance evaluation of mutual fund with regards to risk and return. Very few have discussed on mutual fund investors buying behaviour and their attitude in an Indian context on a qualitative data base.

The study on investor response to suggested criteria for the selection of mutual funds examined the selection criteria an investor should use in an efficient market based on three factors- load charges, management expense ratios, portfolio turnover and brokerage ratios. The results indicated that all

these factors appear to influence the net sales ratios (Walt, Woerheide, 1982). The study was conducted to identify the information sources influencing the buying decision, and the factors influencing the choice of a particular fund. The study reveals that Income Schemes and Open Ended Schemes are more preferred than Growth Schemes and Close Ended Schemes. Investors look for safety of Principal, Liquidity and Capital appreciation in the order of importance from the mutual fund investment. Newspapers and Magazines are the first source of information through which investors get to know about mutual fund Schemes; and investor service is a major differentiating factor in the selection of Mutual Fund Schemes (Madhusudhan, Jambodekar, V , 1996).

Another study has been conducted to examine the related aspects of the fund selection behaviour of individual investors towards Mutual funds, in the city of Mumbai. (Kavitha, Ranganathan, 2001). The mutual fund is a retail product designed to target small investors, salaried people and others who are intimidated by the mysteries of stock market but, nevertheless, like to reap the benefits of stock market investing. The investors look for safety first in MF products, followed by good returns, tax benefits, liquidity, and capital appreciation (Rajeswari, T.R, 2002). While making fund selection from a variety of information sources, the mutual fund investors pay a great deal of attention to past performance of funds and its overall fee structure (Ronald, Wilcox, T, 2003). The investors look for safety first in mutual fund products followed by good returns, tax Benefits, liquidity and capital appreciation. The scheme selection decision is made by respondents on their own, and the other sources influencing their selection decision are news papers and magazines, brokers and agents, television, friend's suggestions and direct mail (Nilamadhav, Samal, 2009). The investors consider a wide range of information before purchasing mutual funds shares and that the share holders consult a variety of sources for mutual fund information before and after purchasing shares, the one being professional financial advisor (Sandra, West, & Victoria, Leonard, 2006).

From the review of literature, it can be observed that mutual fund as an investment vehicle is capturing the attention of various segments of the society like academicians, industrialists, financial intermediaries and regulators for varied reasons, and deserves an in depth study regarding

the behaviour of its investors in an Indian perspective. The study on investors behaviour in mutual fund in relation to underlying behavioural principles, psychographics, risk tolerance and other investor related aspects to be studied further. The fundamental normative model of investment behaviour considers only the risk and return as the crucial variables affecting the investor's buying behaviour. Thus, it is in this context the researcher has made a humble attempt to fill this lacuna.

5. Results and Discussions

The fund/scheme selection of mutual fund investors mainly influences the investments objectives, and risk tolerance level of the investors. Nowadays, different Asset Management Companies design and offer wide variety of tailor-made schemes/funds cater to the requirements of the investors. In order to select right fund/schemes from the

market requires awareness and financial literacy from the part of the investors or financial advice from the expert. In this paper, the first part of the discussion is concerned with the fund preferences of the investors, and later part of the discussion dealt with the examination of relationship of fund preferences of the investors with their investment objectives and risk appetite.

5.1. Scheme and fund preferences of mutual fund investors

In order to assess the fund preferences of the mutual fund investors, various schemes/fund of mutual fund products opted for investment were classified and analysed on the basis of type of schemes (Table 1), and nature of portfolio (Table 2). Indian financial market offers three types of mutual fund schemes to the investors such as open ended schemes, close ended schemes, and interval schemes.

Table 1: Classification of the sample respondents on the basis types of mutual fund schemes (based on type of schemes) selected for investment

Sl. No	Schemes	Opted for investment		Not opted for investment		Total
		Number of respondents	Percentage	Number of respondents	Percentage	
1	Open ended schemes	305	76.25	95	23.75	400
2	Close ended schemes	45	11.25	355	88.75	400
3	Interval schemes	25	6.25	375	93.75	400

Source: Survey data

The classification of sample respondents on the basis of maturity period of mutual fund schemes indicates that majority of sample respondents (76.25percent) have opted open ended schemes. But in the case of close ended schemes, the percentage share in this respect is only 11.25. Similarly, only 6.25 percent of respondents have opted interval schemes. Open-ended schemes are more attractive to the investors when compared to other type of schemes. Under this scheme, the investors are free to buy and sell any number of units at any point of time. The main objective of this type of fund is to get regular income/dividends.

Table 2: Classification of the sample respondents on the basis of types of mutual fund schemes (based on the nature of portfolio) selected for investment

Sl. No	Type of Funds/ portfolio	Opted for investment		Not opted for investment		Total
		Number of respondents	Percentage	Number of respondents	Percentage	
1	Growth fund	296	74	104	26	400
2	Income fund	42	10.50	358	89.5	400
3	Balanced fund	40	10	360	90	400
4	Tax saving schemes	91	22.75	309	77.25	400
5	Money market funds	27	6.75	373	93.25	400
6	Sectoral based funds	25	6.25	375	93.75	400
7	Index Funds	23	5.75	377	94.25	400
8	Exchange traded funds	65	16.25	335	83.75	400
9	Capital protection schemes	24	6	376	94	400
10	Fund of funds	11	2.75	389	97.25	400

Source: Survey data

The study on the pattern of fund preference of mutual fund investors on the basis of nature of portfolio indicates that majority (74 percent) of the respondents opted for growth fund, where as, the percentage share of other types of funds in this category is comparatively very low. The percentage of the respondents opted income fund is only 10.5, and the percentage share of balanced fund is only 10. However, the percentage of the respondents opted for tax saving schemes is 22.75, and exchange traded fund is 16.25. But, the percentage share of the respondents opted money market fund, sectoral funds, index funds, capital protection schemes, and fund

of funds are below 10 percent. The growth oriented funds aim at meeting the investors' need for capital appreciation by investing the funds predominantly on equities with high growth potential.

5.2. Influence of fund preference on investment objectives, and risk perception

In this section, the researcher has made an attempt to associate the fund preference of the investors with their investment objectives, and risk perception. The hypothesis formulated to test the influence fund preference on investment

objectives were H_{01} , H_{02} , and H_{05} .

Hypothesis (H_{01}): There is no significant association between the rankings of investment objectives of the mutual fund investors, and their fund preferences based on the type of schemes.

In order to study the influence of investment objectives of mutual fund investors on fund preferences based on type of schemes, *Friedman's test* has been deployed (Tables 03 & 04) .

Table 03: Ranking of investment objectives of sample respondents across their scheme-wise preferences based on maturity

Objectives of Investors	Open ended schemes		Close ended schemes		Interval schemes	
	Mean	Rank	Mean	Rank	Mean	Rank
Return	5.18	1	5.02	1	4.56	2
Liquidity	3.07	4	3.31	3	3.29	3
Safety	4.41	2	4.96	2	5.40	1
Tax benefits	2.15	6	3.09	4	2.87	6
Capital appreciation	3.65	3	2.33	5	2.88	5
Provision for Contingencies	2.59	5	2.22	6	2.99	4

Source: Survey data

Table 04: Equal variance test between investment objectives and scheme-wise (maturity) preferences of sample respondents

'F' value	Table value	Degrees of freedom	P value	Results
0.333	5.991	2	0.956*	*Not significant at 05% level

Source: Survey data

It has been observed that return and safety of the investment have got more or less same rank i.e. first two ranks among the investors in respect of open-ended, close ended, and interval schemes. Equal variance test shows that the calculated value of 'F' (0.333) with 02 degrees of freedom is less than the tabulated value of chi-square (5.991) at 05 percent level of significance. So, the null hypothesis (H_{01}) was rejected, and concluded that the fund preference (based on type of schemes) of mutual fund investors does not have any

influence on their investment objectives.

Hypothesis (H_{02}): There is no significant association between the ranking of investment objectives of the mutual fund investors, and their fund preferences based on the nature of portfolio.

In order to test the hypothesis, *Friedman's test* has been employed to check the association between the investment objectives of mutual fund investors, and their fund preferences based on nature of portfolio (Tables 05 & 06)

Table 05: Ranking of investment objectives of sample respondents across their fund-wise preferences based on the nature of portfolio

Type of Funds		Investment objectives					
		Return	Liquidity	Safety	Tax benefit	Capital appreciation	Provision for contingencies
Growth fund	Mean	5.28	2.99	4.42	2.18	3.59	2.66
	Rank	1	4	2	6	3	5
Income fund	Mean	5.29	2.93	4.43	2.10	4.19	2.26
	Rank	1	4	2	6	3	5
Balanced fund	Mean	4.73	3.88	4.43	2.25	3.10	2.55
	Rank	1	3	2	6	4	5
Tax saving schemes	Mean	4.89	2.91	3.92	3.11	3.49	2.93
	Rank	1	6	2	4	3	5
Money market funds	Mean	4.48	3.85	4.67	1.94	3.33	2.82
	Rank	2	3	1	6	4	5
Sectoral based funds	Mean	4.81	3.19	4.31	2.06	3.56	3.06
	Rank	1	4	2	6	3	5
Index funds	Mean	5.47	3.47	4.12	2.12	3.76	2.06
	Rank	1	4	2	5	3	6
Exchange traded funds	Mean	5.11	2.88	5.17	2.49	3.77	2.63
	Rank	2	4	1	6	3	5
Capital protection schemes	Mean	4.98	3.11	4.64	2.56	3.07	2.73
	Rank	1	3	2	6	4	5
Fund of funds	Mean	5.71	1.71	5.00	3.43	3.86	1.29
	Rank	1	5	2	4	3	6

Source: Survey data

Table 06: Equal variance test between investment objectives and fund-wise preferences of sample respondents

'F' value	Table value	Degrees of freedom	P value	Results
2.182	16.919	9	0.988*	*Not significant at 05 % level

Source: Survey data

The analysis shows that among the different funds based on the nature of portfolio, more or less same ranking has been given by investors i.e. return, and safety of their investment were major investment objectives(first two ranks) across different types of funds. Friedman's test reveals that the calculated value of 'F' (2.182) is less than the table value of chi-square (16.919) with nine degrees of freedom at 05 percent level of significance. Therefore, the null hypothesis (H_{02}) was accepted; and concluded that there is no significant influence of investment objectives of mutual fund investors, and their fund preferences based on the nature of portfolio. The testing of both hypothesis (H_{01} & H_{02}) related with scheme/fund preferences and investment objectives reveals that no significant association between the ranking of investment objectives of mutual fund investors, and their scheme/fund selection. Therefore, it is inferred that the mutual fund investors does not consider their investment objectives while selecting different types of fund/schemes.

This practice followed by the investors is not a scientific method of investing money in mutual fund.

Hypothesis (H_{03}): *There is no significant association between the ranking of investment objectives of the mutual fund investors, and their risk perception*

The study has made an attempt to associate the scheme/ fund preferences of mutual fund investors with their level of risk perception (Table 07). The risk perception of the investors have been classified in to three group such as low level, moderate level, and high level. Due to the lack of availability of sufficient number of respondents opted for certain schemes, the analysis has been restricted to selected funds such as Open ended schemes, Close ended schemes, Growth fund, Income fund, Balanced fund, Tax saving schemes, and Exchange traded fund. Chi-square test has been employed to test the hypothesis (Table 08).

Table 07: Associations between fund/scheme preferences of mutual fund investors and their risk perception

Type of funds	Levels of risk		Whether opted for investment		Total
			Yes	No	
Open ended schemes	Low	Count	13	17	30
		% within the group	43.3%	56.7%	100.0%
	Moderate	Count	163	51	214
		% within the group	76.2%	23.8%	100.0%
	High	Count	129	27	156
		% within the group	82.7%	17.3%	100.0%
Total	Count	305	95	400	
	% within the group	76.2%	23.8%	100%	

Cont...

Type of funds	Levels of risk		Whether opted for investment		Total
			Yes	No	
Close ended schemes	Low	Count	6	24	30
		% within the group	20.0%	80.0%	100.0%
	Moderate	Count	21	193	214
		% within the group	9.8%	90.2%	100.0%
	High	Count	18	138	156
		% within the group	11.5%	88.5%	100.0%
Total		Count	45	355	400
		% within the group	11.2%	88.8%	100%
Growth fund	Low	Count	16	14	30
		% within the group	53.3%	46.7%	100.0%
	Moderate	Count	148	66	214
		% within Risk MF group	69.2%	30.8%	100.0%
	High	Count	132	24	156
		% within the group	84.6%	15.4%	100.0%
Total		Count	296	104	400
		% within the group	74.0%	26.0%	100%
Income fund	Low	Count	6	24	30
		% within the group	20%	80%	100.0%
	Moderate	Count	27	187	214
		% within the group	13.5%	85.9%	100.0%
	High	Count	9	147	156
		% within the group	5.8%	94.2%	100.0%
Total		Count	42	358	400
		% within the group	10.5%	89.5%	100%

Cont...

Type of funds	Levels of risk		Whether opted for investment		Total
			Yes	No	
Balanced fund	Low	Count	6	24	30
		% within the group	20.0%	80.0%	100.0%
	Moderate	Count	23	191	214
		% within the group	10.7%	89.3%	100.0%
	High	Count	11	145	156
		% within the group	7.1%	92.9%	100.0%
Total		Count	40	360	400
		% within the group	10.0%	90.0%	100%
Tax saving schemes	Low	Count	6	24	30
		% within the group	20.0%	80.0%	100.0%
	Moderate	Count	51	163	214
		% within the group	23.8%	76.2%	100.0%
	High	Count	34	122	156
		% within the group	21.8%	78.2%	100.0%
Total		Count	91	309	400
		% within the group	22.8%	77.2%	100%
Exchange traded funds	Low	Count	7	23	30
		% within the group	23.3%	76.7%	100.0%
	Moderate	Count	31	183	214
		% within the group	14.5%	85.5%	100.0%
	High	Count	27	129	156
		% within the group	17.3%	82.7%	100.0%
Total		Count	65	335	400
		% within the group	16.2%	83.8%	100%

Source: Survey data

Table 08: Chi-square tests for dependence of scheme fund preferences of mutual fund investors and their risk perception

Schemes/Funds	Calculated value of chi- square	Table value	Degrees of freedom	P value	Results
Open ended schemes	19.621	5.991	2	0.000*	*Significant at 05% level
Close ended schemes	1.405	5.991	2	0.843	Not significant
Growth fund	24.512	5.991	2	0.000*	*Significant at 05% level
Income fund	7.344	5.991	2	0.025*	*Significant at 05% level
Balanced fund	7.528	5.991	2	0.023*	*Significant at 05% level
Tax saving schemes	0.263	5.991	2	0.877	Not significant
Exchange traded fund	3.499	5.991	2	0.174	Not significant

Source: Survey data

The Table 07 depicts that out of 305 mutual fund investors who have opted open ended schemes, 163 investors fall under moderate level of risk group. The chi-square test reveals that the calculated value (19.621) is more than the tabulated value (5.991) at two degrees of freedom with five percent level of significance, and it falls in the critical region. So, the null hypothesis was rejected; and concluded that there is significant association between preference for open ended schemes and risk perception of the investors. Open-ended schemes are preferred by the investors having moderate level of risk tolerance, and assure regular income to the investors from short-term perspective.

In the case of close ended schemes, out of 400 sample respondents 355 investors have not opted for the scheme. Within this group, 193 investors belong to moderate level of risk group. The statistical test shows that the calculated value of chi- square (1.405) is less than the tabled value (5.991), and therefore, the null hypothesis was accepted. It is concluded that there is no significant association between preference for close ended schemes and risk perception of the investors. It indicates that among the investors who opted for close ended schemes, the risk appetites of the investors were not considered for selection of the fund. The main objective of this fund is to get capital appreciation on long-term perspective with high risk. But, the study indicates that the selection of fund was done not based on the risk tolerance level of the investors. It is not good practice followed by the investors to invest fund in this category.

The analysis of growth fund reveals that out of 296 investors opted for growth fund schemes 148 investors have moderate level of risk perception, and 132 investors belongs to high level

of risk perception. The chi-square test shows that the calculated value (24.512) is greater than the tabulated value (5.991) at two degrees of freedom with five percent level of significance, and it falls in the critical region. Therefore, the null hypothesis was rejected; and concluded that there is significant association between preference for growth fund and risk perception of the investors. The study indicates the fund selection in this category is appropriate to the risk level of the investors.

Out of 400 sample respondents surveyed, 42 investors have opted for income fund scheme; and among these respondents 27 investors belongs to moderate level of risk group. The calculated value of the *chi- square* (7.344) is greater than the tabled value (5.991) at two degrees of freedom with five percent level of significance, and it falls in the critical region. Thus, the null hypothesis was rejected; and inferred that there is significant association between preference for income fund schemes and risk perception of the investors. Here the fund preference has been done in accordance with the risk perception of the investors.

In the case of balanced fund, out of 400 sample respondents 40 investors have opted balanced fund, among these 23 investors fall under moderate level of risk group, and 11 investors belong to high level risk group. The statistical test shows that the *chi-square* value (7.528) is greater than the tabled value at two degrees of freedom with five percent level of significance, and it falls in the critical region. Therefore, the null hypothesis was rejected; and concluded that there is significant association between preference for balanced fund schemes and risk perception of the investors. It also indicates the fund selection has been engaged in accordance with the risk perception of the investors.

Out of 400 sample respondents surveyed, 91 investors have opted for the tax saving scheme, among these 51 investors belongs to moderate level risk group and 34 investors represented by high level risk group. Here the *chi-square* value (0.263) is less than the tabled value (5.991). Therefore, the null hypothesis has been accepted; and it is concluded that there is no significant association between preference for tax saving schemes and risk perception of the investors.

In the case of exchange traded funds, out of 400 sample respondents, 65 investors have opted for the fund, among these 31 investors come under moderate level of risk perception, and 27 investors belongs to high level of risk perception. The statistical test shows that that the calculated value of *chi-square* (3.499) is less than the tabled value (5.991). Therefore, the null hypothesis has been accepted; and concluded that there is no significant association between preference for exchange traded funds and risk perception of the investors.

The results of association test between risk perception of mutual fund investors and their scheme/fund preferences indicates that risk perception of investors depends on fund preferences of the investors in respect of open ended schemes, growth fund, income fund, and balanced fund. However, the risk perception of investors does not depend on fund preferences of the investors in respect of close ended schemes, tax saving schemes, and exchange traded funds.

Conclusions and Implications

The present study has made an attempt to understand the fund preferences of mutual fund investors; and to examine the influence of investment objectives and risk appetite of the investors on the selection of different mutual fund schemes. Financial planning in the area of personal finance suggests that while taking investment decision, investment objectives and risk tolerance level of investors to be considered. The portfolio selected for the investment should match with the financial goals and risk perception of the investors. Mutual fund products are tailor-made products designed to cater to the different requirements of the investors. The fund selection by the investors is to done in accordance with the investment objectives, and risk appetite of the investors.

The study found that majority of the mutual fund investors preferred growth/equity fund, and opted for open-ended

schemes. The fund/scheme preferences of mutual fund investors were not influenced by the investment objectives. This is due to lack of financial literacy among the investors, and *mis-selling* on the part of intermediaries. However, the risk perception of the investors have an influence on the fund/scheme preferences in respect of open end schemes, growth fund, income fund and balanced fund. Apart from these funds, the fund selection has not been done in accordance with the risk tolerance level of the investors. The study provide key information inputs regarding investors' fund/scheme selection behaviour, that will guide future mutual fund product managers in designing and marketing right mutual fund products for the right investors. It also highlights the necessity to create awareness, financial advice, and financial literacy among the individual investors to select right type of mutual fund products.

References

1. Kavitha, Ranganathan. 2003. *Fund selection behaviour of individual investors towards mutual funds- with reference to Mumbai city. Unpublished doctoral dissertation, Madurai Kamaraj University, Tamil Nadu.*
2. Madhusudan, Jambodekar, V. 1996. *Marketing strategies of mutual funds – current practices and future directions, Working Paper, UTI – IIMB Centre for Capital Markets Education and Research, Bangalore.*
3. Nilamadhav, Samal. 2009. *The factors affecting investors' preference for mutual funds in India, Retrieved from <http://www.ripublication.com/gjfm.htm>.*
4. Rajeswari, T. R. 2002. *Performance evaluation of selected mutual funds and investor behaviour -A diagnostic and prognostic approach, unpublished doctoral dissertation, Sri Satya Sai Institute of Higher Learning, Andra Pradesh.*
5. Ronald, Wilcox, T. 2003. *Bargain hunting or star gazing? Investor's preferences for stock mutual funds. Journal of Business, 76(4): 17-24.*
6. Walt, Woerheide. 1982. *Investor response to suggested criteria for the selection of mutual funds. Journal of Financial and Quantitative Analysis, 27(1): 27- 33.*

Interest Rate: Futures and Cash Market Spill-over's in India

Hruda Ranjan Sahoo

Pradiptarathi Panda

Abstract

The present study analyses the spill-over's effect between the interest rate cash and futures market in India. We use daily data of volumes, weighted average price, weighted average yield to represent cash market and number of contracts traded, values, open interest, settlement price to represent futures market from 4th August 2014 to 31st December 2015 with 337(trading days) number of observations. We consider a single instrument (i.e. 08.40 GS 2024) which is most liquid, active and have contracts for a longer time period. All data are sourced from Clearing Corporation of India Ltd. (CCIL) and National Stock Exchange (NSE). We first presents descriptive statistics followed by stationarity test, Correlation, Regression, Granger Causality test and ARMA (1, 1), GARCH (1, 1) spill-over's model. The study finds cash market price is leading the futures market but the future settlement price has impact on the yield of the underlying security.

Key Words

Govt. Securities, Interest Rate Futures, NSE, CCIL

JEL Classification

C 58, G 12, G 13

1 Introduction

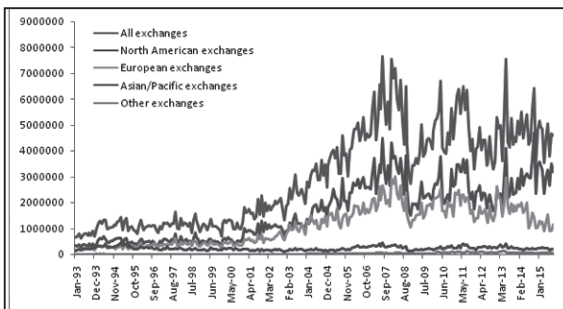
Interest rate plays a significant role for stability, growth

and development of an economy. Change in interest rate will affect the value of investment, cost of borrowing, cost of raising money from the securities market, value of the company, etc. therefore with the primary objective to hedge the interest rate risk, interest rate future were introduced like other financial derivatives. It is nothing but a future contract with the underlying an interest bearing instrument, which will be bought and sold on a predetermined future date, at a predetermined price and is also traded on the exchange platform. Mostly, the underlying in the interest rate future contracts are liquid treasury securities of different maturities.

Investors use interest rate derivative to hedge against interest rate risk. Among all derivative instruments, Interest Rate Futures (IRF) is the most popular derivative products available in the market across globe. Chicago Mercantile Exchange (CME) is the first exchange introduced IRF in the year 1981¹. This particular product has gained interest in developed markets. The total turnover of IRF of all world exchanges is \$4,576 billion under which North American exchanges, European exchanges, Asia/ pacific exchanges and other exchanges turnover is \$3,175 billion (69%), \$1135 billion (25%), \$199 billion (4%) and \$67 billion (2%) respectively (See Figure-1 & Figure- 2). But as a developing and emerging country like India, it is struggling since 2003. IRF has failed in the year 2003 and 2009. But in the third time as it is introduced in the year 2014 (MCX-SX introduced on 20th January 2014, NSE on 21st January 2014 and BSE on 28th January 2014), the volume in the NSE is high among all the three exchanges (Panda and Thiripalraju, 2015). A lot of debate arises among researchers, policy makers and market participants on whether future market leads cash market or cash leads futures market? Although several studies exists based on equity/commodity/index cash and futures market, there are no more studies

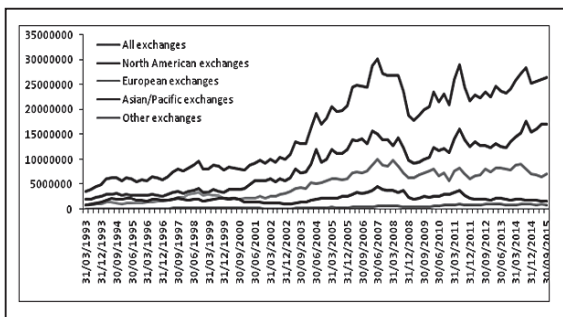
exists considering interest rate cash and futures especially in respect to India. Considering commodity cash and futures market, studies find that futures market leads cash market {Oellermann & Farris (1985), Oellermann et al. (1989), Chaihetphon and Pavabutr (2010), Kumar and Arora (2011) & Arora and Kumar (2013)}. In case of equity cash and futures market, studies also find futures market leads cash market {Chan (1992), Raju and Karande (2003), Gupta and Singh (2007) & Gupta and Singh (2009)}. Hence this study takes an attempt further to examine the spill-over's effect between interest rate cash and futures market in India.

Fig 1: Notional Amount Turnover (USD Millions) of Interest Rate Derivative Contracts from Jan, 1993 to Sep, 2015.



Source: Bank for International Settlement (BIS)

Fig 2: Notional Amount Outstanding (OI) (USD Millions) of Interest Rate Derivative contracts of All Exchanges from March, 1993 to Sep, 2015.



Source: Bank for International Settlement (BIS).

Table-1: IRF Volume in Indian Scenario (NSE)

Sl. No.	Period	Name of the Underlying	Future Market Value as a % of Cash Market Volume
1	21/01/14 to 30/10/14	883GS2023	5.46%
2	04/08/14 to 31/12/15	840GS2024	13.88%
3	29/05/15 to 31/12/15	772GS2025	14.73%
4	31/07/15 to 31/12/15	827GS2020	1.14%
5	31/07/15 to 31/12/15	788GS2030	3.57%

Source: Authors estimation/ CCIL/NSE

Table-1, presents IRF volume in Indian Scenario. During the period of our observation IRF contracts were mostly on these treasury securities 883GS 2023, 840GS2024, 772GS2025, 827GS2020 & 788GS2030. The trading volumes are mostly concentrated towards 10 year maturity horizon.

2. Review of Literature:

Studies based on interest rate futures are mostly on developed markets may be due to highest market share. The following are some literature on interest rate futures:

In a study, **Poon et al. (1998)** find suspension of trading in Shanghai Treasury bond futures has a positive impact on the market liquidity of both A and B shares traded on both Shanghai and Shenzhen Stock Exchanges. **Brewer et al. (2000)** finds a positive relationship between the use of interest rate derivatives by banks and the growth in bank lending's (Commercial and industrial loans). **Kuttner (2000)** finds a strong relationship between surprise policy actions and market interest rates, but response to anticipated actions are small. Further, the response to surprise actions at the short end of the yield curve suggests that many of these surprises have more to do with timing of rate changes than with the level of rates and surprise target rate changes have virtually no effects on expectations of future Fed actions. **Choi & Finnerty (2006)** shows the market trading on the announcement day of Federal Open Market Committee (FOMC) is different from

the market trading on a non-announcement for both the Eurodollar and T-Note futures market. The difference in autocorrelation structure exists at both markets, but the price level difference is not noticeable at T-Note market. There is strong correlation among the interest rates of T-Bonds and the federal funds rate. Further, despite of all the considerations, the difference in the maturity seems to have an effect on the magnitude of the FOMC impact. **Zhou (2007)** shows strong evidence that the movement of Eurodollar rates and the federal funds rate appears to be related to the way the Fed targets the funds rate. The study uses co-integration and vector error correction mechanism. The study finds that Fed may affect the market interest rates through a policy of changing the federal funds rate target by a fixed amount for the foreseeable future. **Hyde (2007)** finds in all four major European economies: France, Germany, Italy and the UK the industries are significantly exposed to both market risk and exchange rate risk. However, the sensitivity of stock returns at the industry level to interest rate risk was observed mainly in Germany and France. **Purnanandam (2007)** finds banks which usages derivatives for interest rate risk management are more comfortable during the events of external shocks. Usage of derivatives helps the banks to hedge their interest rate risk and also provides smooth cash flow to the bank and are unaffected in terms of their lending volume due to change in policy rates. **Debasish (2009)** finds no significant volatility Spill-over's from futures to spot market on NSE Nifty by using GARCH time series techniques. **Park and Choi (2011)** finds interest rate sensitivity of US property/liability insurer stock returns is time varying and is closely related to the underwriting cycle or performance of the insurance industry. The period of study was from 1992 and 2001. In Indian case **Panda and Thiripalraju (2015)** evaluates the rise and fall of interest rate futures (IRF) in Indian derivative market presenting three different cases like 2003, 2009 and 2014. The study uses the trend analysis of 2014 IRFs for three different exchanges like BSE, NSE and MCX-SX. The study finds NSE IRFs volume is higher in the Indian derivative market.

Based on the above literature, we find most of the research on interest rate derivatives have been done in developed markets. But as per our knowledge, in case of emerging markets like India the study on IRF are a few. As in India IRF failed two times and this is the third time (from 2014 onwards), the IRF market is growing, we find only one study Panda and Thiripalraju (2015) consider 2014 data. But they have not examined the

inter-linkages between Interest rate cash and futures market. This study empirically examines the spill-over between interest rate cash and futures market in respect to India.

3. Data Sources and Methodology

Data Sources:

For our analysis we have considered the most liquid treasury security in the 10 year maturity horizon i.e. 840 GS 2024. All futures market data are sourced from National Stock Exchange (NSE) and all cash market data are obtained from Clearing Corporation of India Ltd. (CCIL). The period of our study covers form- 4th August 2014 to 31st December 2015 with total number of 337 daily observations (trading days). We considered four variables from the futures market such as daily settlement price, number of contracts traded, value of contracts traded and open interest and three variables from the cash market such as weighted average price, volume and weighted average yield for our analysis. The detailed of variables used and their codes are presented in Table- 2.

Table-2: Codes used in this study

Futures Market Variables	rsp	Natural log return of daily settlement price
	rcon	Natural log Return of number of contracts traded on daily basis
	rval	Natural log Return on total value of contracts traded on daily basis
	roi	Natural log return of total open interest on daily basis
Cash Market Variables	rwap	Natural log return of daily weighted average price
	rvol	Natural log return on total daily volume
	rway	Natural log return on daily weighted average yield

For futures market, we considered the daily settlement price of the near month contracts as those contracts are more liquid and active. The number of contracts traded, value of contracts traded and open interest are the gross value on daily basis. Each contract consists of 2000 units of the underlying security.

Methodology:

To normalize the data, all data series were converted to natural logarithm by formula $-\ln(P_t/P_{t-1}) * 100$

Where -

P_t represents settlement price/ contracts traded/total value of contracts traded/open interest/ weighted average price/ total volume/weighted average yield, etc. on the same day.

P_{t-1} represents settlement price/ contracts traded/total value of contracts traded/open interest/ weighted average price/ total volume/weighted average yield, etc. on the previous day.

We proceed further by representing descriptive statistics of the variables and checked the stationarity by Augmented Dickey Fuller Test (ADF) of Dickey and Fuller (1979), Philips and Perron test of Philips and Perron (1988) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test of Kwiatkowski-Phillips-Schmidt-Shin (1992).

To check the relationship among variables, we present correlation matrix among variables. Subsequently, we run ordinary least square with the variables by considering different dependent and independent variables. The equations are as under:

$$rwap = a_0 + \beta_1 rvol + \beta_2 rcon + \beta_3 roi + \beta_4 rsp + \beta_5 rway + \epsilon_i \dots \dots \dots (i)$$

$$rway = a_0 + \beta_1 rvol + \beta_2 rcon + \beta_3 roi + \beta_4 rsp + \beta_5 rwap + \epsilon_i \dots \dots \dots (ii)$$

$$rsp = a_0 + \beta_1 rwap + \beta_2 rcon + \beta_3 roi + \beta_4 rvol + \beta_5 rway + \epsilon_i \dots \dots \dots (iii)$$

$$rcon = a_0 + \beta_1 rwap + \beta_2 sp + \beta_3 roi + \beta_4 rvol + \beta_5 rway + \epsilon_i \dots \dots \dots (iv)$$

Further we checked VAR lag length criteria and we find most of the criteria are satisfied with 4th lag order. After lag order selection we applied Granger Causality test of Granger (1969, 1980) to know about the cause and effect relationship among variables.

The Granger causality test checks the causality between two variables. If there are two variables say X and Y then the causality result between these two variables may come in 4 possible cases. That are-

- a. Unidirectional causality: X granger cause Y
- b. Unidirectional causality: Y granger cause X
- c. Bidirectional causality: if causality exists from X to Y and Y to X
- d. No Granger Causality: No causality exists from either X to Y or Y to X

To test causal relations between two stationary series X_t and Y_t (in bi-variate case) can be based on the following two equations:

$$Y_t = \alpha_0 + \sum_{i=1}^4 \alpha_i Y_{t-i} + \sum_{j=1}^4 \beta_j X_{t-j} + \epsilon_t \dots \dots (v)$$

$$X_t = \gamma_0 + \sum_{i=1}^4 \gamma_i X_{t-i} + \sum_{j=1}^4 \theta_j Y_{t-j} + v_t \dots \dots (vi)$$

Here Y_t and X_t denotes respective variables. The disturbance term ϵ_t and γ_t are assumed to be un-correlated.

- a. Unidirectional Granger causality from X to Y will exist if $\sum_{j=1}^4 \beta_j \neq 0$ and $\sum_{j=1}^4 \theta_j = 0$
- b. Unidirectional Granger causality from Y to X will exist if $\sum_{j=1}^4 \beta_j = 0$ and $\sum_{j=1}^4 \theta_j \neq 0$
- c. Bidirectional causality will exist if $\sum_{j=1}^4 \beta_j \neq 0$ and $\sum_{j=1}^4 \theta_j \neq 0$
- d. No causality exists between X and Y if $\sum_{j=1}^4 \beta_j = 0$ and $\sum_{j=1}^4 \theta_j = 0$

Finally, we run Volatility spill-over's effect among the variables like- rsp & $rwap$; rsp & $rway$; and $rval$ & $rvol$ by AR (1) MA (1)-GARCH (1,1) spill-over's model. The respective equations are given below:

$$R_{cashmarket} = \alpha_0 + \alpha_i AR(1) + \beta_j MA(1) + \epsilon_i \dots \dots (vii)$$

$$R_{futurmarket} = \alpha_0 + \alpha_i AR(1) + \beta_j MA(1) + \epsilon_i \dots \dots (viii)$$

We run AR (1) MA (1) for variables of cash markets ($rwap$,

rway & rvol) and futures market (rsp & rval). In each run, we capture residual of the particular equation and square it. Further we employ the squared residual in other variable's variance equation of GARCH model of Bollerserve (1986) to capture the spill-over's effect between the variables. The GARCH (1, 1) spill-over's model in each case are given below:

$$h_{t(\text{futures market})} = \alpha_1 + \beta_1 \varepsilon_{t-1}^2 + \beta_2 h_{t-1} + \phi (\text{sqrresid}_{\text{cash market}}) \dots \dots \dots \text{(ix)}$$

$$h_{t(\text{cash market})} = \alpha_1 + \beta_1 \varepsilon_{t-1}^2 + \beta_2 h_{t-1} + \phi (\text{sqrresid}_{\text{futures market}}) \dots \dots \dots \text{(x)}$$

Here-

$$\alpha_1 > 0, \beta_1 >= 0, \beta_2 >= 0$$

h_t = the conditional variances of both futures market and cash market respectively. It is function of mean α_1 .

The news about volatility from the previous period is measured as the lag of the squared residual from the mean equation (ε_{t-1}^2), previous periods forecast variance (h_{t-1}) and the squared residual of futures market and cash market respectively in

both the above equations.

4. Empirical Results

We first present descriptive statistics in Table-3 to know the nature of data series under consideration. Descriptive statistics describes the nature of data in quantitative terms. Mean is the average of a data series and indicates where the values are centred. Over the period of time mean of contracts, open interest, settlement price, value & weighted average prices is positive and volume & weighted average yield are negative. From the standard deviation we observe that contracts, value and volumes are more volatile but settlement price, weighted average price and weighted average yield are less volatile. From the skewness we find open interest & weighted average yield is positively skewed and rest of the variables are negatively skewed. Kurtosis tells us the distribution is less or more peaked than a normal distribution. Here all value of kurtosis are positive and more than three indicates the distribution is leptokurtic and more peaked distribution than normal distribution. From the probability value of Jarque- Bera test, we find all data series are non-normal.

Table-3 : Descriptive Statistics

	RCON	ROI	RSP	RVAL	RVOL	RWAP	RWAY
Mean	0.390	0.830	0.011	0.401	-0.693	0.011	-0.022
Median	1.954	0.255	0.006	1.868	0.796	0.005	0.000
Maximum	219.022	109.205	0.676	219.644	208.811	0.632	1.524
Minimum	-239.436	-32.450	-0.971	-239.505	-135.824	-0.811	-1.293
Std. Dev.	66.669	9.994	0.216	66.683	44.707	0.180	0.354
Skewness	-0.330	4.003	-0.451	-0.329	-0.018	-0.166	0.072
Kurtosis	4.163	47.339	5.431	4.166928	4.152	4.820	4.772
Jarque-Bera	25.064	28421.070	94.207	25.16067	18.585	47.949	44.249
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	336	336	336	336	336	336	336

Table 4 presents stationarity of data series. To check stationarity of data series, we employ ADF test, PP test and KPSS test. KPSS test find stationarity in opposite way. That means if probability value of coefficients in KPSS test is insignificant then

the series is stationary. In case of KPSS test, the series is stationary at level and intercept but in 3 cases of trend and intercept it is non stationary. We find over-all data series are stationary at level in both intercept& trend and intercept.

Table 4: Result of Stationarity Test at Level

	ADF		PP		KPSS	
	Intercept	Trend and intercept	Intercept	Trend and intercept	Intercept	Trend and intercept
RCON	-1.621 (0.089)*	-1.622 (0.089)*	-1.364 (0.051)*	-1.363 (0.051)*	0.391 (3.637)	1.979 (7.268)
ROI	-0.769 (0.043)*	-0.796 (0.429)*	-0.768 (0.043)*	-0.796 (0.043)*	0.830 (0.546)	-0.023 (0.006)*
RSP	-1.139 (0.077)*	-1.156 (0.077)*	-1.011 (0.055)*	-1.016 (0.055)*	0.011 (0.012)	0.038 (0.024)
RVAL	-1.622 (0.089)*	-1.623 (0.089)*	-1.363 (0.051)*	-1.364 (0.051)*	0.401 (3.638)	2.017 (7.269)
RVOL	-1.513 (0.089)*	-1.519 (0.089)*	-1.313 (0.053)*	-1.314 (0.052)*	-0.693 (2.438)	1.435 (4.873)
RWAP	-0.972 (0.694)*	-0.987 (0.069)*	-0.834 (0.054)*	-0.841 (0.054)*	0.011 (0.009)	0.037 (0.020)***
RWAY	-0.988 (0.070)*	-1.000 (0.070)*	-0.849 (0.054)*	-0.854 (0.054)*	-0.023 (0.019)	-0.069 (0.038)***

Note:
- * **&*** represents significant at 1%, 5% and 10 % respectively;
- Numbers in the parenthesis are standard errors.

Table-5 represents the correlation among variables of both future and cash markets. It is observed that there is a high degree of positive correlation between number of contracts traded in futures market and total traded value in futures market (0.999) & daily settlement price in futures market and the daily weighted average price in cash market (0.778). There is a high degree of negative correlation between daily settlement price in futures market and daily weighted average yield in the cash market (-0.762) & the daily weighted average price in cash market and daily weighted average yield in the cash market (-0.988). The rest of the variables are less correlated.

Table-5: Correlation Matrix

	rcon	rval	roi	rsp	rvol	rwap	rway
rcon	1.000						
rval	0.999	1.000					
roi	0.254	0.254	1.000				
rsp	-0.003	-0.001	-0.199	1.000			
rvol	0.410	0.411	0.001	0.270	1.000		
rwap	0.083	0.086	-0.146	0.778	0.271	1.000	
rway	-0.091	-0.094	0.124	-0.762	-0.278	-0.988	1.000

Further we run regression in 4 different equations. The regression result is given in table-6. In equation-i, we consider the impact of volume, contract, open interest, settlement price and weighted average yield on weighted average price. We find no significant impact from volume and contract on weighted average price. The impact from open interest, settlement price and weighted average yield to weighted average price is negative and significant. Among all the variables the weighted average yield impacts more on the weighted average price. In equation-ii, we regressed weighted average yield with volume, contracts, open interest, settlement price and weighted average price. In this case we find only open interest and weighted average price negatively impacts weighted average yield significantly and rest of the variables impact is insignificant. The weighted average price impacts more on the weighted

average yield. In equation-iii, we regress settlement price with weighted average price, contracts, open interest, volume and weighted average yield. We find significant positive impact exists from weighted average price and volume to settlement price and significant negative impacts from contracts and open interest. Weighted average price impacts more on settlement price. For equation - i, ii & iii the R squared value is high and the Durbin Watson statistics is more than two, indicates the model is good fit. The equation-iv regress contract with weighted average price, settlement price, open interest, volume and weighted average yield. Although significant negative impact shown from settlement price and significant positive impact shown from open interest and weighted average yield to contract; the R squared is very low.

Table-6: Regression Result

Variable	Equation-i	Equation-ii	Equation-iii	Equation-iv
	Coefficient	Coefficient	Coefficient	Coefficient
α_0	7.751 (0.001)	-0.000 (0.003)	0.003 (0.007)	-0.478 (3.206)
β_1	-3.971 (3.731)	-9.731 (7.541)	1.218 (0.269)*	79.796 (121.178)
β_2	1.641 (2.501)	1.071 (5.051)	-0.000 (0.000)**	-57.109 (23.840)**
β_3	-0.000 (0.000)**	-0.001 (0.000)**	-0.001 (0.001)***	0.627 (0.075)*
β_4	-0.048 (0.011)*	0.026 (0.022)	0.001 (0.000)*	12.705 (59.985)
β_5	-0.481 (0.006)*	-1.965 (0.026)*	0.165 (0.137)	1.601 (0.328)*
R ²	0.979	0.977	0.625	0.245
AR ²	0.978	0.977	0.620	0.234
DW	2.887	2.897	2.871	2.592
<p>- Note:</p> <p>- *,** & *** indicates level of significance at 1%, 5% & 10%.</p> <p>- Numbers in the parenthesis are standard errors.</p> <p>- R²= R Squared, A R²= Adjusted R Squared, DW= Durbin-Watson stat</p>				

Before running Granger causality test, we run VAR lag order selection criteria (See Table 7). We find most of the conditions

like LR, FPE and AIC has been satisfied at lag 4. So we consider lag 4 for granger causality test.

Table-7: VAR Lag Order Selection Criteria

Endogenous variables: rcon, roi, rsp, rval, rvol, rwap, rway						
Exogenous variables: C						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3133.359	NA	0.488	19.148	19.229	19.18083
1	-2917.774	420.653	0.177	18.132	18.780*	18.391*
2	-2836.683	154.766	0.145	17.937	19.151	18.421
3	-2780.450	104.922	0.139	17.893	19.673	18.604
4	-2725.152	100.817*	0.134*	17.855*	20.202	18.791
5	-2691.158	60.524	0.148	17.946	20.860	19.109
6	-2655.385	62.168	0.161	18.026	21.508	19.415
7	-2616.280	66.287	0.171	18.087	22.134	19.702
8	-2586.804	48.706	0.195	18.206	22.820	20.047

* indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Table -8 presents pair wise granger causality between variables. We find bidirectional causality exists between volume and contracts traded, settlement price and open interest, open interest and weighted average yield & volume and value. Unidirectional causality exists from open interest to value and weighted average price, weighted average price to volume and weighted average yield & weighted average yield to volume. For rest of the variables causality does not exist.

Table-8 : Pair wise Granger Causality Test

Lags: 4			
H ₀ : Does not Granger Cause			
H ₀	F-Statistic	H ₀	F-Statistic
RSP → RCON	0.987	RVOL → RSP	1.041
RCON → RSP	0.960	RSP → RVOL	1.149
RVOL → RCON	2.143***	RWAP → RSP	1.026

Cont...

RCON → RVOL	3.869*	RSP → RWAP	14.728
RWAP → RCON	1.088	RWAY → RSP	1.196
RCON → RWAP	0.725	RSP → RWAY	15.453
RWAY → RCON	1.018	RVOL → RVAL	2.125***
RCON → RWAY	0.850	RVAL → RVOL	3.886*
RSP → ROI	1.988***	RWAP → RVAL	1.098
ROI → RSP	3.257**	RVAL → RWAP	0.724
RVAL → ROI	1.025	RWAY → RVAL	1.022
ROI → RVAL	1.933***	RVAL → RWAY	0.848
RVOL → ROI	3.458	RWAP → RVOL	3.250**
ROI → RVOL	1.386	RVOL → RWAP	0.320
RWAP → ROI	0.962	RWAY → RVOL	3.511*
ROI → RWAP	4.391*	RVOL → RWAY	0.342
RWAY → ROI	0.835*	RWAY → RWAP	0.510
ROI → RWAY	4.332*	RWAP → RWAY	2.144***
RVAL → RSP	0.960		
RSP → RVAL	0.999		
<p>- Notes-</p> <p>- *, ** & *** indicates level of significance at 1%, 5% & 10%.</p> <p>- H_0 is the Null Hypothesis</p>			

Volatility is the fluctuation in a variable over a period of time. It results unpredictability, uncertainty and risk. It affects investors wealth and increases the bid ask spread which signifies the importance of risk management (Beg and Anwar, 2012). Engel (2004) in his Nobel lecture rightly posits that volatility is an important issue in financial econometrics. It is associated with the concept of risk. Table -9 presents volatility Spill-over's across variables. Here β_1 , β_2 and ϕ represents ARCH (volatility persistence), GARCH (volatility clustering) and

volatility spill-over's effect between the variables respectively.

The β_1 i. e. ARCH term is insignificant in all cases except value to volume. This indicates absence of volatility persistence.

The β_2 i. e. volatility clustering is significant in all cases. We find ϕ i. e. volatility spill-over's effect is significant in all cases indicates existence of volatility spill-over's effect.

**Table-9. Examination of Volatility Spill-over's
AR(1) MA(1)-GARCH(1,1)**

Parameters	RSP & RWAP		RSP & RWAY		RVAL & RVOL	
	rsp → rwap	rwap → rsp	rsp → rway	rway → rsp	rval → rvol	rvol → rval
α_0	0.006 (0.006)	0.015 (0.008)***	-0.015 (0.012)	0.015 (0.008)***	-0.940 (2.082)	-0.550 (3.127)
α_1	0.000 (0.049)	-0.136 (0.059)**	-0.015 (0.052)	-0.140 (0.055)**	-0.344 (0.049)*	-0.389 (0.049)*
β_0	0.001 (0.001)*** ()	0.005 (0.001)*	0.004 (0.003)	0.005 (0.001)*	-2.613 (13.403)	5.251 (51.773)
β_1	-0.018 (0.049)	0.014 (0.039)	0.009 (0.050)	0.022 (0.043)	-0.051 (0.013)*	0.019 (0.025)
β_2	0.361 (0.080)*	0.141 (0.060)**	0.363 (0.083)*	0.116 (0.054)**	0.977 (0.020)*	0.907 (0.034)*
ϕ	0.463 (0.098)*	1.108 (0.207)*	1.759 (0.373)*	0.313 (0.054)*	0.039 (0.008)*	0.182 (0.077)**
$M(1)$	0.339	0.405	0.115	0.970	2.424	1.354

5. Conclusion

The study finds over the period of time contracts, open interest, settlement price, value and weighted average prices mean is positive and volume and weighted average yield are negative. We observe high degree of positive correlation between daily settlement price in futures market and the daily weighted average price in cash market and a high degree of negative correlation between daily settlement price in futures market and daily weighted average yield in the cash market. From regression result, we find impact from open interest, settlement price and weighted average yield to weighted average price is negative and significant and weighted average yield impacts more on the weighted average price. We find only open interest and weighted average price negatively impacts weighted average yield and are significant. Further significant positive impact exists from weighted average price to settlement price. Bidirectional causality exists between volume and contracts traded, open interest and weighted average yield & volume and value; unidirectional causality exists from open interest to weighted average price as proved from Granger causality test. We find absence of volatility persistence among the variables. Volatility clustering and volatility spill-over's exists from cash markets to futures markets and from futures markets to cash markets. Significant spill-over impact exists from weighted average price to settlement price and from settlement price to weighted average yield. Thus, cash market price is leading the futures market but the future settlement price has impact on the yield of the underlying security.

6. References

1. Arora S. & Kumar N. 2013. Role of Futures market in price discovery. *Decision*, 40(3): 165-179
2. Beg, A. R. M. B. A. & Anwar S. 2012. Detecting Volatility Persistence in GARCH models in the presence of the Leverage Effect. *Quantitative Finance*, 14(12): 2205-2213.
3. Bollerslev, T. 1986. Generalised Autoregressive Conditional Heteroskedasticity. *Journal of Econometrics*, 31(3): 307-327.
4. Brewer, III E., Minton B. A. & Moser J. 2000. Interest-rate derivatives and bank lending. *Journal of Banking & Finance*. 24: 353-379.
5. Chaihetphon P. & Pavabutr P. 2010. Price discovery in Indian gold futures market. *Journal of Economics and Finance*, 34(4):455-467
6. Chan K. 1992. A further analysis of the lead-lag relationship between the cash market and stock index futures market. *Review of Financial Studies*, 5(1):123-152
7. Choi, H. & Finnerty J. 2006. Impact study on the interest rate futures market. *The Quarterly Review of Economics and Finance*. 46: 495-512.
8. Debasish, S. S. 2009. Effect of futures trading on spot-price volatility: evidence for NSE Nifty using GARCH. *The Journal of Risk Finance*. 10(1): 67-77.
9. Dickey, D. A., & Fuller W. A. 1979. Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*. 74(366): 427-431.
10. Engle, R. F. 2004. Risk and Volatility: Econometric Models and Financial Practice. *American Economic Review*. 94(3): 405-420.
11. Granger, C. W. J. 1969. Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica*. 37(3): 424-438.
12. Granger, C.W.J. 1980. Testing for Causality: A personal Viewpoint. *Journal of Economic Dynamics and Control*. 2 (4): 329-352.
13. Gupta K. & Singh B. 2007. An examination of price discovery and hedging efficiency of Indian equity futures market. 10th Indian Institute of Capital Markets conference paper. Available at SSRN: <http://ssrn.com/abstract=962002> or <http://dx.doi.org/10.2139/ssrn.962002>
14. Gupta K. & Singh B. 2009. Price discovery and arbitrage efficiency of Indian equity futures and cash markets. NSE Research Paper. www.nseindia.com/content/research/res_paper_final185.pdf. Accessed on 23rd February 2016.
15. Hyde, S. 2007. The response of industry stock returns to market, exchange rate and interest rate risks. *Managerial Finance*. 33(9): 693-709.
16. Kumar N. & Arora S. 2011. Price discovery in precious metals market: a study of gold. *International Journal of Financial management*, 1(1):49-58.
17. Kuttner, K. N. 2001. Monetary policy surprises and interest rates: Evidence from the Fed funds futures market. *Journal of Monetary Economics*. 47(3): 523-544.
18. Oellermann M.C. & Farris P.L. 1985. Futures or cash: which market leads live beef cattle prices? *Journal of Futures Market*, 5(4):529-538.
19. Oellermann M.C., Brorsen W.B. & Farris P.L. 1989. Price discovery for feeder cattle. *Journal of Futures Market*, 9(2):113-121.
20. Panda, P., & Thiripalraju M. 2015. Rise and fall of Interest Rate Futures in Indian Derivative Market. *International Journal of Financial Management*, 5(1):57-58.
21. Park, J. & Choi B. P. 2011. Interest rate sensitivity of US property/liability insurer stock returns. *Managerial Finance*. 37(2): 134-150.
22. Phillips, P. C. B., & Perron, P. 1988. Testing for a Unit Root in Time Series Regression. *Biometrika*, 75(2): 335-346.
23. Poon, W. P. H., Firth M. & Fung H. G. 1998. The spill-over's effects of the trading suspension of the treasury bond futures market in China. *Journal of International Financial Markets, Institutions and Money*. 8(2): 205-218.
24. Purnanandam A. 2007. Interest rate derivatives at commercial banks: An empirical investigation. *Journal of Monetary Economics*. 54(6): 1769-1808.
25. Raju M.T. & Karande K. 2003. Price discovery and volatility on NSE futures market. Securities and Exchange Board of India Working Paper Series No. 7. http://www.sebi.gov.in/cms/sebi_data/attachdocs/1293096997650.pdf. Accessed on 23rd February 2016.
26. Zhou, S. 2007. The dynamic relationship between the federal funds rate and the Eurodollar rates under interest-rate targeting. *Journal of Economic Studies*. 34(2): 90-102

Foot Note

'Major exchanges issued IRF are- Chicago Mercantile Exchange/US, Korea Exchange/South Korea, Tokyo Stock Exchange/Japan, Australian Securities Exchange/Australia, BM & F Bovespa/ Brazil, EUREX Exchange/Germany, Intercontinental Exchange/USA, NYSE Euronext/USA, NASDAQOMX/USA, Singapore Exchange/Singapore, South African Futures Exchange/ South Africa,

Interest Rate Futures and Market Structure in India

Sunder Ram Korivi
Elizabeth James

Abstract

The 16-month period from January 2014 to April 2015 is analyzed in three distinct phases, on the basis of the underlying bonds. Entropy arises when views of market participants are unidirectional and also, cannibalized by contracts on other underlying bonds of the same tenor. In the developing phase, correlations between Total Contracts Traded and Open Interest are high, as well as between Value and Open Interest. However, an inflection point towards higher level is attained when more players with counter-views come in, coupled with an overall movement of interest rates towards the mean, representing the zone of uncertainty. This raises OI to higher levels, somewhat reducing the tightness in the correlations.

Key Words

Interest Rate Futures, India Market Structure, Entropy

Background and Motivation

Any uncertainty in interest rates impacts various stakeholders: borrowers as well as lenders. To mitigate interest rate risk, interest rate derivatives such as interest rate futures, interest rate swaps and forward rate agreements have evolved in the financial markets. Notably, interest rate futures (IRF) are the largest traded products among all derivatives. In USA, IRF trading volumes are several times the size of equity derivative trading volumes. In terms of market size, the US markets had an IRF trading worth of approximately US\$ 1,250 trillion in calendar year 2013 [1]. In South Korea, trading volumes in IRF account for 14% of all derivative trades [2].

By contrast, IRF, in the first full year in the Indian markets (April 1, 2014 to March 31, 2015), registered a trading volume worth US\$ 35 trillion [1]. This was the third attempt at popularizing the instrument after two failures in 2003 and 2009. By way of market acceptance and trading volumes, although this can be termed a success in relation to past two Indian experiences, there is a long way to go before greater size and scale can be achieved on a consistent basis. A realistic comparison between US and Indian markets is made below:

Table 1: Comparison between US and Indian markets

US Market	Indian Market
Established market	Nascent. Succeeded in 2014 in the third attempt
Annual volume: US\$ 1,250 trillion approx.	Annual volume: US\$ 0.803 approx. in 1st full year

Long history of interest rate uncertainty	Long history of administered interest rate regime
Need for hedging felt many decades ago	Need for hedging arose recently, since 2003
High levels of awareness among stakeholders	Low levels of awareness among stakeholders
Well-developed yield curve	Yield curve not well developed
Many reference bonds across tenors	Only one reference bond: 10-year G Sec
Well-developed corporate bond market	Corp. bonds active mainly via private placement
Wide spectrum of market participants	Mainly institutions, who Hold-to-Maturity (HTM)
Wide spectrum of views on interest rates	Unidirectional (most participants being HTM)
Interest rates to mean-revert from lower side	Interest rates to mean-revert from higher side

Hence, these two markets are not strictly comparable, owing to the 11 points mentioned above.

The nationalization of Indian banks commenced in 1969, leading to government ownership of 20 large banks accounting to almost 80% of the total bank assets in India. Administered interest rates, both on the deposit as well as the lending side, left the interest rate prescriptions to the government and the Reserve Bank of India (RBI)- the central banking authority. There was no purpose for any individual view on interest rates. Capital was scarce and rationed through licenses by the Controller of Capital Issues. Equity markets as an alternate source of capital for a wider basket of companies opened up in the early 1990s, with the creation of the Securities and Exchange Board of India (SEBI), which went operational in 1992. A large number of mutual funds got established during the 1990s to perform the savings-investment intermediation function, providing vital capital to industry. A government-initiated privatization programme also necessitated the strengthening of capital markets. The Small Industries Development Bank of India (SIDBI) was established to provide refinance to banks for on-lending to Small & Medium Enterprises (SMEs). The foreign exchange regime became more benevolent in 1996, resulting in inflows of foreign capital into India. Also in 1996, the same year, the National Stock Exchange of India (NSE) was established as a competitor to the Bombay Stock Exchange (BSE) and dematerialization and automation of trading took place. As a result of all these developments in the Indian capital markets, for the first time since 1969, interest rates witnessed a sustained decline from 1998 to 2003, coupled with lower inflation and a stable government.

In recognition of a departure from the unidirectional and upward interest rate movements, corporate bond issuers such as IDBI, ICICI and SIDBI started embedding call-back features in their bond covenants, in respect of their own issuances. These institutions were able to refinance themselves at lower interest rates during 1998-2003 by invoking the call-back feature in their bond covenants. The equity indices were at the cusp of a boom (on hindsight, the indices tripled between 2003 and 2007), freeing up banks' lendable resources and easing interest rates. This is the background against which the first attempt at launching IRF was made in 2003.

Liquidity was tightened in India's response to the global financial crisis of 2008, keeping interest rates higher in India. Liquidity originating in Japan found its way into India through yen carry-trades. Subsequently, India benefited from the quantitative easing (QE) measures in USA and the LTRO in Europe. This helped in lowering Indian interest rates, prompting the second attempt at launching IRF in 2009.

In 2011, the crisis in the European Union prompted the ECB to keep interest rates low. Later, Japan also offered a huge stimulus under its three-arrow policy, lowering interest rates. However, increasing signs of a revival in the US economy began to emanate in 2013. From May 2013, indications of a possible reversal of the quantitative easing jolted the financial world, as carry trades reversed, and dollars flowed back from emerging economies to USA. Such episodes of interest rate uncertainty drove up the demand for IRF in 2013. RBI also expressed its intent to widen and deepen the financial markets through a wide suite of derivative instruments, IRF included. From an

Indian perspective, a persistent fall in international crude oil prices in 2013 and prudent fiscal management by the Indian government improved the prospects for a sovereign bond rating upgrade towards the end of 2014. A dip in inflation also gave RBI the elbow-room to announce two repo-rate cuts that created a 'zone of uncertainty' insofar as Indian interest rates were concerned, forcing market participants to seek hedging measures, raising IRF trading volumes in 2015. Such a zone of uncertainty did not exist in clear terms in most of the history of Indian financial markets from 1969, barring 1998-2003. On this aspect, the 2014 launch was on a different footing in contrast to 2003 and 2009. The possible causes of failure of IRF trading in the Indian financial markets in 2003 and 2009, gleaned from experts from RBI, are tabulated below.

Table 2: Failures of IRF in Indian markets in 2003 and 2009

Year	Key Features of IRF Design
2003	IRFs were based on three underlying bonds. The market was fragmented with poor linkages with the cash market. The underlying corporate bond market was almost non-existent, and most investors did not feel a need for hedging, owing to their 'Hold-to-Maturity' (HTM) style of investing.
2009	Trading declined to zero after two settlements. Physical settlement took place between 62% and 72% of the peak Open Interest (OI), as opposed to 1% to 3% expected in an efficient market. The situation resulted in a one-way arbitrage: sell futures and buy the Cheapest-to-Deliver security. Since there was no party with a counter-view, trading dwindled. There was a serious disconnect between IRF, Interest Rate Swaps (IRS) and G Sec pricing, violating the fundamental 'no arbitrage' condition or the 'law of one price'. The markets were also fragmented and not seamlessly integrated [2].

The third attempt at introducing IRFs in the Indian financial markets took off on January 21, 2014. Volumes slackened in May 2014. This was followed by a pick-up in volumes from July 2014, ultimately reaching a volume equivalent to US\$ 35 trillion in the period June-October 2014. The surprise repo-rate cuts in January and March 2015 put an end to the hitherto unidirectional nature of bets on interest rates, leading to a further surge in volumes, prompting most market participants to remark that IRFs had finally found a general acceptance in the Indian markets, though there remains a long way to go.

The objective of this study is to track the developments related the Indian IRF market from April 2010 to April 2015 to understand the structure of the market and gauge the reasons for the relative success of the instrument vis-à-vis the two earlier attempts, to effect improvements in the design and processes. These learnings could also be transplanted for enhancing the climate for the introduction of other derivatives in the interest and credit space to widen and deepen the Indian financial markets.

Organization of Contents

This paper is divided into seven parts, as listed below.

- I Review of Literature
- II Research Problem
- III Research Design
- IV Data
- V Methodology
- VI Analysis, Discussion and Findings
- VII Summary and Concluding Remarks

The running text is interspersed with Tables 1 to 6 and Figures 1 to 3. Notes and References are provided at the end.

I Review of Literature

Literature across the 20-year period from 1982 to 2013 relevant to the paper are summarized below, to identify the gaps.

Kolb and Chiang (1982) recommended hedge ratios for the use of IRFs for a cost-effective immunization strategy. Likewise, Gay and Kolb (1983) identified the use of IRFs in conjunction with immunization strategies. Along the lines as Kolb et al (1982 and 1983), Yawitz and Marshall (1985) highlighted the use of IRF in immunization strategies. Two banking sector regulators, viz. the Federal Reserve of St. Louis-USA and the BIS-Basle, Switzerland also suggested the use of IRF in hedging

interest rate risks – through the works of Belongi and Santori (1983) and Frenkel (1984) respectively. Bhar (1996) studied the 90-day bill futures contracts on the Sydney Futures Exchange with cointegration tests and Granger’s causality to improve forecasting. Wu and Shieh (2007) performed a Value-at-Risk analysis for interest rate futures, with reference to fat tail and long memory in return innovations. Gurrola and Herrerias (2011) studied the interplay between futures price maturities and volatility based on data on Mexican IRFs.

There are two papers are on the Indian markets. Sinha (2012) studied the impact of IRF on the underlying bond market, during the period 2009-2011, when IRF were introduced and then petered out. Srivastava and Srivastava (2013) studied the causal factors for the failure of IRFs which were introduced in 2009.

Srivastava and Srivastava’s (2013) paper is the most relevant to this study, and makes note of the fact that Indian interest rates had become more uncertain over the past decade. It examined 4 independent variables, viz., trading volume of 10-year G-Sec cash market, trading volume of currency derivatives, 10-year G-Sec yield and the 10-year interest rate and tested them for significance on IRF. Two variables were identified as having a significant and negative impact on IRF: trading volumes of currency derivatives and the 10-year interest rates.

In the context and background of the current study, the following gap emerges:

The need for an updated study on the successful and continued acceptance of IRFs in the Indian markets in the 16-month period from January 2014 to April 2015. Market conditions have changed for the better, and so have the economic conditions. Three regulators (RBI, SEBI and IRDA) have stakes in market development, as also three exchanges – National Stock Exchange of India (NSE), Bombay Stock Exchange (BSE) and Metropolitan Stock Exchange (MCX-SX). There is a continuous dialogue with the market participants through the Fixed Income, Money Markets and Derivatives Association (FIMMDA). Moody’s has given India a sovereign bond rating upgrade and foreign investment in Indian debt securities are at an all-time high. The Indian IRF market needs to be studied afresh in the light of these developments.

II Research Problem

Indian interest rates in 2015 have headed considerably downward vis-à-vis 2009, due to structural improvements on the fiscal side, with a sovereign rating upgrade from Moody’s. In spatial and symmetrical terms, Indian interest rate expectations are now closer to a binomial characteristic – an equal possibility of an upward or downward drift or movement. This causes volatility, and volatility is the *raison d’être* for hedgers, arbitrageurs and speculators. In statistical terms, the Probability (P) of an upward movement (P_u) is equal to the Probability (P) of a downward movement (P_d) or, $P_u = P_d$ and $0 < P < 1$. These are the notations typically used in the Ho-Lee and other term structure models.

Interest Rate Futures are also known as Bond Futures. The underlying asset concept is the Price-Yield curve (P-y curve) depicting the valuation of a Bond:

$$P = \sum_{t=1}^n C_t / (1 + y)^t$$

Where:

P = Price of the Bond

C = Cash flow at time t

y = Yield to Maturity (based on market expectations)

t = Timing of the Cash flows

C and t are constants and do not change through the life of the bond. P and y are variable in this equation. The two have an inverse relationship, i.e. $P \propto 1/y$ or, $y \propto 1/P$ (i.e. P varies inversely as y, and vice-versa). In the case of a G Sec, its generally default-free characteristic and large, liquid market keeps its market price closely aligned to its intrinsic value. Hence, P becomes an input to the valuation model and y is extracted from it. When an IRF contract is introduced in an exchange, it is linked to an underlying bond (say, a 10-year G Sec). Varying perceptions of y will determine the price at which the reference bond is traded. To impart greater liquidity, the IRF contracts are generally cash-settled, where there is no need for a physically-settled cheapest-to-deliver (CTD) bond. This design makes IRF an ideal instrument for hedgers, arbitrageurs and speculators.

In the aftermath of the failed IRF take-offs in 2003 and 2009, the relative success, as gauged from the experience from January 2014 to April 2015 is the focus of this study. It may provide insights into the market microstructure for IRFs and indicate directions for further facilitating the introduction of other interest rate and credit derivatives to widen and deepen the Indian financial market.

III Research Design

The primary aim of this study is to identify the causes and circumstances impacting the failure or success of IRF trading in the Indian markets.

This study is carried out under the framework of entropy, a term arising from statistics, information theory and thermal dynamics. In general terms, a system having a set of conditions facilitates the interaction of agents within it, so long as such conditions prevail. With loss of energy (such as heat), the depleted conditions no longer support the interactions of agents within the system. An ideal example is heating of water to make tea – lack of fuel will result in a failure to sustain heat, and the adding of tea leaves to tepid water will be futile. This unintended dissipation of heat is entropy – the system fails to work as envisaged. Alternately, one could use a different variety of tea leaves that are amenable for brewing in tepid water, to achieve the intended result. More fuel or different tea leaves are the possible answers to fight entropy, in this example.

The previous two attempts in 2003 and 2009 saw entropy creeping in, and the market for IRF collapsed within a few settlements. In the 2014 launch, there seemed to be signs of slackening in May-June 2014. A perceived design failure was addressed between August and October 2014. The market got re-energized in November 2014 with the entry of new types of participants and ground-level changes on interest-rate policy between January and March 2015. The research design for this paper seeks to do justice to all the secondary market data that emanated during this period.

Correlation studies are performed on the various sets and subsets of data, to measure the interrelationships between key variables arising in the IRF markets. Changes in correlation patterns are also studied to identify their causes and their consequences in terms of failure or success of the IRF contracts

arising from such underlying securities.

In this study, lower levels of correlation amongst variables (say, below 0.20) are viewed as conditions depicting entropy, whereas moderate to higher levels of correlation (say, 0.50 and above), viewed with associated causes, are viewed as favourable conditions for interaction between market participants.

IV Data

This study is based on secondary data. Trading commenced in January 2014 for the newly launched contracts. Data has been sourced from NSE, the leading exchange (www.nseindia.com), from Jan 22, 2014 to April 6, 2015, spanning across 16 months. This represents a total of 281 trading days. During this period, four contracts were launched, the underlying G Sec bonds being: the 91-day Treasury-Bill, the 7.16% 10-year bond, the 8.83% 10-year bond and, from August 4, 2014, the 8.40% 10-year bond. Daily trade data is available in three fields: 1. Number of Contracts Traded, 2. Contact Value and 3. Open Interest. This data set has been downloaded into an Excel spreadsheet for analysis. Since 100% of all published data is used, there is no sampling error or bias.

V Methodology

The data file downloaded from the NSE website needed to be parsed into four distinct sets, representing the four underlying bonds, and rearranged date-wise in three fields. Since there had been absolutely no trade in the 91-day G Sec, that data set is rendered redundant. The remaining three data sets, each with three fields, are tested for intra-field correlation to measure the intensity of their interrelationships. Since these three fields, viz., Number of Contracts Traded, Contract Value and Open Interest are axiomatically inter-connected, weak inter-relationships could signal entropy in the system and lead to a complete standstill in trading due to poor linkages with market reality. There had been a relatively drastic fall in IRF trading between May and October 2014, which worried the stock exchanges, regulators and other stakeholders. Market fragmentation was one of the major reasons of failure of the Indian IRF market in 2009 (besides the need for physical settlement). Therefore, the Open Interest (OI) field in respect of the 7.16% 10-year bond and the 8.83% 10-year were tested for negative correlation when they traded simultaneously from

January 22, 2014 to April 23, 2014 to look for signs of market fragmentation. Likewise, the Open Interest (OI) field in respect of the 8.83% 10-year bond and the 8.40% 10-year were tested for negative correlation when they traded simultaneously from August 4, 2014 to October 30, 2014, to look for signs of market fragmentation. The detection of (a) correlations amongst three fields give rise to multi-collinearity and (b) the absence of identifiable dependent and independent variables, with a clear direction in causality, preclude the use of regression analysis at this stage of the research and market development.

Finally, the post-October 2014 period was viewed in the event-study framework, to gauge the news flows that occurred when trading activity picked up once again, to scale new heights. The presence of catalyzing factors (uncertainty in interest rate movements) and new players (with a counter-view as opposed to the unidirectional viewpoints as seen in 2009) were expected to have a conducive impact on enhancing IRF trading activity.

VI Analysis, Discussion and Findings

The results are presented in chronological order, based on the trading period in respect of each of the three underlying bonds.

In respect of the IRF contract based on the 7.16% 10-year G Sec that traded from January 22, 2014 to April 23, 2014, there were 58 data points. Trading volume was thin from the very beginning, with an Open Interest of around 100 to start with, falling to 0 from February 28, 2014.

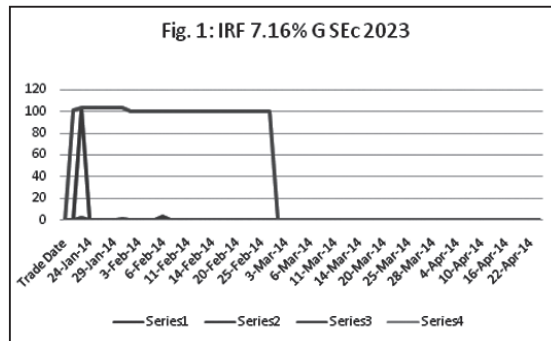
The correlation statistics are tabulated below:

Table 3: Correlation analysis of IRF with underlying as 7.16% G Sec 2023

	Contracts	Value	OI
Contracts	1.000000	0.999998	0.164102
Value	0.999998	1.000000	0.164035
OI	0.164102	0.164035	1.000000

The correlation between Contracts and OI is 0.164102, whereas that between the Value and OI is 0.164035. Entropy set in, and trading came to a complete standstill long before the data series came to a close on the NSE. The onset of entropy is

depicted in the graph below. From Feb 28, 2014, OI levels are down to zero, until April 23, 2014, as depicted in Figure 1 below.



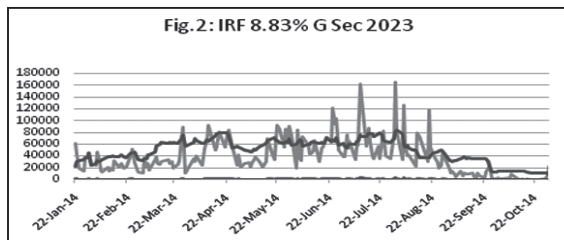
In respect of the 8.83% 10-year G Sec based IRF contract that traded from January 22, 2014 to October 30, 2014, there were 182 data points. The correlation statistics are tabulated below:

Table 4: Correlation analysis of IRF with underlying as 8.83% G Sec 2023

	Contracts	Value	OI
Contracts	1.000000	0.999946	0.673728
Value	0.999946	1.000000	0.672187
OI	0.673728	0.672187	1.000000

Noticeably, the correlation between Contracts and OI was 0.673728 and that between Value and OI was 0.672187, indicating a stronger set of inter-relationships between the fields, and therefore, no entropy as this particular contract was consciously withdrawn by the exchange to prevent further market fragmentation vis-à-vis the one based on the 8.40% G Sec 2024.

The movements are depicted in the graph below as Figure 2. Higher correlations also reflect that there is no clear area spatially, between the OI line and the Total Contracts line.



In order to gauge the impact of market fragmentation, i.e. reduced trading activity in the 7.16% based IRF contract with a simultaneously increased trading activity in the 8.83% based IRF contract, evidence was sought in the form of negative correlation during the period they were both traded (January 22, 2014 to April 23, 2014, 58 observations). As expected, the result was -0.744417, indicating that activity in the 8.83% based IRF contract was increasing even as the 7.16% based IRF contract was declining.

In respect of the 8.40% 10-year G Sec based IRF contract that traded from August 4, 2014 to April 6, 2015, there were 158 data points. The correlation statistics are tabulated below:

Table 5: Correlation analysis of underlying 8.40% G Sec 2024

	Contracts	Value	OI
Contracts	1.000000	0.999808	0.525533
Value	0.999808	1.000000	0.536454
OI	0.525533	0.536454	1.000000

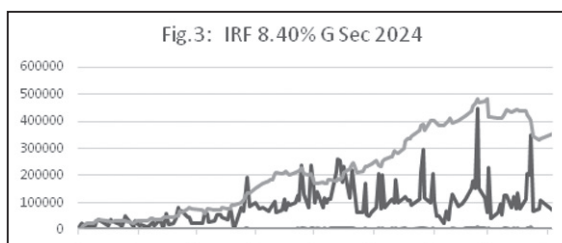
The correlation between Contracts and OI was 0.525533, and that between Value and OI was 0.536454, which is thrice the values as compared to the 7.16% bond based IRF contracts, depicting stronger relationships between the fields. Relative to the IRF based on the 8.83% G Sec, there is space between OI and the Total Contract lines, depicting new participants (including speculators), widening the OI to Total Contract gap, and hence a looser correlation.

In order to gauge the impact of market fragmentation, i.e. reduced trading activity in the 8.83% based IRF contract with a simultaneously increased trading activity in the 8.40% based IRF contract, evidence was sought in the form of negative correlation during the period they were both traded (August 4, 2014 to October 30, 2014, 56 observations). The result was -0.885399, indicating that activity in the 8.40% based IRF contract was increasing even as the 8.83% based IRF contract was declining.

During the period August 4, 2014 to April 6, 2015, there were some significant news flows on select days:

Table 6: Key events impacting IRF market in the post-October 2014 period

Date	Event
09 Oct 2014	Receding inflation and falling crude prices trigger faith in G Sec and IRF
17 Nov 2014	HNI's liven up IRF market. OI at record high, on rate cut expectations
28 Jan 2015	HNI's on a buying spree, more participation by insurers will raise volumes
11 Mar 2015	With RBI rate cuts, participation rises by 50%. Mutual funds to raise exposure further



These event dates roughly coincide with the days around which the OI levels have been rising with multi-directional participation, peaking at in March 2015. Two out-of-turn policy rate cuts on January 15, 2015 and March 2, 2015 resulted in pushing OI to new levels, widening the Total Contracts: OI ratio and somewhat weakening the correlation. From a conceptual and statistical perspective, India is now long-term mean-reverting from the higher side, entering a rate-cut cycle, but the magnitude and timing of the cuts is a matter of uncertainty. Further on, rate increases or decreases could be either way (i.e. binomial = either way), which is the zone of uncertainty, insofar as interest rate expectations are concerned. Indian financial markets have not experienced this zone of uncertainty before, potentially leading to higher OI levels and counter-views between hedgers, arbitrageurs and speculators.

Notably, Figures 1, 2 and 3 depicted above, are all reflective of progressively higher OI ranges, visible from the Y-axes of the respective graphs. Commencing with 103 in the case of Fig.1, the peak attained in Fig.2 is 83743 on August 1, 2014, a few days prior to the introduction of the new contract, and, in Fig.3, 484033 on March 3, 2015 on the second repo-rate cut.

It is heartening to note that the downloaded data from NSE,

when parsed underlying bond-wise, provided three data sets amenable for analysis. A simple correlation analysis provided insights into the phenomenon of entropy that occurred in the case of IRF 7.16% G Sec 2013. Correlation was tighter in the case of IRF 8.83% G Sec 2023, but this instrument was a victim of market fragmentation. After October 30, 2015, IRF 8.40% 2024 had the entire market left for itself. Although correlations were three times tighter than that of IRF 7.16% G Sec, it was lower than that of IRF 8.83% G Sec 2023. However, the critical point here was that the entry of HNI Investors, Mutual Funds and Insurers provided counter-trades opportunities with a multiplicity of views, and the enabling environment was provided with repo-rate cuts that drove interest rate expectations towards the centre of the binomial distribution. Thus, in scientific terms, entropy was defeated by molecules with greater compatibility to combine (players with multi-directional views), as well as supported by fuel that raised and maintained kept the heat at optimal levels (interest rates approaching the zone of uncertainty). As the interest rate zone of uncertainty is approached, OI rises and correlations drop, but the chemistry is better. This sums up the analysis.

VII Summary and Concluding Remarks

The 16-month period from January 2014 to April 2015 is analyzed in three distinct phases, on the basis of the underlying bonds. Entropy arises when views of market participants are unidirectional and also, cannibalized by contracts on other underlying bonds of the same tenor. In the developing phase, correlations between Total Contracts Traded and Open Interest are high, as well as between Value and Open Interest. However, an inflection point towards higher level is attained when more players with counter-views come in, coupled with an overall movement of interest rates towards the mean, representing the zone of uncertainty. This raises OI to higher levels, somewhat reducing the tightness in the correlations.

In a nascent market like India, it would be prudent not to introduce more than one contract at the same time, to prevent cannibalization [4]. The attraction of more players will lead to higher levels of OI, calling for incentives in the form of relaxed hedging definitions for regulated players. When interest rates mean-revert, a zone of uncertainty will create an ambient climate for speculators (High Net Worth Individuals or HNIs) to come in as counter-traders. Another fact that needs to be borne in mind is that Foreign Portfolio Investors who find

Indian G Sec yields attractive (more so in the light soft rates in US, Europe and Japan and an Indian sovereign credit rating upgrade from Moody's) have reached their investment limit of US \$ 30 billion set by the Indian finance ministry. Had this limit not been in place, higher investments could have led to higher hedging (and speculation by counterparties) activity in the IRF market.

Notes

[1]Hindu Business Line, Mumbai, November 9, 2014

[2]Business Standard, Mumbai, October 18, 2013

[3] Edited excerpts of the Keynote Address by V.K. Sharma, Executive Director-RBI, at Finnoviti, organized by Banking Frontiers, Mumbai, November 8, 2012. Published in the Hindu Business Line, Mumbai on November 12, 2012

[4] Office bearers of the Fixed Income, Money Markets and Derivatives Association of India (FIMMDA), at the panel discussion on Developing Rupee Debt Markets in the India Regulatory Summit, Mumbai on March 10, 2015 held by Regulation Asia.

References

1. *Bhar Ramaprasad (1996), Cointegration of Interest Rate Futures Trading on Sydney Future Exchange, Applied Financial Economics (Routeledge), Vol.6, Issue 3*
2. *Belongi, Michael T. and G. J. Santoni (1984), Hedging Interest Rate Risk with Financial Futures, Federal Bank of St. Louis*
3. *Frankel A.B. (1984), Interest Rate Futures, An Innovation in Financial Techniques for the Management of Risk, BIS Economic Papers No.12 - September*
4. *Gay, Gerald D. and Robert W. Kolb(1983), Interest Rate Futures as Tool for Immunization, Journal of Portfolio Management, Vol.10, No.1, Fall*
5. *Gurrola, Pedro and Renata Herrerias (2011), Maturity Effects in the Mexican Interest Rate Futures Market, Journal of Futures Markets, Vol. 31, Issue 4*
6. *Kolb, Robert W. and Raymond Chiang (1982), Duration, Immunization and Hedging with Interest Rate Futures, Journal of Financial Research, Volume 5, No.2, Summer*
7. *Kumar Raghu (2014), From the Rings: Decoding Interest Rate Futures, (The) Hindu Business Line, Mumbai, November 9*
8. *Sharma V.K., (2012), The Financial Innovations That Never Were, (The) Hindu Business Line, Mumbai, November 12*
9. *Sinha Manish (2012), The Impact of Interest Rate Futures on*



the Underlying Interest Rate Markets in India, Developing Country Studies, Vol.2, No.12

10. *Srivastava Divya and Shashi Srivastava (2013), Success and Failure of Interest Rate Futures in India, Advances in Management, Vol. 6, Issue 6, June*
11. *Wu Ping-Tsung and Shwu-Jane Shieh (2007), Value At Risk Analysis for Long-term Interest Rate Futures: Fat Tail and Long Memory in Return Innovations, Journal of Empirical Finance, 14(2), March*
12. *Yawitz, Jess B. and William J. Marshall (1985), The Use of Futures in Immunized Portfolios, Journal of Portfolio Management, Vol.11, No.2, Winter*

Mobilization of funds by Corporate Enterprises in India: An Empirical Study

Jeelan Basha.V

Abstract

Adequate mobilization of capital needs proper timing, type and method of issue. This is a dire necessity for fulfillment of minimum subscription. Under SEBI guidelines, the securities can be offered for sale in the primary market in different ways. Each method of issue has got its procedure and mechanism.

The objectives of the study are to study mobilization of funds in primary market and provide suggestions based on findings/ results. In view of the objectives of the study, exploratory research design has been adopted. The study is based on secondary data covering annual data of mobilization of funds from various categories covering from 1993-94 to 2013-14. This has been collected from official websites of Reserve Bank of India, Securities Exchange Board of India and various other reports like magazines, journals, and published books for the present study. The statistical tools applied for data analysis is descriptive and inferential statistics. E-views are used. Based on objectives, the hypotheses are formed for analysis.

It is concluded that there are compound annual growth rate of 4% in total amount of issues and decline by 12% in total number of issues, concentration of Western and Northern regions largely, mobilization of substantial amount of share of capital from the size of more than Rs. 100 crores, preference of FPOs to IPOs, raising of majority of capital at premium and focusing of manufacturing industries as against service industries. It is suggested that there should be balanced growth among the regions, establishment of separate platform for mobilizing size of capital of less than Rs. 10 crores, encouragement of

manufacturing sector for minimum risk through diversified growth and seeking of new avenues of capital carrying lower rate of interest.

Key Words

Fund Mobilization, Primary Market, Follow On Public Offer (FPO), Initial Public Offering (IPO)

Introduction

Adequate mobilization of capital needs proper timing, type and method of issue. This is a dire necessity for fulfillment of minimum subscription of Companies act 2013. It primarily prescribes four modes of increasing share capital: Public issue, Rights issue, Bonus issue and Private placement. Under SEBI guidelines, the securities can be offered for sale in the primary market in different ways. Each method of issue has got its procedure and mechanism. Government should strive strictly balanced regional growth, even development of various sectors for diversification, establishment of investment platform for small and medium-sized industries, seeking of new avenues for raising capital through lower cost of capital and inculcation of habit for making investment in capital and money markets to the investors.

Companies raise funds from a large number of investors widely scattered throughout the country. A method ensures a wider distribution of securities thereby leading to diffusion of ownership and avoids concentration of economic power in

a few hands. The method is quite convenient and economical. Moreover, the company gets the money quickly and there is virtually no risk of non-receipt of minimum subscription. A method saves the company from the cost and trouble of selling securities directly to the investing public. It ensures that the whole issue is sold and stamp duty payable on transfer of shares is saved. A method helps to save the expenses of public issue.

Objectives of the study

1. To study mobilization of funds in primary market.
2. To provide suggestions based on findings/ results.

Research Design: In view of the objectives of the study, exploratory research design has been adopted. Exploratory research is one, which largely interprets the already available information, and it lays particular emphasis on analysis and interpretation of the existing and available information and it makes use of secondary data.

Research Methodology

The study is based on secondary data covering annual data of mobilization of funds from primary market from 1993-94 to 2013-14. The methods of mobilizing capital from primary market are classified on various ways. This has been collected from official websites of Reserve Bank of India and Securities Exchange Board of India. Various other reports like magazines, journals, published books are also referred to for the present study.

Sources of data

Tools of analysis: The data collected for the study is analysed to arrive at meaningful conclusions. The statistical tools applied for data analysis is descriptive and inferential statistics. E-views are used. Based on the objectives, the hypotheses formed for analysis are:

H₀1: There are no differences among various classes of issues in terms of number and amount

Results / Findings:

A. Number of Issues

1. Average total number of issues during the study period is 326.9524. Its Coefficient of variation (C.V.) of 1.650153 is inconsistent and decline by CAGR of 11.93% respectively.

Category-wise:

● Average total number of Initial Public offers (IPOs) and Further Public Offers (FPOs) (Listed Companies) issues over the study period are 54% and 46% respectively.

● Public Issue is about not less than 50% of the total issues and right issues about not more than 50% of total number of issue in the study period.

Instrument-wise:

● Number of issues at par and premium is decreasing from 1181 in 1995-96 and 651 in 1994-95 to 1 in 2009-10 and 8 in 2001-02 respectively along the study period.

● Number of issues in case of Cumulative Convertible Preference Shares (CCPS) and Bonds are negligible in the total issues during the study period.

● In case of other issues, they are a few/ moderate/marginal.

Region-wise:

● Western region, on an average mobilize capital to the highest of 42% of total issues ranging from maximum of 66% to minimum of 28% during the study period. It is followed by an average total number of 26% from southern region ranging from 59% to 16% of total issues, 20% from northern region ranging from 37% to 4% and 10% from eastern region ranging from 23% to 4% respectively.

Sector-wise:

● Lion's share of total number of issues of capital mobilization is from private sector including joint sector over the study period. It is hardly 10% of total issue form public sector.

Size-wise:

● On an average, 39% of total issues of capital are mobilized from less than 5 crores of capital. It is followed by 18% from

less than 10 crores of capital, 13% from less than 50crores of capital, 9% from more than 100 crores of capital and 5% from less than 100 crores capital during the study period.

Industry-wise:

● 21% of total issues are raised only from finance industry during the study period. It is followed by 10% by textile, 9% by food processing, 7% by chemical , 6% by health and less than 5% each by other industries like Banking/ Financial institutions, cement & Construction, Electronics, Engineering, Entertainment, Information & Technology, Paper & Pulp, Plastic, Power, Printing, and Telecommunication, others etc.

B. Amount of Issues

1. Average amount of issues during the study period is 28580.66. Its coefficient of variation (C.V.) of 0.801 is consistent and growth by CAGR of 4.2148% respectively.

Category-wise

● Not more than 38% of average amount of issues is mobilized from IPO ranging from the highest of 86% in 2011-12 and the lower of 2% in 2013-14 during the study period. Not less 62% of average amount of issues is raised from FPO (Listed Companies) ranging from the highest of 98% in 2013-14 and the lowest of 14% in 2011-12 over the study period.

● More than $\frac{3}{4}$ of average total amount of capital is from Public Issue and not more than $\frac{1}{4}$ of average amount of capital is from right issues in the study period.

Instrument-wise:

Average amount of issues mobilized at equity premium register 56%. It is followed by bond issue at 29%, others issues by 7%, equity issues at par by 6% and CCPS issues by negligible percent respectively during the study period.

Region-wise:

● Not less than 50% of average amount of capital is collected from Western region ranging from Rs. 64139 in 2007-08 to Rs. 2319 in 1997-98 during the study period. Not more than 29% of average amount of capital is collected from northern

region ranging from Rs. 43961 in 2013-14 to Rs. 78 in 2002-03 during the study period. 13% of average amount of capital is collected from southern region ranging from Rs. 12870 in 2009-10 to Rs. 293 in 1998-99 during the study period. Rest is from eastern region assorting from Rs. 17190 in 2010-11 to Rs. 98 in 2012-13 during the study period.

Sector-wise:

● More than 2/3 of total amount of issues of capital mobilization is from private sector including joint sector and the rest from public sector.

Size-wise:

● Lion's share of average total amount of issues of capital is garnered from the size of more than 100 crores. Hardly 5% each of average total amounts of issues of capital is from less than 50 crores and 100 crores. Trivial percentage is from less than 5 crores and less than 10 crores.

Industry-wise:

The highest amount of capital is mobilized by Banking/financial institutions industry recording 32% of total issues followed by power by 12%, finance by 8%, Cement & Construction by 6% and other industries namely textile, food processing, chemical, health, Electronics, Engineering, Entertainment, Information & Technology, Paper & Pulp, Plastic, Power, Printing, and Telecommunication, others etc. each by less than 5% during the study period.

There is strong evidence that among different classes of number and amount of issues, there are significant differences. Null hypotheses are rejected since prob. values of ANOVA F-test and WELCH F-test are 0.0028 and 0 respectively.

On unsatisfactory of parametric test, non-parametric test of Med. Chi-square, Adj. Med. Chi-square, Kruskal-Wallis, Kruskal-Wallis (tie-adj.) and van der Waerden statistics are also used whose probability values are zero. Hence, null hypotheses of insignificant differences are rejected. The alternative hypotheses of significant differences between and within the variables of number and amount of issues are accepted.

Suggestions

1. Balanced growth among the regions is required since there is uneven growth. Southern and Eastern regions are required to be developed for even growth.
2. Separate platform are to be established for mobilizing capital of less than Rs. 10 crores. This is essential for developing small and medium size businesses.
3. Various sectors like textile, food processing, chemical, health, Electronics, Engineering, Entertainment, Information & Technology, Paper & Pulp, Plastic, Power, Printing, and Telecommunication, others etc. are not developed. In nutshell, they all belong to manufacturing sector which are required to be developed for minimum risk through diversified growth.
4. Since IPOs and FPOs have high cost of capital, other methods of raising capital carrying lower rate of interest are to be sought.

Conclusions

Funds are mobilized from a large number of investors widely scattered throughout the country from different classes namely sector, instrument, size, industry, region and category. It is concluded that there are compound annual growth rate of 4% in total amount of issues and decline by 12% in total number of issues, concentration of Western and Northern regions largely, mobilization of Lion's share of capital from the size of more than 100 crores, preference of FPOs to IPOs, raising of majority of capital at premium and focusing of manufacturing industries

as against service industries. It is suggested that there should be balanced growth among the regions, establishment of separate platform for mobilizing size of capital of less than 10 crores, encouragement of manufacturing sector for minimum risk through diversified growth and seeking of new avenues of capital carrying lower rate of interest.

References

1. Agbemava, E., Nyarko, I. K., Asimah, V., Sedzro, E., & Antor, G. K. (2016), "The impact of savings on capital mobilization: A case study of selected primary and junior high school teachers in Ho municipality", *African Journal of Business Management*, 10(2), 33-43.
2. CMA Dr. Jeelan Basha (2015), "A Study on Private Placement- A key to primary market" *International Multidisciplinary E-journal*, Vol. IV, Issue VIII Aug. 2015, Pp. 369-377.
3. Solomon, O. (2013), "The Role of Capital Market as a Vehicle for capital mobilization in Nigeria", www.independent.academia.edu/kingsooloo.
4. Lezaasi Lenee Torbira and Onyemachi Maxwell Ogbulu (2014), "Fund Mobilization by Insurance Companies and Fixed Capital Formation: Evidence from the Nigerian Economy"; *International Journal of Financial Research* Vol. 5, No. 2; pp. 69-78.
5. Dr. Nikhil Kothar (2014), "Role of Capital Market in Developing Economy", *Abhinav National Monthly Refereed Journal of Research in Commerce & Management*, Vol. 3, Issue 3, Pp. 30-36.
6. Ozurumba, B.A. and Chigbu, E.E. (2013), "An Econometric Analysis of Capital Market Performance and Economic Growth of Nigeria", *Interdisciplinary Journal of Contemporary Research in Business*, Vol.4 No. 10, Pp. 165-176.
7. David M Levine and others (2013), "Statistics for Managers using Microsoft Excel", Seventh Edition, PHI Learning Private Ltd.
8. M. Y. Khan & P.K. Jain (2012), "Financial Management", Tata McGraw Hill Education Pvt. Ltd., sixth Edition.
9. Sebi.gov.in

Appendix-1 Descriptive Statistics of Total Number and Amount of Issues of Capital during 1994-2014

Year	Total					Descriptive Statistics																
	No. issues	Amount	Year	No. issues	Amount	Total Amount Issue					Total No. Issues											
1993-94	1143	24372	2004-05	60	28256																	
1994-95	1692	27633	2005-06	139	27382	Mean	28580.67	Mean	326.9524	Standard Error	4999.3	Standard Error	117.7332	Median	24372	Median	91	Mode	#N/A	Mode	124	
1995-96	1725	20804	2006-07	124	33508	Standard Deviation	22909.94	Standard Deviation	539.5213	Sample Variance	5.25E+08	Sample Variance	291083.2	Kurtosis	0.676321	Kurtosis	2.788083	Skewness	1.0822	Skewness	2.017152	
1996-97	884	14284	2007-08	124	87029	Range	82959	Range	1699	Minimum	4070	Minimum	26	Maximum	87029	Maximum	1725	Sum	600194	Sum	6866	
1997-98	111	4570	2008-09	47	16220	Count	21	Count	21	C.V	0.801589	C.V	1.650153	CAGR	0.0421	CAGR	-0.1193					
1998-99	58	5587	2009-10	76	57,555																	
1999-00	93	7817	2010-11	91	67,609																	
2000-01	151	6108	2011-12	71	48,468																	
2001-02	35	7543	2012-13	69	32,455																	
2002-03	26	4070	2013-14	90	55,652																	
2003-04	57	23272	Total	5975	146060																	

Appendix-2 Classification of number of issues for Mobilization of Capital during 1994-2014

Year	Category-wise		Issuer-wise		Instrument-wise					Size-wise					Region-wise				Sector-wise	
	Public	Right	Listed	IPO	At Par	Premium	CCPS	Bonds	Others	<5Cr.	<10Cr.	<50Cr.	<100Cr.	>100Cr.	Northern	Eastern	Western	Southern	Private	Public
1993-94	773	370	451	692	608	383	1	9	142	0	0	0	0	0	314	94	503	232	0	0
1994-95	1342	350	453	1239	942	651	7	0	135	853	305	51	41	41	399	178	740	375	1684	8
1995-96	1426	299	368	1357	1181	480	8	6	63	1066	418	175	43	23	467	168	680	410	1718	7
1996-97	753	131	167	717	697	148		10	27	547	215	87	14	19	221	114	360	187	872	10
1997-98	62	49	59	52	64	33	3	4	10	52	26	15	6	12	18	26	46	21	105	6
1998-99	32	26	40	18	20	20	3	10	6	15	9	14	9	11	10	10	29	9	57	1
1999-00	65	28	42	51	30	52	0	10	2	19	15	26	14	19	13	7	46	27	91	2
2000-01	124	27	37	114	84	54	2	10	1	66	25	34	8	18	10	9	43	89	148	3
2001-02	20	15	28	7	7	8	0	16	4	3	3	8	3	18	3	2	23	7	30	5
2002-03	14	12	20	6	6	11	0	8	2	2	1	10	0	13	1	3	13	9	18	8
2003-04	35	22	36	21	14	37	0	6	0	6	5	16	5	25	15	7	21	14	39	18
2004-05	34	26	37	23	6	49	0	5	0	2	5	17	11	25	8	7	34	11	55	5
2005-06	103	36	60	79	10	128	0	0	1	6	4	47	33	49	30	13	56	40	131	8
2006-07	85	39	47	77	2	119	0	2	1	3	6	40	31	44	28	5	55	36	122	2
2007-08	92	32	39	85	7	113	2	2	0	4	1	33	25	61	22	11	55	36	120	4
2008-09	22	25	25	22	5	40	0	1	0	1	1	21	6	18	6	5	21	15	47	0
2009-10	47	29	37	39	1	71	1	3	0	1	3	18	9	45	17	10	36	13	71	5
2010-11	68	23	38	53	2	78	1	10	0	1	2	13	20	55	20	8	35	27	77	14
2011-12	55	16	17	54	4	47	0	20	0	2	2	18	14	35	20	5	25	21	62	9
2012-13	53	16	36	33	4	45	0	20	0	2	13	15	6	33	25	3	30	11	49	20
2013-14	75	15	52	38	19	36	0	35	0	14	17	10	3	46	33	12	28	17	70	20
Total	5280	1586	2089	4777	3713	2603	28	187	394	2665	1213	922	311	610	1680	697	2879	1607	5566	155

Source: Sebi.gov.in

Appendix-3 Classification of amount of issues for

Year	Category-wise		Issuer-wise		Instrument-wise				
	Public	Right	Listed	IPO	At Par	Premium	CCPS	Bonds	Others
1993-94	15449	8923	16508	7864	3808	9220	2	1991	9351
1994-95	21045	6588	11061	16572	5529	12441	124	0	9538
1995-96	14240	6564	9880	10924	4958	9727	145	2086	3888
1996-97	11565	2719	8326	5958	3441	4412		5400	886
1997-98	2862	1708	3522	1048	271	1610	10	1550	1128
1998-99	5019	568	5182	405	197	660	78	4450	202
1999-00	6257	1560	5098	2719	786	3780	0	3200	51
2000-01	5378	729	3385	2722	818	2408	142	2704	36
2001-02	6502	1041	6341	1202	151	1121	0	5601	670
2002-03	3639	431	3032	1038	143	1314	0	2600	13
2003-04	22265	1007	19838	3434	360	18589	0	4324	0
2004-05	24640	3616	14507	13749	420	23968	0	3867	0
2005-06	23294	4088	16446	10936	372	27000	0	0	10
2006-07	29796	3710	5002	28504	12	32889	0	356	249
2007-08	54511	32518	44434	42595	387	79352	5687	1603	0
2008-09	3582	12637	12637	2082	96	14176	0	448	0
2009-10	49,236	8,319	32,859	24,696	9	54,866	180	2,500	10
2010-11	58,105	9,503	32,049	35,559	50	57,617	490	9,451	249
2011-12	46,093	2,375	6,953	41,515	104	12,753	0	35,611	0
2012-13	23,510	8,945	25,926	6,529	571	14,902	0	16,982	0
2013-14	51,076	4,576	54,416	1,236	824	12,445	0	42,383	0
Total	5E+05	1E+05	337402	261287	23307	395250	6858	147107	26281

Source: sebi.gov.in

Mobilization of Capital during 1994-2014 (Rs. in Crores)

Size-wise					Region-wise				Sector-wise	
<5Cr.	<10Cr.	<50Cr.	<100Cr.	>100Cr.	Northern	Eastern	Western	Southern	Private	Public
0	0	0	0	0	314	1352	14559	2633		
2569	3033	6356	3584	12090	399	2216	10824	8039	26270	1362
3183	2833	3344	2934	8511	467	1416	10811	3467	16639	4165
1760	1473	1671	908	8465	221	767	9041	1087	10241	4035
122	177	368	420	3484	18	1164	2391	713	3852	718
35	63	297	581	4611	10	266	4856	293	5516	70
53	105	629	997	6034	13	106	5235	577	7617	200
186	165	764	507	4486	10	240	4105	1555	5893	215
8	20	199	177	7140	3	180	5942	419	6601	942
7	8	255	0	3801	1	117	3358	588	1897	2173
16	36	330	351	22539	15	636	6826	1235	4612	18660
3	44	461	723	27025	8	204	17951	1377	17162	11094
20	32	1325	2189	23815	30	1495	14963	5535	20199	7183
10	45	1129	2386	29938	28	165	22964	6706	31728	1779
16	6	920	1669	84418	22	1093	64139	5270	67311	19718
3	7	509	445	15255	6	315	11202	1800	16220	0
2	24	596	636	56,298	17	4,175	15,796	12,870	32,477	25,078
2	11	455	1,406	65,735	20	17,190	21,479	10,097	29,385	38,223
9	14	510	1,018	46,916	20	225	5,817	6,880	19,874	28,594
7	86	290	440	31,632	25	98	4,499	2,041	15,473	16,982
41	122	174	221	55,093	33	908	6,969	3,815	11,681	43,970
8052	8304	20582	21592	517286	1680	34328	263727	76997	350648	225161

Appendix-4: Test for Equality of Means Between Series

Date: 01/30/16 Time: 22:09	Sample: 1 21	Included observations: 20		
Method		Df.	Value	Probability
Anova F-test		(19, 380)	2.20146	0.0028
Welch F-test*		(19,135.572)	8.22781	0
*Test allows for unequal cell variances				
Analysis of Variance				
Source of Variation		Df.	Sum of Sq.	Mean Sq.
Between		19	2045509	107658.4
Within		380	1.9E+07	48903.1
Total		399	2.1E+07	51700.97
Category Statistics				
Variable	Count	Mean	Std. Dev.	of Mean
>100cr	20	14.85	14.5178	3.246273
<50cr. to <100cr	20	29.55	16.7032	3.734952
>10cr. to < 50 cr.	20	49.9	130.28	29.13145
>5 cr. to <10cr	20	41.75	71.9034	16.07808
<5cr.	20	105.9	294.479	65.84743
At_Par	20	150.8	341.076	76.26687
Bonds	20	8.85	8.55493	1.912941
CCPS	20	1.4	2.32605	0.520121
Eastern	20	29.15	53.0385	11.85977
IPO	20	203	402.662	90.03789
Listed (FPO)	20	96.1	142.617	31.89002
Public sector	20	226.35	427.957	95.69418
Northern	20	72.95	140.572	31.43293
Others	20	18.35	43.3993	9.704387
Premium	20	122.75	173.535	38.80355
Private sector	20	234.7	502.975	112.4687
Public	20	7.25	6.22284	1.391468
Right	20	72.75	115.995	25.93726
Southern	20	71	120.855	27.02406
Western	20	125.95	225.88	50.50834
All	400	84.165	227.379	11.36892

Appendix-5: Test for Equality of Medians Between Series

Date: 01/30/16 Time: 22:10		Sample: 1 21		Included observations: 20	
Method		df	Value	Probability	
Med. Chi-square		19	169.79	0	
Adj. Med. Chi-square		19	147.39	0	
Kruskal-Wallis		19	193.43	0	
Kruskal-Wallis (tie-adj.)		19	193.6	0	
van der Waerden		19	180.54	0	
Category Statistics					
			> Overall		
Variable	Count	Median	Median	Mean Rank	Mean Score
>100cr	20	9	6	149.975	-0.3944
< 50 cr. to <100cr	20	25	12	230.5	0.17887
>10cr. to < 50 cr.	20	5	4	131.675	-0.4987
>5 cr. to <10cr	20	17.5	8	208.1	0.05386
<5 cr.	20	3.5	4	138.1	-0.4278
Equity issues atPar	20	8.5	7	182.6	-0.0334
Bonds	20	7	3	115.975	-0.641
CCPS	20	0	0	39.3	-1.4115
Eastern	20	8.5	4	156.825	-0.2694
IPO	20	51.5	17	285.575	0.71884
Listed (FPO)	20	38.5	19	289.425	0.65318
Public sector	20	63.5	19	312.125	0.92664
Northern	20	19	10	204.325	0.0675
Others	20	1	3	87.725	-1.0073
Equity issues at Premium	20	50.5	18	300.1	0.77175
Private sector	20	70.5	18	313.85	0.94139
Public	20	5.5	2	105.075	-0.7161
Right	20	26.5	15	249.25	0.36645
Southern	20	21	11	229.225	0.24868
Western	20	35.5	19	280.275	0.61771
All	400	19	199	200.5	0.00727

Offer for Sale - An Alternative Mechanism for Price Discovery of Equity Share: An Empirical Study in Indian Context

Paritosh C. Basu

Aman Jain

Vaibhav Singhal

Abstract

This paper examines effectiveness of Offer for Sale (OFS) as a tool to divest Promoters' shareholdings of a listed entity in compliance with specific regulations promulgated by the Securities and Exchange Board of India. It is based on analytical study of sixty-six OFSs. Specific instances of divestments by certain large corporates have been explained to bring out how improper fixing of floor price can lead to destruction of shareholders' wealth. It explores the reasons behind oversubscription and undersubscription of some of the OFSs. Certain trends in movements of prices have been identified, which can be used by intraday traders and retail investors to avoid immediate losses. The paper also opens upon anomaly in the present process of OFS which can be exploited by institutional investors to earn profits by way of arbitrage at the cost of erosion in wealth of existing shareholders. Recommendations have been provided for ensuring that the process of price discovery becomes a win-win game for all concerned.

Key Words

Offer For Sale (OFS); Offers For Sale (OFSs), Price Discovery; Divestment; Sebi; Floor Price; Undisclosed Price; Indicative Price; Allotment Price; Promoters; Exchange, Oversubscribed; Undersubscribed; Shareholders' Wealth; Wealth Destruction; Bombay Stock Exchange, Mumbai, India (BSE).

Background

In India, large number of companies have higher proportions of shareholdings by promoters. There were 88 of 153 companies, around the time of this study, with market capitalization above Rs. 100,000 million, in which promoters' share was greater than 60%¹. It has been established long before that wider participation of investors facilitates efficient capital market operation, results in higher liquidity, and helps better price discovery, which is the ultimate objective of any stock Exchange. All these lead to avoiding manipulation and price rigging by dominant players and thus protect retail and minority shareholders' interest.

"On the other hand dispersed shareholding can be value destructor", as observed by Manoj Pant and Manoranjan Pattanayak². Their study confirms that "...with an increase in insider ownership stake, firm value initially increases. At the initial level of ownership, either insiders do not have a substantial stake to entrench themselves or they have incentives to perform more to acquire more ownership stakes. The market discipline may force the insiders to pursue value maximisation, despite their lack of personal incentives to do so at this low level of stake. But, when their stake exceeds 20% they have a reasonably high stake in the firm. They play a crucial role in the decision-making process".

They also observed that *“it is very hard to note the exact source of entrenchment as earlier studies ascribed it to a number of factors: status as a founder, increasing voting power, increased tenure with attachment to the firm, lower employment of professional managers, and dominance of insider over outside directors in the board. As and when their ownership stake goes beyond 49%, there is a convergence of interest with the firm. They have very high interest in the firm as they have to bear maximum loss for each dollar loss. Also, as per the monitoring hypothesis, with greater ownership stake insiders keep an eye on other constituents of the firm and the firm gets rid of the free rider problem associated with dispersed ownership”*.

Practical problems arise when the promoter, group of promoters and / or promoter group entities; hereinafter collectively called as the Promoter; look out for avenues for divestment. The erstwhile regulations for divestment in India were plagued with lengthy, time consuming and inefficient procedures.

K. S. Chalapati Rao in his research³ observed that, Rs. 9,894.07 Bln. is the value of promoters' excess holding in 227 companies at the end of Mar'10 when compared with minimum public shareholding of 25%. This study included giant public sector companies. Offloading this quantum requires efficient processes along with transparent mechanisms. In 2012 The Securities and Exchange Board of India (SEBI) introduced the new regulation 'Offer for Sale' (OFS).

Objective

This paper aims at critically analysing the new OFS process and assessing its effectiveness as a tool for price discovery in secondary capital market for equity shares before Promoters actually divest.

Efforts have been made to identify whether any arbitrage opportunities can get created due to operation of OFS simultaneously with the ongoing regular dealings of the stock in the concerned stock exchange, herein after referred as the Exchange.

It also examines whether one of the major objectives of SEBI to provide a platform to the divesting Promoters for discovering the true price of their shares could be achieved or not and

whether any lacuna has crept-in, which needs to be dealt with to make OFS more effective and robust.

SEBI's Circulars for OFS

SEBI, vide its circulars CIR/MRD/DP/18/2012 dated July 2012, and CIR/MRD/DP/04/2013 dated January 25, 2013, has permitted the concerned Exchanges to provide a new window for OFS. The same will be separate from the existing trading system for normal market segment, to facilitate Promoters of listed companies to dilute and / or off load holdings in a transparent manner for price discovery with wider participation.⁴ The said two circulars essentially define OFS and lay down certain processes, which provide a separate channel with an interface to bid for shares to be divested by Promoters.

Research Work

The steps for OFS, included in SEBI's circular, have critically been analysed and examined with the objective to appreciate how the process differs from the earlier so called inefficient methods for divestment of Promoters' share.

Earlier, Promoters had to use SEBI's regulated procedure for Follow-on Public Offer (FPO)⁵ for dilution of their shareholdings, which were also being used for further issue of shares after the Initial Public Offer (IPO). While FPO and OFS have some similar purposes, they are poles apart when in terms of actual procedure. An OFS steals a march on an FPO due to its simplicity.

For initiating a FPO, a company first files it with SEBI for approval, appoints lead managers, performs most of the paperwork and follow steps as are mostly required for IPO. Then a price band is defined within which the investors should bid. Once the offer is launched, it is required to be kept open for at least three to ten days. Allotment begins only after the issue closes. The time taken for allotment and listing of new shares is usually up to twelve days. Multiple bids by the same investor are not allowed. Altogether it takes about twelve weeks for a Promoter to divest through FPO. OFS has a great deal of difference from FPO.

Sixty-six cases of OFS during the period from March 1, 2012 to December 31, 2015 by Promoters of listed companies

have been studied. These companies are from 27 different sectors. The authors have also studied background of divesting companies, their operating performance, prevailing overall economic environment and business ecosystem of the concerned industry sector. Prices prevailing in the secondary capital market immediately before and after respective OFSs were also studied to analyse and appreciate the following:

- To what extent the prices, offered by respective companies for OFS, were above or below the price that prevailed on the day before and after the date of OFS;
- In how many instances the floor price for OFS was open and kept undisclosed from investors before bidding and how that impacted the price bidding against OFS;
- Analyses of peculiar features of certain bids to draw inferences, and observe behavioural patterns of Promoters in fixing floor price;
- At what price the actual OFS deal was executed;
- Repercussions and implications of the OFS on trading done by regular investors in the secondary capital market; and
- Returns to investors through OFS based on market prices that prevailed after ninety days from the date of OFS.

Extensive research has been conducted to trace out whether in any other developed, emerging, or developing country there is any practice and / or regulation related to divestment of Promoters' shares similar to OFS. But no such instance could be traced. Hence, this research has been conducted based on SEBI's regulations; reports and analytical studies in printed media and reports from stock exchanges.

Steps and Processes

The following paragraphs summarise major steps of OFS process, as promulgated by SEBI:

1. The Promoter first engages brokers and files a declaration at least one day before the specific OFS actually opens for others. The declaration contains details such as number of shares on offer, designated stock Exchange(s), date and time of opening and closing of OFS, allocation and allotment methodology

vis-à-vis applications made, names of brokers on behalf of Promoter, date and time of declaration of floor price, etc⁶.

2. The Promoter can opt for any one of the two options for indicating the price or not. He can declare the 'floor price' after trading hours of a day before the specific OFS opens at the designated stock Exchange(s), which informs the public about the same. Alternatively he can submit the floor price in a sealed envelope to the stock Exchange(s) which is not disclosed to anyone and not even to the Promoter's brokers. This floor price is revealed after conclusion of the concerned OFS.

3. The bidding process for OFS runs simultaneously during the usual trading hours of the Exchange. All orders through such bids are collected by brokers through a separate window provided by the Exchange. Orders and funds are processed during the same time on the Exchange platform. The Exchange at specified intervals provides information on bid quantity to the participants.

4. From time to time the Exchange discloses the 'indicative price' which is volume weighted average price of all the valid and confirmed bids. Bids will be halted if the stock price hits the circuit filter in normal trading window. Trading is suspended if the maximum permissible limit is hit in either direction.

In OFS only limit orders are allowed and one buyer can place multiple orders. When an investor places a limit order, the directive to the broker is that the investor does not want the market price, but that he /she wants the stock price to move in a certain direction before the order is executed.

Any bid below the floor price will not be accepted if the floor price is disclosed. One fourth of the total number of shares offered through an OFS are reserved for insurance companies and mutual funds.

5. Allocation under an OFS is done either of the following bases⁷.

a. Price Priority - Allocation is done on multiple prices. In this method the highest price bidder gets maximum preference and every bidder above the clearing price gets allocation on price priority basis. The clearing price is determined by the Promoter and the appointed investment bankers on the basis

of the demand and supply for shares.

b. Proportionate Basis - The Allocation is done on a single price. In this method every bidder whose bid is at or above the clearing price gets allocation of shares on proportionate basis.

6. Allocations and obligations resulting thereof are intimated to the brokers on the transaction or trade day, called the T day, generally two or three hours after the OFS is closed. The settlement of each OFS session will be on T+1 day or T+2 day depending on the type of bids placed. For 100% margin bids pay-out will be on T+1 day and for 0% margin bids, pay-out will be on T+2 day at 1 p. m. The pay-out of both the days will be under the same settlement number. Brokers will have to issue contract notes to their clients based on the allotment price and allotment quantity.

Regulatory Provisions^{8and9}

The regulatory provisions related to OFS can briefly be delineated in the following lines.

The following are eligible for OFS in India:

- a. All Promoter(s)/Promoter group entities of listed companies that are eligible for trading and are required to increase public shareholding to meet the minimum public shareholding requirements in terms Rule 19(2)(b) and 19A of Securities Contracts (Regulation) Rules, 1957 (SCRR), read with clause 40A (ii) (c) of Listing Agreement promulgated by SEBI.
- b. Any non-Promoter shareholder of eligible companies, holding at least 10% of share capital, can also offer shares through the OFS mechanism.
- c. In case a non-Promoter shareholder's offer, the Promoter may participate subject to compliance with applicable provisions of SEBI (Issue of Capital and Disclosure Requirements) Regulations, 2009 and SEBI (Substantial Acquisition of Shares and Takeovers) Regulations, 2011.
- d. Promoters of top 200 companies by market capitalisation in any of the last four completed quarters are eligible, subject to certain regulatory compliances.

For (a) and (b) above, the Promoters should not have purchased and/or sold shares of the company in twelve weeks' period prior to the offer and they should undertake not to purchase and/or sell in twelve weeks' period after. However, within such

cooling-off period the Promoter can offer shares only through OFS or Institutional Placement Programme (IPP) as per another SEBI regulation with a gap of two weeks between successive offers. The above shall also be applicable to Promoters and Promoter group entities who have already offered their shares through OFS or IPP.

2. SEBI has subsequently advised to stipulate a minimum 10% of the OFS issue size to be reserved for retail investors, who may bid for amount less than Rs.200,000¹⁰. The objective is to encourage participation of small investors.

3. Advertisements for the OFS for any entity's shares through Exchange(s), if to be done, shall be issued after notice is submitted for the same to the Exchange(s) in accordance with prescribed guidelines.

4. The size of the offer shall be for a minimum amount of Rs. 250 Mln. However, the size can be less than that if the OFS is for achieving minimum public shareholding of 25% in any company in a single tranche based on a separately regulatory requirement of SEBI.

5. The duration of any OFS shall be as per the trading hours of the secondary market and shall not exceed one trading day.

6. Orders with cent percent of margin paid upfront by institutional investors and non-institutional investors can be modified or cancelled at any time during the trading hours. Orders without paying upfront margin by institutional investors only cannot be modified or cancelled except for making upward revision in the price or quantity.

7. Cumulative bid quantity shall be made available online to market throughout the trading session at specific intervals in respect of orders with 100% upfront margin and separately in respect of orders placed without any upfront margin.

8. If the security has a price band in the normal segment, the same shall not apply for the orders placed through the separate window for OFS.

9. The clearing house, which functions for settlement of OFS transactions, shall collect cent percent margin in cash from non-institutional investors. In case of institutional investors who places orders:

- With cent percent of margin upfront, custodian confirmation shall be sent within trading hours,

- Without upfront margin, custodian confirmation shall be as per existing rules of secondary market transactions.

The funds collected shall neither be utilized against any other obligation of the trading member nor co-mingled with other segments.

10. Minimum 25% of the shares offered shall be reserved for mutual funds and insurance companies, subject to the allocation methodology. Any unsubscribed portion thereof shall be available to other bidders. No single bidder other than mutual funds and insurance companies shall be allocated more than 25% of the size of any OFS.

11. An OFS can be withdrawn prior to its proposed opening. In such a case there will be a cooling-off period of ten trading days from the date of withdrawal before another OFS.

12. Cancellation of an OFS is not permitted during bidding period. If the Promoter or any individual adopting the process of OFS fails to get sufficient demand at or above the floor price and if there are cases of defaults in settlement obligation, the seller may choose to either conclude the offer or cancel it.

Analyses of OFS Cases

Sixty-six OsFS¹¹ of Indian companies, during the period from March 1, 2012 to December 31, 2015, have been studied. Certain relevant information, collected from the website of BSE, have been presented in Appendix – I. During this period the last OFS was on August 24, 2015. In the following analyses the following seven data points have been considered:

1. Floor Price – The minimum allotment price in case of OFS;
2. Disclosure of Floor Price – Yes or No;
3. Closing price of stock – On day before OFS (OFS-1), On day of OFS, on day after OFS (OFS+1);
4. Indicative Price;
5. Number of shares on offer;
6. No. of times the OFS has been subscribed;
7. Type of allotment – Price Priority Method or Proportionate Basis;
8. Type of Company – Domestic or MNC; and
9. Sector

Offers which have shown some peculiar behaviour regarding floor price, subscription levels, etc. have been listed for further review. The following is a summary of observations for more analyses to start with:

Subsequent Price Movement vis-a-vis Nature of Floor Price in OFS (March 1 2012 to December 31, 2015)

OFS Price Disclosed or Not Disclosed	Total No of OFS Studied	Floor Price as Compared to Previous Day's Closed Market Price					
		Above		Below		Not Available	
	1 Count	2 Count	3 %	4 Count	5 %	6 Count	7 %
Disclosed							
MNCs	8	0	0	7	12	1	20
Domestic	45	3	100	42	72	0	0
Subtotal	53	3	100	49	84	1	20
Undisclosed							
MNCs	2	0	0	2	3	0	0
Domestic	3	0	0	3	5	0	0
Subtotal	5	0	0	5	9	0	0
Not Available							

Cont...

MNCs	1	0	0	1	2	0	0
Domestic	7	0	0	3	5	4	80
Subtotal	8	0	0	4	7	4	80
Grand Total	66	3	100	58	100	5	100

Table - 1: Source: Field study

One can observe the following from the above Table:

1. Out of total 66 cases, data is available for 58 OsFS indicating whether floor prices were disclosed or not and in 61 cases floor prices were available.
2. Out of 58 cases for which disclosure related information is available, in 53 (90%) cases floor prices have been disclosed. This includes 8 out of 11 cases of multinational companies (MNCs).
3. Again out of 61 cases for which price related information was available, floor prices were fixed below the previous trading day's closing market price for 58 (95%) OFSs. These include 10 out of 11 (90%) cases of MNCs.

It can, therefore, be inferred that Promoters in general have a tendency to disclose floor price and fix OFS price below the previous day's closing traded price. The emerging behavioural pattern appears to be their anxiety for the probable effect that the OFS will not be fully subscribed unless prices are not disclosed and fixed below the closing price of previous trading day.

Analyses of Specific Cases

The specific sample 9 cases, out of total sixty-six, have been divided into the following three major categories for more detailed analysis:

- A. Category A - Floor price was very low as compared to the previous trading day's closing price;
- B. Category B - Reasons for under subscription of OFS are to be analysed in details; and
- C. Category C - Other general cases.

Such cases have been highlighted in bold letters in Appendix - 1. For subsequent analysis, the items stated in immediate following paragraph have been considered for keeping matters simple and easy comprehension of the main findings and inferences.

In all the four subsequent figures, the mentioned date is the date on which the OFS was offered or one day before OFS date depending upon availability of Chart in the website of BSE. The horizontal axis represents time periods considered for reviewing movements in price starting from July 1, 2012 to January 1, 2013 and so on over the years, except in Figure - 4 for which the price points were on January of every year. The dot on the price line denotes the price point on the date of OFS.

All prices of stocks have been indicated in Indian Rupee (Rs.) and volumes in Million Nos. stated as 'M' or in thousands stated as 'K'. Decimal places have been rounded-off to the next number if the same was above 0.5 for both the purposes of absolute value of stock prices and percentage calculations.

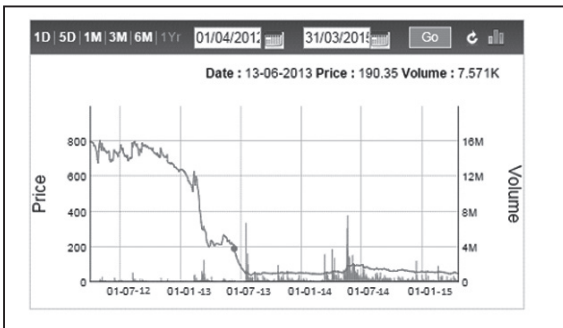
A. Cases where the floor price was very low compared to the previous day's closing price

i. MMTC (June 13, 2013 - Serial number 29 of Appendix 1)

MMTC is a valuable public sector company since 1963. It deals with precious and other metals, minerals, coal and hydrocarbon, commodities like agro products, fertilizer, etc. both in domestic and international markets.

The floor price was set at Rs. 60 for OFS when its market price was Rs. 210, i.e., at about 71% discount to the market price. The disclosed indicative price was Rs. 60.86. Shareholders panicked and started selling, which led to the stock hitting lower circuit at 10%, on two consecutive days resulting in large destruction of their wealth.

Figure 1: MMTC Ltd.– Movements in stock price before and after OFS

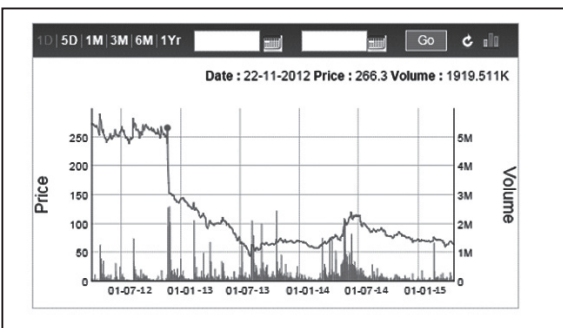


Source: Website of BSE.

ii. Hindustan Copper Limited(November 23, 2012- Serial number 57 of Appendix 1)

This company is a vertically integrated large multi-unit copper producer, engaged in a wide spectrum of activities ranging from mining to different types of finished goods. The floor price was set with 42% discount at Rs.155 when the market price was Rs. 266. The indicative price disclosed was Rs. 157. The shareholders started selling to prevent huge losses and as a result the stock hit lower circuit (20%) on two consecutive days. Within two days the stock lost 36% of market value.

Figure 2: Hindustan Copper Ltd.– Movements in stock price before and after OFS



Source: Website of BSE.

It is a good example to demonstrate how shareholders' wealth is lost due to under-pricing of OFS. Probably management of the Company has realised this and, therefore, their next

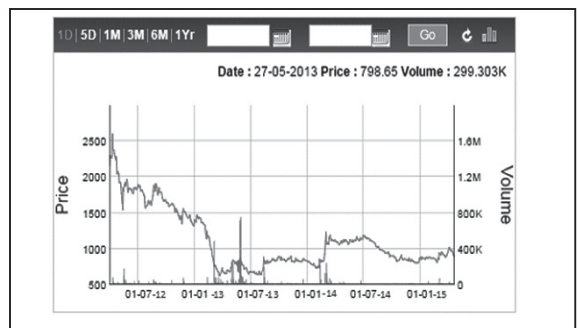
OFS was priced at a floor price of 70 which was only at 3% discount to the previous day's closing price.

iii. AstraZeneca PharmaIndia Ltd.(May 28, 2013 - Serial number 39 of Appendix 1)

AstracZeneca manufactures basic drugs, pharmaceutical formulations, fine chemicals and industrial chemicals. It is a mid-size profit making company. Its OFS was oversubscribed to around five times because of very low disclosed floor price of Rs. 490 at 39% discount to the closing market price Rs. 805 on the day before OFS.

But the indicative price ofRs. 567,resulted inabout 17% fall in the price on the OFS declaration day reducing to about Rs. 669, as compared to Rs. 805. The allotment price was Rs. 620, which was about 7% below the OFS day closing price of Rs. 669. Hence there was no further fall in the price.

Figure 3: AstraZeneca Ltd – Movements in stock price before and after OFS



Source: BSE Website.

The above analysis indicates that when the floor price is at a steep discount to the previous day's closing price, existing shareholders should exercise caution as the same stock may destroy their wealth.

B. Cases for which reasons for undersubscription of OFS to be analysed

The following four have been identified which the present authors consider as the major reasons for under subscription of shares in response to respective OFSs:

1. Issue size is very big in comparison to what the market can absorb;
2. The stock has not been performing well immediately before the OFS;
3. The floor price is not attractive as compared to the price in the secondary market; and
4. Economy is not doing well and hence the timing of the OFS has not properly been planned.

The following OsFS are cases in point, which support the above observations.

i Oil & Natural Gas Corporation (ONGC) (March 1, 2012 - Serial number 66 of Appendix 1)¹²

ONGC is one of the largest profit making companies, engaged in exploration and production of crude oil and natural gases. The Company has six overseas joint ventures for oil fields.

This was the first stock where Central Government, being the promoter, diluted its stake. The floor price was set at 1% discount to the market price of Rs. 293 on OSF-1 day. Also the stock's performance was average for previous couple of months. So there was no incentive for investors as the floor price was not attractive. As a result, the OFS was heavily undersubscribed for 14 M as against total offer of 427 M. Around the time of closure the Exchange disclosed that bids for 420 M shares were finally received.

It was later disclosed that the issue could achieve 98% subscription because Life Insurance Corporation of India (LIC), the largest institutional investor, invested around Rs. 110,000 M out of total Rs. 124,050 M. Incidentally it was the biggest ever OFS in India.

One can infer that perhaps the retail investors were looking for more discount. On the other hand the issue size was a cause of concern as ONGC would have lost large cash flow if floor price would have been fixed at 10% discount. Moreover, there was some sense of pessimism in market due to European crisis around that time. It can, therefore, be inferred that retail investors in general at the market place did not support this OFS.

ii Wipro Ltd. (Date of OFS March 14, 2012 - Serial number 65 of Appendix 1)

Wipro is engaged in IT, ITES, computer related technologies, consulting and design activities. It also deals in other consumer products and considered as one of the most respected and successful large enterprises. This was the second and the first private stock for which the Promoter diluted stake through OFS.

Here again, the floor price, which was fixed only at 3% discount to the previous trading day's closing price of Rs. 431, was not much favourably reacted by investors. It was gathered from published reports that blind bidding has led to under subscription.

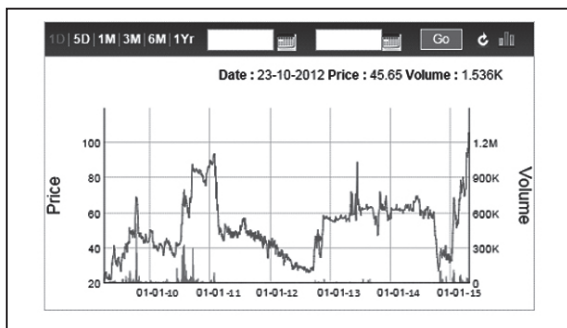
Timing for this offer was also not very appropriate, as the investors were not in a mood to invest due to prevailing negative sentiment triggered by European crisis. Thus, this OFS was subscribed only 0.71 time. It is relevant to note here that out of the first seven OFSs announced in 2012 the maximum subscribed OFS was 1.29 times.

iii. Pioneer Distilleries Ltd. (PDL) (Date of First OFS October 23, 2012 - Serial number 11 and 60 of Appendix 1)

PDL manufactures alcohol and related by products. It also generates electricity from bio-gas and bio-mass. This OFS was subscribed only 0.06 time of quantity despite being offered at Rs. 38, being 83% of previous day's closing price. The reason for such a fiasco is related to the stock's past performance. As is evident from Figure - 4, price of this stock had fallen from a high of Rs. 94 on February, 2011 to a low of Rs. 25 on August 30, 2012, i.e., a fall of 73% in about eighteen months.

The shareholders were fast losing money. However, suddenly there was a spike in price due to rally in market. PDL's management thought it was the right time for OFS. But the investors' view was just the opposite, as they needed some stability in the stock before making any investment. Hence the stock was unable to gather much traction and the OFS was a complete failure. Their management could have waited for some time till the stock's performance would have stabilised.

Figure 4: Pioneer Distilleries Ltd. – Movements in stock price before and after OFS



Source: BSE Website

Probably this is the reason for which PDL was able to garner much better attention in its next OFS after 23 months on September 24, 2014, which was subscribed 3.97 times. The closing market price on the day before the second OFS was Rs. 60, which also did play a major role. The floor price was set at 83.33 % lower at Rs. 10. The OFS was finally allotted at Rs. 39. In the first occasion of OFS both the floor and allotment rates were Rs. 38.

Inferences that can be drawn from this B Group is that management should consider certain major factors while deciding for an OFS, viz.:

- i. General condition of prevailing business environment and the state of affairs of the country's macro-economy;
- ii. Impacts from certain developments that may / will affect the market sentiment, including coupling effects from events in international arena,
- iii. Actual operating results in immediate prior financial periods and guidance about projected performance of the entity which management has communicated to all stakeholders.

All these factors are important from the perspective of the theory of efficient market hypothesis. They should also carefully select the option of announcing floor price or keeping it undisclosed till completion of bidding, as it has major implications in investors taking decision about subscribing through OFS or not.

C. Other Cases

i. Gillette India Limited (Date of OFS November 13, 2013 - Serial number 19 of Appendix 1)

Gillette, a profitable joint venture between Gillett group of the US and Poddar Group of India, manufactures varieties of shaving razors and blades, stationery products and small electrical appliances. The company did set floor price after 16% discount at Rs.1,650 as against previous day's closing price of Rs. 1964. The indicative price discovered was Rs. 1,926 and the offer was subscribed 1.36 times. This cheered up shareholders in secondary market and closing price was Rs.2,056 on the day of OFS. The shares were allotted at Rs. 1,801 and triggered a decline in price. The stock finally closed at Rs.1,933 on the next day.

It can be observed that as the floor price was set at a much lower level, investors through OFS clearly had an advantage over existing shareholders. Through a more rationally determined floor price the company could have managed to better serve existing shareholders' interest, besides enabling Promoters to mop up more cash. This was possible because both Gillet's operating performance and timing for OFS were good with the mood of investors.

ii. Videocon Industries Limited (VIL September 24, 2013 - Serial number 21 of Appendix 1)

VIL manufactures consumer durable electronics and home appliances. The Company also deals in oil and gas exploration and extraction. The floor price was set at Rs. 177, which was almost equal to the previous day's closing price. The indicative price was Rs. 179 and the allotment took place at Rs. 178. The entire pricing process took place smoothly and provided no arbitrage or windfall gains to existing investors or those through the OFS route. Because there was hardly any difference in all the three prices.

The leaning point here is that floor price should not be at a steep discount from the price prevailing in main secondary market, unless there is any compulsive reason.

iii. Oberoi Realty Limited (ORL) (September 26, 2013 – Serial number 20 of Appendix 1)

ORL is a real estate developer with focus on premium dwelling units. They also have a diversified portfolio of projects covering other segments of real estate, which target upper end of market.

Floor price of Rs. 158 for OFS was at a discount of 6% of previous day's closing price of Rs. 168.15. The indicative price was discovered at Rs. 167 and the allotment took place at Rs. 168. ORL's OFS was subscribed 1.62 times. Management could time the OFS well and did not understate the floor price much below the price of OFS -1 day.

From this analysis of C Group cases it can be inferred that the Promoters need to evaluate the right time to enter the market for OFS when both the stock's performance and market as a whole are doing well. Floor price is also to be rationally fixed to ensure that there is no arbitrage and thus shareholders' wealth is not eroded.

Findings from analyses of all OFSs

Further combined analytical study of all the sixty-six cases, as listed in Appendix-I, lead to the following additional observations and assessment of resultant impacts of OFSs categorised based on certain common features.

1. OFS allotment price is less than the closing price on the day of OFS:

Closing prices fell on the trading day immediately next to the day of allotment as compared to the OFS day closing price in four-fifth of 46 cases as listed - II. These cases have been indicated with negative sign and cases of increase without any sign. Such a result strongly helps validating the obvious learning point that retail investors in main market segment picked up cues about forward looking directional changes in prices as compared to the prices that were explored through the OFS route.

There were also declines in prices of stocks, for which OFS allotment price was at a discount of 10% or more, on the very next trading day in 8 out of 9 such cases as listed in Appendix - III. This finding can be used by the intraday traders for purchase price decisions. The immediate reaction of traders in the main secondary market is with negative sentiment.

2. OFS allotment prices equal to the floor prices and closing prices on the day of OFS greater than the allotment price

Closing prices went down on the next to OFS day. This has been true in 20(87%) out of total 23 such cases, as listed in Appendix - IV. Such a directional change can also be used by traders who make money from intraday movements. The intraday traders should remain away from these stocks which have shown such behaviour.

Combining the cases listed in immediate paragraphs 2 and 3 above, it can be observed that in cases where allotment prices are equal to the floor prices, and are lower than closing prices on the day of OFS, there is a tendency of the prices to fall on the next day's trading.

3. Price movements after ninety days of OFS

Only 18(35%) stocks out of 51 have shown positive returns. In other words OFS has led to destruction of wealth in about two-third cases as is evident from Appendix - V. To add more to this malady, the authors observed that if an investor would have invested Rs. 1,000 in each of these OFSs with total investment of Rs. 51,000, he / she would have been poorer by 2.61% after 90 days with cumulative investment value down to Rs. 49,670. Remaining more than one-third include:

- Delisted cases after OFS - 6;
- Cases for which allotment prices were not available - 6; and
- Prices increased after 90 days of OFS - 3.

4. Exploitable Gap in OFS Process

The gap gets created when floor price remains undisclosed. The bidders can quote for very high quantities at low prices and thus can exploit OFS for unusual benefit. This can adversely impact indicative price against an OFS and thus can result in serious wealth destruction.

As per the extant OFS Regulation of SEBI, indicative price is the weighted average price of valid bids. But when the floor price remains undisclosed all the bids are considered valid and hence bids with exorbitant lower prices are also valid. This very low quoted bids with high volume drives down the indicative price. Because the indicative price becomes low, as compared to the spot rate, retail investors and intraday players start panicking and sell holdings. This accelerates price declining

process and the stock hits lower circuit resulting in destruction of shareholders' wealth.

Such a situation can also be exploited by the market participants by short selling the stock in futures market at the beginning of the OFS day and buy towards the end of day.

Conclusions

Keeping in view the above discourse, the following conclusions can be drawn:

1. OFS, as was introduced by SEBI in 2012, is an effectively regulated process. It brought in some sense of method in divestment by Promoters for which nothing, worth the name of a regulated framework, was available before. The present OFS framework has the following advantages:

a. It allows Promoters to dilute holdings through the Exchange with faster regulatory clearances, and without much paperwork, and expensive roadshows, etc.

b. It is a relatively faster and friendly, yet a controlled and transparent mechanism for the Promoters to liberate funds, locked up in a listed entity, post stabilisation of operations and profitability.

c. Funds liberated through such OFS, can again be invested by the Promoters in search of excellence and more value creation in some other business opportunities. Therefore, it provides a mechanism that helps more capital investments for economic development of the country.

2. OFS did assume critical importance in the context of the then mandatory requirements in India for diluting Promoters' stakes in private companies to 75% by June 2013 and state-run listed firms to 90% by August, 2013. It will continue to help Government further divestment and thus better managing the country's fiscal deficit problem.

3. Some Promoters seem to have not properly understood this tool and / or have not effectively administered it in terms of timing, fixation of prices and exercising options for keeping floor prices open or closed. These in turn have led to destruction of shareholders' wealth as could be observed in cases like MMTC, AstraZeneca, etc.

4. Value erosion in shareholders' wealth mainly takes place due to setting of floor price at a high discount to the prevailing market price. Such decisions mostly emanate from informed judgement being taken without keeping in view the organisation's

performance and stability, contemporary business ecosystem and prevailing sentiment in the secondary capital market due to several domestic and international factors.

5. Erroneous decisions regarding timing, floor price fixation and keeping the same being open or secret may erode huge values for large and very successful companies like that of ONGC, Wipro as have been narrated above.

6. Certain gaps and weaknesses in the SEBI's regulations could also be identified which can be exploited by bidders leading to serious deterioration in shareholders' wealth. SEBI may like to consider certain recommendations of present authors detailed in the next section for making OFS process more robust and effective.

Recommendations

The following are the present authors' recommendations to render OFS more efficient as a regulated framework for divestment by Promoters from the perspective of all concerned.

1. The floor price should not be set at a high discount to the prevailing market price and it may be in the range of 0-10% to the market price that prevailed a day before the OFS depending upon performance of the stock and prevailing overall market conditions.

2. The Promoters should be very careful regarding timing as there can be high chances of lower subscription and subsequent deterioration in market price if prevailing market sentiments are not good. If prevailing market prices of the company or its sector peers are volatile, the management should wait to allow the environment to stabilise before planning for OFS.

3. Promoters can issue OFS in tranches, while remaining within the regulation. The first OFS can be used as more of a market exploratory exercise. This will facilitate better market price discovery in the subsequent one or more tranches of OFS for the same stock.

4. OFS bidding process should be kept open for more days to increase number of bids, and those should be accepted on a twenty-four hours basis so that overseas bidders can also participate.

5. Promoters should not be given the choice to disclose or not to disclose floor price. It should be mandatory to disclose, as in absence of floor price the market can be manipulated by players.

6. SEBI may consider to include certain additional guidelines in respect of the following:

i. Selection of time for OFS propositions

One major factor that may be considered is the range of price volatility within a given number days before the OFS date vis-a-vis the concerned index of the Exchange. For example the index may be NIFTY and / or the Sector Index, e. g. FMCG; and the market segment, e. g. Midcap or Smallcap to which the entity belongs.

ii. Timing of OFS

Banning of a defined period of days for OFS before and / or after certain major events that might have already happened or is due to happen in domestic and or global economic environment which may have large impacts or may influence market movements and volatilities. For example these may include any major upheaval in world market that may affect domestic business through coupling effect, etc.

iii. Introduction of upper and / or lower caps for fixing floor price

Floor price, as compared to the previous day's closing price or average of such closing prices of a given number days before OFS date, should be subject to some upper and lower limits. While introducing a framework for this, specific reference may be made to past financial performance of the entity as well as return from the stock in secondary market. All these can be done through specific notifications from time to time or through general guidelines, e.g., range of price fluctuations like the Exchange does for invoking circuit filters.

Further empirical research needs to be conducted by contacting all those companies and their Promoters. Objective will be to understand and appreciate what have gone wrong and right, what are the learning points for other entities who may use this tool in future, as well as their own recommendations to SEBI. The overriding objective is to render OFS framework more effective, robust yet user friendly.

Developing and emerging countries may consider to adopt such OFS mechanism with due modifications befitting the long term business ecosystem of that country.

Bibliography

1. *Comprehensive Guidelines on Offer for Sale (OFS) of Shares by Promoters through Stock Exchange Mechanism. Circular Number CIR/MRD/DP/04/2013 dated January 25, 2013.*
2. Manoj Pant and Pattanayak, Manoranjan (2007). *Insider ownership and firm value: evidence from Indian corporate sector. Economic and Political Weekly. Vol.42 No. 16, pp. 1459 -1467.*
3. Rao, KS Chalapati (2010). *Ensuring Minimum Public Holding in Listed Companies, Economic and Political Weekly, pp 44-50.*

4. *Comprehensive Guidelines on Offer for Sale (OFS) of Shares by Promoters through Stock Exchange Mechanism. Circular Number CIR/MRD/DP/18/2012 dated July 18, 2012.*

Others

- <https://www.edelweiss.in/tools/screener.aspx>
- <http://www.bseindia.com/Static/Markets/PublicIssues/aboutOFS.aspx?expandable=0>
- <http://www.thehindubusinessline.com/portfolio/beyond-stocks/how-an-offer-for-sale-differs-from-an-fpo/article7045725.ece>
- <http://www.bseindia.com/markets/MarketInfo/DownloadAttach.aspx?id=20140610-40&attachedId=668b7a97-dada-4a83-9b88-b839e5cde743>
- <http://www.bseindia.com/downloads/FAQForInvestors.pdf> accessed on 18-07-14
- http://www.bseindia.com/markets/downloads/Comprehensive_Guidelines_OFS_SEBI.pdf
- http://www.bseindia.com/markets/downloads/SEBI_Cir_250113.pdf
- <http://www.livemint.com/Money/I9cDrBhsXxNyE204aJdLIK/Sebi-says-listed-state-firms-to-have-25-public-holding-in-t.html>
- http://www.nse-india.com/live_market/content/live_watch/offer_sale/ofs_sale.htm
- http://www.bseindia.com/markets/PublicIssues/OFSHistorical_new.aspx
- <http://ak57.in/ipo/ongc-offer-for-sale-turns-out-to-be-a-fiasco/5072/>

Foot Notes

- ¹<https://www.edelweiss.in/tools/screener.aspx>
- ²Manoj Pant and Pattanayak, Manoranjan (2007). *Insider ownership and firm value: evidence from Indian corporate sector. Economic and Political Weekly. Vol.42 No. 16, pp. 1459 -1467.*
- ³Rao, KS Chalapati (2010). *Ensuring Minimum Public Holding in Listed Companies, "Economic and Political Weekly, pp 44-50.*
- ⁴<http://www.bseindia.com/Static/Markets/PublicIssues/aboutOFS.aspx?expandable=0> accessed on 18-07-14.
- ⁵<http://www.thehindubusinessline.com/portfolio/beyond-stocks/how-an-offer-for-sale-differs-from-an-fpo/article7045725.ece> accessed on 08-08-15.
- ⁶<http://www.bseindia.com/markets/MarketInfo/DownloadAttach.aspx?id=20140610-40&attachedId=668b7a97-dada-4a83-9b88-b839e5cde743> accessed on 18-07-14
- ⁷<http://www.bseindia.com/downloads/FAQForInvestors.pdf> accessed on 18-07-14
- ⁸http://www.bseindia.com/markets/downloads/Comprehensive_Guidelines_OFS_SEBI.pdf
- ⁹http://www.bseindia.com/markets/downloads/SEBI_Cir_250113.pdf
- ¹⁰<http://www.livemint.com/Money/I9cDrBhsXxNyE204aJdLIK/Sebi-says-listed-state-firms-to-have-25-public-holding-in-t.html>
- ¹¹http://www.nse-india.com/live_market/content/live_watch/offer_sale/ofs_sale.htm accessed on 18-07-14
- ¹² <http://ak57.in/ipo/ongc-offer-for-sale-turns-out-to-be-a-fiasco/5072/>

Summary of Offers for Sale with Compilation of Relevant Data for Review and Analyses

Sl. No.	Name of Company	Offer Date	Floor Price Rs.	Closing Price (OFS-1) Rs.	Closing Price (OFS) Rs.	Closing Price (OFS +1) Rs.	Indicative Price (OFS) Rs.
1	Indian Oil Corporation Limited	24-08-2015	387.00	394.85	378.10	394.85	NA
2	Dredging Corporation of India Limited	21-08-2015	382.00	387.65	380.15	344.05	NA
3	Power Finance Corporation Limited	27-07-2015	254.00	259.55	254.25	245.65	NA
4	Network18 Media & Investments Limited	08-07-2015	53.40	61.20	57.20	56.50	54.32
5	Rural Electrification Corporation Limited	08-04-2015	315.00	321.25	330.30	336.35	324.73
6	Accel Frontline Limited	27-02-2015	75.00	73.80	76.15	75.00	75.30
7	Accel Frontline Limited	12-02-2015	75.00	84.50	82.30	75.05	77.33
8	Coal India Limited	30-01-2015	358.00	374.95	360.85	355.10	358.50
9	Accel Frontline Limited	27-01-2015	75.00	88.50	85.50	88.05	NA
10	Steel Authority of India Limited	05-12-2014	83.00	85.25	82.90	82.25	83.45
11	Pioneer Distilleries Limited	24-09-2014	10.00	60.00	60.96	57.95	23.11
12	Bharti Infratel Limited	07-08-2014	250.00	271.85	252.85	258.90	NA
13	L&T Finance Holdings Limited	11-06-2014	74.00	81.90	77.80	76.35	72.77
14	Orient Green Power Company Limited	20-05-2014	10.50	13.15	13.70	13.10	NA
15	South India Projects Limited	26-03-2014	30.00	NA	NA	NA	NA
16	L&T Finance Holdings Limited	14-03-2014	70.00	79.15	74.20	73.60	72.77
17	Schneider Electric Infrastructure Limited	29-01-2014	57.00	66.55	65.05	63.85	NA
18	Dalmia Bharat Sugar and Industries Limited	22-01-2014	12.00	14.55	13.95	12.80	9.86
19	Gillette India Limited	13-11-2013	1650.00	1961.55	2056.35	1933.30	1925.66
20	Oberoi Realty Limited	26-09-2013	158.00	168.15	174.00	166.15	166.93
21	Videocon Industries Limited	24-09-2013	177.00	177.75	173.70	170.80	179.37
22	India Tourism Development Corporation Limited	02-08-2013	70.00	NA	NA	NA	70.39
23	The State Trading Corporation of India Limited	02-08-2013	74.00	74.65	74.30	72.90	74.01
24	National Fertilizers Limited	31-07-2013	27.00	26.55	27.15	25.15	27.00
25	Bajaj Corp Limited	19-07-2013	200.00	245.25	244.75	247.00	225.98
26	Hindustan Media Ventures Limited	11-07-2013	120.00	123.80	115.00	113.00	120.00
27	BGR Energy Systems Limited	05-07-2013	118.00	126.65	123.35	121.65	119.24
28	Hindustan Copper Limited	03-07-2013	70.00	72.35	70.30	67.90	70.00
29	MMTC Limited	13-06-2013	60.00	210.05	189.05	170.15	60.86
30	Tata Communications Limited	03-06-2013	196.00	206.50	195.15	196.00	174.41
31	BGR Energy Systems Limited	03-06-2013	163.00	192.95	169.55	163.60	167.99
32	Essar Ports Limited	03-06-2013	77.00	78.00	77.65	76.25	78.76



Allotment Price Rs.	Price after 90 days Rs.	Floor Price Disclosure	Shares on offer (OFS-1) No	No. of Times Subscribed	Type of Allotment	Domestic / MNC	Sector	Floor price as compared to OFS-1 day closing price
387.00	411.80	Disclosed	19,42,36,198	1.43	Price Priority Method	Domestic	Refineries	Lower
382.00	367.00	Disclosed	1260000	1.66	Price Priority Method	Domestic	Shipping	Lower
254.10	242.80	Disclosed	5,28,01,628	1.80	Price Priority Method	Domestic	Finance - Term Lending Institutions	Lower
56.10	49.75	Disclosed	2,91,77,858	1.88	Price Priority Method	Domestic	Finance - General	Lower
327.25	282.55	Disclosed	3,94,98,360	4.66	Price Priority Method	Domestic	Finance - Term Lending Institutions	Lower
75.00	71.75	Disclosed	392009	1.52	Price Priority Method	Domestic	Computers - Software Medium & Small	Higher
75.00	72.70	Disclosed	3256384	0.76	Price Priority Method	Domestic	Computers - Software Medium & Small	Lower
358.00	370.95	Disclosed	50,53,09,152	1.23	Price Priority Method	Domestic	Mining & Minerals	Lower
75.10	71.05	NA	3499647	0.63	Price Priority Method	Domestic	Computers - Software Medium & Small	Lower
83.50	66.85	Disclosed	18,58,73,638	2.01	Price Priority Method	Domestic	Steel	Lower
39.00	37.40	Disclosed	1368060	3.97	Price Priority Method	Domestic	Breweries & Distilleries	Lower
250.00	291.40	NA	8,50,00,000	1.27	Price Priority Method	Domestic	Telecommunications- Equipment	Lower
76.00	70.15	Disclosed	27585744	3.19	Price Priority Method	Domestic	Finance - Investments	Lower
11.35	14.80	NA	7661400	1.32	Price Priority Method	Domestic	Power	Lower
30.10	NA	NA	493133	1.13	Price Priority Method	Domestic	Finance - General	NA
71.50	76.35	Disclosed	83258633	1.28	Price Priority Method	Domestic	Finance - Investments	Lower
62.10	92.90	NA	7479178	1.51	Price Priority Method	MNC	Power	Lower
12.00	NA	Disclosed	3000000	1.55	Price Priority Method	Domestic	Sugar	Lower
1801.00	1986.95	Disclosed	2857744	1.36	Price Priority Method	MNC	Personal Care	Lower
167.50	229.00	Disclosed	11441069	1.62	Price Priority Method	Domestic	CoReal Estate	Lower
178.25	172.85	Disclosed	1800000	1.00	Price Priority Method	Domestic	Consumer Goods - Electronic	Lower
70.00	NA	NA	4288470	1.09	Price Priority Method	Domestic	NA	NA
74.00	171.00	Disclosed	613600	1.13	Price Priority Method	Domestic	Trading	Lower
27.00	21.25	Disclosed	3,74,79,940	1.56	Price Priority Method	Domestic	Fertilizers	Higher
228.00	248.95	Disclosed	1,43,75,000	2.44	Price Priority Method	Domestic	Personal Care	Lower
120.00	118.40	Disclosed	1939027	1.00	Price Priority Method	Domestic	Media & Entertainment	Lower
118.40	108.35	Disclosed	2175364	1.72	Price Priority Method	Domestic	Infrastructure - General	Lower
70.00	63.65	Disclosed	37119152	1.18	Price Priority Method	Domestic	Metals - Non Ferrous	Lower
60.00	54.25	Disclosed	93312000	1.55	Price Priority Method	Domestic	Trading	Lower
196.00	167.55	Undisclosed	2750000	1.57	Price Priority Method	Domestic	Telecommunication	Lower
163.00	100.15	Disclosed	4422830	0.51	Price Priority Method	Domestic	Infrastructure - General	Lower
77.00	68.75	Disclosed	2,26,71,161	0.90	Price Priority Method	Domestic	Infrastructure - General	Lower

Sl. No.	Name of Company	Offer Date	Floor Price Rs.	Closing Price (OFS-1) Rs.	Closing Price (OFS) Rs.	Closing Price (OFS +1) Rs.	Indicative Price (OFS) Rs.
33	Tata Teleservices (Maharashtra) Limited	30-05-2013	7.60	8.00	7.55	7.50	7.65
34	Essar Shipping Limited	30-05-2013	19.50	20.55	20.15	19.20	19.57
35	Jet Airways (India) Limited	30-05-2013	510.00	536.95	528.45	491.75	515.17
36	Digital Electronics Limited	29-05-2013	350.00	NA	NA	NA	NA
37	Sun TV Network Limited	29-05-2013	403.00	411.05	428.30	421.05	416.13
38	Jaypee Infratech Limited	29-05-2013	35.00	39.50	35.70	34.35	35.13
39	AstraZeneca Pharma India Limited	28-05-2013	490.00	805.30	668.60	797.30	567.22
40	Puravankara Projects Limited	24-05-2013	81.00	84.90	83.10	82.05	81.52
41	JSW Energy Limited	22-05-2013	61.50	65.00	62.50	58.70	61.79
42	Oracle Financial Services Software Limited	22-05-2013	2275.00	2421.95	2443.45	2661.00	2386.60
43	Styrolution ABS (India) Limited	21-05-2013	400.00	519.15	473.65	433.85	422.04
44	Tata Teleservices (Maharashtra) Limited	17-05-2013	8.90	NA	NA	NA	5.67
45	Linde India Limited	16-05-2013	230.00	251.40	261.30	250.75	240.44
46	Steel Authority of India Limited	22-03-2013	63.00	63.90	63.35	63.00	63.07
47	3M India Limited	21-03-2013	3300.00	3446.35	3499.10	3521.30	3654.33
48	National Aluminium Company Limited	15-03-2013	40.00	44.10	40.35	38.50	40.05
49	Rashtriya Chemicals and Fertilizers Limited	08-03-2013	45.00	43.90	45.45	44.75	45.02
50	Mahindra Holidays & Resorts India Limited	07-03-2013	270.00	275.85	275.65	273.95	NA
51	NTPC Limited	07-02-2013	145.00	151.80	148.05	148.05	145.91
52	Oil India Limited	01-02-2013	510.00	540.00	525.50	534.75	517.99
53	MPS Limited	28-12-2012	110.00	122.25	124.60	122.40	NA
54	Eros International Media Limited	20-12-2012	200.00	210.30	207.90	201.75	202.62
55	Honeywell Automation India Limited	14-12-2012	2150.00	2399.10	2391.70	2777.35	2314.72
56	NMDC Limited	12-12-2012	147.00	159.55	154.30	156.90	149.18
57	Hindustan Copper Limited	23-11-2012	155.00	266.15	212.95	170.40	157.00
58	Blue Dart Express Limited	23-11-2012	1720.00	2059.55	1989.80	2003.15	1823.11
59	D.B. Corp Limited	09-11-2012	205.00	215.45	207.95	206.95	205.50
60	Pioneer Distilleries Limited	23-10-2012	38.00	46.20	43.90	41.75	NA
61	Fresenius Kabi Oncology Limited	12-10-2012	80.00	NA	NA	NA	NA
62	Uttam Sugar Mills Limited	23-07-2012	24.00	28.05	27.75	29.10	NA
63	Jaiprakash Power Ventures Limited	29-06-2012	33.50	34.60	34.85	34.25	33.53
64	D.B. Corp Limited	10-05-2012	196.00	199.80	198.70	195.35	196.00
65	Wipro Limited	14-03-2012	418.00	430.95	426.05	427.45	421.35
66	Oil and Natural Gas Corporation Limited	01-03-2012	290.00	293.20	288.00	281.45	303.67



Allotment Price Rs.	Price after 90 days Rs.	Floor Price Disclosure	Shares on offer (OFS-1) No	No. of Times Subscribed	Type of Allotment	Domestic / MNC	Sector	Floor price as compared to OFS-1 day closing price
7.60	6.01	Disclosed	3,50,00,000	0.00	Price Priority Method	Domestic	Telecommunication	Lower
19.50	13.70	Disclosed	1,78,72,751	1.10	Price Priority Method	Domestic	Shipping	Lower
510.00	290.25	Disclosed	4317697	0.69	Price Priority Method	Domestic	Aviation	Lower
400.00	NA	NA	38725	1.51	Price Priority Method	Domestic	Computers - Hardware	NA
420.10	376.60	Disclosed	7881700	3.17	Price Priority Method	Domestic	Media & Entertainment	Lower
35.00	15.50	Disclosed	120000000	1.91	Proportionate Basis	Domestic	Infrastructure - General	Lower
620.00	840.75	Disclosed	3749950	4.87	Price Priority Method	MNC	Pharmaceuticals	Lower
81.00	64.40	Disclosed	14135576	1.46	Price Priority Method	Domestic	Construction and Contracting - Real Estate	Lower
61.60	39.10	Disclosed	28230000	1.75	Price Priority Method	Domestic	Power	Lower
2420.00	2896.15	Disclosed	4430501	3.91	Price Priority Method	MNC	Computers - Software	Lower
426.00	346.90	Undisclosed	2167562	2.36	Price Priority Method	MNC	Petrochemicals	Lower
7.60	6.26	NA	5,16,23,679	0.85	Price Priority Method	Domestic	Telecommunications	NA
237.10	252.25	Disclosed	1,23,45,126	1.57	Price Priority Method	MNC	Chemicals	Lower
63.00	53.55	Disclosed	24,03,96,572	1.00	Price Priority Method	Domestic	Steel	Lower
3950.00	3518.10	Disclosed	113198	2.15	Price Priority Method	MNC	Diversified	Lower
40.00	29.60	Disclosed	12,88,61,925	1.22	Price Priority Method	Domestic	Aluminium	Lower
45.00	40.10	Disclosed	6,89,61,012	1.29	Price Priority Method	Domestic	Fertilizers	Higher
273.10	245.80	Disclosed	3400000	1.31	Price Priority Method	Domestic	Hotels	Lower
145.55	156.35	Disclosed	78,32,62,880	1.70	Price Priority Method	Domestic	Power	Lower
520.00	558.15	Disclosed	60113157	2.56	Price Priority Method	Domestic	Oil Drilling and Exploration	Lower
117.00	125.60	Undisclosed	214500	4.70	Price Priority Method	MNC	Printing & Stationery	Lower
204.10	173.65	Disclosed	2573710	4.40	Price Priority Method	Domestic	Media & Entertainment	Lower
2450.00	2539.60	Disclosed	551333	7.38	Price Priority Method	MNC	Telecommunication - Equipment	Lower
148.50	145.35	Disclosed	396471600	1.85	Price Priority Method	Domestic	Mining & Minerals	Lower
155.00	124.20	Disclosed	8,87,23,300	0.58	Price Priority Method	Domestic	Metals - Non Ferrous	Lower
NA	2240.30	Disclosed	1431937	3.62	Price Priority Method	MNC	Couriers	Lower
205.00	236.00	Disclosed	1,19,27,000	1.77	Price Priority Method	Domestic	Media & Entertainment	Lower
38.10	NA	Disclosed	935982	0.06	Proportionate Basis	Domestic	Breweries & Distilleries	Lower
80.00	NA	Disclosed	1,42,40,489	1.08	Proportionate Basis	MNC	Pharmaceuticals	NA
NA	24.80	Undisclosed	790401	1.29	Price Priority Method	Domestic	Sugar	Lower
NA	34.25	Disclosed	29055382	1.13	Proportionate Basis	Domestic	Power	Lower
NA	190.25	Disclosed	9000000	1.03	Proportionate Basis	Domestic	Media & Entertainment	Lower
NA	393.15	Undisclosed	35000000	0.71	Price Priority Method	Domestic	Computers - Software	Lower
NA	252.10	Disclosed	427774504	0.98	Price Priority Method	Domestic	Oil Drilling and Exploration	Lower

Allotment Price Less Than Closing Price on the OFS Day
Annexure - 11

Sr No.	Name of Company	Offer Date	Floor Price Rs.	Allotment Price Rs.	Closing Price (OFS) Rs.	Closing Price (OFS +1) Rs.	Decline Rs.
1	Power Finance Corporation Limited	27-07-2015	254.00	254.10	254.25	245.65	-8.60
2	Network18 Media & Investments Limited	08-07-2015	53.40	56.10	57.20	56.50	-0.70
3	Rural Electrification Corporation Limited	08-04-2015	315.00	327.25	330.30	336.35	6.05
4	Accel Frontline Limited	27-02-2015	75.00	75.00	76.15	75.00	-1.15
5	Accel Frontline Limited	12-02-2015	75.00	75.00	82.30	75.05	-7.25
6	Coal India Limited	30-01-2015	358.00	358.00	360.85	355.10	-5.75
7	Accel Frontline Limited	27-01-2015	75.00	75.10	85.50	88.05	2.55
8	Pioneer Distilleries Limited	24-09-2014	10.00	39.00	60.96	57.95	-3.01
9	Bharti Infratel Limited	07-08-2014	250.00	250.00	252.85	258.90	6.05
10	L&T Finance Holdings Limited	11-06-2014	74.00	76.00	77.80	76.35	-1.45
11	Orient Green Power Company Limited	20-05-2014	10.50	11.35	13.70	13.10	-0.60
12	L&T Finance Holdings Limited	14-03-2014	70.00	71.50	74.20	73.60	-0.60
13	Schneider Electric Infrastructure Limited	29-01-2014	57.00	62.10	65.05	63.85	-1.20
14	Dalmia Bharat Sugar and Industries Limited	22-01-2014	12.00	12.00	13.95	12.80	-1.15
15	Gillette India Limited	13-11-2013	1,650.00	1,801.00	2,056.35	1,933.30	-123.05
16	Oberoi Realty Limited	26-09-2013	158.00	167.50	174.00	166.15	-7.85
17	The State Trading Corporation of India Limited	02-08-2013	74.00	74.00	74.30	72.90	-1.40
18	National Fertilizers Limited	31-07-2013	27.00	27.00	27.15	25.15	-2.00
19	Bajaj Corp Limited	19-07-2013	200.00	228.00	244.75	247.00	2.25
20	BGR Energy Systems Limited	05-07-2013	118.00	118.40	123.35	121.65	-1.70
21	Hindustan Copper Limited	03-07-2013	70.00	70.00	70.30	67.90	-2.40
22	MMTC Limited	13-06-2013	60.00	60.00	189.05	170.15	-18.90

cont..

Sr No.	Name of Company	Offer Date	Floor Price Rs.	Allotment Price Rs.	Closing Price (OFS) Rs.	Closing Price (OFS +1) Rs.	Decline Rs.
23	BGR Energy Systems Limited	03-06-2013	163.00	163.00	169.55	163.60	-5.95
24	Essar Ports Limited	03-06-2013	77.00	77.00	77.65	76.25	-1.40
25	Jet Airways (India) Limited	30-05-2013	510.00	510.00	528.45	491.75	-36.70
26	Essar Shipping Limited	30-05-2013	19.50	19.50	20.15	19.20	-0.95
27	Sun TV Network Limited	29-05-2013	403.00	420.10	428.30	421.05	-7.25
28	Jaypee Infratech Limited	29-05-2013	35.00	35.00	35.70	34.35	-1.35
29	AstraZeneca Pharma India Limited	28-05-2013	490.00	620.00	668.60	797.30	128.70
30	Puravankara Projects Limited	24-05-2013	81.00	81.00	83.10	82.05	-1.05
31	JSW Energy Limited	22-05-2013	61.50	61.60	62.50	58.70	-3.80
32	Oracle Financial Services Software Limited	22-05-2013	2,275.00	2,420.00	2,443.45	2,661.00	217.55
33	Styrolution ABS (India) Limited	21-05-2013	400.00	426.00	473.65	433.85	-39.80
34	Linde India Limited	16-05-2013	230.00	237.10	261.30	250.75	-10.55
35	Steel Authority of India Limited	22-03-2013	63.00	63.00	63.35	63.00	-0.35
36	National Aluminium Company Limited	15-03-2013	40.00	40.00	40.35	38.50	-1.85
37	Rashtriya Chemicals and Fertilizers Limited	08-03-2013	45.00	45.00	45.45	44.75	-0.70
38	Mahindra Holidays & Resorts India Limited	07-03-2013	270.00	273.10	275.65	273.95	-1.70
39	NTPC Limited	07-02-2013	145.00	145.55	148.05	148.05	-
40	Oil India Limited	01-02-2013	510.00	520.00	525.50	534.75	9.25
41	MPS Limited	28-12-2012	110.00	117.00	124.60	122.40	-2.20
42	Eros International Media Limited	20-12-2012	200.00	204.10	207.90	201.75	-6.15
43	NMDC Limited	12-12-2012	147.00	148.50	154.30	156.90	2.60
44	Hindustan Copper Limited	23-11-2012	155.00	155.00	212.95	170.40	-42.55
45	D.B. Corp Limited	09-11-2012	205.00	205.00	207.95	206.95	-1.00
46	Pioneer Distilleries Limited	23-10-2012	38.00	38.10	43.90	41.75	-2.15

Annexure - II

Allotments done at a price which was at a discount of 10% or more to the closing price on the day of OFS

Sr No.	Name of Company	Offer Date	Floor Price Rs.	Allotment Price Rs.	Closing Price (OFS) Rs.	Closing Price (OFS +1) Rs.	Allotment Price (% discount to Closing Price)	Price decline next day of OFS Rs.
1	Accel Frontline Limited	27-01-2015	75.00	75.10	85.50	88.05	12%	2.55
2	Pioneer Distilleries Limited	24-09-2014	10.00	39.00	60.96	57.95	36%	-3.01
3	Orient Green Power Company Limited	20-05-2014	10.50	11.35	13.70	13.10	17%	-0.60
4	Dalmia Bharat Sugar and Industries Limited	22-01-2014	12.00	12.00	13.95	12.80	14%	-1.15
5	Gillette India Limited	13-11-2013	1650.00	1801.00	2056.35	1933.30	12%	-123.05
6	MMTC Limited	13-06-2013	60.00	60.00	189.05	170.15	68%	-18.90
7	Styrolution ABS (India) Limited	21-05-2013	400.00	426.00	473.65	433.85	10%	-39.80
8	Hindustan Copper Limited	23-11-2012	155.00	155.00	212.95	170.40	27%	-42.55
9	Pioneer Distilleries Limited	23-10-2012	38.00	38.10	43.90	41.75	13%	-2.15

Appendix - IV

Allotment Prices Equals to Floor Prices and OFS Closing Prices Were Greater than Allotment Prices

Sr No.	Name of Company	Offer Date	Floor Price Rs.	Allotment Price Rs.	Closing Price (OFS) Rs.	Closing Price (OFS + 1) Rs.	Price Rise / Decline (OFS+1) Rs.
1	Accel Frontline Limited	27-02-2015	75.00	75.00	76.15	75.00	-1.5%
2	Accel Frontline Limited	12-02-2015	75.00	75.00	82.30	75.05	-8.8%
3	Coal India Limited	30-01-2015	358.00	358.00	360.85	355.10	-1.6%
4	Accel Frontline Limited	27-01-2015	75.00	75.10	85.50	88.05	3.0%
5	Bharti Infratel Limited	07-08-2014	250.00	250.00	252.85	258.90	2.4%
6	Dalmia Bharat Sugar and Industries Limited	22-01-2014	12.00	12.00	13.95	12.80	-8.2%
7	National Fertilizers Limited	31-07-2013	27.00	27.00	27.15	25.15	-7.4%
8	Hindustan Media Ventures Limited	11-07-2013	120.00	120.00	115.00	113.00	-1.7%
9	Hindustan Copper Limited	03-07-2013	70.00	70.00	70.30	67.90	-3.4%
10	MMTC Limited	13-06-2013	60.00	60.00	189.05	170.15	-10.0%
11	BGR Energy Systems Limited	03-06-2013	163.00	163.00	169.55	163.60	-3.5%
12	Essar Ports Limited	03-06-2013	77.00	77.00	77.65	76.25	-1.8%
13	Tata Communications Limited	03-06-2013	196.00	196.00	195.15	196.00	0.4%
14	Jet Airways (India) Limited	30-05-2013	510.00	510.00	528.45	491.75	-6.9%
15	Essar Shipping Limited	30-05-2013	19.50	19.50	20.15	19.20	-4.7%
16	Tata Teleservices (Maharashtra) Limited	30-05-2013	7.60	7.60	7.55	7.50	-0.7%
17	Jaypee Infratech Limited	29-05-2013	35.00	35.00	35.70	34.35	-3.8%
18	Puravankara Projects Limited	24-05-2013	81.00	81.00	83.10	82.05	-1.3%
19	Steel Authority of India Limited	22-03-2013	63.00	63.00	63.35	63.00	-0.6%
20	National Aluminium Company Limited	15-03-2013	40.00	40.00	40.35	38.50	-4.6%
21	Rashtriya Chemicals and Fertilizers Limited	08-03-2013	45.00	45.00	45.45	44.75	-1.5%
22	Hindustan Copper Limited	23-11-2012	155.00	155.00	212.95	170.40	-20.0%
23	D. B. Corp Limited	09-11-2012	205.00	205.00	207.95	206.95	-0.5%

Returns to Shareholders After Ninety Days of OFS from Movement in Price of Stock					Appendix - V	
Sr. No.	Name of Company	Offer Date	Allotment Price Rs.	Price after 90 Days Rs.	Returns after 90 Days (%)	
1	Indian Oil Corporation Limited	24-08-2015	387	411.80	6%	
2	Dredging Corporation of India Limited	21-08-2015	382	367.00	-4%	
3	Power Finance Corporation Limited	27-07-2015	254.1	242.80	-4%	
4	Network18 Media & Investments Limited	08-07-2015	56.10	49.75	-11%	
5	Coal India Limited	30-01-2015	358.00	370.95	4%	
6	Accel Frontline Limited	27-01-2015	75.10	71.05	-5%	
7	Steel Authority of India Limited	05-12-2014	83.50	66.85	-20%	
8	Pioneer Distilleries Limited	24-09-2014	39.00	37.40	-4%	
9	Bharti Infratel Limited	07-08-2014	250.00	291.40	17%	
10	L&T Finance Holdings Limited	11-06-2014	76.00	70.15	-8%	
11	Orient Green Power Company Limited	20-05-2014	11.35	14.80	30%	
12	L&T Finance Holdings Limited	14-03-2014	71.50	76.35	7%	
13	Schneider Electric Infrastructure Limited	29-01-2014	62.10	92.90	50%	
14	Gillette India Limited	13-11-2013	1,801.00	1986.95	10%	
15	Oberoi Realty Limited	26-09-2013	167.50	229.00	37%	
16	Videocon Industries Limited	24-09-2013	178.25	172.85	-3%	
17	The State Trading Corporation of India Limited	02-08-2013	74.00	171.00	131%	
18	National Fertilizers Limited	31-07-2013	27.00	21.25	-21%	
19	Bajaj Corp Limited	19-07-2013	228.00	248.95	9%	
20	Hindustan Media Ventures Limited	11-07-2013	120.00	118.40	-1%	
21	BGR Energy Systems Limited	05-07-2013	118.40	108.35	-8%	
22	Hindustan Copper Limited	03-07-2013	70.00	63.65	-9%	
23	MMTC Limited	13-06-2013	60.00	54.25	-10%	
24	BGR Energy Systems Limited	03-06-2013	163.00	100.15	-39%	

cont..

25	Tata Communications Limited	03-06-2013	196.00	167.55	-15%
26	Essar Ports Limited	03-06-2013	77.00	68.75	-11%
27	Jet Airways (India) Limited	30-05-2013	510.00	290.25	-43%
28	Essar Shipping Limited	30-05-2013	19.50	13.70	-30%
29	Tata Teleservices (Maharashtra) Limited	30-05-2013	7.60	6.01	-21%
30	Jaypee Infratech Limited	29-05-2013	35.00	15.50	-56%
31	Sun TV Network Limited	29-05-2013	420.10	376.60	-10%
32	AstraZeneca Pharma India Limited	28-05-2013	620.00	840.75	36%
33	Puravankara Projects Limited	24-05-2013	81.00	64.40	-20%
34	JSW Energy Limited	22-05-2013	61.60	39.10	-37%
35	Oracle Financial Services Software Limited	22-05-2013	2,420.00	2896.15	20%
36	Styrolution ABS (India) Limited	21-05-2013	426.00	346.90	-19%
37	Tata Teleservices (Maharashtra) Limited	17-05-2013	7.60	6.26	-18%
38	Linde India Limited	16-05-2013	237.10	252.25	6%
39	Steel Authority of India Limited	22-03-2013	63.00	53.55	-15%
40	3M India Limited	21-03-2013	3,950.00	3518.10	-11%
41	National Aluminium Company Limited	15-03-2013	40.00	29.60	-26%
42	Rashtriya Chemicals and Fertilizers Limited	08-03-2013	45.00	40.10	-11%
43	Mahindra Holidays & Resorts India Limited	07-03-2013	273.10	245.80	-10%
44	NTPC Limited	07-02-2013	145.55	156.35	7%
45	Oil India Limited	01-02-2013	520.00	558.15	7%
46	MPS Limited	28-12-2012	117.00	125.60	7%
47	Eros International Media Limited	20-12-2012	204.10	173.65	-15%
48	Honeywell Automation India Limited	14-12-2012	2,450.00	2539.60	4%
49	NMDC Limited	12-12-2012	148.50	145.35	-2%
50	Hindustan Copper Limited	23-11-2012	155.00	124.20	-20%
51	D.B. Corp Limited	09-11-2012	205.00	236.00	15%
	Index (Rs. 1000 invested in each OFS)		51,000.00	49670.42	-2.61%

REITs: How far are we from Implementation?

Bhavik Panchasara

Abstract

One of the biggest announcements in the union budget of 2014-15 for the real estate sector of India was the introducing of Real Estate Investment Trusts (REITs) by Securities and Exchange Board of India (SEBI) and Infrastructure Investment Trusts. Though, first drafted regulation for REITs was released in December 2007, but initial framework didn't receive approval due to lack of clarity on tax. Launching of REITs by the SEBI was expected to be a major relief for real estate players seeking liquidity since long time. But surprisingly, till now not a single REIT has come up in the market. At this moment it will be interesting to analyse the status of REITs in India and possible reasons for delay in implementation of the same. This paper focuses on the REITs in India and issues related with it in accordance with current regulatory framework and expectations of real estate sector.

Key Words

Infrastructure Investment Trusts, Real Estate Sector, REITs, SEBI

1. Introduction

Real estate sector of India is considered as one of the fastest growing and actively contributing sector to the economy. The data shows that the sector has contributed 6.3% in

Indian Gross Domestic Product (GDP) in 2013. The sector is currently fourth largest sector in the country in terms of foreign direct investment (FDI) inflows. Total FDI in the construction development sector during April 2000 to May 2015 was around US\$ 24.07 billion.

The sector is second largest employer after agriculture and it is expected to create more than 17 million employment opportunities across the country by 2025. Keeping in view the importance and contribution of the sector to the GDP, in the union budget of 2015-16, the sector had been allotted US\$ 3.72 billion for housing and urban development. Apart from that, government has also raised FDI limits for township and settlements development projects to 100 percent and real estate projects within the Special Economic Zone (SEZ) are also permitted 100 percent FDI. Release of draft guidelines for Real Estate Investment Trusts (REITs) in non-residential segment is also a step to boost the sector.

2. Market Size and Prevailing Trends in Real Estate Sector Funding

The Indian real estate sector is a capital intensive sector. While the ever changing dynamics remain a challenge, given the demand for capital in this sector and the returns that it can potentially generate, the supply of capital keeps re-inventing itself (Kochhar, 2013). To boost the Indian real estate sector, foreign direct investment (FDI) was allowed in 2005, which resulted in major transformation of the investment sentiment for the sector. Change in policy also opened the door for global real estate funds, private equity funds, hedge

funds, strategic investors and foreign developers apart from traditional sources. Thus primary sources of Indian real estate sector financing can be divided in three phases, i.e. Pre FDI (before 2005), Post FDI and before global meltdown (2005 – 2008) and post global meltdown (2008 onwards). Following table 1 presents the details for the same.

Table 1: Phases of Primary Sources of Financing for Real Estate Sector

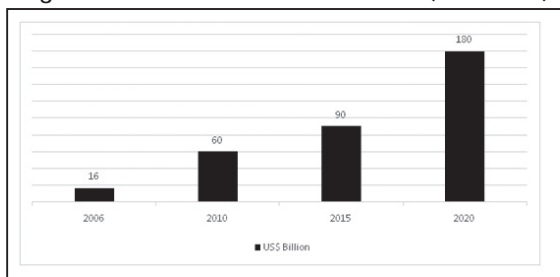
Pre FDI – Before 2005	Post FDI and before global meltdown – 2005 to 2008	Post Global Meltdown – 2008 onwards
Bank Lending Private Lending	Offshore Listing Domestic Equity Markets PE Funds Bank Lending Private Lending	PE Funds NBFC Lending Private Lending Bank Lending

Source: EY and FICCI Report ‘Brave new world for India real estate: Policies and trends that are altering Indian real estate’.

The sector has become one of the most preferred destinations in the Asia Pacific as overseas funds accounted for more than 50 percent of all investment activity in India in 2014, compared with just 26 percent in 2013. As per various government sources, the size of the Indian real estate market was around US\$ 16 billion in 2006 and it is expected to reach US\$ 180 billion by 2020, registering a Compound Annual Growth Rate (CAGR) of 18.9 percent. The housing sector alone contributes

5-6 percent to the GDP. Chart 1 below presents the Indian real estate market size.

Figure 1: Indian Real Estate Market Size (US\$ Billion)



Source: Investment Commission of India, ASSOCHAM, CREDAI

3. Concept of REITs:

REIT is a company that owns of finances income producing real estate. Same like mutual funds, REITs provide low and middle income investors with the opportunity of becoming stakeholder in a portfolio of real estate assets. The concept of REITs originated in the USA in 1960 and followed by success in market replicated across numerous economies across the globe. The US REIT market is the oldest and largest market globally. First REIT was listed in US stock exchange in 1961. Since inception of REITs has attracted a market capitalization of over US\$ 600 billion alone in the US. Apart from USA, Australia, France, Japan, UK and Singapore are among the most developed REIT/REMF markets in the world today. Table 2 below presents the growth and market size of REITs among the top countries in the world.

Table 2: Size and Performance of major players of Global REIT Market

Country	No. of REITs	Market Size (US\$ Billion)	Percent of Global REITs Market	REITs performance as per S&P Dow Jones (Annual Return in %)	
				5 Year	10 Year
USA	163	621	57.68	23.80	9.58
Australia	52	86	8.33	18.11	5.10
France	37	68	6.33	20.74	16.46
Japan	41	64	5.98	14.84	7.78
UK	23	49	4.55	18.52	NA
Singapore	32	45	4.23	22.04	15.09

Source: European Public Real Estate Association (EPRA) – Global REIT Survey 2013

4. Evolution of REITs in India

To invest in the commercial real estate sector in India has largely remained difficult for the common man as the sector doesn't have any monetization vehicle for the capital intensive sub-sectors of the commercial sector. Apart from this, such investment requires huge cash inflow, which is not possible for individual investor normally. As a remedy to this problem, SEBI introduced the Real Estate Investment Trusts (REITs) and Real Estate Mutual Funds (REMFs).

The evolution of REIT in India rooted in the Chapter VIA in the Mutual Fund Regulation 1996 issued by SEBI. The chapter includes the guidelines for introduction of real estate mutual fund schemes. In December 1999, Association of Mutual Funds in India (AMFI) introduced a committee headed by Mr. Deepak Satwalekar. Aim of Satwalekar Committee was to explore the opportunities and possibilities of introducing real estate investment schemes for mutual funds in India. The Committee submitted its report by October 2010. Further, in

August 2002, another subcommittee reported, formed by AMFI, for further investigation and to formulate working plan for launching real estate investment schemes. In 2008, SEBI announced the Draft SEBI (REIT) Regulations, 2008 to bring the accruing benefits of REITs mechanism in Indian economy, and to make the regulation more effective and permits mutual funds to launch real estate mutual funds (REMFs), on 16 April, 2008, notification amended as SEBI (Mutual Funds) Regulations, 1996. Regime.

On 10th October, 2013, Securities & Exchange Board of India (SEBI) issued draft regulations on SEBI (Real Estate Investment Trusts) Regulations, 2013 (Draft Regulations) by way of a consultative paper inviting public comments. Further in the budget of 2014-15, tax incentives and relaxations declared in the foreign direct investment (FDI) regime. On 26 September, 2014, SEBI finally notified the final regulations SEBI (Real Estate Investment Trust) Regulations, 2014 and the journey finally reached to its destination. Overview of major provisions laid down in the regulations are shown in the table 4 below.

Table 3: Overview of SEBI (REIT) Regulations, 2014

Structure	To be set up as Trust, registered with SEBI Relevant parties to be trustee (registered with SEBI), sponsor and manager
Offer, Eligible Investor and Listing of Units	May raise funds from both residents as well as foreign investors Minimum subscription size to be Rs. 2 lakhs per investor, and the unit size to be Rs. 1 lakh Minimum investors to be 200
Borrowings	Aggregate consolidated borrowings and deferred payments capped at 49% of the value of the REIT assets
Valuation of Assets	Full valuation including physical inspection of the properties to be carried at least once a year Valuer need to be independent from sponsor, manager and trustee and with 5 years of relevant experience in valuation of real estate
Sponsor	Maximum three sponsor with minimum net worth of Rs. 200 million on a consolidated basis Should hold minimum 25% of the total units of the REIT on post issue basis, which shall be locked in for the period of 3 years from the date of listing Sponsor or its associate to have minimum 5 year experience in real estate industry on individual basis
Manager	Should have minimum net worth of Rs. 100 million Manager or its associates should have at least 5 years of relevant experience At least two key personnel to have at least five years of relevant experience
Investment Condition	Shall invest only in properties/securities in India Minimum 80% of the value of the REIT assets to be in completed and rent generating properties and prohibited to invest in vacant land/agricultural and mortgages and other REITs Permitted to invest in properties through Special Purpose Vehicles (SPVs) subject to certain specified conditions
Income and Dividend Distribution	Minimum 75% of the revenues of the REIT to be from rental, leasing and letting real estate assets at all times. Minimum 90% of the net distributable cash flows of the REIT to be distributed to the unit holders.

Source: SEBI (REIT) Regulations, 2014

5. Forms of REIT Investment

From investors' point of view, REITs can be formed in three types which are as under

● **Equity REITs:** the enterprise concerned fully owns the revenue generating property. The difference between REITs and real estate entity is that the REITs should purchase and develop its properties principally to drive income but the real estate entity can sell it and is not liable for continuous engagement with the owners.

● **Mortgage REITs:** such enterprises extends loans to real estate firms or property management group directly or indirectly. The returns churned out from the same are passed onto its individual shareholders.

● **Hybrid REITs:** as the terminology says it is a combination of both – equity and mortgage. The percentage in each category depends on the risk bearing capacity of the enterprise.

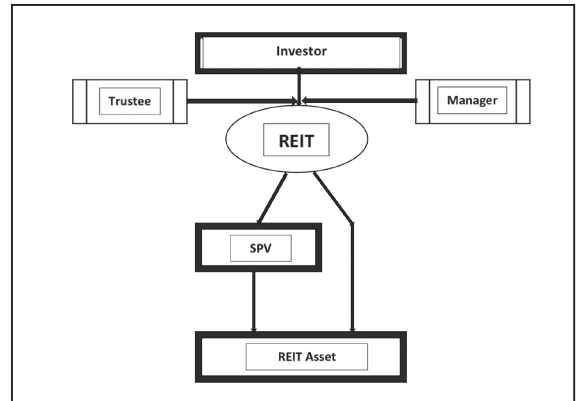
6. Structure of REITs

Typical structure of REIT involves parties similar to any mutual fund company. Following figure 2 presents the parties involved in any typical REIT.

7. Benefits of REITs to different Stakeholders:

Based on the global experience and performance of REITs, it is expected that the benefits of REITs are not only limited to

Figure 2: Structure of typical REITs



Trustee means any person who holds the REIT assets in trust for the benefit of unit holders. REIT Manager looks after management of assets and investment of REIT. Property Management Company acts as facility management provider to ensure the standard and quality of assets to look after the adequate management of the property. Valuer is any independent third party appointed for valuation of assets of REIT. Special Purpose Vehicle or SPV means anybody corporate in which REIT holds or proposes to hold controlling interest. And finally investors are the key participants of any REIT who subscribes the units issued by REIT.

investors, but for all the parties related to REITs and real estate sector as a whole. REITs will provide investors an opportunity to invest in income generating and completed properties. This will be less risky as compared to under construction properties.

Table 4: Benefits of REITs to different Stakeholders

Developers	Government	Institutional Investors	Retail Investors
<ul style="list-style-type: none"> Improves liquidity in the sector Capital raising opportunity for mid-tier developers especially for small companies with lower/minimal credit worthiness 	<ul style="list-style-type: none"> Increase in revenue Funding through REITs could help to facilitate other key real estate policy implementation at national level like developing 100 smart cities. 	<ul style="list-style-type: none"> Provides an exit opportunity for existing players Act as an alternative financing opportunity with increase depth of Indian real estate capital market Help attract long term investors looking for moderate risk v/s return ratio 	<ul style="list-style-type: none"> Reduced ticket size for investing in real estate sector Transparent investment alternative in real estate sector with experienced professional and independent oversight Easy entry and exit

Source: KPMG India Analysis 2014

Apart from this, it will provide the guaranteed returns in the form of dividends to the investors from rental income earned. On the other hand, REITs will help to unlock capital and enhance return on equity for core operators and helps business concentrate on their core activity. It will also unlock the intrinsic value of the real estate and therefore free up capital. It would substantially improve the return ratios on the capital invested. Moreover, regulations for REITs have been introduced timely when most of the real estate developers are debt ridden and are struggling to raise money for future growth. REITs would allow real estate developers to monetize their developed, revenue generating assets by offloading them to REITs. REITs will provide real estate developers and real estate private equity investors a secondary market exit route. In short, REITs would help the unorganized real estate sector to be organized and well structured. Apart from discussed above, REITs are expected to be beneficial to other stakeholders also. Table 5 above presents the benefits of REITs to different stakeholders.

8. Why REITs not yet implemented in India?

Launching of REITs by the SEBI was expected to be a major relief for real estate players seeking liquidity since long time. But surprisingly, till now not a single REIT has come up in the market. Though DLF Ltd., India's largest real estate developer has been contemplating listing a pair of REITs since August, 2014, but not yet come due to certain tax related issues. It is expected that there are some issues which are being considered as obstacles for implementation of REITs which are as under:

8.1 Taxation Issues:

One of the most crucial aspect for delay in REITs in India is tax structure. Under the prevailing tax structure for REITs holding the property directly, the income by way of interest paid by the special purpose vehicles (SPVs) to the trusts along with the rental income received from directly held properties by them are not taxed at the level of REITs. It is only taxable in the hands of respective investors of REITs. When the properties are held through an SPV, then the company pays corporate tax as well as the dividend distribution tax (DDT) when the income is distributed to the REIT as a shareholder. Thus, according to the experts, since the SPV structure has been provided in India, it leads to double taxation, because the SPV first pays tax on its earnings and then it is also subject to DDT, and

that's the reason which proven hurdle in implementing the REITs till now. Though in Union Budget 2016, finance minister has declared to remove DDT.

Further, as per SEBI regulations on REITs, developers can transfer their properties to a REIT SPV or to the REIT directly in exchange of units. In second case, when transferring to REIT directly, any capital gains arising on such transfer of property is subject to capital gain tax. This creates an unbalanced treatment between the two processes, and takes away the flexibility provided under the SEBI regulations. Further, any capital gains earned by REIT on sale of shares of REIT SPV or property itself is subject to taxation in the hands of REIT and not in the hands of unit holder. This restricts pass through taxation status for REIT resulting in additional taxation at REIT level.

Considering the experience of other countries who adopt REIT earlier, tax efficiency is very critical aspect to make REIT successful. In India it is expected that the government should consider further amendments to the Income Tax Act to provide a tax efficient and stable regime to REITs in some issues like capital gain arising on exchange of shares of SPV, gain accruing on account of appreciation in the market value after transfer to REIT and listing or REIT units, exchange of REIT units, corporate taxes applicable to SPV, classification of REIT units holding period for valuation of capital gain like other financial securities, etc. Government should focus on such issues in next amendments to make REITs more tax efficient.

8.2 Exchange Control Issues:

Allowing foreign investment in REITs may be critical to create the necessary liquidity and depth in the market post listing of the REITs. Many foreign private equity players are investing in commercial stabilized assets only. Capping or restrictions to foreign portfolio investors and non-resident Indians may be obstacle to attract them. Apart from that, more clear policies should be prepared under foreign direct investment (FDI) in real estate sector through REITs to make it successful in large extent.

8.3 Land Title Related Issues and Significant Land Litigations:

In India, land and stamp duty is a state subject and financial regulation comes under central government. Apart from that, state laws on real estate differ from state to state. India's

land laws are also a hindrance. Also it is very difficult to win a litigation with builder and typically litigation is very long drawn; legal framework is simply stacked against the consumers/investors. On the other hand, delay in construction project related approvals resulting in significant schedule and cost overrun in real estate and infrastructure projects.

8.4 Unregulated Industry:

Indian real estate industry is facing regulatory issues. Till now, the industry was unregulated and due to that customers were facing various issues related to quality and delivery. Though, recently much awaited the Real Estate (Regulation & Development) Bill, 2015, which has been envisaged as a landmark reform for the sector, has passed by both the Rajya Sabha and the Lok Sabha, and now is awaiting the assent of the President, before it becomes a law. So it is expected that now real estate sector will come under control and it will lead to protect the rights of home buyers, bring in transparency and plug the flow of unaccounted money into the sector (see annexure 1).

Further, industry is depended on unorganized labour. There is significant shortage of skilled and unskilled workforce. Traditional methods of construction and lack of advance technology has created a serious issue of quality of construction and delivery of projects in time.

8.5 Black Money:

Last but not least, issue of black money is very conscious in Indian real estate market. It is open secret that the real estate sector in India is quite a big part of black economy. Lot of black money gets invested and created through real estate sector. In some cases, the documentation contains only 5 – 10% of the market value of property, it means all remaining portion contains cash component only.

9. Government's Stance for the Sector and REITs

The present government is considering the real estate sector seriously to solve the issues of it. Which has proven by the introduction of various significant reforms last year to overcome the liquidity situation and to boost affordable housing and urban infrastructure. The government has formalized its vision 'Housing for All by 2022', which encompasses building sixty million housing units through public private partnership (PPP) model. Apart from that government has also formalized

various initiatives related to urban infrastructure, FDI in the sector, direct and indirect tax advantages etc. Apart from that recently passed the Real Estate Regulatory Bill – 2015 (see annexure 1) is also assumed to be game changer for the sector. Most importantly, the announcement related to REITs is as under.

9.1 Tax Amendment for REITs in Union Budget 2016-17:

In the Union Budget of 2016, the much awaited issue of DDT is finally resolved. Finance minister has declared very important announcement related to REITs is removal of DDT. Following are the major announcements made in Finance bill, 2016:

'In order to further rationalize the taxation regime for business trusts (REITs and Invits) and their investors, it is proposed to provide a special dispensation and exemption from levy of dividend distribution tax. The salient features of the proposed dispensation are:-

- (a) exemption from levy of DDT in respect of distribution made by SPV to the business trust;
- (b) such dividend received by the business trust and its investor shall not be taxable in the hands of trust or investors;
- (c) the exemption from levy of DDT would only be in the cases where the business trust either holds 100% of the share capital of the SPV or holds all of the share capital other than that which is required to be held by any other entity as part of any direction of any Government or specific requirement of any law to this effect or which is held by Government or Government bodies; and
- (d) the exemption from the levy of DDT would only be in respect of dividends paid out of current income after the date when the business trust acquires the shareholding referred in (c) above in the SPV. The dividends paid out of accumulated and current profits up to this date shall be liable for levy of DDT as and when any dividend out of these profits is distributed by the company either to the business trust or any other shareholder.

The amendment will take effect from 1st June 2016 [Clause 7, 55, 61 & 80 – Finance Bill 2016]

10. Conclusion

Indian real estate sector is one of the most growing one among developing economies and it is also considered as most supportive element to boost the economic growth of the country by Indian government. There is no doubt that REITs will provide platform for retail and institutional investors to invest in real estate properties, with the benefits of a regulated structure and risk diversification and also beneficial for all other parties related to REITs. Ultimately, REIT may be game changer for Indian real estate sector, however there is a need to overcome certain taxation and regulatory aspects which makes investment through REITs hostile with respect to pricing and asset quality compared to direct real estate investment and other investment asset classes. Going ahead, we hope that announcement made in recent union budget and certain key legislations such as Real Estate Regulatory Bill may bring some changes towards the view of investors and may attract them to come up with new REITs.

References

1. Commonfloor (2016). *Real Estate Regulatory Bill – 2015*. Available at <https://www.commonfloor.com/guide/wp-content/uploads/2015/12/REAL-ESTATE-REGULATORY-BILL-2015.pdf>
2. Dash, M. P. (2012). *Role of Real Estate Funds for the Faster Growth of Indian Real Estate Sector*. *J S International Journal of Economics*, 2.
3. Ernst & Young LLP. (2013). *Brave new world for India real estate*. Mumbai: FICCI.
4. IVCA. (2014). *Destination India - Are we ready for REITs?* Mumbai: KPMG India.
5. K, M. P. (2004). *Dynamics of Housing Finance in India*. *Bank Quest*, 75.
6. K, N. K. (2013). *Real Estate Development in India and the Behaviour of Investors to Invest in the Real Estate Market: An Empirical Investigation*. *S S International Journal of Economics and Management*, 85.
7. Kochhar, R. (2013). *Brave new world for India real estate*. Mumbai: Ernst & Young LLP.
8. KPMG (2016). *Building Construction and Real Estate: Union budget 2016*. KPMG India. Available at: <https://www.kpmg.com/IN/en/services/Tax/unionbudget2016/Documents/Building-Construction-RealEstate.pdf>
9. KPMG (2014). *Destination India: Are we ready for REITs?* KPMG India. Available at: [\[IssuesAndInsights/ArticlesPublications/Documents/Real-Estate-Investment-Report.pdf\]\(https://www.kpmg.com/IN/en/IssuesAndInsights/Documents/Real-Estate-Investment-Report.pdf\)](https://www.kpmg.com/IN/en/

</div>
<div data-bbox=)

10. KPMG (2016). *Real Estate (Regulation and Development) Bill: Driving change and accountability*. KPMG India. Available at: [https://www.kpmg.com/IN/en/IssuesAndInsights/ArticlesPublications/Documents/Real-Estate-\(Regulation-and-development\)%20Bill,%20March%202016.pdf](https://www.kpmg.com/IN/en/IssuesAndInsights/ArticlesPublications/Documents/Real-Estate-(Regulation-and-development)%20Bill,%20March%202016.pdf)
11. Malpani, S. (2014). *Real Estate Investment Trusts: Are they heading towards reality?* Kolkata: VKCPL.
12. Malpani, S. (2014). *REITs Regulation 2014: Green flag from the market regulator*. Kolkata: VK & Co.
13. Malpani, S. (2014). *Taxation of REITs and other Securities*. Kolkata: VK & Co.
14. Ministry of Finance (2016). *Finance Bill 2016*, Available at <http://indiabudget.nic.in/ub2016-17/memo/mem1.pdf>
15. Nair, N. B. (2014). *A beginning for REITs in India - SEBI finalises REIT regulations*. Kolkata: VK & Co.
16. NAREIT. (2014, September 15). Retrieved from <http://www.reit.com>: <http://reit.com/investing/reit-basics/reit-faqs/global-real-estate-investment>
17. Nath, M. S. (2013). *Real Estate Investment Trusts*. CAPAM 2013 *The Expert's Voice* (pp. 28-29). Mumbai: FICCI.
18. Patel, C. (2013). *Brave new world for India real estate*. Mumbai: Ernst & Young LLP.
19. Reserve Bank of India. (2013). *Sectoral Deployment of Gross Bank Credit*. New Delhi: Reserve Bank of India.
20. SEBI. (2014). *SEBI (REIT) Regulations*. Mumbai: Securities and Exchange Board of India. Available at <http://www.sebi.gov.in/sebiweb/home/detail/29272/yes/PR-SEBI-Real-Estate-Investment-Trusts-Regulations-2014>

Annexure 1

Overview of Real Estate Regulatory Bill – 2015

The Real Estate Regulatory Bill, which was first introduced by the UPA government in the Rajya Sabha in August 2013, was recently approved by the Union Cabinet. The Bill is expected to ensure greater accountability towards consumers, and to significantly reduce frauds and delays. The proposed legislation is expected to promote regulated and orderly growth of the real estate sector through efficiency, professionalism and standardization. Key measures of the Real Estate Regulatory Bill, 2015 are as under:



Applicability of the bill:

the proposed initial bill was applicable for residential real estate. It is now proposed to cover both residential and commercial real estate

Establishment of Real Estate Regulatory Authority:

the Bill provides for the establishment of one or more 'Real Estate Regulatory Authority' in each State/UT for oversight of real estate transactions. It also proposes to appoint one of more adjudicating officers to settle disputes and impose compensation and interest.

Registration of Real Estate Projects and Registration of Real Estate Agents:

developers have to mandatorily register the projects with the real estate regulatory authority. Real estate agents who intend to sell any plot, apartment or building also have to get themselves registered with the authority.

Mandatory Public Disclosure of all project details:

the Bill proposes mandatory public disclosure norms for all registered projects such as details of promoters, project, layout plan, plan of development works, land status, status of statutory approvals and disclosure of Proforma agreements, names and addresses of real estate agents, contractors, architect, structural engineer etc.

Functions and Duties of Promoter:

the Bill spells out the duties of developers including disclosure of all relevant information of project, adherence to approved plans and project specifications, obligations regarding veracity of the advertisement for sale or prospectus, rectification of structural defects and refund of money in cases of default.

Compulsory deposit of 70%:

builders will now have to deposit at least 70% of the sale proceeds, including land cost, in a spate escrow account to meet construction cost. As per the earlier proposal, it was 50% or less of sale proceeds. This is aimed at preventing developers from diverting money raised from allottees.

Adherence to declared plans:

under the Bill, promoters are barred from altering plans, structural designs and specifications of the plot, apartment or building without the consent of two third allottees after disclosure. However, minor additions or alterations are allowed

due to architectural and structural reasons.

Functions of Real Estate Agents:

the Bill makes it mandatory for real estate agents to sell properties registered with the authority. They are also required to maintain books of accounts, records and documents and are batted from getting involved in any unfair trade practices.

Rights and Duties of Allottees:

the Bill spells out the right of the allottee to obtain stage-wise time schedule of project and claim possession as per promoter declaration. He is also entitled to refund with interest and compensation for default by the promoter. On their part, allottees must make payments and fulfill responsibilities as per agreement.

Functions of Real Estate Regulatory Authority:

according to the Bill, the Authority must act as the nodal agency to co-ordinate efforts regarding development of the real estate sector and render necessary advice to the appropriate Government to ensure the growth and promotion of a transparent, efficient and competitive real estate sector

Fast Track Dispute Settlement Mechanism:

the Bill also establishes a fast-track dispute resolution mechanism through adjudication and establishment of a Real Estate Appellate Tribunal. Appellate tribunals will now have to adjudicate cases in 60 days as against 90 days proposed earlier and Regulatory Authorities to dispose-off complaints in 60 days.

Punitive Measures in Case of Non-compliance:

the penal provisions under the proposed law include a payment of 10% of project cost for non-registration and payment of additional 10% of project cost or three year imprisonment or both if still not complied with. For wrong disclosure of information or for not complying with the disclosures and requirements, payment of 5% of project cost will be imposed. The Bill provides regulatory authorities the power to cancel project registration in case or persistent violations and decide on further course of action regarding completion of such projects.

Source: <https://www.commonfloor.com/guide/wp-content/uploads/2015/12/REAL-ESTATE-REGULATORY-BILL-2015.pdf>

Returns From Investment in Initial Public Offers: A Study in Consistency of Returns

Nitin K Tike
Praveena S Muley

Abstract

In the capital scarce economy of India, several corporates offer securities to investors for raising funds, and list these securities on stock exchanges. Different types of investors like retail, non-institutional and qualified institutional buyers invest through process of public issues. The present study observe returns given by investment in corporate equities vary over a period of time. The study period covers from 2001 to 2010. There are some investments which offer higher returns on listing day and there after the returns do not match with listing day returns. In other cases, there may be negative returns on the listing day; however the trend may change over a period of time.

Key Words

IPOs, Returns, Investors, Indian Stock Market

I. Introduction

As human beings have requirements of *Roti, Kapda aur Maakan*, businesses need men, money and materials. As businesses grow, all these requirements to grow. From point of view of study economics, finance, investment and management, it makes sense to study a firm, its requirement of money, the ways and means of raising money and associated issues.

All over the world, promoters of businesses initially use their own money. In the next stage of growth, money is raised from friends and relatives. In case of businesses involving high

technology and innovation, sometimes angel investors may replace friends and relatives. In the next stage of growth, bankers and financial institutions are likely to provide funds to a business. So businesses may get funds from lenders as well as investors. Lenders generally have limited exposure to a business in terms of time and this time frame of exposure is defined. Investors may have short, medium and long term exposure to a business and that time frame may not be defined while making an investment decision.

Initial public offers give opportunity to a business to get funds as well as new investors. Businesses have to take a call whether to raise money through initial public offer and go public or raise money through other avenues and remain a non- public business.

When a business decides to remain private i.e. ownership is limited to few shareholders / owners, funds are raised through friends, relatives, high net worth investors, angel investors, venture capital and private equity firms and institutional investors. Largely there is no public participation. When a firm wants to raise funds through public at large, it decides to go public, offer ownership through initial public offer or offer for sale, and have large number of investors. When a business / a company has few and knowledgeable / informed investors, they have idea of firms' business, business environment, competition, promoters and management. These investors also have idea of risk involved in the business as well as what kind of returns can be expected from the investment. In case of shareholders coming through a public offer / offer for sale, they are to be provided with idea of business, promoters, management, competition, business environment, risk involved in business, tax environment etc. Further, investors are to be kept informed on justification of offer price. From investors'

point of view, they get opportunity of participating in growth of a business, take risk as per their ability and willingness and get reward, if any.

Till 1991, the country had office of Controller of Capital Issues (CCI), in Ministry of Finance, who would decide pricing of IPOs. Methods followed by the CCI for pricing of IPOs were such that it made subscription to IPOs a profitable proposition. After 1991, as office of CCI was abolished, and the capital market entered era of free pricing under supervision of Securities and Exchange Board of India, IPOs are being priced at close to market rates. So investment proposition in IPO has not remained the same as it was there during pre-1991 period. As such, one has to give adequate thought before investing in IPO. IPO investment has become as good or bad as any other investment in a stock in secondary market. However, the ghost of the past is yet to get down from minds of investors and they are oblivious to the reality of the day. They still blindly chase IPOs as if every subscription is likely to result in some gain, if not substantial. This mind set of investors is carried out to investment in new schemes of Mutual Funds too.

When a company comes out with IPO, it has to appoint a Merchant Banker to draft the prospectus, to sell the issue, to appoint underwriters and for attending all such new issue related matters. The Merchant Banker is also expected to advise the company on timing and pricing of the issue. Since the Merchant Banker is appointed by the company, and acts as agent of the company, and gets incentive for higher collection of issue proceeds; he is more likely to price IPO at higher level than at reasonable level. Investors investing in IPOs depend on the information doled out by the Merchant Banker, who is appointed by the company, rather than taking an independent advice or independent judgment.

Many investors have sneaking belief that, companies under price their IPOs and leave some margin for investors to cash in. Though there are instances of wilful under pricing, these are far and few. There are more instances of promoters over pricing an IPO rather than under-pricing. There have been instances of IPOs being withdrawn for want of investor interest or bailed out by the Merchant Bankers because of over pricing.

The objectives of the study are- to study various IPOs during the period 2001 – 2010, to evaluate returns from IPOs on the day of listing and to evaluate returns from IPOs periodically

after 1, 3 and 5 years from the day of listing

The rest of the study is organised on the following manner. Section two presents review of literature, section three Data collection and methodology, section four empirical analysis and section five concludes the study.

II Literature Review

Krishnamurthi & Kumar (2002) describes the environment for making initial public offerings (IPOs) in India and the process itself; and discusses the applicability of various research explanations for under-pricing to the Indian Market. Suggests that it will be greater for new firms and issues managed by reputable merchant bankers; and analyses 1992-1994 data on 386 IPOs to assess their performance. This data shows that issues with high risk and/or smaller offer prices are more under-priced; and that returns are strongly correlated with subscription levels. It discusses the underlying reasons for this and the implications for public policy. **Shah Ajay (1995)** identifies some of the stylized empirical regularities about India's IPO market via a dataset of 2056 IPOs which had trading commence from January 1991 to April 1995. **Ghosh (2004)** attempts a detailed investigation of the boom and slump phases in the Indian primary capital market, it concentrates on two key variables, namely, IPO volume and initial returns and analyses their nature and interrelation during these two periods. This study also analyses the firm-specific characteristics and their influence on the timing of a company getting listed in the hot and cold market. **Ghosh (2005)** attempts to identify the factors explaining under-pricing of initial public offerings (IPOs) in an emerging economy, India, using 1,842 companies that got listed on the Bombay Stock Exchange from 1993 to 2001. It is found that uncertainty played a role in perverse under-pricing in the Indian primary market. IPOs with a large issue size and those that went for seasoned offerings had less under-pricing. Contrary to the international evidence, under-pricing was less during the high volume (hot) period compared to the slump period in the Indian IPO market. During the hot period, new issues belonging to business groups under-priced more than their stand-alone counterparts did. Small issues belonging to private stand-alone firms had less under-pricing during the hot period and did not come to the market subsequently to raise funds. Large issues belonging to the business groups, on the other hand, under-priced more and subsequently raised funds from

the market. These results support the predictions of signalling theory for the POs listed in the Indian stock markets over the last decade. **Sahoo and Rajib (2010)** presents fresh evidence on IPO performance, i.e., short-run under pricing and long-run underperformance for 92 Indian IPOs issued during the period 2002-2006. It is reported that on an average the Indian IPOs are underpriced to the tune of 46.55 per cent on the listing day (listing day return vis-à-vis issue price) compared to the market index. Another contribution of this paper is the evaluation of the long-run post-issue price performance of Indian IPOs. **Kumar (2008)** examines the performance of IPOs issued through the book building process in India over the period 1999-2006. The sample comprises 156 firms that offered their shares through the book building route on the NSE. Upon listing the IPOs on an average offered positive returns (after adjusting for market movements) to investors and a large part of the closing day returns on the listing day were accounted for by the opening returns. In the long run the IPOs offered positive returns up till twenty four months but subsequently they underperform the market. However we cannot be emphatic about our later finding as our sample size comes down substantially because majority of the IPOs in the sample were issued in the last three years hence they do not have a five year track record. The excess buy and hold returns from IPOs are not positive both in the short term as well as in the long run. Further studies can examine the pricing efficiency of book building process by comparing the excess returns from fixed price offerings during the same period. **Arif, Pandey and Singh (2009)** conclude that subscription level of Non-institutional investors' demand is significantly influenced by the subscription patterns of the Qualified Institutional Buyers (QIBs). Further, the market under-pricing is influenced by unmet demand of the non-institutional buyers.

John and Vikraman (2008) examine the performance of public offers of equity shares during the period 2004 -2008. The sample consisted of 71 firms. The study examined performance of IPOs the in short-run as well as in the long-run. The study found that performance of IPOs of PSUs was better than IPOs of private sector firms. **Williams and Sohl (2012)** claim that while venture investors are prone to under price IPO firms, reducing the proceeds from the offering, angel investors have incentives more aligned with non – venture capital pre-IPO shareholders. **Ong (2006)**, Using three factor model and CAPM as bench mark, this paper examines the evidence on the long-run underperformance of IPOs in the Chinese and

Indian market using a data set of firms over the period 2000-2002. The paper concludes that under-pricing in India is due to many factors which are unique by world standards. Some of such factors are a) Delay from the issue date to listing date, b) the way offer price is fixed and availability of information to investors, and c) IPOs are sold directly to uninformed investors rather than the institutional investors. **Murthy and Singh (2011)** This paper states that the extant literature broadly supports the view that IPOs are under-priced. IPO pricing is mostly argued from the point of view of listing gains/ losses. This paper explains the process and outcomes of IPO pricing in the Indian capital market with the help of a basic model. This paper, with the help of certain cases, attempts to show that concept of under-pricing is misleading and needs to be revised. According to this paper the extant notion of 'under-pricing' needs to be termed as 'overpricing' by the IPO market. The paper examines six different strategies of investment. Amongst other testing methods it uses a non-parametric test, namely, the sign test. With the help of these tests this paper shows that IPOs are overpriced in comparison to their true price irrespective of the boom or recession in the market, in the Indian capital market. **Aminul, Ruhani and Ahmad (2010)** find that the degree of under-pricing in the Bangladesh capital market is rather high compared to that of other Asian and advanced stock markets. It has been documented that the average initial returns is 116.01 percent with a standard deviation of 261.94 percent during the period between 1994-1999. During the period between 1994 and 2001, the IPOs of DSE were largely under-priced at 285.21 percent. At the same period the degree of under-pricing in Malaysia was 46.44%, Singapore and Turkey were 31.4% and 13.6% respectively India was 96.56% and in US market was 22%. Out of the 117 companies that were listed in the years 1995 to 2005, 102 (87.18%) IPOs were found to be under-priced, 13 (11.11%) overpriced while only 2 were accurately priced. The overall level of overpricing was 15.37% with a standard deviation of 18.89. The high degree of under-pricing is still persistent. The paper suggests that in order to reduce the persistent higher degree of under-pricing the Securities and Exchange Commission should review the fixed pricing system. It is recommended that Book building pricing be implemented to reduce the persistent higher degree of under-pricing. The paper shows that offer size and size of the company is positively related to the degree of under-pricing. The industry type is found to be negatively related to the degree of under-pricing. However age of the firm and timing of offer were found to have no

significant influence on the degree of under-pricing of IPOs in the Dhaka Stock Exchange.

III Data collection and methodology

The study involved collection of information on:

1. The number of companies that came out with public issues during the period of 1st January 2001 till 31 December 2010.
2. Names of companies that came out with public issues during the period of 1st January 2001 till 31 December 2010.
3. Sector wise grouping of companies
4. Finding out the date of opening and closing of public issue
5. Finding out the offer price for the issue (if it was a fixed price issue) and issue price (if it was a book built issue)
6. Finding out the closing price of the share on the listing day on BSE Ltd. (or the National Stock Exchange of India Ltd. if the company was not listed on BSE Ltd.)
7. Finding out the closing price of the share on a date after one year from the listing date, on BSE Ltd. (or the National Stock Exchange of India Ltd. if the company was not listed on BSE Ltd.)

8. Finding out the closing price of the share on a date after three years from the listing date, on BSE Ltd. (or the National Stock Exchange of India Ltd. if the company was not listed on BSE Ltd.)

9. Finding out the closing price of the share on a date after five years from the listing date, on BSE Ltd. (or the National Stock Exchange of India Ltd. if the company was not listed on BSE Ltd.)

10. Computing absolute or annualised returns as the case may be.

11. Classifying returns into positive and negative return category.

All data are sourced from BSE, Money control, Capitaline and CMIE Prowess data base.

Table no: 1

Industry wise distribution of IPOs over period of study

To carry industry wise distribution of Initial Public Offers during period 2001-2010, the researcher classified companies / IPOs in 15 different industry groups. These groups were formed based on their significance to the economy. All the IPOs which did not belong to these 15 groups were clubbed under 'Miscellaneous' category.

Sr No.	Name of sector	Number of public issues in the sector during the study period	Capital raised in the sector through IPOs (Rs. Crores)
1	Auto and Auto Ancillaries	6	1,243.11
2	Chemicals	15	1004.24
3	Construction, Construction material	49	27,669.32
4	Electrical and electronics	11	2,598.11
5	Engineering	20	5,052.80
6	Entertainment, media and software	29	5,214.75
7	Financial services	33	15,898.40
8	Fast Moving Consumer Goods	6	730.46
9	Healthcare	20	2,236.50

Cont...

10	Information Technology	50	9,392.02
11	Metal, Metal products and mining	35	18,683.18
12	Oil and Gas	4	16,143.04
13	Power	16	38,383.68
14	Telecom	8	4,226.70
15	Textiles	37	3,219.56
16	Miscellaneous	78	14,984.65
	Total	417	1,66,680.52

Table no: 2

Year wise distribution of IPOs over period of study

To find out year wise distribution of initial public offers and the amount raised during each year, calendar year i.e. period of 1st January to 31st December was considered. Further, if the public offer opened in a calendar year and closed in the next year, then the offer was included in the year in which public offer opened for subscription.

Sr. no	Year of issue	Number of Initial Public offers during the year	Total Capital raised (Rs. Crore)
1	Jan-December 2001	11	267.45
2	Jan-December 2002	6	1,981.48
3	Jan-December 2003	11	1,924.31
4	Jan-December 2004	29	15,181.46
5	Jan-December 2005	58	10,743.76
6	Jan-December 2006	78	24,905.41
7	Jan-December 2007	101	33,611.73
8	Jan-December 2008	38	18,552.65
9	Jan-December 2009	20	19,525.11
10	Jan-December 2010	65	39,987.16
	Total	417	1,66,680.52

IV. Empirical Results

Table No: 3

To evaluate returns from IPOs on the day of listing

To evaluate the return from a public offer on the day of listing, absolute return was calculated based on the difference in the issue price and the closing price on the listing day.

S No	Name of the industries	Number of the companies	No of companies gave positive returns	No of companies gave negative returns
1	Auto and Auto Ancillaries	6	3	3
2	Chemicals	15	8	7
3	Construction, Construction material	49	31	18
4	Electrical and electronics	11	7	4
5	Engineering	20	15	5
6	Entertainment, media and software	29	19	10
7	Financial services	33	29	4
8	Fast Moving Consumer Goods	6	3	3
9	Healthcare	20	13	7
10	Information Technology	50	41	9
11	Metal, Metal products and mining	35	29	6
12	Oil and Gas	4	2	2
13	Power	16	10	6
14	Telecom	8	6	2
15	Textiles	37	18	19
16	Miscellaneous	78	51	27
	Total	417	285	132

To evaluate returns from IPOs periodically after 1, 3 and 5 years from the day of listing

Table No: 4
Returns of the companies after one year from the day of listing

To compute the return from a public offer after one year from the day of listing, absolute return was calculated based on the difference in the issue price and the closing price on BSE Ltd after one year from the day of listing. In case, the security was not listed on BSE Ltd. the closing price on the National Stock Exchange was considered for computing the returns.

S No	Name of the industries	Number of the companies	No of companies gave positive returns	No of companies gave negative returns
1	Auto and Auto Ancillaries	6	3	3
2	Chemicals	15	4	11
3	Construction, Construction material	49	15	34
4	Electrical and electronics	11	4	7
5	Engineering	20	5	15
6	Entertainment, media and software	29	17	12
7	Financial services	33	18	15
8	Fast Moving Consumer Goods	6	2	4
9	Healthcare	20	7	13
10	Information Technology	50	26	24
11	Metal, Metal products and mining	35	16	19
12	Oil and Gas	4	4	0
13	Power	16	4	12
14	Telecom	8	4	4
15	Textiles	37	14	23
16	Miscellaneous	78	38	40
	Total	417	181	236

Table no: 5

Returns of the companies after three years from the day of listing

To compute the return from a public offer after three years from the day of listing, annualised return was calculated based on the difference in the issue price and the closing price on BSE Ltd after three years from the day of listing. In case, the security was not listed on BSE Ltd, the closing price on the National Stock Exchange was considered for computing the returns.

S No	Name of the industries	Number of the companies	No of companies gave positive returns	No of companies gave negative returns
1	Auto and Auto Ancillaries	6	2	4
2	Chemicals	15	5	10
3	Construction, Construction material	49	8	41
4	Electrical and electronics	11	3	8
5	Engineering	20	3	17
6	Entertainment, media and software	29	8	21
7	Financial services	33	22	11
8	Fast Moving Consumer Goods	6	1	5
9	Healthcare	20	8	12
10	Information Technology	50	22	28
11	Metal, Metal products and mining	35	9	26
12	Oil and Gas	4	3	1
13	Power	16	3	13
14	Telecom	8	2	6
15	Textiles	37	7	30
16	Miscellaneous	78	25	53
	Total	417	131	286

Table no: 6
Returns of the companies after five years from the day of listing

To compute the return from a public offer after five years from the day of listing, annualised return was calculated based on the difference in the issue price and the closing price on BSE Ltd after five years from the day of listing. In case, the security was not listed on BSE Ltd. the closing price on the National Stock Exchange was considered for computing the returns.

S No	Name of the industries	Number of the companies	No of companies gave positive returns	No of companies gave negative returns
1	Auto and Auto Ancillaries	6	3	3
2	Chemicals	15	4	11
3	Construction, Construction material	49	7	42
4	Electrical and electronics	11	3	8
5	Engineering	20	2	18
6	Entertainment, media and software	29	9	20
7	Financial services	33	21	12
8	Fast Moving Consumer Goods	6	1	5
9	Healthcare	20	5	15
10	Information Technology	50	15	35
11	Metal, Metal products and mining	35	11	24
12	Oil and Gas	4	2	2
13	Power	16	4	12
14	Telecom	8	3	5
15	Textiles	37	7	30
16	Miscellaneous	78	24	54
	Total	417	121	296

V. Findings and conclusion

IPOs offer good investment opportunity to investors; however returns vary across industry and across different periods. Most of the IPOs get oversubscribed, but the over subscription may not result gains to the investors. Out of all the 417 public issues under the study, a significant 31.65 per cent IPOs gave negative returns on the day of listing. Only 43 per cent, 31 per cent and 28.70 per cent of companies, that came out with public issues, have given positive returns over a period of one, three and five years respectively. Only 24 per cent of the companies (99 companies out of 417) who came out with public issues have given positive return over one and three years, while only 18 per cent of companies (74 companies out of 417) who came out with public issues have given positive returns over one, three and five years.

To conclude, investors may look at investment in IPOs just like any other investment decision and not go by the idea that IPOs in India are generally under-priced.

References:

1. Ghosh Saurabh (2005). "Under-pricing of Initial Public Offerings: The Indian Experience" *Emerging Markets Finance and Trade*, Vol.41(6) :45-57
2. Ghosh Saurabh. 2004. "Boom and Slump period in the Indian IPO market", Reserve Bank of India - Occasional Paper, Reserve Bank of India, Vol-25(2): 39-56
3. Islam, Md Aminul, Ruhani Ali, and Zamri Ahmad. "Why Ipos Are Underpriced? Evidence from the Dhaka Stock Exchange, Bangladesh."
4. Johnson, William C., and Jeffrey E. Sohl. (2012) "Initial public offerings and pre-IPO shareholders: angels versus venture capitalists." *Journal of Developmental Entrepreneurship*. Vol.17 (4)
5. Khurshed, Arif, Alok Pande, and Ajai K. Singh. 2009. "Subscription patterns, offer prices and the underpricing of IPOs." EFA 2009 Bergen Meetings Paper.
6. Krishnamurthi Chandrasekhar and Kumar Pradeep (2002). "The initial listing performance of Indian IPOs" *Managerial Finance*, Vol. 28 (2): 39 - 51.
7. Kumar, K. C. J. S., and P. Vikkraman (2008). "Investor's preference on IPOs in India." *Academic journal article from Global Business and Management Research: An International Journal*
8. Murthy, KV Bhanu, and Amit Kumar Singh. 2010. "IPO Market: Underpricing or overpricing?." Available at http://www.igidr.ac.in/conf/money/mfc-12/Amit_bhanu_IPO%20Market.pdf. Accessed on 21st March 2016.
9. Ong, Sze Wei Daniel (2006) "Under-Pricing and Long-Run

- Performance of Initial Public Offerings in Developing Markets."
10. S S S Kumar (2008) "Short and Long run performance of IPOs in the Indian Capital Market", *International Journal of Management Practices & Contemporary Thoughts*, Volume 2, No.2, July-December 2007, Pages 20-29
 11. S Sahoo and Prabina Rajib, (2010) "After market pricing performance of Initial Public Offerings: Indian IPO market 2002-2006"; *VIKALPA*, Vol. 35(4): 27-43
 12. Shah Ajay (1995). "The Indian IPO Market: Empirical facts", *Social Science Research Network*. <http://ssrn.com/abstract=6530>. Accessed on 2nd March 2016. pp.1-27

Bibliography

1. Pandey I. M., *Financial Management*, 9th edition
10. Parikh, Parag: *Value investing and Behavioral Finance*
11. Choudhary Anil, Deka Rajneesh, *Securities Regulation: Primary market, Offerings in*
12. www.cmie.com
13. *Dion Global Research*
14. www.monneycontrol.com
15. *Capital Market Online.com*
2. Barely, Myers and Allen, *Principles of Corporate Finance*
3. Chandra, Prasanna: *Financial Management*
4. www.sebi.gov.in
5. www.bseindia.com
6. www.nseindia.com
7. www.primedatabase.com
8. Graham, Benjamin: *The interpretation of financial statements*
9. Graham, Benjamin: *Intelligent Investor India*, 2015

Risk Management for a Commercial Lending Portfolio Using Time Series Forecasting and Small Datasets

Tanmoy Ganguli

Abstract

Most risk managers use the Expected Credit Loss model to create allowances and provisions by calculating expected credit loss for the next 12 months. The expected loss is an estimate of the next 12 months actual loss percentage. This approach, by far, is considered to be a standard in the banking domain since it uses estimates from BASEL compliant Probability of Default, Loss Given Default and Exposure at default models. But the limitation of the approach is it's over conservative nature, and managers end up reserving much more than is optimally required. This paper argues that time series forecasting techniques help in estimating next 12 month's actual loss percentage more accurately than the expected loss approach and hence is more appropriate technique of loss forecasting. The paper addresses the challenges of developing time series models with small datasets. Aggregating quarterly reported transaction data at the portfolio level, the data points get largely condensed and it is difficult to get more than 25 quarterly reported data points. To solve this problem associated with the small number of observations; this paper suggests a simple technique to simulate monthly data points using random numbers, under specific assumptions. ARIMA models are developed on the simulated data to estimate

the next 12 months loss. The time series models show a lower prediction error as compared to the Basel compliant Expected Loss approach.

Key Words

Stock Market, Stock Market Volatility, Botswana Stock Exchange (BSE)

JEL Classification

G17, G20

Section1: Introduction

Forecasting credit losses for commercial lending portfolios, using time series has been a challenge since businesses do not maintain huge volumes of historical data, given the data management and maintenance costs. Many financial institutions maintain historical data, recorded at transaction level, reported quarterly, for at most seven years. Aggregating the dataset from transaction level to a quarterly level condenses the data, making it difficult to obtain more than 25-30 quarterly data points. Most of the widely used loss forecasting techniques (such as Net Flow Rate method, Vintage loss curves, Score distributions etc.) employed by the businesses require huge volumes of historical transaction level data to forecast losses for a window of 12 to 24 months. Some financial and credit institutions in the Europe and America, provide consultants

with the next 12 months actual loss percentage at a quarterly level- a forward looking loss measure (obtained by adding up the consecutive four quarterly loss percentages on a rolling basis for a historical data and reporting it at the beginning of the first quarter in the rolling data) which helps in the development and back-testing of predictive credit loss forecasting models.

Most risk managers use the expected credit loss approach to forecast losses over the next 12 months window and validate it on the historical values of actual loss percentage over the next 12 months. This approach is by far considered to be a reliable standard in the banking domain, since it uses the BASEL compliant estimates from Probability of Default (PD), Loss Given Default (LGD) and Exposure at Default (EAD) models. More than 50% of the large banks (with assets more than \$50billion) use the expected loss approach, for forecasting their expected losses, which is used for downstream processes like estimating FAS 5 general reserves. The main limitation is their tendency to estimate an over-conservative coverage ratio, which has a high opportunity cost in terms of dividend payments or further investments. Therefore, the businesses face a trade-off between maintaining reserves and allocating investible funds.

The paper focusses on two main areas. First, it explains the advantages of time series models over other methods of forecasting expected portfolio losses. Time series forecasting techniques help in estimating next 12 month actual loss percentage more accurately from the actual loss percentage data. Second, it proposes an alternate methodology to develop time series models using small datasets (less than 30 observations). The paper is arranged as follows- Section 2 discusses the characteristics of the portfolio and the description of the available data, Section 3 describes the expected loss approach and the research problem, Section 4 discusses the challenges of applying time series models in small data sets,

Section 5 discusses the data preparation, model development, the results and observations and Section 6 concludes.

Section 2: Portfolio Characteristics and data description

This work is based on a US based Healthcare Financial Services (HFS) lending portfolio composed of cash flow and asset based loans. Healthcare Financial Services refer to a line of business where credit is extended out to healthcare centers to finance the purchase of medical equipments or to support their working capital requirements. The obligors in the portfolio comprise both high-margin companies with little hard assets (for cash flow loans) as well as companies with relatively low profit margins and large asset rich balance sheets (for asset based loans).

For calculating the actual loss percentage every business has their own definition based on the obligors, recovery patterns and the line of business for which the lending is done. Actual loss is a forward looking loss measure which gives the risk managers an idea about the actual net write-offs a portfolio has had historically over a twelve months window. It is mostly decided through a discussion between the business, risk managers and the respective portfolio managers. Listed below is a list of actual loss definition that has been used for this portfolio.

Definition 1: Actual loss = Life time net write off from the defaulters in the next 12 months

Definition 2: Actual loss = 12 months of net write off from the defaulters in the next 12 months

The actual loss percentages are calculated at a quarterly level and are reported as a next 12 months loss percentage at a quarterly level (Table 1):

Table 1: Next_12_months_loss - a hypothetical example

Quarter	Actual Loss percentage	Next 12 months loss percentage
2008Q1	1%	8.5%
2008Q2	2%	1.5%
2008Q3	3%	14.5%
2008Q4	2.5%	13.5%
2009Q1	4%	-
2009Q2	5%	-
2009Q3	2%	-

The Next 12 month's actual loss percentage is based on rolling sample analysis. Blanks occur as sample cannot be rolled further

The next 12 month loss percentage is a forward looking measure of actual loss. Since, the performances of the expected loss are validated on the actual loss at the beginning of every quarter therefore the measure of the actual loss must also be forward looking. Therefore, for 6 years of data, summarized quarterly, there are 24 data points.

Section 3: Expected Credit Loss model of loss forecasting

The main objective of the expected credit loss approach is to estimate potential losses for the performing non-impaired accounts by estimating the expected 12 months credit losses - the weighted average of credit losses, using the respective probability of defaults as weights, defined as:

$$\text{Expected Credit losses} = \text{PD} * \text{LGD} * \text{EAD}$$

Where PD = Probability of Default, LGD = Loss Given Default, EAD = Exposure at Default.

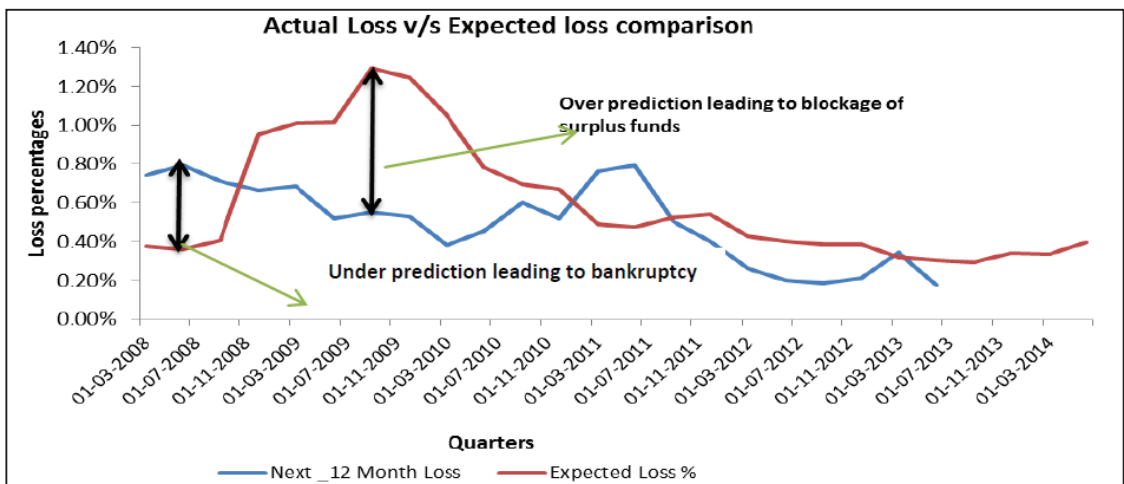
This approach is based on estimating the credit losses for the next twelve months (Next 12 month's loss). For large exposure portfolios, the most commonly used technique across the industry is to look at the expected loss as an estimator of the actual losses that can be incurred over the next 12 months window. The accuracy of the Expected loss model depends on the accuracy of the feeder models – PD, LGD and EAD models

respectively. The Probability of Default (PD) is the likelihood that the borrower of a loan or debt will default (more than 90 days past due or written off) on the contractual terms of the payments over the next 12 months. The Loss Given Default (LGD) is the share of an asset that is lost by a bank or other financial institutions when a borrower defaults on a loan, and is calculated as a percentage of the total potential exposure at default. The Exposure at Default (EAD) is defined as the total value that a bank is exposed to at the time of default. The EAD along with the PD and the LGD is used to predict the expected losses for the financial institutions over the next 12 months' time horizon.

Though the expected loss model is commonly accepted as a technique of forecasting expected losses, it suffers from some limitations (summarized in Figure 1):

- i) First, the feeder PD, LGD and EAD models are based on portfolio information which is at least 12 months old. This limitation arises as a requirement of the BASEL accords, which requires the performance period for obligors to be at least 12 months. So for predicting the expected losses for the year 2015 using historical data from 2008Q1 to 2014Q4, information up to Q12014 can be used, at best. So the most recent changes in the portfolio characteristics or the impacts of most recent macroeconomic factors on the portfolio behaviour are not captured in the model.

Figure 1: Actual Loss v/s Expected Loss comparison using the EL (Basel) approach



ii) Second, the expected losses approach provides an over-conservative estimate of losses. It either over reserves and blocks up surplus capital or under reserves given its inability to predict possible macroeconomic changes and increases the chances of bankruptcy for the financial institutions.

The Expected Credit Loss model under predicted the actual loss in 2008 and 2011. The actual losses in 2008 have been higher relative to expectations as a result of the global financial crisis. The feeder models for calculating EL of 2008 was based on the data up to Q1 2007 and was not equipped to identify the possibilities of sudden adverse macro-economic changes during 2008. This explains the first limitation of this approach. The second limitation follows from the first limitation. A similar under prediction is observed in 2011, as the feeder models did not capture the risks that the US economy could be exposed to as result of the Eurozone crisis.

The main advantage of time series models, as an alternate loss forecasting technique is that it uses all historic information related to the forecasted dependent variable. It considers the lagged values of the dependent variables (Autoregressive models) as well as the impact of the forecast errors (Moving Average models). For forecasting the actual loss percentage using time series model, the historic loss percentages are used. This work focusses on forecasting net 12 months loss percentage for the cash flow portfolio. The results can be extended, without loss of generality, to the asset based loans.

Section 4: Challenges of developing time series models using small datasets

From the time it has been suggested by Box-Jenkins, the ARIMA models have enjoyed fruitful applications in forecasting social, economic, engineering, foreign exchange and stock problems. The landmark contribution of **Box-Jenkins (1970)** in the ARIMA model was to consolidate the linear operator models developed by **Yule (1921)** and **Wold (1938)** in developing the time series models. These models have an adaptive ability to represent a wide range of processes within a parsimonious model and permit modelling in the presence of external events (interventions) or multiple stochastic exogenous variables (transfer function models). This model has the advantage of accurate forecasting in a short time period; it also has the limitation that at least 50 observations and preferably 100 observations or more should be used. In the domain of

risk management, the environment is uncertain and changes rapidly; therefore, future situations must be forecasted using little data in a short span of time. The uncertainty is created from changes in the integral environment and rapid development of technology. Another major challenge of obtaining properly aggregated data in the banking sector arises from the inability of some financial institutions (NBFCs as well as banks) to aggregate and manage adequately vast amount of data (**KPMG, 2014**). Therefore, obtaining a dataset of adequate size for developing a time series model is a major challenge in the domain of credit risk management.

A very important check of the goodness of fit for a time series model is to check whether the error terms are white noise or not. The “white noise” condition of the error terms in a time series model imply that the residual series contains no additional information that might be utilized by a more complex model. The Autocorrelation Function (ACF) is an important tool to test whether the residual series is sequences of uncorrelated random variables have constant mean and variance. **Box-Pierce (1970)** argued that the autocorrelation coefficients for the residuals can be calculated directly from the observations if the parameters of the ARIMA model were directly known. Since, the parameters are at best, estimated, therefore it is more logical to study the sample autocorrelation function of the residuals. They also showed that, for large samples, residual autocorrelations are a very close approximation of the true errors of the actual data generating process and can be represented as a singular linear transformation of the autocorrelation of the errors so that they possess a singular normal distribution. **Anderson (1942)** also showed that the Autocorrelation Function was normally distributed for samples more than 30 and for small lags the residual autocorrelations are not a good approximation of the true behaviour of the error process. Since, the approximations are not good for autocorrelations of small lags, the identification tests applied to the data to find out a smaller sub-class of models to represent the stochastic process or diagnostic checks applied to the residuals may not be yielding an accurate result for small data sets.

Hurvich and Tsai (1989) showed that for small sample, the model selection criteria, Akaike Information Criteria (AIC) become biased. If the true time series model is infinite dimensional, AIC provides an asymptotically efficient selection of a finite dimensional approximating model. The method tends

to over fit severely unless strong assumptions are placed on the maximum allowable dimension of the candidate model. The imposition of such cut offs are problematic when the sample size is small. Therefore, the primary objective of this work is to simulate, sufficiently large number of observations for the actual loss %series.

Section 5: Data Preparation and Model development

The methodology design has been constructed under the following assumption:

1. It is assumed that the data is available only on the variable Next_12_months_loss percentage. The transaction level data points are unavailable.

2. The non-leveraged cash flow loan portfolio is studied. Leveraged Loans are outside the scope of analysis (since they composed a negligible proportion of the portfolio).

3. The loss percentages reported are for cash flow loans. The asset based loans are outside the scope of the present discussions.

4. The expected loss estimates includes only on books non-defaulted accounts. Frauds, bankruptcies are already removed.

5. Intra-quarter losses do not vary significantly. Inter-quarter losses display a greater variability.

The dataset (Table 2) has been sourced from an international non-bank financial corporation

Table 2: Next_12_months_loss data (based on actual loss) and EL estimates

Next 12 month loss percentages and Expected loss from 2008-2014					
Quarter	Next_12 Month Loss	Weighted PD	Weighted LGD	Expected Loss %	
31-03-2008	0.74%	3.09%	12.23%	0.38%	
30-06-2008	0.79%	3.26%	11.10%	0.36%	
30-09-2008	0.71%	3.55%	11.41%	0.41%	
31-12-2008	0.66%	8.21%	11.59%	0.95%	
31-03-2009	0.68%	9.20%	11.00%	1.01%	
30-06-2009	0.52%	8.67%	11.74%	1.02%	
30-09-2009	0.55%	7.69%	16.84%	1.29%	
31-12-2009	0.53%	7.01%	17.82%	1.25%	
31-03-2010	0.38%	5.66%	18.57%	1.05%	
30-06-2010	0.45%	4.25%	18.49%	0.79%	
30-09-2010	0.60%	4.07%	17.15%	0.70%	
31-12-2010	0.52%	3.44%	19.52%	0.67%	
31-03-2011	0.76%	2.59%	18.86%	0.49%	
30-06-2011	0.79%	2.52%	18.86%	0.48%	
30-09-2011	0.50%	2.91%	18.08%	0.53%	
31-12-2011	0.40%	3.00%	18.01%	0.54%	
31-03-2012	0.26%	2.45%	17.58%	0.43%	
30-06-2012	0.20%	2.23%	18.09%	0.40%	
30-09-2012	0.18%	2.20%	17.66%	0.39%	
31-12-2012	0.21%	2.16%	18.03%	0.39%	
31-03-2013	0.34%	1.87%	17.24%	0.32%	
30-06-2013	0.17%	1.78%	17.23%	0.31%	
30-09-2013		1.66%	17.86%	0.30%	
31-12-2013		1.88%	18.09%	0.34%	
31-03-2014		1.86%	18.07%	0.34%	
30-06-2014		2.21%	17.94%	0.40%	

The quarterly loss percentages for the next four quarters are added up in a rolling manner and reported at the beginning of the first quarter of the particular rolling sample to obtain the Next_12_months_loss figures. Consider the following example the Next 12 months loss reported at Q1 2008:

$$\begin{aligned}
 &\text{Next 12 months loss (Q1 2008)} \\
 &= \text{Loss percent in Q1 2008} + \text{Loss percent in Q2 2008} \\
 &+ \text{Loss percent in Q3 2008} \\
 &+ \text{Loss percent in Q4 2008 (marked in red in the table)}
 \end{aligned}$$

Similarly, the Next 12 month's loss reported at Q2 2008 will be

$$\begin{aligned}
 &\text{Next 12 months loss (Q2 2008)} \\
 &= \text{Loss percent in Q2 2008} + \text{Loss percent in Q3 2008} \\
 &+ \text{Loss percent in Q4 2008} \\
 &+ \text{Loss percent in Q1 2009 (marked in blue in the table)}
 \end{aligned}$$

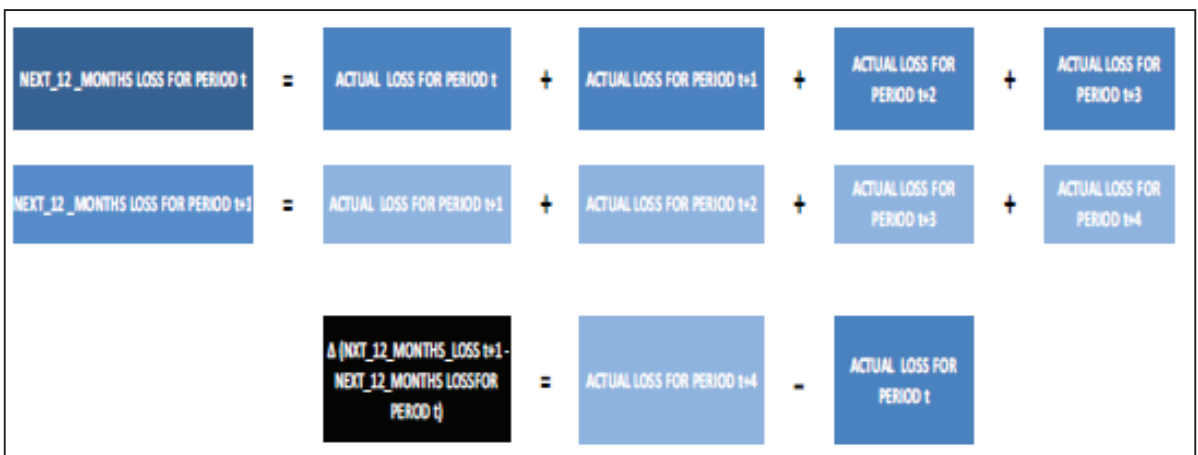
The numbers of data points are condensed in the variable Next_12 month's loss and insufficient to develop a stable time series model for forecasting portfolio losses. To solve this problem the following technique is suggested:

- (1) Obtain the quarterly data points from the Next_12 month loss variable.
- (2) Simulate the monthly observations from the quarterly data points.
- (3) Estimate the quarterly losses up to Q4 2015.
- (4) Obtain the Next_12 month loss estimates from the predicted quarterly data points.

Obtaining the quarterly data points from the Next_12 _months loss variable:

Since, a minimum of 50 observations are essential for applying the Box-Jenkins method of time series forecasting, the variable Next_12_month loss is unsuitable for developing a time series model. For reasons described in section 4, the actual loss percentages must be disaggregated to a quarterly and then to a monthly level to have a sufficiently large dataset. A recurrence relation derived from the first order difference of Next_12_month_loss is used to extract the quarterly observations. The first order difference of the Next_12_month loss is the year on year change in actual loss percentage. The rationale for using this recurrence is explained in the figure below:

Figure 2: Derivation of the Quarterly data points recursion relation



The first order difference between the Next_12_months_loss (Q1'2008) and the Next_12_month_loss (Q2'2008) is the percentage year on year change in the actual loss percentage. Therefore, the recurrence relation:

Actual loss percentage Q1 2009 = Actual loss percentage in Q1 2008+ year_on_year change in actual loss percentage (1)

(1) Cannot calculate the first four quarters of the data starting from Q1 2008 to Q4 2008, since data prior to 2008 are unavailable. The first four quarters are used as initial conditions for generating the data from Q1 2009- Q4 2009. While specifying the set of initial conditions, the following points are to be considered: (i) The sum of the actual loss percentage for Q1'2008 to Q4'2008 must equal the Next_12_month_loss value at Q1'2008 (ii) The distribution of the variable Next_12_month_loss must be analyzed before making any imputations (iii) The actual loss percentage values obtained in the different quarters must be consistent with the then prevalent business scenario.

A Univariate description of Next_12_month_loss distribution:

The Next_12_month loss is normally distributed (Table 3 and 4) with mean 0.005 and standard deviation 0.002.

Table 3: Basic statistical measures for Next_12_months_loss

Basic Statistical Measures			
Location		Variability	
Mean	0.005008	Std Deviation	0.00208
Median	0.005235	Variance	4.3097E-6
Mode	0.005235	Range	0.00620
		Interquartile Range	0.00

Table 4: Tests for Normality for Next_12_months_loss

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.933012	Pr < W	0.1418
Kolmogorov-Smirnov	D	0.10162	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.048849	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.401074	Pr > A-Sq	>0.2500

Since the loss distribution is symmetric therefore, the data point for Q1'2008 is imputed by the average of the Next_12_months_loss reported at Q1'2008. Imputing the quarterly loss percentage by the average of the annual loss percentage is the most conservative measure since no historical loss information is available for the particular data point (Table 5). For the remaining three quarters of 2008, there is relatively more information for identifying their values.

Table 5: Calculation of initial quarterly loss percentages for 2008

Quarter	Next_12 Month Loss	Average	Q1 Average Loss	Q2 Average Loss	Q3 Average Loss	Q4 Average Loss	Quarterly loss estimate for 2008 (A.M)
3/31/2008	0.74%	0.00186	0.185%	-	-	-	0.185%
6/30/2008	0.79%	0.001984	0.185%	0.198%	-	-	0.191%
9/30/2008	0.71%	0.001784	0.185%	0.198%	0.178%	-	0.187%
12/31/2008	0.66%	0.001659	0.185%	0.198%	0.178%	0.165%	0.181%
3/31/2009	0.68%	0.001709	-	0.198%	0.178%	0.165%	-
6/30/2009	0.52%	0.001309	-	-	0.178%	0.165%	-
9/30/2009	0.55%	0.001384	-	-	-	0.165%	0.74%

The second column shows the Next_12_months_loss percentages reported at the beginning of the four quarters of 2008. The third column shows the average percentage of loss incurred in the portfolio during 2008. No other information about the loss percentage is available for Q1 2008; therefore the quarterly actual loss percentage is imputed by the average of the next_12_month loss for Q1. Since, the estimates for the Next_12_months_loss is made on a rolling sample basis, therefore, Q2 2008 uses Q1 and Q2 average losses in calculating its actual loss percentage and similarly, Q4 2008 uses the average loss information for all the four quarters to calculate the actual loss percentage. The quarterly actual loss percentages for Q2,Q3and Q4 are calculated from the average of column (4), (5), (6) and (7) (Table 6). The sum of the quarterly losses also add up to the Next_12_month_loss (Q1 2008) of 0.74%. The data points from Q1 2009 onwards are generated using the recurrence relation defined in (1).

Table 6: Sample of Quarterly loss percentages and Next_12_month_loss percentages

Quarter	Actual loss %age	Next_12_month_loss
3/31/2008	0.185%	0.74%
6/30/2008	0.191%	0.79%
9/30/2008	0.186%	0.71%
12/31/2008	0.181%	0.66%
3/31/2009	0.235%	0.68%
6/30/2009	0.111%	0.52%
9/30/2009	0.136%	0.55%
12/31/2009	0.201%	0.53%
3/31/2010	0.075%	
6/30/2010	0.141%	
9/30/2010	0.116%	

The quarterly loss percentages generated in table 6 can be used as a proper representation of the possible loss behavior of the healthcare financial services lending portfolio since the data points represent consistent statistical and business behavior.

Table 7(a): Basic Statistical measures for Quarterly Actual loss

Basic Statistical Measures			
Location		Variability	
Mean	0.001250	Std Deviation	0.00104
Median	0.001411	Variance	1.08915E-6
Mode	.	Range	0.00355
		Interquartile Range	0.00136

Table 7(b): Normality results for Quarterly Actual loss

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.952736	Pr < W	0.2887
Kolmogorov-Smirnov	D	0.127052	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.059851	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.382049	Pr > A-Sq	>0.2500

Tables 7(a) and (b) summarize the results of normality test for the variable Quarterly Actual loss. The Next_12_months_ losses obtained from the quarterly loss percentage is also normally distributed and hence, consistent statistically.

The dataset generated is also consistent from the business perspective. Since the main line of business of the portfolio is Healthcare financing, the actual loss is affected by the factors which impact the cash flows of the obligor. The 2008 financial crisis had impacted healthcare facilities, medical equipments and managed healthcare companies. Since, the window of analysis for the data is Q1 2008-Q1 2014, the impacts of the financial crisis can be observed, on the patterns of the quarterly actual loss percentage. The financial crisis impacted the healthcare industry in two ways:

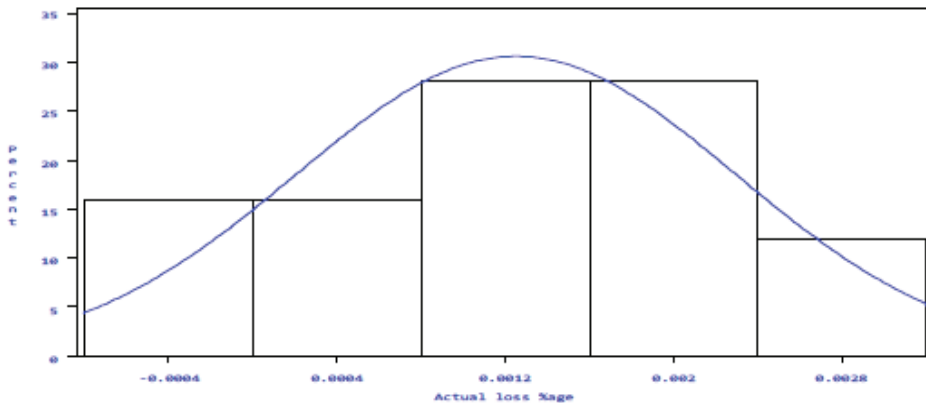
- (1) Through declines in elective procedures such as knee and hip replacement, as well as screening procedures as colonoscopies
- (2) increase the number of patients whose economic situation has worsened to the point that they have lost all insurance coverage and are uninsured.

Under both these situations the cash flow of the healthcare firms are adversely affected and the losses are likely to increase for the financial institution who has lent out funds to the respective healthcare firms. The S&P Equity Research continued to observe a strong demand for healthcare services through September 2008. The downward trend started beginning 2009. The rising unemployment and increasing number of un-insured Americans were mainly responsible for the rising losses in the healthcare portfolios. This is responsible for the actual losses spiking up at the end of the first quarter of 2009. The losses in the second quarter of 2009 and first quarter of 2010 had fallen relative to the neighboring time points on account of recovery of a large loan. The highest percentages of the losses have been incurred during the year 2009.

Simulating the monthly data points from the quarterly data points:

The technique relies on repeated random sampling to simulate monthly data points from the identified statistical distribution of the quarterly losses. The results of the descriptive statistics in tables 7(a) and 7(b) show that the quarterly loss is more or less symmetric.

Figure 3: Distribution of the Quarterly Actual loss data points



The Normal distribution is used to simulate the monthly actual loss percentages values such that the sum of three months actual loss percentage must be equal to the quarterly value of the actual loss percentage. For the simulation, each trial has three observations (the number of months in a quarter) and the numbers of trials are limited to 250. The mean of the

distribution is the quarterly loss value divided by three and the standard deviation is assumed to be one-fourth the value of the mean. The business assumes that intra-quarter losses do not display much variability. Variability in losses becomes more distinct when loss patterns quarter over quarter are examined. The simulation procedure has two steps: First, 250

Trials of random numbers are generated, each trial containing 3 observations and sum for the three observations is obtained. Second, the trials with sum equal to the quarterly loss percentage for a given time point are chosen, since; the monthly loss percentages must add up to the value of the quarterly sum of actual loss percentage.

Table 8: Dissociation of quarterly observations into monthly observations

Month	Average monthly losses	Quarterly loss
1/31/2008	0.062%	
2/28/2008	0.068%	
3/31/2008	0.055%	0.185%
4/30/2008	0.056%	
5/31/2008	0.069%	
6/30/2008	0.066%	0.191%
7/31/2008	0.069%	
8/31/2008	0.064%	
9/30/2008	0.053%	0.186%
10/31/2008	0.054%	
11/30/2008	0.063%	
12/31/2008	0.064%	0.181%
1/31/2009	0.066%	
2/28/2009	0.106%	
3/31/2009	0.064%	0.235%

The Average monthly losses are approximately symmetric (table 8(a) and 8(b)), contains 75 observations and is suitable for developing an ARIMA lossforecasting model.

Table 8(a): Basic Statistical measures for monthly Actual loss

Basic Statistical Measures			
Location		Variability	
Mean	0.000412	Std Deviation	0.0003489
Median	0.000457	Variance	1.21727E-7
Mode	0.000250	Range	0.00141
		Interquartile Range	0.0004800

Table 8(b): Normality test results for monthly Loss percentages

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.969618	Pr < W	0.0682
Kolmogorov-Smirnov	D	0.080216	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.110619	Pr > W-Sq	0.0833
Anderson-Darling	A-Sq	0.718003	Pr > A-Sq	0.0610

Estimating the quarterly losses up to Q4'2015:

The ARIMA model formulation includes four steps:

1. Identification of the ARIMA (p, d, q) structure. Use autocorrelation function (ACF) and Partial Autocorrelation Function (PACF) to choose the candidate ARMA model. Testing that the autocorrelation structure is not a white noise at least up to a given lag, so that ARMA could be applied to model the data

2. Estimating the unknown model parameter for identifying

the optimal ARMA model which fits the series.

3. Diagnostic checks are applied with the objective of uncovering possible lack of fit and diagnosing the cause. The error term must be white noise after all optimal lags are assigned.

4. Forecasting using the selected model.

The autocorrelation plot for the variable, Average_monthly_losses shows how the values of the series are correlated with its past values (Table 9).

Table 9 (a): Autocorrelation plot for Average_monthly_losses (shown up to 6 lags)

Autocorrelations				
Lag	Covariance	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1	Std Error
0	1.20104E-7	1.00000	*****	0
1	7.23667E-8	0.60253	.*****	0.115470
2	3.60746E-8	0.30036	.*****	0.151706
3	-6.8537E-9	-.05707	. * .	0.159438
4	-5.9101E-9	-.04921	. * .	0.159710
5	-5.8225E-9	-.04848	. * .	0.159912
6	1.91554E-9	0.01595	. .	0.160108

The correlation between the Average_monthly_losses is the highest with the Average_monthly_losses for the previous period (0.6025). The series for the Average_monthly_losses is stationary since the autocorrelation exponentially declines after the first lag. In PACF graph (Table 9(b)), the partial autocorrelation cuts off after the first lag and drops to zero, suggesting an AR(1) process for Average_monthly_losses.

Table 9(b): Partial Autocorrelation function for Average_monthly_losses

Partial Autocorrelations																							
Lag	Correlation	-1	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	1	
1	0.60253		.		*****																		
2	-0.09841		.	**		.																	
3	-0.03116		.	*		.																	
4	0.02496		.		*																		
5	-0.03459		.	*		.																	
6	-0.06412		.	*		.																	

The final check is to validate whether the autocorrelation of the variable up to a given lag is significantly different from zero. If the series is a white noise, then the loss behavior cannot be modeled using an ARIMA process. The check for white noise in Table 10 indicates that the actual loss variable is highly correlated with its previous values. Thus, a first order autoregressive model is a good candidate to fit the actual loss process.

Table 10: Autocorrelation for check of White noise

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	36.14	6	<.0001	0.603	0.300	-0.057	-0.049	-0.048	0.016

In the estimation stage an AR (1) model is fitted to the actual loss series.

Table 11: Parameter Estimates Table for the Auto regressive procedure

Conditional Least Squares Estimation					
Parameter	Estimate	Standard Error	t Value	Approx. Pr > t	Lag
MU	0.0004107	0.00008253	4.98	<.0001	0
AR1,1	0.62746	0.09422	6.66	<.0001	1

Table 11 lists the parameters in the model; for each parameter, the table shows the estimated value and the standard error and t value for the estimate. The table also indicates the lag at which the parameter appears in the model. Both, the intercept MU (0.0004107) and the auto regressive parameter AR1, 1(0.62746) are significant as shown by the p-values. The “Goodness-of-fit” measures are summarised in table 12 below:

Table 12: Goodness of fit measures for ARIMA

Constant Estimate	0.000153
Variance Estimate	7.674E-8
Std Error Estimate	0.000277
AIC	-1013.9
SBC	-1009.26
Number of Residuals	75

The final part of the estimation stage is to check whether the residual series is white noise or not (Table 13).

Table 13: Check for white noise of the Residual series

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	11.03	5	0.0509	0.053	0.139	-0.320	-0.020	-0.086	-0.072
12	17.69	11	0.0891	-0.006	0.134	0.176	0.065	0.051	0.139
18	25.34	17	0.0873	-0.016	-0.039	-0.265	0.026	-0.033	0.076
24	27.27	23	0.2445	-0.001	0.045	0.015	0.032	0.034	0.114

The null hypothesis of white noise is accepted for autocorrelation of residuals up to 24 lags. Since the diagnostic tests show that the parameter of the model is significant and the residual series is a white noise, the AR (1) process can be used to predict the monthly losses for this portfolio. In the forecasting stage, the values of the dependent series are forecasted for some periods ahead. The forecast for a snapshot of 4 periods is shown (Table 14).

Table 14: Forecasts for the variable Average_monthly_losses

Forecasts for variable Average_monthly_losses				
Obs	Forecast	Std Error	95% Confidence Limits	
76	0.00003571	0.0002770	-0.00050724	0.00057867
77	0.00017543	0.0003270	-0.00046555	0.00081641
78	0.00026310	0.0003447	-0.00041259	0.00093878
79	0.00031810	0.0003515	-0.00037077	0.001007

The forecasted values are next used to compute the predicted values of the Quarterly loss and the Next_12_months_loss. The monthly losses are summed up to get the quarterly loss and the quarterly losses are added on a rolling basis to get the **Next_12_months_loss**. For comparing the reliability of the forecasted values, the actual values of the variable Next_12_months_loss is compared to the Next_12_months loss obtained from the time series analysis and the Expected Loss approach. The estimates of prediction accuracy like Mean Absolute Error (MAE), Mean Absolute Prediction Error (MAPE) and Root Mean Square Error (RMSE) are computed to validate the accuracy of the forecasts.

Obtain the Next_12_Months Loss estimates from the quarterly predicted data points:

The estimated monthly data points are aggregated to the quarterly level and the quarterly data points are summed up to the Next 12 months level (Table 15)

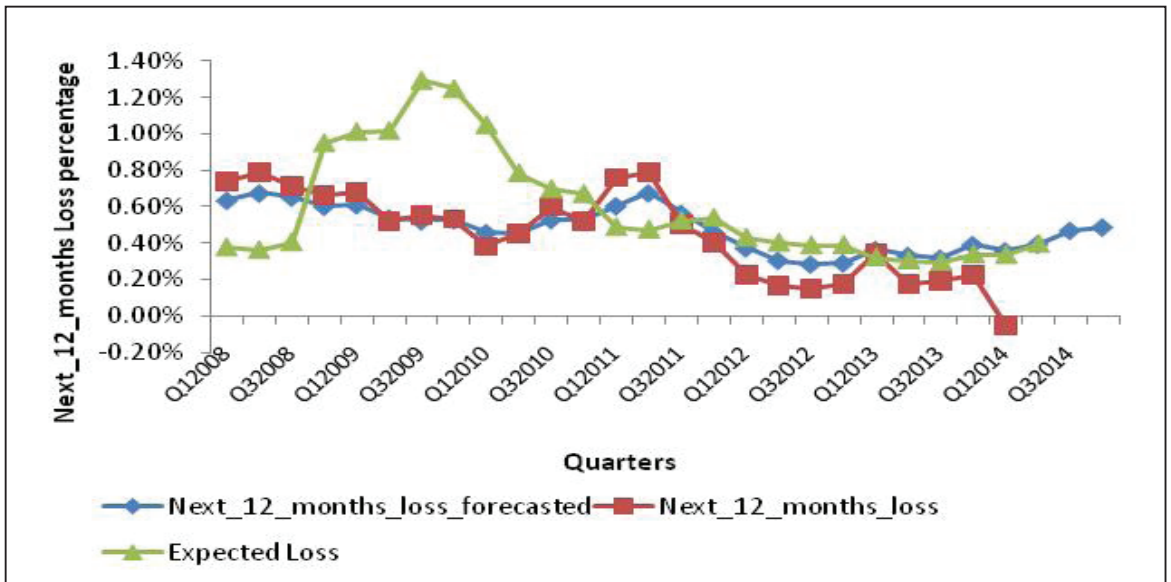
Table 15: A Table of the quarterly loss estimates v/s actual loss percentages

Obs	Quarter	Qtrly_loss_forecasted	Qtrly_loss_actual	Year
1	Q12008	.001532485	0.001850000	2008
2	Q22008	.001586538	0.001907197	2008
3	Q32008	.001706288	0.001860687	2008
4	Q42008	.001526125	0.001811712	2008
5	Q12009	.001938173	0.002351812	2009
6	Q22009	.001358012	0.001106121	2009

The Quarterly forecasted loss estimates are aggregated up to a quarterly level to obtain the Next_12_months_loss reported quarterly. These estimated Next_12_month loss obtained from the time series model is compared with the expected loss estimates. The two models are compared using APE and MAPE.

The loss estimates derived using the time series model is better, compared to the Expected loss estimates. Both models under predict the actual loss during the period of the financial crisis, but the extent of under prediction is lower for the time series model compared to the Expected Loss approach. Therefore, the time series model is a better technique for forecasting losses if the data contains crisis episodes. Also, the extent of over prediction of actual losses is lower in the time series model than expected loss model. The coverage ratio exceeds 100% but is not as high as the coverage ratio of the expected loss model (Figure 4)

Figure 4: Comparison between actual and forecasted next 12 months loss and Expected loss



Maheshwari and Sengupta (2014) pointed out the tradeoff between the conservativeness of the reserve policy and the profitability of the business. Overestimating the reserve reduces the profitability of the lending business, since a large part of loan able funds are booked up as reserves. Similarly, under reserving for loans and lease losses creates the risks of financial ruin. Expected losses arise from the possibility of default from the obligors, delay in interest payments and change in credibility of obligors within next one year. As reserve is calculated for yearly horizon, probabilities of defaults (PD) are forecasted for yearly horizon. The PDs are calculated based on a twelve month performance period, as a result of which the portfolio information based on which the model is developed is one year old and the most recent portfolio changes are not reflected in the estimates. Time Series models; on the other hand, uses the behavior in the most recent past to model future losses. Therefore, the latter model gives a more accurate prediction of the future losses.

The time series model has a lower MAPE and MAE compared to the Expected Loss model and the average under prediction for the former is much lower compared to the later. But, the time series model has a limitation. Its chances of over prediction are relatively higher compared to the Expected Loss model, but the overall chances of under prediction are much lower than the Expected Loss models. Incorporating the impacts of appropriate macroeconomic variables can improve the predictive capacity of the model in the neighbourhood of crises periods.

Table 16: Comparison between Time Series model and Expected Loss model

Metrics	Next_12_months _loss_TS	Next_12_month _loss_EL
Total Number of Quarters	26	26
Mean Absolute Error (MAE)	0.0011	0.0030
Mean Absolute Percentage Error	57%	97%
Number of quarters with underprediction	11	6
Average Extent of Under prediction	-0.07%	-0.29%

Section 6: Conclusion

Most risk managers use the Expected Credit Loss model to create allowances and provisions by calculating expected credit loss for the next 12 months. The expected loss is used as an indicator of the next 12 months actual loss percentage. This approach, by far, is considered to be a standard in the banking domain since it uses estimates from BASEL compliant Probability of Default, Loss Given Default and Exposure at default models. But the limitation of the approach is its over conservative nature, and managers end up with reserving much more than optimally needed. This paper argues that time series forecasting techniques help in estimating next 12 month's actual loss percentage more accurately than the expected loss approach and hence is more appropriate technique of loss forecasting. The ARIMA record a lower MAPE and MAE with a lower extent of under prediction compared to the Expected Loss model.

Readings and References

1. Anderson, R.L., "Distribution of the Serial Correlation Coefficient", *Annals of Mathematical Statistics*, Volume 13, 1942.
2. Box, G.E.P and Jenkins, G.M., *Time Series Analysis, Forecasting and Control*, Holden Day, Inc., San Francisco, Calif., 1976, 1994 (with Gregory Reinsel)
3. Box, G.E.P and Pierce, D.A., "Distribution of the Residual Autocorrelations in Auto Regressive Integrated Moving Average Time Series Models", *Journal of the American Statistical Association*, Volume 65, No.332, December 1970.
4. Hurvich, C.M and Tsai, C.L. (1989), "Regression and time series model selection in small samples", *Biometrika*, Vol.76, No.2 (Jun 1989), pp. 297-307.
5. Maheshwari, C. and Sengupta, B., *Insufficient Data for Forecasting Probability of Default - Challenges and Suggested Solutions*, Risk white papers, GARP, April 2014 online.
6. Wold, H., *A study in the analysis of the stationary time series*, Stockholm: Almqvist and Wicksell, 1938.
7. Yule, G.U., "On a method of Investigating periodicities in disturbed series, with special reference to Wolfer's sunspot numbers", *Philosophical transactions*, (A) 226 (July 1927), 267-98.

Role of Intermediaries in a Securities Market

Neha Mahajan

Abstract

Intermediaries occupy an indispensable and pivotal space in today's capital market. While some trade dealings may involve only a single intermediary entity, more complex transactions comprise networks and chains of intermediaries at different levels. These market dynamics are further complicated by proprietary dealings by such intermediaries, where the thin line of distinction between investors and intermediaries as separate market players gets diluted. In the face of such market complexities, market intermediaries often tend to put themselves in conflict of interests situations. Given the sensitive market scenario, it is imperative to keep a vigil on the growth of intermediaries, especially the new categories of intermediaries who may or may not be covered by the existing regulatory framework, particularly in the context of the new, innovative, and hybrid products that are frequently launched. Thus, it is essential to revisit the significance of fair play by intermediaries in the context of their multifaceted operations, the issues related to conflict of interests, and contemporary challenges from a practical standpoint.

Key Words

Securities Market, Financial Intermediaries, Conflict of Interests, Self-Regulatory Organizations (SROS)

Introduction

Financial intermediaries and financial markets can in many cases act as substitute sources of financial services. Lenders/

savers in particular have a choice between the risk, return and liquidity offered by both segments of the financial system. Each segment is able to offer a different range of investments and offers services to firms that are not complete substitutes. Broadly speaking, financial markets provide lower cost arm's length debt or equity finance to a smaller group of firms able to obtain such finance, while financial intermediaries offer finance with a higher cost reflecting the expense of uncovering information and ongoing monitoring. Financial intermediaries and markets may also provide complementary financial services to many firms.

We identify the challenges confronted in the intermediaries-driven market regime, especially in preventing intermediaries' conflicts of interest's vis-à-vis investors and issuer companies. Moreover, in the paper we attempt to ascertain if the existing regulatory framework is cognizant of such challenges and if it encompasses measures to fix intermediaries' accountability and liability in conflict of interest's situations. Currently, a rule-based avoidance regime of conflicts of interest is predominant in India, in contrast to the principle-based compliance seen in more mature capital markets. Given that regulations and rules alone cannot remedy such situations of conflict; the rules need to be supplemented with enduring principles and an ethical business culture. Creating robust internal control systems and self-regulation would be the two primary and predominant mechanisms to establish this culture. We conclude that conflicts of interests of intermediaries are inevitable, and we make recommendations to combat the conflict of interest crisis and mitigate risks while scrutinizing India's regulatory approach towards this menace from a practical standpoint. The establishment of SEBI-registered Self-Regulatory Organizations for market intermediaries is expected to bring the Indian market at par with international markets.

How Intermediaries Came Into Operation

In the era of closed markets, intermediaries were not common because buyers and sellers transacted in close proximity to one another and a “middleman” was not required. However, as financial markets expanded and matured, it was no longer possible for buyers and sellers to have direct dealing; thus, contemporary capital markets are substantially dependent on market intermediaries. To understand this dependence, to comprehend how market intermediaries are driving the market today, and to ascertain the regulatory contours of India’s securities market regulator—the Securities and Exchange Board of India (SEBI)—in respect of intermediary governance, it is imperative to understand who these market intermediaries are.

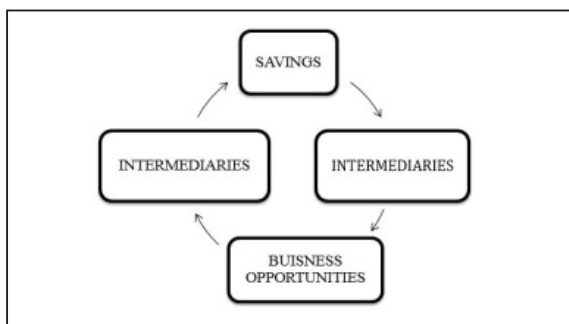
In simple terms, market intermediaries operate as the bridge between capital providers and capital seekers. According to this understanding, any person operating in the capital markets other than the issuer and the investor may be considered a market intermediary. Does the regulatory understanding of “market intermediaries” conform to this interpretation? Interestingly, the SEBI does not offer any conceptual or exhaustive definition of “market intermediaries.”

Role Of Securities Market Intermediaries

A Necessary Evil

The primary need for market intermediaries in the securities market is to match its demand and supply forces. In other words, intermediaries facilitate economies in confronting the critical challenge of the allocation of savings to investment opportunities, as shown in Figure

Flow of Funds in the Capital Market



Economies that are able to match their available resources/savings to appropriate investment opportunities are successful in the creation of novel business avenues and the generation of more wealth and progress. Thus, to say that intermediaries are capable of making or breaking economies would not be an overstatement. Further, investors and issuers are no longer homogenous; issuers and investors today are diverse and depict heterogeneous characteristics. To connect and manage such diverse groups, a mature market with sophisticated middlemen is essential.

Additionally, in contemporary securities markets, investors and issuers rely heavily on intermediaries to operate on well-informed decisions. Investors, especially retail investors, do not have adequate information, knowledge, or expertise, and issuers do not have adequate resources to reach out to individual investors spread across the country and the globe. Therefore, intermediaries have a very crucial and sensitive role to play in making the market matrix—especially anonymous order-driven trading platforms—work smoothly.

The role of the following financial intermediaries is discussed here

- Investment Banks
- Security Analysts
- Market Makers

Stock markets provide a platform for trading to occur between buyers and sellers. A security’s price is determined based on the market process. Market makers can provide many different services and facilitate trading. The service provided by market makers depends on the structure of the market. A market maker sometimes acts as a broker in which case her role is to bring buyers and sellers together. Another important role of a market maker is to provide liquidity to the market particularly in situations when the market for a stock does not clear automatically at one price. The market maker steps in and supplies securities out of her inventory or buys the stock with her capital in case there is excess supply. Most stocks in emerging markets tend to be thinly traded and lack liquidity, therefore this role of the market maker becomes even more crucial. Market makers do not themselves determine the trading price.



Market makers need to be compensated for this “dealer” role. When acting as a dealer, the market maker posts a bid and a ask price for each security that she wants to trade in. She earns the spread as compensation for providing immediacy and price continuity. This price continuity should result in smaller price swings from transaction to transaction and hence lower price volatility. Dealers face three types of costs:

● **Order-Processing Costs:** These include the cost of space, communication, and labor.

● **Risk-Bearing Costs:** By stepping in the market maker they hold an inventory position.

● **Adverse-Information Costs:** Market Makers can be victimized by information traders

Market makers should be required to post continuous two-sided quotes that are firm for the size posted. They should be bound only for the posted size but within this posted size they should not be able to back away. Stock exchanges should make it fairly easy to allow somebody to become a market maker. For example, on Nasal any member can become a market maker as long as they satisfy minimum net capital requirements. A market maker can also withdraw its registration fairly easily. If he withdraws voluntarily then he cannot make a market in that security for 2 business days.

Investment Banks

Investment banks perform a number of different functions. A typical investment bank's services will include:

● **Financing Services:** They help companies and governments raise capital by issuing different types of securities such as, equity, debt, private placements, commercial paper, medium-term notes.

● **Investment Services:** They trade and make a market in major equity and fixed income products. Many of them specialize in block trading.

● **Research:** Maintenance of large databases that allows them to produce research reports on economies, markets, companies, stocks, and bonds.

● **Mergers and Acquisitions:** Advise on mergers, acquisitions, and divestitures to help companies become more competitive.

Some of these critical financial intermediary services need further development in emerging markets. If financial intermediaries start performing these functions the markets will become more efficient and information flow will increase making the markets less volatile in the long- run. Next, the specific role of investment banks is discussed in capital rising in the primary markets.

Security Analysts

Security analysis examines and evaluates individual securities to estimate the results of investing in them. In making judgment about valuation of securities the analyst must seek out reliable information. This information can come from financial statements, discussions with company executives, clients, and suppliers. The discipline requires detailed analysis and diligence. There are several barriers to the development of the security analysis profession in emerging markets. Lack of timely and reliable information is of utmost importance. If the pumping of funds into these companies by venture capitalists raised the market expectations, and the share prices of these Internet companies inflated tremendously. However, these valuations proved to be unsustainable as the share prices of these companies dropped sharply in April 2000. Eventually, these led to the “*bubble burst*”, having far-reaching implications on the U.S. economy as a whole, which economists refer to as the “lemons problem?” Information is available late or has been manipulated then the security analyst cannot do the valuation. If it is too costly to obtain the information then that becomes another hurdle. There is also a lack of expertise available to do this research and analysis. Security analysts can play an important role in advising potential investors on a wide range of corporate governance issues that include shareholder rights, independent directors, and hostile takeovers.

Com Bubble

The relevance of intermediaries in the securities market was brought to the forefront by the “dot-com bubble” in the U.S. In 1999, several Internet consulting companies (which were around two years old) went public on NASDAQ, claiming that they would bring in their information technology and web expertise to traditional “old economy” companies and lead to a new era of the Internet. The capital markets seemed to rely on

these claims; from July 1999 to February 2000, the NASDAQ Composite Index (heavily weighted with technology and Internet stocks) rose by 74.4%, and the Dow Jones Industrial Average (composed mainly of old economy stocks) fell by 7.7%.

The technology-heavy NASDAQ Composite Index touched 5,048 in March 2000, reflecting the peak of the dot-com bubble. While the dot-com bubble illustrates the flipside of the not-so-well-founded but ambitious man oeuvres of intermediaries, they do have their advantages such as full market coverage, investor and issuer outreach, lower costs, systematic fund flow, marketing and distribution services, and logistic support, *inter alia*. Thus, intermediaries may be acknowledged as the “necessary evils” of contemporary diverse capital market.

Lemon’s Problem

One of the most important contributions to the literature on asymmetric information is Karloff’s paper “The Market for Lemons: Qualitative Uncertainty and the Market Mechanism.” The main point in this paper is that the presence of asymmetric information creates an adverse selection problem: if consumers cannot tell the quality of a product and are willing to pay only an average price for it, then this price is more attractive for sellers who have bad products than to seller who have good products (hence the term adverse selection). Consequently, more bad products (i.e., lemons) will be offered than good products. Now, if consumers are rational, they should anticipate this adverse selection and expect that at any given price, a randomly chosen product is more likely to be a lemon than a good product. Of course, these expectations imply a lower willingness to pay for products and so the proportion of good products that is actually offered falls further. Eventually, this process may lead to a complete breakdown of the market. This lemons idea is also important for corporate finance: if investors cannot observe the value of firms before they buy them then they would be willing to pay only an average price for the equity of firms. Given that the price is average, selling equity on the market is much more attractive to owners of bad firms than to owners of good firms so the average value of firms that are actually offered on the market should be below average. This implies that investors should be suspicious that if they are offered equity then it must mean that the firm’s value is more likely to be below the average. Hence, investors will no longer be willing to pay an average price for the equity of firms once they are offered to buy this equity.

Indian Laws Governing Securities Market Intermediaries

The SEBI crafted a comprehensive regulatory framework encompassing all intermediary categories—the Intermediary Regulations. However, most of the provisions are yet to be notified, except those dealing with enforcement orders and procedures. Today, intermediaries continue to be governed by the specific regulations governing each category of intermediaries, which *inter alia* include:

- The SEBI (Stock Brokers and Sub-brokers) Regulations, 1992;
- The SEBI (Depositories and Participants) Regulations, 1996;
- The SEBI (Bankers to an Issue) Regulations, 1994; the SEBI (Merchant Bankers) Regulations, 1992;
- The SEBI (Portfolio Managers) Regulations, 1993;
- The SEBI (Registrar to an Issue and Share Transfer Agents) Regulations, 1993;
- The SEBI (Underwriters) Regulations, 1993.

The basic structure of all these regulations includes the registration requirements, eligibility conditions, continuous compliance requirements, perpetuity or renewal of registrations (as the case may be), code of conduct, disclosures, maintenance of books/records, inspection and disciplinary proceedings, investigation, enquiry, adjudication, enforcement orders, and appeal powers.

Despite the basic structural commonalities, the specific regulations pertaining to the various categories of intermediaries are not uniform in terms of continual disclosures, display of registration certificate at intermediary offices, prohibition of irresponsible investment advice and disclosure of interests involved, permanency of registration, redress of investor grievances, and specific conflict of interests and corporate governance provisions found in Regulations 4, 12(2), 15, 11, 13 and the Code of Conduct of the Intermediary Regulations, *inter alia*. A consolidated intermediary regulatory framework based on consistent objective standards—which would be able to account for the common requirements of intermediaries while preventing conflicts in interpretation with the specific regulations for each category—is essential today. From an administrative perspective, a consolidated framework would be convenient, especially while legally amending the common intermediary

requirements/mandates. Hence, effectuating the Intermediary Regulations is critical to disciplining the market.

Conflict Of Interest

Defrauding by intermediaries

The term “conflict of interests” is widely used to identify situations where pecuniary or other competing interests prevent a party from acting in a certain manner, which would otherwise be legally or ethically appropriate; however, there is no universally accepted definition for the same. A conflict of interest’s situation can generally be understood as a situation where the multifaceted interests of an individual are *in inter se* conflict. In the context of market intermediaries, such conflicts are augmented by the vast and diversified client base, endless product innovations, undisclosed and complex market mechanics, and simultaneous operations in multiple intermediary services.

(i) Client financing by intermediary: Where the intermediary has extended finance facility (loans/credit) to any of its clients, it will tend to invest the client’s funds in a manner that facilitates the expeditious recovery of the loan/credit, regardless of the investment objectives of the client.

(ii) Churning: Churning refers to a situation where a broker, for the sole purpose of generating commissions and maximizing its income, is involved in excessive trading on a client’s account, even when such trading involves unprofitable investments or unnecessary transaction costs for the client.

(iii) Use of clients’ funds for proprietary trades: Intermediaries may give advice to their clients that are contrary to what the real circumstances demand, and then use the funds earned by commission to trade as per the real market conditions on the proprietary account. This conflict is more prevalent when the intermediary is operating in different capacities; for instance, as a market analyst and investment advisor for the client and also as a stock broker undertaking proprietary trades.

(iv) Aggregation of orders: Aggregation of orders placed by clients with proprietary accounts, undertaken primarily for reducing administrative costs and enhanced convenience, may benefit the intermediary at a client’s cost.

(v) Competitive actions: Intermediaries may indulge in unfair competitive practices, such as soliciting and inducing other intermediaries’ clients, which is detrimental to investors and market functions.

(vi) Circular trading: Circular trading involves the buying/selling of certain scrip’s *inter se* the intermediary and its group entities or other intermediaries to create artificial volume in the scrip, thus causing an increase in the price of the scrip

(vii) Laddering: Laddering involves favorable share allotment to investors (mostly institutional investors) who promise to purchase further shares from the secondary market through the same intermediary. Such practices not only result in discriminatory market practices but also create artificial stock prices to lure retail investors.

(viii) Stuffing {Underwriting v. investor interest}: When an intermediary underwrites an issue and simultaneously represents investors in the same issue, the investors might end up paying a higher issue price. Moreover, the intermediary may make false and fraudulent statements to sell the issue. Further, underwriters often shift their potential loss from unsuccessful underwritings to a client account that is not well monitored by the client and is subject to the underwriter’s discretion and decisions. This is known as **stuffing**.

(ix) Internal Conflicts: This category involves intra-intermediary conflicts, such as in the case of an intermediary having group operations. What is in the best interests of the group may not be in the best interests of a specific branch or subsidiary. In such a situation, decisions are usually taken factoring the overall interest of the group, resulting in losses to the branch/subsidiary concerned and its related clients. This conflict has become more rampant with the increasing percentage of corporate intermediaries.

Similarly, when intermediaries under common ownership deal in diverse categories of intermediary services, what is profitable for one service may be detrimental to another?

Multiple Services Conflicts

This category includes the conflicts inherent in the practice of multiple intermediary services by the same intermediary (or intermediaries under common ownership). For instance, when two intermediaries are owned by the same proprietor,

with one providing analyst and advisory services and the other underwriting an issue, the analyst's report and investment advice is likely to be prejudiced and biased in favor of the underwritten issue. Similarly, the common owner may use the insider information procured during the underwriting process by one of its concerns for subsequent trading in those shares, either on its own account or on behalf of clients through another concern. Another example of this conflict category is where a merchant banker rolls out a public issue and recommends investor subscription to this issue in the capacity of an investment advisor, regardless of the actual health of the issue. The variety of services rendered by an intermediary is directly correlated with the situations involving conflicts of interest; i.e., with the increase in such services, the probability and likelihood of conflicts of interests also rise.

Regulating the Activities of Intermediaries

Conflicts of interests involving securities market intermediaries are inevitable and can be expected to increase with further progression and maturity of the market. While this issue cannot be eliminated, it can certainly be regulated to check any exorbitant abuse and to mitigate losses. Some regulatory efforts to this end are discussed below:

- Regulatory efforts of RBI.
- Regulatory efforts of SEBI

Regulatory Efforts Of RBI

Reserve Bank of India (RBI)

The RBI, vide the Master Circular on Prudential Norms for Classification, Valuation, and Operation of Investment Portfolio by Financial Institutions (RBI, 2012), prescribed an internal control system for investments made by specified financial institutions:

- Clear functional separation of trading, accounting, and settlement, with monitoring and control. Clear separation of proprietary account, portfolio management client account, and other constituents' (such as brokers) account. Further, any transactions between the financial institution's proprietary account and portfolio account are required to be strictly at arm's length rates.
- Portfolio management client's account must be subjected to a separate audit by an external auditor.

- In the case of placement of funds for portfolio management by the same client on more than one occasion, on a continuous basis, each such placement should be treated as a separate account.

- Portfolio management client services are required to be in the nature of investment consultancy/management for a fee, entirely at the client's risk without any guarantee of investment returns.

- A client having a portfolio account is entitled to get periodic statements of its portfolio account.

Regulatory efforts of SEBI

The SEBI is cognizant of the menace of conflicts of interests at the intermediary level, as reflected in several of its regulatory provisions.

- **Regulation 15 of the Intermediary Regulations:** This requires an intermediary as well as its directors, officers, employees, and key management personnel (henceforward, "related persons") to disclose any direct or indirect interest of itself or its dependents in any security of which it renders any investment advice. Further, it forbids them from rendering any investment advice unless they have reasonable grounds to believe that the recommendation is suitable. However, the SEBI does not explain what grounds will qualify as reasonable to make an advice appropriate, and much is left for the intermediaries to interpret.

- **Regulation 16 of the Intermediary Regulations read with the Code of Conduct (Schedule III):** An intermediary, along with its related persons, are required to conform at all times to the Code of Conduct (henceforward, the Code), which includes the following provisions for conflicts of interests:

- ◆ Specific provisions for conflict of interests, requiring intermediaries to avoid situations involving conflicts of interests, to make adequate disclosures of its interests (including potential sources and areas of conflict) to the public, and to resolve any such conflicts in an equitable manner. (Article 4 of the Code)
- ◆ Best efforts to protect investors having considered the client's needs, environment, and its own professional

skills. (Article 1.1 of the Code)

- ◆ High standards of integrity, fairness, dignity, ethics, and professionalism in conduct of business. (Article 1.2 of the Code)
- ◆ Exercise of due diligence, independent professional judgment, and no collusion with other intermediaries. (Article 1.3 of the Code)
- ◆ No misrepresentation, misleading, or exaggerated statements to clients. (Articles 3.2 and 3.3 of the Code)
- ◆ Quality disclosures to enable clients to make well-informed and balanced decisions. (Article 3.1 of the Code)
- ◆ No indulgence in any unfair competition practices that are prejudicial to investors. (Article 5.1 of the Code)
- ◆ No indulgence in corrupt practices such as price rigging, creation of false market, passing of price sensitive information, or activities distorting the market equilibrium, for personal gain. (Article 5.3 of the Code)
- ◆ Arm's length relationship with respect to activities undertaken in different intermediary categories or market positions.

(iii) Regulation (17)(2)(b) of the Intermediary Regulations read with Article 6.1 of the Code: An intermediary is required to implement adequate internal control systems and safeguards.

(iv) Regulation 12(4) of the Intermediary Regulations read with Article 5.2 of the Code: An intermediary is required to maintain records, data, and back-up at all times, which can facilitate tracing any defaults and manipulations.

(v) Regulation 3 of the Intermediary Regulations read with Form A (Schedule I): An intermediary is required to disclose its ownership structure and the details of its promoters at the time of registration, which could potentially help the regulator to manage conflicts of interests arising from the same proprietors undertaking multiple intermediary services or from the owners having any conflicting engagements.

As was stated earlier, since most of the Intermediary Regulations are not yet operative, these provisions are only persuasive in nature. Nevertheless, most of these provisions are mirrored in the specific intermediary regulations and their respective codes of conduct as well, and intermediaries are mandatorily bound by similar provisions for conflicts of interests (discussed later in more detail).

(vi) SEBI (Investment Advisors) Regulations, 2012: While the SEBI approved this regulation in August 2012, it is yet to be notified. This regulation requires an investment adviser to act in a fiduciary capacity towards its clients, segregate other activities undertaken—such as distribution, referral, or execution business—from advisory services, and disclose all conflicts of interests, including any commission remuneration or compensation received from such other services. While direct commercial exploitation of investors from irresponsible and ignorant investment advice may be curtailed by regulating the entities providing investment advice to investors for a commission, the advice rendered without any fee attributable to it is excluded from the ambit of this regulation, as suggested by the Investment Advisory Board of the SEBI in the 3–4 November, 2012 meeting (SEBI, 2012c). Thus, it is yet to be seen how these regulations are implemented with regard to the otherwise specifically exempted intermediary categories in practice (SEBI, 2012b).

Further, these regulations encompass the class of investment advisers providing investment advisory services to private investment trusts, family offices, private equity funds, venture capital funds, and hedge funds. The regulations do not exempt from certification this class of advisers, although their services are directed towards sophisticated institutional investors, who are expected to be aware of investment risks. It is pertinent to note that the U.S. Investment Advisers Act, 1940 provides exemptions from registration with the SEC to investment advisers in certain circumstances; e.g., if the investment adviser has less than fifteen clients, it does not hold itself out generally to the public as an investment adviser, and it does not advise investment companies. Likewise, under the Financial Advisers Regulations, 2002 of Singapore, a financial adviser is exempt from holding a financial adviser's license if it provides advice to only thirty accredited investors.

Therefore, an exemption along these lines in the Regulations would be very beneficial, as this would enable the regulator

to focus on and commit its resources to monitoring the investment advisers that cater to the more vulnerable investor category of retail investors, and would greatly reduce the administrative burden.

Prohibition of Insider Trading

The SEBI (Prohibition of Insider Trading) Regulations, 1992 (henceforward, the Insider Trading Regulations):

Any dealing in securities by an insider while in possession of unpublished price-sensitive information is prohibited. Thus, although the Insider Trading Regulations is not specific to intermediaries, it condemns dealing in securities by intermediaries based on or while in possession of insider information, e.g., information procured while underwriting an issue, whether as an agent for its clients or as the principal on its proprietary account.¹⁶

- The Insider Trading Regulations also mandate the creation of a “Chinese wall” for the segregation of the departments/undertakings with access to unpublished price-

- Sensitive information from the public areas.¹⁷ Following this, the intermediaries are required to put in place “Chinese walls” to check abuse of confidential information, more so when the same entity operates as intermediary in different capacities, such as underwriter as well as investment advisor.

- Further, analysts preparing the research reports of a company are forbidden from trading in its securities for thirty days from the preparation of such report, and are required to disclose their interest, if any, in the company.

Specific Intermediary Regulations:

The SEBI has issued several circulars under the SEBI (Stock Broker & Sub-broker) Regulations, 1992, mandating the segregation of broker proprietary monies from client monies, 19 the disclosure of proprietary trading undertaken to its clients, 20 and so on. Similar preventive provisions are also found in the SEBI (Portfolio Managers) Regulations, 1993, 21 the SEBI (Merchant Bankers) Regulations, 1992, 22 and the SEBI (Underwriters) Regulations, 1993.

SEBI on churning in the context of mutual funds:

While condemning conflicting practices like churning in the context of mutual funds, the SEBI recommended the inclusion

of misspelling as a “fraudulent and unfair trade practice” under the SEBI (Prohibition of Fraudulent and Unfair Trade Practices relating to Securities Market) Regulations, 2003 (henceforward, the FUTP Regulations) (SEBI, 2012b).

Regulation 4(2) of the FUTP Regulations:

In addition to general fraudulent and unfair trade practices such as false statements or concealment of truth, promises made without intending to perform, and so on, the FUTP prohibits certain practices specific to intermediaries, such as an intermediary reporting transactions in an inflated manner to its client so as to increase its commission/brokerage; circular transactions with respect to a security entered into between intermediaries to provide a false and inflated impression of trading; an intermediary buying/selling securities in advance of a substantial client order, or where a futures or option position is taken about an impending transaction in the same or related futures or options contract, and so on.

Despite these FUTP provisions, it appears that fixing the liability of intermediaries under these regulations is qualified by the onerous “knowledge” test; i.e., unless it can be proved that the broker had the knowledge of the circular nature of trades directed by its client, the broker cannot be held liable. Further, the FUTP Regulations need clearer interpretations, more so in view of the recent Securities Appellate Tribunal (SAT) order²⁶ stating that the FUTP Regulations do not clearly define “front-running” and therefore, setting aside the SEBI order penalizing certain intermediaries for front-running.

Having said that, there have been several instances recently where the SEBI took proactive measures against intermediaries under the FUTP Regulations.

Considering that most of these regulatory provisions prefix the conflicts of interest’s aspect with the word “shall,” it appears that the SEBI intends to create mandatory obligations of intermediaries in this regard. However, there are a few exceptions to this rule-based regime, such as the requirement of arm’s length relationship (mentioned earlier in this section), which is a “shall endeavor to” provision, and thus, is only recommendatory in nature. Therefore, it may be stated that the law relating to conflicts of interests of intermediaries in India is a blend of rule-based and principle-based regulations. While it is well acknowledged that most of the conflicts of interests are dependent on internal controls, the Indian capital

market is still not mature enough to rely completely on self-regulation and culture rectification. Thus, despite containing several lacunae and loopholes, the current combination of rule-based and principle-based regulatory framework in India is appreciable in today's context. The onus now lies on the effective implementation of this framework, which continues to be a challenge.

Challenges

In fixing accountability of intermediaries

Managing conflicts of interests of intermediaries and fixing their accountability is an onerous challenge, which further intensifies with the increasing complexities and diversities of the market. Some of the emerging aspects that can potentially increase the abuse of conflict of interests by intermediaries are discussed below.

Outsourcing Of Intermediary Services:

Intermediary services are no exception to the surge of inbound and outbound outsourcing witnessed by India. Taking cognizance of this, the SEBI issued certain guidelines on outsourcing by intermediaries in 2011, similar to the 2011 Guidelines on Outsourcing for Capital Market Intermediaries issued by the Securities Commission (Malaysia). While the SEBI (through this circular) retains accountability and liability of the registered intermediaries with respect to all outsourced services, it does not require the third-party outsourced entities to procure any regulatory approval or registration prior to undertaking such outsourced assignments. Further, unlike the 2011 Malaysia Guidelines, it does not make any distinction between domestic and offshore/outsourced entities in terms of due diligence, regulation, and governance. Considering that this circular is still in a nascent stage, it is yet to be seen how the intermediaries implement and conform to these outsourcing principles.

Market Analysts and Researchers:

While analysts/researchers associated with mainstream intermediaries such as broking houses, merchant bankers, and so on are regulated, those operating on an independent and standalone basis, especially those providing services other than for a fee (SEBI, 2012c), remain outside any registration requirements of the regulator, which necessitates a comprehensive regulatory regime for them, similar to the U.S. rules.

Rapid Growth of Intermediaries:

With the rapid increase in the number of intermediaries in the Indian market, it becomes difficult to identify the genuine and authorized intermediaries from the disguised, fraudulent ones. In this context, it is essential that the SEBI publishes a comprehensive updated database of all registered intermediaries, similar to what the Monetary Authority of Singapore publishes. While the SEBI website provides lists of recognized intermediaries, these lists are not updated; some of the lists date back to 2009. To combat the menace of abuse of market mechanics caused by the faceless market interface of the anonymous technology-driven trading platforms, a comprehensive institutionalized definition of "intermediaries" is urgently needed to determine the regulatory contours and eliminate the unrecognized entities floating in the market without any streamlined accountability. Moreover, standardized benchmarks regulating intermediaries' conduct, on similar lines as the Intermediary Regulations, must be made operational at the earliest to facilitate the fixation of accountability.

Lack Of Expertise And Advent Of Hybrid Products:

The risks linked to market dealings aggravate manifold owing to the complex and hybrid products floating in the market today. The dearth of expert intermediary services increases the market apprehensions. It is high time that the dealings in complex products were restricted to only intermediaries having expertise/qualifications, ascertained through certification programs, minimum experience conditions, and so on.

Irresponsible And Unauthenticated News/Rumors:

Despite the SEBI's directions to control the circulation of unauthenticated news/rumors having serious market implications, this problem persists, more so in smaller towns and remote areas lacking sophisticated corporate intermediaries. The "stock guru" scam involving cores of investors' monies duped by certain individuals through fake offices, celebrity promotion, and ambitious promises of returns equaling double the invested amount within six months, which was unraveled recently is a glaring example of the abuse of naive investors. To this end, the SEBI must take proactive steps towards investor education and awareness, with a focus on retail investors, such that investors are able to exercise prudence and judgment to filter information prior to making investments based on such information. This becomes all the more critical considering that the SEBI is an active player at the IOSCO, and heads the Asia-Pacific Regional Committee of the IOSCO.

Extensive Anti-Corruption Laws:

Factoring the impact of the U.S. Foreign Corrupt Practices Act, 1977, along with the U.K.'s Bribery Act, 2010, Indian companies and individuals all over the world with foreign exposure, including market intermediaries, must put in place anti-corruption compliance policies and procedures. Failing to do so may trigger strict enforcement actions and prosecutions by the U.S. Department of Justice and the SEC. Further, anti-corruption compliance must be factored by intermediaries while selecting their outsourcing/business partners, as any direct or indirect U.S./U.K. exposure can trigger anti-corruption enforcement actions. Companies and commercial ventures are now significant interested parties to corruption matters pursuant to extensive corruption laws at the international level. Therefore, the SEBI must take cognizance of this less explored but critical area in the context of actions of market intermediaries and market participants as a whole.

Conclusion

Since the reliance on principle-based compliance demands a more mature capital market and since the Indian capital market has still not matured, a rule-based avoidance regime of conflicts of interest is predominant in India, which is evidenced in various SEBI Regulations and the Code of Conduct, the SEBI enforcement actions, and the RBI Guidelines. While a shift from a rule-based towards a principle-based compliance regime should not be hasty, and must be aligned with India's market conditions, regulations and rules³⁵ alone cannot remedy such situations of conflict, which need to be supplemented with enduring principles and an ethical business culture.

Creating robust internal control systems and self-regulation are the two primary and predominant mechanisms to establish this culture. Although India has been debating over the establishment of SEBI-registered Self-Regulatory Organizations (SROs) for market intermediaries for a long time, and despite the SEBI having promulgated the SEBI (Self-Regulatory Organizations) Regulations, 2004 (the "SRO Regulations") for the recognition and constitution of SROs, this concept continues to remain theoretical. While the SEBI has advocated the formation of a registered SRO for intermediaries³⁶ and has more recently proposed the formation of a self-regulatory board for investment advisors,³⁷ the proposition to this end is yet to materialize. Most jurisdictions like the U.S., Japan, Korea, and Turkey have established SROs—the National Association of Securities Dealers

for brokers, Japan Stock Dealers Association, Korean Stock Dealers Association, and the Association of Capital Market Intermediary Institutions for all capital market intermediaries, respectively. Although India has a few functional industry associations like the Association of Mutual Funds of India for the mutual funds industry, they are not yet registered with the SEBI as SROs under the SRO Regulations.³⁸ To work at par with international markets and to cope with intermediary challenges, the Indian market eagerly awaits the launch of its first SEBI-registered intermediary SRO.

References

- SEBI. (2012b). *Securities and Exchange Board of India Press Release no. PR No. 77/2012, dated 16 October 2013*
- Regulation 2(1)(g) of the Intermediaries Regulations.
- *KarnavatiFincap v. SEBI*, (1996) 10 SCL 5 (Guj.).
- *Securities and Exchange Board of India Press Release no. PR No. 77/2012, 16/10/2013*
- *Price Waterhouse & Co. v. SEBI*, [2010] 103 SCL 96 (Bom.).
- *Price Waterhouse & Co. v. SEBI*, [2010] 103 SCL 96 (Bom.).
- *Securities and Exchange Board of India Press Release no. PR No. 77/2012, 16/10/2013*.
- Agrawal, S. & Baby, R. J, *Agrawal & Baby on SEBI Act: A Legal Commentary on Securities & Exchange Board of India Act, 1992*, New Delhi Taxmann Publications Pvt. Ltd, (2nd ed.,2011)
- Agrawal, S. & Baby, R. J, *Agrawal & Baby on SEBI Act: A Legal Commentary on Securities & Exchange Board of India Act, 1992*, New Delhi Taxmann Publications Pvt. Ltd. (2nd ed.,2011)
- *Ibid.*
- Mantel, S.J., Rosegger, G, 1987 *The role of third-parties in the diffusion of innovations: a survey*, 13 *Amsterdam Law Journal* 122,134 (1987)
- *Attorney General of the State of New York. (2003). Global Settlement: Findings of Fact.* Albany, NY: *Office of the State Attorney General.*
- Stewart, M. *Conflicts of Interest Among Market Intermediaries*, U.S. Securities and Exchange Commission International Institute Presentation, available at http://www.sec.gov/about/offices/oia/oia_market/conflict.pdf, last seen on 20/10/2013.
- *Manual of SEBI ACT, Rules, Regulations, Guidelines, Circulars, etc., Volume 2.*, New Delhi: Bharat Law House Pvt. Ltd, (19th ed. 2012).
- Stewart, M. *Conflicts of Interest Among Market Intermediaries*, U.S. Securities and Exchange Commission International Institute Presentation, available at http://www.sec.gov/about/offices/oia/oia_market/conflict.pdf, last seen on 20/10/2013.

Stock Market Volatility: A Case Study of the Botswana Stock Exchange (BSE)

M. Simbarashe

G. Tobedza

B.N. Swami

Abstract

Swings in stock market prices are identified across the world. It is logical to assume that the BSE will follow suit of other countries of the world in volatility of stock market prices. For this study the scholars focused on the literature that relates to stock market behaviour prevailing in BSE and the causes that influence volatility on Stock Market in general and BSE in particular. While using primary and secondary data, this paper takes an in depth look at the rationale behind the prevailing stock market forms of the BSE. The findings of this study concluded that investment culture, financial literacy, lack of information relating to price asymmetric, liquidity and the type of instruments traded contribute to shaping the stock market's form and controlling stock market volatility.

Key Words

Stock Market, Stock Market Volatility, Botswana Stock Exchange (BSE)

Introduction

There are various variables that alter the overall effectiveness of the stock markets in wealth creation. Given all these parameters, such as information asymmetry, investor speculation and financial literacy of investors', stock

markets are in practice highly complex fields which have become a focal point of numerous studies. The stock market forms one of the most prominent aspects of a free market economy as it provides a platform for capital creation, giving companies access to capital for investment projects and investors' access to lucrative investment opportunities. The stock market in essence makes it possible to cultivate small, initial, sums of money into larger holdings, and to become wealthy without taking on the risk of starting a business or making the sacrifices that often accompany a high paying career.

The stock market allows investors to participate in the financial achievements of the companies whose shares they hold. When companies are profitable, stock market investors make money in one of two ways. This is either through capital gains or dividend received. The stock market has been split into two main sections, namely primary market through Initial Public Offering (IPOs). Institutional investors typically purchase a larger proportion of these shares and Secondary market where all subsequent trading goes and major participants include both institutional and individual investors.

From May 2013 to date the largest stock market, in terms of market capitalization and traded instruments, is the New York Stock Exchange (NYSE) (Statista, 2013), boasting a market cap of over nineteen (19) trillion US dollars. The exchange was founded over two centuries ago in the year 1792 and according to the Efficient Market Hypothesis (EMH), (Fama E., 1970) such markets are the

closest to “efficient” and thus no individual/institutional investor can repeatedly beat the market making copious returns. Anomalies to the EMH have been noted however, philanthropist Warren Buffet being one, these investors have repeatedly made plentiful returns on stock markets such as the NYSE despite their “strong form volatility” .

History of Stock Market

Historically Belgium boasted the first stock exchange, dating as far back as 1531 in Antwerp. Brokers and money lenders used to meet there to deal in business, government and even individual debt issues. It is odd to think of a stock exchange that dealt solemnly in promissory notes and bonds but in the 1500s there were no real stocks. The 1600’s however saw a new era to stock markets; ships owners making voyages to the East would call up funds from investors to make their costly trips possible and in return promise them a portion of the earnings they would make selling goods from their voyage. These engagements were however only for single voyages. Investors would spread their risk by investing in several different voyages simultaneously, thereby playing the odds, something we now refer to as diversification. When the East Indian companies formed later, they changed the way business had been done. These companies had stocks that would pay dividend on all proceeds from all voyages made by the company, rather than going voyage by voyage. These were the first modern joint stock companies. This essentially allowed the companies to demand more for their shares and build larger fleets (Investopedia, 2012).

Statement of the Problem

This paper seeks to outline the issue of efficiency of BSE through means of measuring volatility of the stock market. It is important to note that the market efficiencies may arise due to less volatility in the stock market. Fama (1970) refers to volatility due as the rate at which stock prices on an exchange incorporate informational changes. Also, this research paper shall look at the overall volatility impacts on wealth creation. BSE has only been operational from 1989. Then it is logical to assume the BSE shall follow the footsteps of long standing Johannesburg Stock Exchange (JSE) in acquiring a semi-strong form of efficiency through controlling Stock Market Volatility (SMV).

Objectives

The prime goals of this study are to find out:

- the investment culture and its impact on the SMV that is prevalent in respective markets
- the degree at which domestic populations are informed on capital markets
- the level of institutional vs. individual investors
- how information is disseminated by companies
- the effort on the part of the exchanges to propel their business.

Scope of the Study

Market samples were drawn within Gaborone, capital city of Botswana and cover a vast range of stock market participants fitting different criteria such as age, financial literacy as well as future prospects.

Literature Review

Efficient Market Hypothesis

This theory forms one of the building blocks of the modern finance theory. It was the work of (Fama, 1970) that gave credibility to this theory, though this was actually a building of the work that had already been conducted by Samuelson (1965). In the words of Allan Timmermann, (2004) this theory in its crudest form effectively outlines how as much as individual investors would like to speculate returns on assets, this is essentially impossible. This is a highly regarded theory amongst academics with its earliest form appearing over a century ago as the random walk theory (Bachelier, 1964) and being later confirmed empirically. This theory of efficient markets was proposed based on the overpowering logic that if investors were in a position to forecast returns accurately then investors would subsequently generate unlimited profits all the time, as pointed out by Allan Timmermann, (2004). Jensen, (1978) defines an efficient stock market with respect to information as one with an information set (X_t) and an inability to make economic profits based on the trading of information set (X_t). Malkiel, (1992) further compounded this

definition by adding how a capital market is efficient only if it reflects all relevant information in determining the prices of securities. Formally, this market would then be referred to as efficient in terms of information set (X_t). An alternative definition of market volatility is that built on the notion of value of an asset as distinct from its price.

The financial theories that form building blocks of contemporary finance often have several underlying assumptions which have proven to make them not fully applicable in real life situations. Financial theories are stringent and account for rationality of investors but not personality. Black, (1986) opened the flood gates for those contending the Efficient Market Hypothesis and other objective financial theories such as the Capital Asset Pricing Model (CAPM)

Behavioural Finance

Selden, (1912) wrote “Psychology of the Stock Market”. He based the book upon the belief that the movements of prices on the exchanges are dependent to a very considerable degree on the mental attitude of the investing and trading public. Since then the idea of human emotions has been knowledge to most but only recently starting to receive the level of recognition it should. Sewell, (2007) defined this; behavioural finance, as the study of psychological influence on financial practitioners and the subsequent effects of their actions on markets and their overall volatility. He further highlights how behavioural finance is becoming a topic of interest given its aid in explaining how and why markets might be, in practice, inefficient.

Jonathan Clarke, (2013) mediated the arguments around markets and their volatility as they outlined how, arguably, no other theory in economics or finance generates a more passionate discussion between its challengers and proponents. An example was given where Harvard financial economist Michael Jensen writes “there is no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Market Hypothesis,” while investment connoisseur Peter Lynch claims “Efficient markets? That’s a bunch of junk, crazy stuff”. The academics go on to highlight how EMH claims that investors cannot outperform the market. Yet we can see that some of the successful analysts (such as George Soros, Warren Buffett, or Peter Lynch) are able to do exactly that. Therefore, EMH must be incorrect.

Methodology

Sampling Scheme

Considering it is almost impossible to take into account an entire population, a purposive sampling was used. Patton, (1990) describes this sampling method as being key to the provision of highly qualitative research allowing for in depth information to be provided by a smaller population sample. With this sampling method the scholars decided what needs to be known and pin points whomever is in a position to provide this information (Tongco, 2007). Only a hand-full of institutional as well as individual investors were approached to share their insight along with the capital markets and financial intermediaries.

Period Covered

For the sake of any good research paper a clear picture of past trends is needed along with good insight on current proceedings. This allows for a better forecasting position. Given this reason an analysis of the JSE as well as the BSE dated back as far as 20 years; 1994 to date – this will allow an interpretation of trend/volatility to reveal itself and give a more vivid picture of current dealings.

Procedure of Data Collection

Interviews with key personal at respective exchanges were conducted to gain perspective of what really goes on exchange floors and whether certain measures could be taken to control the volatility of stock markets. Interviews were conducted with a select few individuals with highly regarded finance knowledgeable to gather their perspective on issues of market volatility. Also, questionnaires were administered to appropriate personnel in institutions and individuals that participate on the domestic capital market to find out their thoughts and professional opinions regarding the domestic capital market and the data was processed by applying SPSS.

Data Analysis

Introduction

Data was acquired through the means of personal interviews including telephone interviews with a purposive sample. The data findings were grouped into six (6) major themes

that manifested in the process of data findings and were compounded with supporting evidence from various secondary sources to allow for an in depth understanding regarding the issue at hand. The response rate is shown in the following Table 1 which indicated that 78% of planned respondents answered.

Table 1: Response Rate

	Quantity	Percentage (%)
Approached for interview	9	100
Responded to interview	7	78
Did not respond to interview	2	22

Statistics from Standard & Poor's, Global Stock Markets, Factbook and supplemental S&P data indicate that the Botswana Stock Exchange shows a healthy growth rate overcoming adversities (financial crisis) that are the downfall of numerous other exchanges (Mundi, 2015). Market capitalization, also known as market value, is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchange at the end of the year. Listed companies do not include investment companies, mutual funds, or other collective investment vehicles. Data is in current U.S. dollars. The latest value for Market capitalization of listed companies (current US\$) in Botswana was \$4,587,518,000 as of 2012. Over the past 21 years, the value for this indicator has fluctuated between \$5,887,210,000 in 2007 and \$261,000,000 in 1991. The exchange saw its ceiling in terms of market capitalization towards end of 2007; prior to the global financial crisis. During this period Botswana was a highly lucrative investment destination for the International portfolio holders given its diamond reserves and its, then, increasingly popular tourism scene. There after (2008-2009) the exchange experienced shock from the global financial crisis but showed great resilience and despite a few sharp falls in market cap for the periods that followed the recession the exchange now shows a steady growth. The global financial crisis hit the Botswana capital market fairly harder than other capital markets this mainly because the economy was centred on goods and services that are regarded as luxuries in the global economy and given the crisis international portfolio holders showed a reduced interest in Botswana as an investment destination.

The efficiency of BSE can be measured if we compare with other long standing stock exchange such as Johannesburg Stock Exchange (JSE) hence the scholars ventured to introduce a comparative study wherever it is necessary.

Table 2: Market capitalization of (BSE) listed companies (current US\$)

Year	Market Cap (US\$)
1994	\$377,000,000.00
1995	\$398,000,000.00
1996	\$326,000,000.00
1997	\$614,000,000.00
1998	\$724,000,000.00
1999	\$1,052,202,000.00
2000	\$977,610,000.00
2001	\$1,268,670,000.00
2002	\$1,722,840,000.00
2003	\$2,130,710,000.00
2004	\$2,548,270,000.00
2005	\$2,436,730,000.00
2006	\$3,946,980,000.00
2007	\$5,887,210,000.00
2008	\$3,555,774,000.00
2009	\$4,278,000,000.00
2010	\$4,075,950,000.00
2011	\$4,106,892,000.00
2012	\$4,587,518,000.00

(Source: <http://www.tradingeconomics.com/botswana/stock-market>)

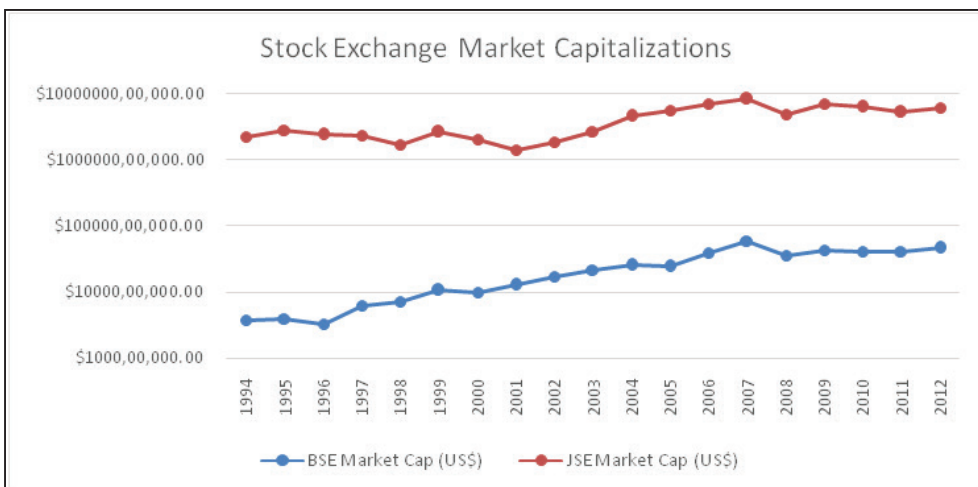
The Johannesburg Stock Exchange currently boasts a market capitalization close to two times greater than that of the Botswana Stock Exchange. Even JSE was also affected by the global financial crisis of 2008 and suffered a sound amount of shock as indicated by the table 3 that follows. The exchange recovered quite well and currently is the largest exchange; in terms of market capitalization, on African soil.

Table 3: Market capitalization of (JSE) listed companies (current US\$)

Year	Market Cap (US\$)
1994	\$226,000,000,000.00
1995	\$280,526,000,000.00
1996	\$241,571,000,000.00
1997	\$232,069,000,000.00
1998	\$170,252,000,000.00
1999	\$262,478,000,000.00
2000	\$204,952,000,000.00
2001	\$139,750,000,000.00
2002	\$184,622,000,000.00
2003	\$267,745,000,000.00
2004	\$455,536,000,000.00
2005	\$565,408,000,000.00
2006	\$715,025,000,000.00
2007	\$833,548,000,000.00
2008	\$491,282,000,000.00
2009	\$704,822,000,000.00
2010	\$635,349,000,000.00
2011	\$522,975,000,000.00
2012	\$612,308,000,000.00

(Source: <http://data.worldbank.org/country/south-africa>)

Chart 1: BSE vs JSE market capitalization trend



The Chart 1 above is a graphic representation of the degree of difference, in terms of market capitalization, that exists between the two exchanges hosted by countries that share a boarder. Which brings about the question; what is happening in RSA that is not happening in Botswana? What attributes are contributing to the current forms of the exchanges and have contributed in the past.

Upon analysing data from the interviews carried out it was quite apparent that there were a number of matters that seemed to be at the core of the prevailing market forms of the respective capital markets. These themes are mentioned below and discussed further there after:

1. Instruments Traded and Return Generation
2. Price Adjustments to Information Changes
3. Financial Literacy of Participants
4. Liquidity
5. Domestic Investment Culture
6. Other Issues

1. Instruments Traded and Return Generation

In an interview with a product development officer at the Botswana Stock Exchange, he outlined that the BSE only trades in three (3) instruments;

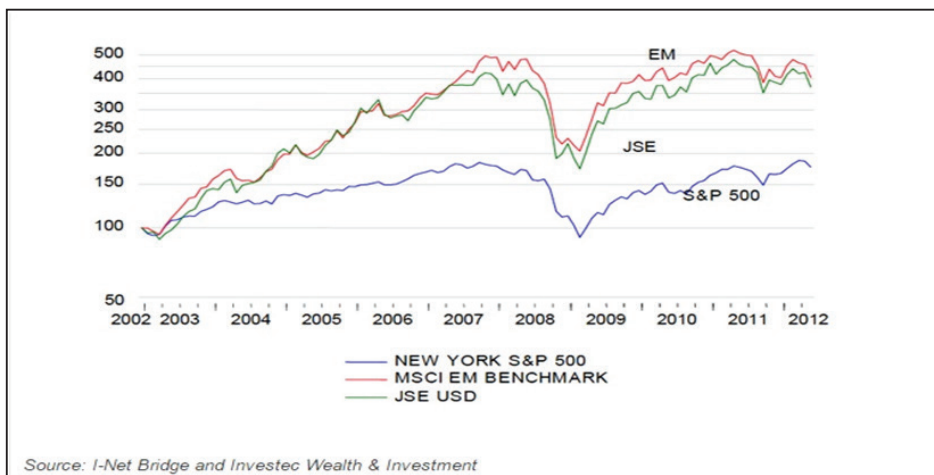
- Share/Equities
- ETFs (Exchange Traded Funds), &

- Bonds

Of which an article by Letsididi, (2014) in the Sunday Standard newspaper where he had a seated interview with the Deputy Chief Executive Officer of the BSE reveals that Exchange Traded Funds only started trading on the BSE in 2013. Whereas other capital markets such as the Johannesburg Stock Exchange trade in numerous other instruments such as; agricultural, currency, energy, equity, interest rate and metal derivatives, debt equity markets and krugerrands. The Johannesburg Stock Exchange has also had these instruments trading for much longer periods of time as compared to the Botswana Stock Exchange. On the issue of return generation it is observed that “return generation is rather poor given the minimal trading that goes on the secondary market of our capital market. However; the primary market has proved to generate good returns for Batswana. Our most recent IPO, the Choppies listing, being a very good example of this return generation”

Kantor, (2012) reviewed the recent history of the Johannesburg Stock Exchange; measuring the outstanding returns provided by the Johannesburg Stock Exchange for shareholders especially since 2003. The scholars demarcate how the Johannesburg Stock Exchange share index has kept up with the average emerging equity market average and outperformed the Standard and Poor’s (S&P) 500 by a very large margin as they showed graphically with the graph below.

Chart 2: JSE vs S&P 500 & Emerging Markets on Return Generation



Basically, the chart indicates a US\$100 invested on the JSE in January 2003 would now have compounded to US\$371, including dividends reinvested in the market. The same US\$100 invested in the S&P 500 would have grown to US\$176, less than half the gains in US dollars realised over the same period by the Johannesburg Stock Exchange.

2. Price Adjustment to Information Changes

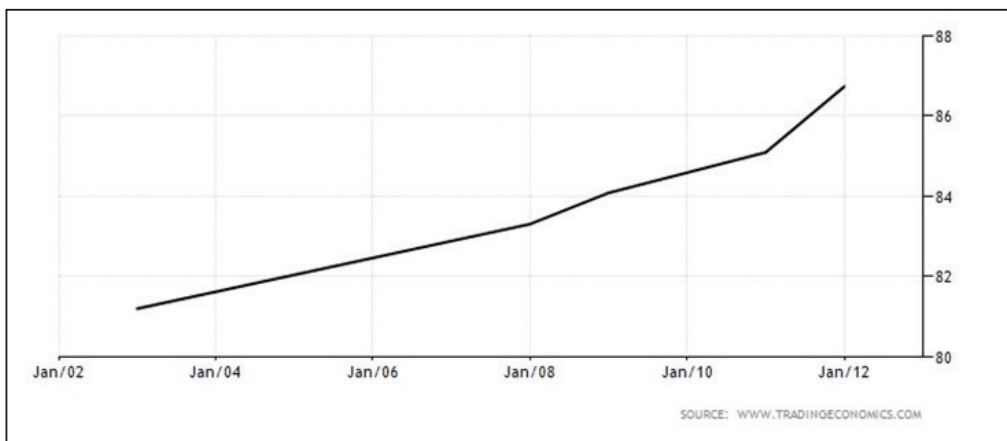
One of the fundamental characteristics of any reputable capital market is the rapid incorporation of information sets to prices of securities traded. This effectively allows participants on the exchange to make more informed decisions regarding their investments at any given point in time. Of the total sample outlined above, a majority of respondents indicated

a disregard for the manner in which information changes are incorporated into share prices on the Botswana Stock Exchange.

3. Financial Literacy of Participants

Literacy rate; adult total (% of people ages 15 and above) in Botswana was last measured at 85.09 World Bank Group (2015). Adult literacy rate is the percentage of people ages 15 and above who can, with understanding, read and write a short, simple statement on their everyday life. The Chart 3 below indicates the latest values, historical data and statistics, for Literacy rate - adult total (% of people ages 15 and above) in Botswana (Economics, 2015).

Chart 3: Adult Literacy Rate in Botswana



Despite the sharp increase in literacy since 2011, there is still an increasing need for the provision of financial literacy in Botswana. This was outlined by 100% of the respondents mentioned as one of the key issues that was outlining Botswana capital market. This issue has been noted by several parties and Letshego Financial Services for one, launched the first ever national campaign on financial literacy where the company committed to travel throughout the country educating the public, precisely public servants on financial literacy (Baatweng, 2014). The issue of financial literacy was deemed by the sample as being at the heart of the Botswana Stock Exchange's in less volatility and thereby more efficiency. In a seated interview with CEO of Banker's Association of

Botswana, he deemed this as one of the major obstacles that once tackled the Botswana Stock Exchange would experience exponential growth and an increased interest from outside parties.

He attributed all subsequent problems on the Botswana Stock Exchange such as lack of liquidity on the secondary market and the sluggish price adjustments to information sets to the low levels of financial literacy in the land. Further the same view was cemented by another CEO who stated that most Batswana are still opting to simply save their money in banks as opposed to investing on exchanges, not because of a risk factor or anything along those lines but simply because they

are unaware of what capital markets are and that they could effectively earn them greater returns than any savings plan a bank could offer. He ended the interview with this very brief and yet insightful statement; “investing is for every one of every age”

4. Liquidity

Liquidity refers to the degree to which an asset or security can be bought or sold in the market without affecting the asset’s price. Liquidity is characterized by a high level of trading activity. Assets that can be easily bought or sold are known as liquid assets (Investopedia, Investopedia Dictionary, 2015). Eighty (80%) of the sample indicated a dissatisfaction regarding the liquidity of assets and securities traded on the Botswana Stock Exchange, a product development officer at the Botswana Stock Exchange, in a seated interview attributed this lack of liquidity particularly on the secondary market to the investment culture that prevails in the country.

Even when the public own stocks it is not often that they are actively engaged in trading; using information sets that are made available to them at different times to make rational investment decisions.

5. Domestic Investment Culture

As afore mentioned; majority of Botswana opt to save their money; keep their money in safer heavens such as banks, as opposed to investing their funds on the stock exchange which bares higher risks. This for one is the domestic culture that exists in Botswana and as such has fostered an environment where companies are unable to raise as much as they would like to raise via the capital market. Another burning issue in terms of domestic investment culture was pointed out by an officer from Stock Brokers. A capital market since inception has always been a platform where those with viable investment ideas go to seek funds and in return offer some form of compensation to their investors. He further outlined how companies should be in a position to seek funds for operation via a capital market. However; in Botswana there exists a culture where individuals opt for operational investments as opposed to exploration or developmental investments. Thus the capital market proves not to be the platform of choice for those with viable business plans but no capital.

6. Other Issues

The CEO of Banker’s Association Botswana disregarded the stigma often associated with the BSE and shed light on some issues that might not be evident to everyday financial enthusiast. He outlined how the Botswana Stock Exchange is corporately efficient as opposed to its overall volatility. He went further to explain how most participants on the Botswana Stock Exchange are in fact institutions such as Investec and Botswana Stock Brokers as well as blue chip investors from abroad. These investors are value maximizing and follow money wherever it goes. As much as the BSE fails to meet the needs of smaller (in terms of value) investors, the Botswana Stock Exchange does generate wealth for corporates. These individuals/ corporations control larger chunks of the securities that are traded on the Botswana Stock Exchange.

Conclusion

Stock market volatility is of enormous interest when it comes to financial literature. It comes as no surprise that the findings of this research endeavour align with ample other writings regarding Botswana’s stock market volatility as defined by Fama, (1970). This also aligns with the research of Mollah, (2007) who conducted empirical tests to prove the Botswana Stock Exchange form of volatility through testing for the Random Walk.

It is somewhat surprising that Botswana: one of Africa’s crown diamonds, an emerging market with so much potential and what has been deemed a healthy growth rate would have a capital market with such a poor form. The findings of this research paper shed some insight on this matter. One respondent, during an interview, indicated how Botswana’s capital market was actually efficient in terms of value creation because most of the investors on the exchange are big players/ blue chip investors from South Africa. In that respect, it’s not all bad news surrounding the Botswana Stock Exchange, but the exchange does have a few boiling issues that result in its current form of volatility. These issues need to be addressed in order for Botswana Stock Exchange to earn a seat at the table with other great African exchanges such as the Johannesburg Stock Exchange.

Behavioural finance encourages us to take note of individual (micro) investment behaviour as this will effectively translate

into macro phenomenon. This simply means the behaviours of multiple individual investors effectively have the ability to summate into masses and influence greater macro-economic variables. The issue of domestic investment culture seems to be at the heart of the prevailing market form of the Botswana Stock Exchange. In a nation where individuals have been educated to rather save as opposed to investing it is no surprise that the capital market does not over perform and one can expect stock market volatility. This preference for saving as opposed to investing which in most cases offers greater returns can be attributed to low levels of financial literacy in the domestic market. In nations such as Republic of South Africa with larger population as well as more financially literate individuals, capital markets strive and perform extraordinarily with less stock market volatility.

Recommendations

Letsego Financial Services has taken a small step on a long journey of educating the masses in Botswana regarding investment and other financial issues. This will prove to be beneficial to the Botswana Stock Exchange over time as more and more people are made financially literate. However, this is not nearly enough in comparison to what needs to be done in order for the Botswana Stock Exchange to break free of its weak form and realise the levels of success that it aims for. Upon conducting data findings for this paper it was noted that most Batswana that own stocks that are traded on the Botswana Stock Exchange do so because they feel these stocks will be easier to manage as compared to stocks traded on exchanges abroad. However, it was also noted that these Batswana seldom check the performance of their stock unless need arises and almost never act on information sets that are made available to them. It would be highly beneficial to Botswana Stock Exchange and the nation as a whole if individuals were educated about investment at a younger age, as opposed to tertiary level only, such as Junior High Schools. This would harness a culture of investment in young people's minds and whether they decide to pursue careers in finance or medicine at the end of the day they are in a position to invest their funds with greater insight and enthusiasm as opposed to having their funds lying in a bank. If such culture is developed BSE will have less SMV as the investors in BSE will become immune from the shocks of "swings in the stock market prices" and will not react emotionally for temporary changes in the stock market prices. The above findings are not only applicable to Botswana but also to all developing

and developed nations such as India and elsewhere.

References

- Allan Timmermann, C. W. (2004). *Efficient market hypothesis and forecasting*. *International Journal of Forecasting*.
- Baatweng, V. (2014, November 24). *Sunday Standard*. Retrieved from <http://www.sundaystandard.info/article.php?NewsID=21601&GroupID=3>
- Bachelier, L. (1964). *Theory of speculation*. In Cootner, P. *The Random Character of Stock Market Prices*.
- Black, F. (1986). *Noise*. *Journal of Finance*.
- Economics, T. (2015, February). *Trading Economics*. Retrieved from <http://www.tradingeconomics.com/>
- Fama, E. (1970). *Efficient capital markets: a review of theory and empirical work*. *Journal of Finance*.
- Fama, E. (1970). *Efficient Capital Markets. A review of theory and empirical work*.
- Group, T. W. (2015). *Literacy rate, adult total*. Retrieved from *The World Bank IBRD . IDA*: <http://data.worldbank.org/indicator/SE.ADT.LITR.ZS>
- Investopedia. (2012). Retrieved from <http://www.investopedia.com/articles/07/stock-exchange-history.asp>
- Investopedia. (2015). *Investopedia Dictionary*. Retrieved from <http://www.investopedia.com/terms/l/liquidity.asp>
- Jensen, M. (1978). *Some anomalous evidence regarding market*. *Journal of Financial Economics*.
- Jonathan Clarke, T. J. (2013). *Efficient Market Hypothesis*. (CNN, Interviewer)
- Kantor, D. H. (2012, June). *Monthly View*. Retrieved from *Investec*: <https://www.investec.co.za/research-and-insights/newsletters/monthly-view-newsletter/june-articles/capital-excellence-explaining-the-exceptional-returns-provided-.html>
- Letsididi, B. (2014, March 10). Retrieved from *Sunday Standard*: <http://www.sundaystandard.info/article.php?NewsID=19364&GroupID=4>
- Letswamotse, P. (2013, April 17). *Business Latest News*. Retrieved from *The Botswana Gazette*: <http://www.gazettebw.com/?p=726>

- Malkiel, B. (1992). *Efficient market hypothesis*. . New Palgrave Dictionary of Money & Finance.
- Mollah, A. S. (2007). *Testing Weak Form Volatility in Emerging Markets*. *International Journal of Theoretical and Applied Finance*, Vol. 10, No. 6.
- Mundi, I. (2015). *Botswana - Market capitalization of listed companies*. Retrieved from <http://www.indexmundi.com/facts/botswana/market-capitalization-of-listed-companies>
- Patton. (1990). *Qualitative evaluation and research methods*. Beverly Hills, CA.
- Samuelson, P. (1965). *Proof that properly anticipated prices fluctuate randomly*.
- Saunders, M. L. (2007). *research methods for business students; essex. pearson education limited*.
- SELDEN, G. C. (1912). *Psychology of the Stock Market: Human Impulses Lead*. New York: Ticker Publishing.
- Sewell, M. (2007). University of Cambridge. *Behavioural Finance*.
- Statista. (2013, May). *The Statistics Portal*. Retrieved from *Largest stock exchange operators in the world by market capitalization: www.statista.com/statistics/270126/largest-stock-exchange-operators-by-market-capitalization-of-listed-companies/*
- Tongco, M. (2007). *Purposive Sampling as a Tool for Informant Selection*.

Testing Efficiency of the Variables in Black Scholes Option Pricing Model: Evidence from Indian Derivatives Market

Shivani Inder

Abstract

The Black Scholes Option Pricing Model is the building block for the theory of pricing of options. The paper evaluates the probability of exercising a call option in the market under the given set of information by employing Black Scholes Model. Thereby, the validity of the model is being tested in the Indian Options market by employing logistic regression. The analysis concluded that Black Scholes Model holds an accuracy level of approximately 79 percent in guessing whether the option would be exercised or not at the time of expiry and whether the option is worth investing or not.

Key Words

Black Scholes, Probability, Option, Logistic Regression, Exercise of Option.

JEL Classification

G13, G14, G17, C25.

Introduction

The Black Scholes Option Pricing Model (BSOPM) is being considered as the founding element of the Modern Options Theory and is still used today. The most remarkable aspect of the BSOPM is to allow the writer of an option to effectuate

risk management and the possibility of knowing the profit and loss of the option with the input of few variable inputs. Derivatives are being caught into the maelstrom which makes investors wonder if such instruments are worth investing or not. One of the areas which have received very scant attention by the investigators is the contribution made by the model in determining the probability that the option will be exercised at the time of expiry.

The Black Scholes Option Pricing Model has the embedded probabilities of executing a call option in its formula itself (Rubinstein, 1994). of the BSOPM is related to the strike price of the call option which tries to capture the probability of exercising the same at its maturity. If it is assumed that the probability given by of BSOPM is valid and correct, then the variables contained in the formula would also be of statistical significance. This argument is the basis for the analysis in this study, which proposes to statistically check the significance of each factor present in the BSOPM with the evidence supported from NSE. It will also be checked whether the BSOPM is of any importance in predicting the positive payoff of the call option at expiry or a naive model would be better off at the disposition of the investor.

Review of Literature

Macbeth and Merville (1979) compared the Black-Scholes model against the constant elasticity of variance (CEV) model, which assumed volatility changes when the stock prices changed. They found that the volatility of the underlying stock decreased as the stock price rose. Their empirical results were also consistent with the results of Geske (1979). Jarrow

and Rudd (1982) proposed a semi-parametric option pricing model to account for observed strike price biases in the Black-Scholes model. They derived an option pricing formula from an Edgeworth expansion of the lognormal probability density function to model the distribution of stock prices. Geske and Roll (1984) showed that both in the money and out of the money options contained volatility bias. They concluded that time and money bias might be related to improper boundary conditions whereas the volatility bias problem might be the result of the statistical errors in estimation. Hull and White (1987) examined the problem of pricing of a European call on an asset that had a stochastic volatility. The option price was determined in series form for the case in which the stochastic volatility was independent of the stock price. And numerical solutions were produced for the case in which the volatility was correlated with stock price. It was found that the Black-Scholes price frequently overpriced options and that the degree of overpricing increased with the time to maturity. Chesney and Scott (1989) examined the Black Scholes model and a random variance option pricing model to study prices of European currency options traded in Geneva. They used actual prices on European currency options from Geneva to compare the performance of the random variance option pricing model with the modified Black Scholes model. It was found that the actual prices on calls and puts conform more closely to Black Scholes model if the variance rate was revised every day. On the other hand, when a constant variance rate was used, then the Black-Scholes model performed very poorly. Frino, Khan and Lodh (1991) tested the efficiency of Black Scholes Model in pricing the options on Australian Stock Exchange. They considered the cross sectional data of option prices for the time period from January 1990 to December 1990. They concluded that Black Scholes Model was capable of effectively pricing the options in an unbiased manner. They also suggested a possible learning effect causing the incidence of market mispricing of options to decrease since 1976. McKenzie, Gerace and Subedar (2007) utilized qualitative regression and a maximum likelihood approach to empirically examine the accuracy and statistical significance of the factors within the Black Scholes model. They considered 159 ASX Index option contracts for the time period of February 2003 to July 2007. The study utilized three different measures of volatility namely historical instantaneous, actual instantaneous and implied volatility. They found that the Black Scholes model is significant at the one percent level in estimating the probability of an option being exercised and also found that the significance of the

Black Scholes model under a logistic distribution is superior to a lognormal distribution.

Testing of Black Scholes Model for predicting the profitable expiry of options and the factors playing significant role in this prediction has been scarcely carried out in developed countries. No such study has been carried out in Indian context.

Theoretical Background of the Response Function for the Black Scholes Model

The Black Scholes Differential Equations do not involve any variable that is affected by the risk preferences of the investors. All the variables that appear in the equation, like strike price, spot price of underlying asset, risk free rate of return, time to expiry and the implied volatility are free from the risk perception of the investors. One way of including the risk perception of the investors in the valuation of call option is to involve the expected value of underlying asset in the differential equation (Hull, 2005).

The solutions to Black Scholes differential equations obtained by risk neutral valuation are valid in all the worlds whether risk neutral or risk averse (Hull, 2005). Let's consider the expected value of an option in a risk neutral world at the time of maturity is

$$E[\max((S_T - X), 0)] \dots\dots\dots (1)$$

Where E represents the expected value in a risk neutral world, S_T is the value of the underlying asset at the time of maturity, X is the strike price.

From the risk neutral valuation argument, the value of a European call option is the discounted expected value of the call option which can be represented as follows:

$$c(t) = e^{-(t+\tau)} E[\max((S_T - X), 0)] \dots\dots\dots (2)$$

In this study, the risk neutral expected value of the call is found at time 't' with 'T-t' i.e. τ time remaining to maturity.

The call option is assumed to be eligible for exercise if at any point of time 't', the risk neutral expected value of the call ('c') at the time of expiry is positive. The exercise of an option at

the time of its expiry is the function of its terminal payoff.

$$\xi_T = f(c(t)) \dots\dots\dots (3)$$

Considering the case of Nifty options, the interest lies in the response probability of exercising an option at the time of expiration.

The response function for the exercise of an option (Z_i) is binary in nature, which assumes only two values, coded as 0 and 1.

$$y_i = \begin{cases} 1 & \text{if the option is exercised} \\ 0 & \text{if the option is not exercised} \end{cases} \dots\dots\dots (4)$$

So, the investigation of the significance of BSOPM can be carried out in binary form where y_i is a Bernoulli variable (Gujarati, 2003). y_i is the realisation of random variable y_i that can take values between 0 and 1 with probabilities π_i and $1-\pi_i$ respectively.

When the response (dependent) variable is of binary nature, then a nonlinear regression model may be employed that considers the output to be either 0 or 1. In turn, it tries to estimate the probability of happening of an event i.e. $y_i=1$

A logistic function can be utilised that can effectively transform the regression model so that fitted values can be bundled with (0, 1) interval. The logit model considers the cumulative standard logistic distribution function (F). The logistic distribution considers fatter tails which allow the conditional probability to approach 0 and 1 at a slower rate than the log normal distribution.

The logistic function (F), which is a function of any random variable,

$$F(Z_i) = \frac{e^{Z_i}}{1 + e^{Z_i}} = \frac{1}{1 + e^{-Z_i}} \dots\dots\dots (5)$$

Where e is exponential under the logit approach and follows cumulative distribution function

$$\begin{aligned} \pi_i &= (Y_i = 1 | S_0, X, \tau, r, \sigma) = \\ &F(\beta_0 + \beta_1 S_0 + \beta_2 X + \beta_3 \tau + \beta_4 r + \beta_5 \sigma) \\ &= \frac{1}{1 + e^{-(\beta_0 + \beta_1 S_0 + \beta_2 X + \beta_3 \tau + \beta_4 r + \beta_5 \sigma)}} \dots\dots\dots (6) \end{aligned}$$

Where S_0 = value of the underlying asset i.e. S&P CNX Nifty for this study, = strike price of the Nifty call option, r = risk free rate of interest. Mumbai Inter Bank Offer Rate (MIBOR)

has been considered as proxy for risk free rate of interest for this study, τ = time to expiration, represented in terms of year. It is equal to the number of days remaining to the date of expiration of contract, σ = volatility of the underlying, and is the probability that option π is exercised at the maturity. Thus, the equation (6) gives the logit transformed model for estimation of the probability (McKenzie et.al.2007).

Research Methodology

The present study considers the daily closing prices of options traded on Nifty Index of National Stock Exchange (NSE) of India. Options on Nifty Index are the most widely traded options on the NSE. These options are European in nature, so there is no problem of early exercise. The sample has been considered one month options (Christensen and Prabhala, 1998) expiring on the last Thursday of the month for the time frame from June 2001 to December 2014. On each trading day, the closing value of option on each strike price has been considered. The data for this study has been taken from website of National Stock Exchange of India and the database of Reserve Bank of India.

Sample Construction Scheme

Christensen and Prabhala (1998) pointed out the problem associated with overlapping data which led to inappropriate regression results in Canina and Figlewski (1997) work, because it caused the problem of serial-correlation between the option prices with different strikes (having variation in time to maturity) but sharing same information on any two consecutive days for the estimates of volatility. They suggested the use of one month contracts for better estimation. Considering this, the sampling of data points to be considered for the study is done on the basis of the following sampling plan:

Step 1: Options to be considered for the study are collected on the working day immediately following the expiry date of the previous month's options. These options approximately have one month (i.e. four to five weeks) time to expiration. This step gives us non-overlapping data points with maximum time to expiry of one month.

Step 2: Out of the options which have been considered for the analysis in step 1, the observations which satisfy the boundary condition i.e. $c > ((F e^{-rt}) - X)$ have been selected.

Step 3: Options must have some trade volume. So the observations which had less than 50 contracts being traded on that day have been dropped. Also, observations which have the settlement price equating to zero have also been rejected out of the sample because such value would not allow the optimal solution to occur in estimation of Black Scholes Implied Volatility

Step 4: The options for which the optimal solution for Black Scholes Implied Volatility could not be converged through Newton Raphson method have also been dropped.

Step 5: The options which are finally considered for the analysis are further divided into different sub samples for the analysis purpose. The data screening statistics for the Nifty options are given in Table 1.

Table 1 Data Screening Statistics for the Nifty Options

Total Call Contract Observations	46314
Criteria	
Observations not satisfying Boundary Conditions	3816
Observations with less than 50 Contracts being Traded	10840
Observations with very low Settlement Price(i.e. less than Rs.1.00)	5080
Observations for which No Convergence is achieved for BSIV	2076
Observations Rejected for synchronization of Nifty Futures Time Series with Nifty Call Options Time Series	106
Rejected Data	21918
Rejected Data (in %)	47.32
Remaining Data Points considered for Analysis	24396
Sampled Data (in %)	52.68

(Source : Author's calculation)

Empirical Findings

Logistic regression analysis has been employed to predict the probability that a particular option would be exercised under the given set of variables as defined by BSOPM. The BSOPM considers that only five variables i.e. value of underlying asset, strike price, volatility, rate of interest and time to expiry are sufficient to be considered as the desired universe for the information contained in the option. It also considers that $N(d_1)$ gives the probability of exercising the option at the time of maturity. If this notion is considered to be right, then the variables contained in the BSOPM should be statistically significant in predicting the exercise of the option at the time of maturity. Considering this notion, the sample of 24396 observations has been put into a logistic regression so that the significance of each variable in estimating the execution of option at the time of expiry can be determined. The aim is to analyse to what extent a variable contains the information in determining the exercise of the option at the time of maturity

at any given point of time 't'.

The analysis is carried out in two stages. In the first stage, the base model has been considered. The base model is the naïve model which is considered to test whether this analysis should be considered or not, or BSOPM is as good as a random estimation. After receiving appropriate results we moved to second stage which considers the Estimated Model. It contains all the original variables as stated in BSOPM. The estimated model is run through the qualitative regression for finding some conclusive evidence.

STAGE 1: The base model to be considered for the stage one contains the basic five variables (S_0, X, τ, r, σ) as predictor variables. The dependent variable $\Psi = 1$, if the option is exercised and is equal to $\Psi = 0$, if the option is not exercised at the time of maturity. Each observation of Ψ has its own information set and is thus independent of each other. Given the initial rates of $\Psi = 1$ or $\Psi = 0$ to the options and no other information, the

best naive strategy is to predict, for every case or observation that the result would be to give decision $y = 1$ i.e. to exercise the option. Such strategy is as good as naive estimation could be. Using this strategy, we have observed that we would be correct up to 52.7 percent of the times (as shown in Table 2). The probability of finding the correct result is as good as flipping of a coin which is not sufficient to reach out to any conclusion for the investor. These results are enough source of motivation for further investigating the BSOPM's factors contribution in estimation of probability for exercising an option.

Table 2
Results for the Classification Table of the Base Model

Observed	Predicted		Total
	0	1	
0	0	11539	11539
1	0	12857	12857
Total	0	24396	24396
Percentage			52.70%

(source : Author's calculation)

STAGE 2: The qualitative regression for the logistic specification of the Model containing all the variables as stated in the equation (6) is being carried out. The logistic distribution suggests that the conditional probability of approaching at 1 or 0 (i.e. exercising an option or not exercising an option) is slower as compared to lognormal distribution. Thus, the application of logit regression would be an appropriate choice for such an investigation.

The qualitative regression model is estimated using the maximum likelihood estimation. Therefore, the standard errors are asymptotic (Gujarati, 2003). Instead of using the t-statistic to evaluate the statistical significance of a coefficient, the z-statistic is used (Stock and Watson, 2003). The estimated model for the equation (6) is shown as follows in table 2

The goodness of fit measures for the logit model is Pseudo R^2 and the classification table. Different Pseudo R^2 are given in table 2. The values of all the Pseudo R^2 i.e. McFaddens R^2 , Cox & Snell R^2 and Nagelkerke R^2 indicate that the performance of the model is satisfactory and we can proceed further towards the classification table which is indicated in Tables 3 and 4.

Table 3
Results of the Logit Regression for the Estimated Model

	Coeff.	S.E.	Z-statistic	p-value	Wald statistic	Exp(B)	95.0% C.I. for EXP(B)
β_0	0.4887	0.0723	6.7567	1.41E-11	45.6530	1.6303	--
β_1	0.0073	0.0001	65.9361	0.00000	4347.58	1.0073	1.0071
β_2	-0.0074	0.0001	-66.977	0.00000	4485.96	0.9926	0.9924
β_3	2.2619	0.8191	2.7614	0.00575	7.62540	9.6022	1.9280
β_4	4.0222	0.9321	4.3151	1.60E-05	18.6203	55.828	8.9829
β_5	-1.3707	0.1453	-9.4290	4.14E-21	88.9074	0.25391	0.1909

McFadden R^2	0.387295
Cox & Snell R^2	0.414784
Nagelkerke R^2	0.554
Log-likelihood	-10339

(source : Author's calculation)

Table 4
Classification Table for the Estimated Model

Actual	Predicted		Total
	0	1	
0	8278	3261	11539
1	1838	11019	12857
Total	10116	14280	24396

(source: Author's calculation)

The classification table 4 indicates that the model is capable of predicting the value of y correctly up to 79 percent approximately $((8278+11019)/24396)$. Kennedy (2003) suggests that it is possible that a naive predictor could perform better than any model if the sample is unbalanced between 0 and 1. E.g. If $y=1$ for 75percent of observations. A simple estimate of $y=1$ for all the cases would outperform any more complex model on this measure. So considering this rationale the composition of y is considered and it is found that

$y=1$ for 12857 times which is approximately equal to 52.7 percent. So any random guess or naive model would not be as good as the considered model. This result can be confirmed by juxtaposing the results given in table 2. So, we can say that data is balanced and the results of the classification table can be relied upon.

Count R^2 is equal to 79.1percent which states the percentage of y values predicted correctly and the percentage of times the predicted y_i matches the observed y_i . Higher the number, the better is the fit of the model. Considering this measure, the model fit can be considered good.

Analysing further the classification table, we can find the sensitivity and specificity of the prediction and the error rates of the prediction. The sensitivity of prediction is the percentage of occurrences correctly predicted. In given model, the sensitivity of prediction is 85.7 percent (i.e. $11019/12857*100$) which is considerably good.

The specificity of the prediction indicates the percentage of negative responses being correctly predicted. In case of given model, the specificity of prediction is 71.7 percent (i.e. $8278/11539*100$) which is also considerably good. It is clear

that higher sensitivity and specificity indicate the goodness of the fit of model.

The Error Rates in the classification table are the False Positive and the False Negative error rate.

The False Positive is the error rate which indicates the percentage of predicting that the option would be exercised when in fact it was not exercised. It is equal to 22.8 percent (i.e. $3261/14280 *100$).

The False Negative is the error rate which indicates the percentage of predicting that the option would not be exercised when in fact it was exercised. It is equal to 18.16 percent (i.e. $1838/10116$).

The error rates are comparatively much lower than the sensitivity and specificity of the predictions. So, it can be concluded from the classification table that the model has satisfactory fit. But the performance of the model cannot be concluded without analysing the variables in the equation of the qualitative regression and residual analysis.

Table 3 shows the logistic regression coefficient, Wald test, z-score, Wald test and odds ratio for each of the predictors. Employing a 5 percent criterion of statistical significance, it can be seen that the variables are significant. The ' β ' estimates give the signs of the partial effects of each variable on the response analysis. The statistical significance of x_j is determined by whether we can reject $H_0: \beta_j=0$. As it is evident from the given table that the null hypothesis is being rejected for β The variable having the higher economic significance as suggested by β are the time to expiry(τ)and rate of interest (r). It must be noted that the response prediction of exercising the option, i.e. $y=1$ holds positive relationship with all the variables except for strike price and volatility of underlying asset. Along with, the time to expiry and the rate of interest are variables with significant economic relevance as compared to other variables.

Table 5
Marginal Effects of the Estimated Model

	$\partial p / \partial x$	S.E.	Z-statistic	p-value	\bar{x}
S_0	0.001818	2.74E-05	66.32	0	3975.7
X	-0.00183	2.73E-05	-67.171	0	3983.3
τ	0.56003	0.20274	2.7623	0.005739	0.04458
r	0.99585	0.23078	4.3152	1.59E-05	0.066058
σ	-0.33938	0.036056	-9.4126	4.84E-21	0.24969

(source: Author's calculation)

The effect of coefficients cannot be interpreted in the normal way as used in ordinary least squares regression. In order to interpret the coefficients effect we need marginal effects. Marginal effects give the partial effects of variables on the response probability which can be calculated using partial derivatives. The marginal effects are given in Table 4. The partial derivatives are found to be significant at 5 percent level of significance. The marginal effect give the relative increase of one unit of variable on the outcome corresponding to $\Psi=1$. The marginal effects are equal to coefficients of the logistic regression multiplied by the probability of $\Psi=1$.

Looking at the Table 5, it can be said that the variables having the highest impact on the exercise of the option are interest rate (r) and time to expiry (τ). The variables like strike price (X) and historical volatility (σ) are inversely or negatively related with exercise of an option (π). An increase of one unit in the historical volatility (σ) would lead to a decrease of 33.9 percent in the probability of exercising the option. Similarly an increase of one unit i.e 1/365 days in time to expiry (τ) would lead to 56 percent increase in the probability of exercising the option.

Conclusion

To conclude it can be said that the BSOPM has performed well in predicting whether the option would end in profit or not. In other words, BSOPM has shown an accuracy level of approximately 79 percent in guessing whether the option would be exercised or not at the time of expiry and whether the option is worth investing or not. The lower error rates indicate a good fit of BSOPM in Indian options market. Along with this, it has also been found that the fact which is significant in determining the fate or worth of the option at the time of expiry of the option in future are rate of interest and time to

expiry. Thus, it can be said that when the decay in the time value of the option is seen in relation to costs involved in holding the options or leverage costs, then the possible fate of option expiry in positive value is determined.

References

- Chesney, M. & Scott, L. (1989). Pricing European Currency Options: A Comparison of the Modified Black Scholes Model and a Random Variance Model. *The Journal of Financial and Quantitative Analysis*, 24 (3), 267-284.
- Christensen, B. J., & Prabhala, N. R. (1998). The Relation between Implied and Realized Volatility. *Journal of Financial Economics*, 50(2), 125-150.
- Figlewski, S. (1997). Forecasting Volatility. *Financial Markets, Institutions & Instruments*, 6(1), Stern School of Business, Blackwell Publishers, Boston, 2-88.
- Frino, A., Khan, E., & Lodh, S. (1991). The Black Scholes Call Option Pricing Model and the Australian Option Market: Where Are We After 15 Years?. *Accounting & Finance Working Paper*. 91/24, School of Accounting and Finance, University of Wollongong.
- Geske, R., & Roll, R. (1984). On Valuing American Call Options with the Black-Scholes European Formula. *The Journal of Finance*, 39(2), 443-455.
- Gujarati, D. (2003). *Basic Econometrics* (4th ed.). New York: McGraw-Hill Publishers.
- Hull, J. C. (2005). *Options, Futures & Other Derivatives*. (5th Ed), Prentice Hall Publishers.
- Hull, J., & White, A. (1987). The Pricing of Options on Assets with Stochastic Volatilities. *The Journal of Finance*, 42(2), 281-300.
- Jarrow, R., & Rudd, A. (1982). Implied Volatility Skews and Skewness and Kurtosis In Stock Option Prices. *Journal of Financial Economics*, 10, 347-369.
- Lewis-beck, M. S. (1980). *Applied Regression: An Introduction*.

- Sage University Papers: Quantitative Applications in the Social Sciences, 07-022. Beverly Hills, CA: Sage.
11. McKenzie, S., Gerace, D. & Subedar, Z. (2007). An Empirical Investigation of the Black Scholes Model: Evidence from the Australian Stock Exchange. *Australia Accounting Business and Finance Journal*, 1(4), 71-82.
 12. Merville, J.L., & Macbeth, D. (1979). An Empirical Examination of the Black-Scholes Call Option Pricing Model. *The Journal of Finance*, 34(5), 1173-1186.
 13. Poteshman, A. M. (2000). Forecasting Future Volatility from Option Prices. Department of Finance, University of Illinois, Urbana-Champaign.
 14. Rubinstein, M. (1994). Implied Binomial Trees. *Journal of Finance*, 49, 771-818.
 15. Stock, J. H., and Watson, M. W. (2003). *Econometrics* (3 ed.). London: Addison Wesley

The Real Exchange Rate Misalignment and Economic Growth in India

S. Anandhan

A. Vadivel

Abstract

This paper is exploring association between the real exchange rate (RER) misalignment and economic growth in India. The study uses ARDL approach to estimates dynamics of short and long run relationship between the variable such as PC, RER, RERMIS, CF, TO, and PO. The study found the long-run relationship between real exchange rate misalignment and economic growth. The real exchange rate keep under control external tread the Reserve Bank of India accumulates huge foreign exchange reserves people life expectancy would be increase.

Key Words

Real Exchange Rate, Economic Growth, Arch/Garch and Ardl.

JEL classification

C32, F63, O11.

1. Introduction

In recent times, the exchange rate stimulated the International Macroeconomic (IM) variables and their fundamentals are not yet recovered from the panic of economic behavior. Because, the unexpected changes in exchange rate movement at the same time unexpected changes in IM variables, it affected growth rate showed upward and downward trend. The

deterioration in the external sector competitiveness and misallocation of domestic resources made it hard to attain desirable economic growth rate. The Balassa - Samuelson hypothesis postulates that the process of economic growth unfolds influence on relatively higher productivity growth rate in the tradable than the non-tradable sector. In addition, the implication for the real exchange rate across the countries, the higher productivity growth led to real exchange rate appreciation [(Harberger (2003); Domac and Shabsigh (1999)].

Subsequently, the real exchange rate is one of the most important relative prices in an economy; it argued that a healthy exchange rate policy is a key to improving economic performance in developing countries. The adverse impact of RER misalignment on growth is stressed by Cottani et al. (1990) who asserted that despite many channels which were affected policy performance, there are many instances where RER was the main transmission mechanism of economic growth. In an overvalued exchange rate regime, exchange rate hurts the export sector and it causes higher imports, competing industries to fierce competition from foreign companies. Overvaluation might lead to tight monetary and fiscal policy (in an attempt by authorities to defend the currency), capital flight (in an anticipation of devaluation), severe decline in foreign direct investment and technological transfers, and a chronic economic recession.

Ghura and Grennes (1993) studied on pooled time series and cross-section data for 33 Sub-Saharan African countries. They found negative relationship between RER misalignment and economic performance. Further, they concluded that inappropriate domestic macroeconomic variables such as trade

and exchange rate policies appeared as important factors. The economic distress virtually in all Sub-Saharan African countries. Klau (1998) found that poor economic performance in the CFA zone from mid-1980s to early 1990s because of the franc overvaluation during those periods. While stable RER was fundamental for promoting East-Asian expansion, persistent RER misalignment hampered development in many African countries by Fosu (2000), Cottani et al. (1990), World Bank (1984). Based on the empirical evidence from developing countries, Cottani et al. (1990) found a strong negative correlation between per capita GDP growth and the measure of RER misalignment. Although instability of economic environment (including misalignment real exchange rate) and also hamper growth (Campa, 1993; Dixit and Pindyct, 1994; and Ghura and Grennes, 1993), Razin and Collins (1997) showed that RER misalignment associated with lower economic growth rate. Back drop of the earlier studies, in the study rendering the relationship between real exchange rate misalignment and economic growth in India. In Indian context, few studies are available on the real exchange rate misalignment and economic growth. The overvaluation of real exchange rate associated with slower growth; moderate to high growth rate (but not very higher growth rate), whereas undervaluation appeared to stimulate economic growth. It argued the RER misalignment distorts price signals, result in a misallocation of resources across sectors, and generate severe macroeconomic disequilibrium conditions. The remaining of this paper is organized as follows: the review of existing literature in Section 2; the data and the methodological issues are described in Section 3; estimation and empirical results in Section 4; finally, conclusions are drawn in Section 5.

2. Review of literature

There are limited studies available on the real exchange rate misalignment and economic growth. Here, we have provided some of the literature evaluating in Indian context Wong (2013) studied real exchange rate misalignment and economic in Malaysia. The Real exchange rate misalignment should be avoided to enable the allocation of resources in the economy according to fundamentals. He found that increase in real exchange rate misalignment will lead to a decrease in economic growth. Naseem and Hamizah (2013) studied the optimal measurement of resource allocation to avoid the real exchange rate misalignment (RERM) to attain the economic growth. The RERM can affect on economic growth particularly emerging

market economics.

Kandil (2004) studied exchange rate fluctuation and economic activity in developing countries. The supply of output varies with unanticipated price movements and the cost of the output produced. Anticipated exchange rate movements determine the cost of the output in the long run. In addition Unanticipated exchange rate movements determined economic condition in the short run such as net export, money demand, and output. Subsequently Aguirre and Calderon (2005) found negative correlation between GDP per capita and economic growth. Also the negative relationship between overvaluation exchange rate and economic growth rate. Prasad et. al., (2007) argued that capital inflows tend to appreciate domestic currencies which hurts the economic growth.

Further, Prasad et.al. (2007) suggested that real exchange rate was relative price to other foreign currency price; determined in general equilibrium along with all other relative prices. The Government policies were influenced by the REM and economic growth. To maintain a more depreciated real exchange rate requires higher saving relative to investment or lower expenditure relative to income. This can be achieved through the fiscal policy (a large structure surplus), income policy (redistribution of income to high savers through real wage compression), saving policy (compulsory saving schemes and pension reform), capital-account management (taxation of capital account inflows, liberalization of capital outflows), or currency intervention (building up foreign exchange reserves), experiences both in developed and developing countries have showed that those countries were targeted REM.

Drozd and Nosal (2008) revealed the short-run price elasticity trade co-existing with the long-run price elasticity in economic growth in developed and developing countries. Gala (2008) found the negative relationship between GDP per capita growth and a PPP-based index of RER overvaluation in a panel of 58 developing countries. Followed by the Rodrick (2008) developing countries revealed that undervaluation of the currency stimulate the economic growth. In addition, those tradable goods suffer disproportionately from the government or market failure that kept poor countries from converging towards high-income level. The two categories (a) institutional weakness and (b) product-market failure sustained REM depreciation increased the relative profitability of investing in tradable goods.

3. Data and Methodology

In order to explain the real exchange rate misalignment and economic growth in Indian perspectives, the study covered data from 1975-76 to 2011-2012, collected from RBI's Handbook of Statistics on Indian Economy. The study uses variables such as PC (per capita), CF (Capital Formation), RER (real effective exchange real variability), REMIS (Real effective exchange rate misalignment), PO (population growth rate) and TO (Terms of trade growth rate). All the data's are converted into growth forms. When move to estimation of the data, we have to check the variables having stationary properties with help of Augmented Dicky fuller test and Phillips – Parren test.

The real exchange rate misalignment constructed from real exchange rate with help of ARCH/GARCH Engle (1982) and Bollerslev (1986). The study uses ECM (error correction model) and Co-integration model to check a linear combination of integrated variables, while such variables revisited to check there is any co-integration. A principle feature of co-integrated variables is that their time paths are influenced by the extent of a deviation from long-run equilibrium. After all, if the system is return to long-run equilibrium. The movement of at least some of the variables must respect the magnitude to reach equilibrium. After examining the co-integration vector, if the trace statistic is more than the critical values, at 1 percent and 5 percent levels, we confirm the presence of co-integrating vectors among the variables. After the confirmation, in order to solve the long-run disequilibrium, the error correction mechanism can be used to assess short run dynamics.

4. Estimation and Results

The paper examines the presence of ARCH effect in the variance of real exchange rate misalignment which includes presented in table 1

one of the variables for estimating mean equation has effects on economic growth rate uses LM test. The test statistics consistently rejected the null hypothesis, therefore there is ARCH effect in the model. This amply justifies using a conditional standard deviation as a measure of volatility.

After an extensive search for an appropriate ARCH specification, we arrived at the following model for the construction of time varying conditional volatility of real exchange misalignment:

$$\log rer_t = 1.580 + 0.960 \log rer_{t-1} + \sqrt{\sigma_t^2} v_t \quad (0.14) \quad (0.00)$$

$$\sigma_t^2 = 0.011 - 0.63\varepsilon_{t-1}^2 + 0.128\sigma_{t-1}^2 \quad (0.56) \quad (0.43) \quad (0.09) \quad \dots(1)$$

L-B Q (5) = 0.54 (0.96) ARCH- LM (5) F = 0.087 (0.99)

where $\varepsilon_{t-1} = \sqrt{\sigma_{t-1}^2} v_{t-1}$ and figures in parentheses are p values. The mean equation contains a constant and AR (1) process while the variance equation follows ARCH/GARCH (1, 1) process. All the estimated coefficients of both mean and variance equations are statistically significant at conventional level. The Ljung-Box Q statistics that follows the χ_2 distribution suggest that the standardized residual of the mean equation v_t is free from autocorrelation up to five lag and the ARCH-LM test that follows the F distribution indicates that the null hypothesis of no ARCH effect in the square of standardized residuals cannot be rejected.

Before the estimation of any econometric mode, we need to check stationary of the data. In this juncture, we have taken variables such as per capita growth, real exchange rate, real exchange rate misalignment, gross capital formation, terms of trade and population are examine using the Augmented Dickey-Fuller test (ADF) and Phillips-Perron the results are

Table 1 Unit Root Test

Variable	ADF		PP	
	Level	1 st Difference	Level	1 st Difference
PC	3.768 (1.00)	-5.170 (0.00)	4.723 (1.00)	-5.230 (0.00)

Variable	ADF		PP	
	Level	1 st Difference	Level	1 st Difference
RER	-0.864 (0.78)	5.894 (0.00)	-0.864 (0.78)	-5.894 (0.00)
RERMIS	-5.707 (0.00)	-9.618 (0.00)	-5.702 (0.00)	-32.94 (0.00)
TO	-1.102 (0.705)	-4.525 (0.00)	-1.033 (0.73)	4.562 (0.00)
PO	-10.712 (0.00)	0.509 (0.98)	-7.173 (0.00)	-0.947 (0.76)
CF	1.260 (0.99)	-7.162 (0.00)	3.917 (1.00)	-7.130 (0.00)

Figure in parentheses are p-value

Table 1 explained ADF test indicates that null hypothesis rejected in the level forms are PC, RER, RERMIS, CF and TO, but RERMIS and PO reject the null hypothesis at 1 percent level. However, the ADF test rejected the null hypothesis at first difference of the PCGR, RER, RERMIS, CF, TO, RERMIS and PO. Further, the PP test has rejected the null hypothesis at 1 percent level of significance. In addition, Phillips-Perron (PP) unit root test indicates that null hypothesis of unit root test rejected in the level form in case of PCGR, RER, RERMIS, CF and TO, but RERMIS and PO reject the null hypothesis at 1 percent level. PP test, however, rejected the null hypothesis at first difference of the PCGR, RER, RERMIS, CF, TO, RERMIS and PO. The results of PP stationary test have rejected the null of stationary in the level 1 % level.

On the basis of the majority criteria, it has been inferred that variables, viz., PC, RER, RERMIS, CF and TO; RERMIS and OP are integrated of order I(1) and order I(0) respectively. After checked unit root properties, following variables shows I(1) and I(0) of the data series, we have to test co-integration use autoregressive distributed lag model (ARDL). The test check long-run relationship among the variables such as PCGR, RER, RERMIS, CF, TO, RERMIS and PO. A general-to-specific modeling approach guided by the short span of data and Akaike Information Criterion respectively to select a maximum lag order of 2 for the conditional ARDL-VECM.

With analysis of the real exchange rate misalignment and

economic growth to estimate long-run relationship among the variables use the ARDL approach. Econometric literature has abundant techniques to investigate relationships among non-stationary macroeconomic variables and prominent among them are univariate co-integration technique (Engle-Granger (1987), multivariate co-integration technique (Johansen and Juselius (1990) and newly developed autoregressive distributed lag (ARDL) model. Nevertheless, we use the bounds test procedure proposed by Pesaran, and Shin (1998) as it does not involve pre-testing the integration properties of the data. It yields asymptotically efficient long-run estimates irrespective of whether the underlying regresses are I (0) or I (1) process. The statistic underlying this procedure is the familiar Wald which used to test the significance of lagged levels of the variables under consideration in a conditional unrestricted equilibrium error correction model (ECM). Another reason for preferring the ARDL approach over other approaches is that it is more robust and performs better for small sample sizes.

This present study used ARDL approach to estimate long-run relationship and short-run dynamics of all the variables are not integrated of the same order and small sample is size. The ARDL approach involves estimating the conditional error correction to predict long run relationship. The conditional VECM in the ARDL framework of interest of the present study could be specified as under this procedure involves two steps. First, we estimates an unrestricted error correction model of reserves:

$$\log pcgdp_t = \beta_0 + \sum_{i=0}^m b_i \log pcgdp_{t-i} + \sum_{i=0}^n c_i \log rer_{t-i} + \sum_{i=0}^n d_i \log rermis_{t-i} + \sum_{i=0}^p e_i \log cf_{t-i} + \sum_{i=0}^q f_i \log to_{t-i} + \sum_{i=0}^r g_i \log po_{t-i} + \gamma_1 \log pcgdp_{t-1} + \gamma_2 \log rer_{t-1} + \gamma_3 rermis_{t-1} + \gamma_4 cf_{t-1} + \gamma_5 to_t + \gamma_6 po_t + \varepsilon_t \quad (2)$$

where X_t is a vector of deterministic variables; $b_i, c_i, d_i, e_i, f_i, g_i$ are short run dynamic coefficients; γ s are long-run multiplier; and ε_t is white noise error. Rejecting the null hypothesis $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = 0$ indicates that there exists long-run relationship among the variables, irrespective of variables' integration properties. However, we have to use the critical bounds available in Pesaran, Shin and Smith (1996) for testing the null, as the asymptotic distribution of Wald or F statistics is nonstandard. If variables have long-run relationship, we estimate the long-run coefficients and the corresponding error correction model. This involves estimating an autoregressive distributed lag model:

$$\log pcgdp_t = \alpha_0 + \alpha_{1t} + \sum_{i=1}^{q_1} \delta_i \log pcgdp_{t-i} + \sum_{i=1}^{q_2} \lambda_i \log rer_{t-i} + \sum_{i=1}^{q_3} \varphi_i rermis_{t-i} + \sum_{i=1}^{q_3} \psi_i \mathbf{f}_{t-i} + \sum_{i=1}^{q_5} \zeta_i \mathbf{b}_{t-i} + \sum_{i=1}^{q_6} \xi_i \mathbf{p}_{t-i} + \varepsilon_t \quad (3)$$

The OLS estimates of equation (3) can be used to obtain the long-run relationship¹:

$$\log pcgdp_t = \alpha_0 + \alpha_{1t} + \phi_1 \log rer_t + \phi_2 \log rermis_t + \phi_3 \log \mathbf{f}_t + \phi_4 \log \mathbf{b} + \phi_5 \log \mathbf{p} + v_t \quad (4)$$

We estimate the error correction representation of benchmark regression equation $\{\log pcgdp_t | \log rer_t, \log rermis_t, \log \mathbf{f}_t, \log \mathbf{b}, \log \mathbf{p}\}$. The lag orders i.e. the length of m, n and p are determined by Akaike information criterion. In all the specifications, a linear trend and a constant are included.

Table 2. F-Stat and Cointegration test

Variables	AIC[1,0,0,0,2,0]	
RER_t	0.043(0.02)	
$RERMIS_t$	-0.882(0.37)	
TO_t	-0.060(0.20)	
PO_t	-3.886(0.00)	
CF_t	0.260(0.00)	
Constant	9.428(0.00)	
T	0.042(0.00)	
ecm_{t-1}	-0.596(0.00)	
F – Stat	Upper Bound	Lower bound
2.76	2.53	3.59

Note: Figure in [#] indicate the lag order of variables chosen by Akaike Information Criterion and figure in (#) are p-values.

The critical bounds for 10% significance level in the case six variable models with constant and a linear trend are 2.53-3.59 (Pesaran et al., 1996). If $F > FU$, one can reject;

$$\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = 0$$

hence, there is a long-term relationship among variables. If $F < FL$, one cannot reject.

$$\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = 0$$

Hence, there is no long-run relationship. Finally, if $FL < F < FU$ the inference is inconclusive.

The F statistics for testing the null hypothesis of long-run relationships are produced in Table 2. The F statistics for the benchmark model are less than the lower bound for phase while it falls in the inconclusive region; suggested that there was no long-run relationship among these five variables. When the benchmark model has augmented by incorporating log of PC, RER, RERMIS, CF, TO, RERMIS and PO there is long-run equilibrium relationship. On the other hand, the coefficient of gross capital formation, population growth, constant and trend has statistically significant at the level of 1% because surge in capital flows leads to an increase in aggregate demand and rise in the price of non-traded goods, which would eventually reflect in appreciation of the real exchange rate. The country would keep nominal exchange rate under the control because trade would be under the control. The coefficient of real exchange rate misalignment values showed there was negative effect to economic growth. The life expectancy ratio would reduce in era of negative real exchange because the people earning lower level compare to other countries. The flexible exchange rate system brings more capital flow into the economy. The developed countries exchange rate not fluctuate compare with developing countries exchange rate because of the fundamental economic variables are very strong. Reinhart and Rogoff (2004).

Therefore, the results showed the long-run relationship between per capita GDP were determinants of real exchange and real exchange rate misalignment. The trade openness showed at -3.886 negative relationships with per capita GDP growth at one percent level of significance. The real exchange rate was competitive levels and avoiding excessive volatility facilitated efforts to capitalize on these fundamentals. Developed countries had experience kept the real exchange rate at competitive levels to achieve stable economic growth. Also shows that high levels of exchange rate volatility can be disruptive to exports and investment.

The Gross Capital formation showed 0.260 positive relationships

with per capita GDP growth, increase the capital formation in domestic countries in relative to foreign countries; the domestic countries have increased the productivity; the people have employment; increase level of per capita GDP. After 1991 India's liberalization brought more capital from the other countries. With dismantled the interest rate, capital/current account convertibility, devaluation of rupee. The population growth showed there negative sign with per capita GDP, decrease the population growth increase the per capita income. Altering the exchange rate regime allowed for a significant increase in volatility, the nominal exchange rate would increase relative to the foreign currency because fluctuation the major exchange rate over the world market.

The coefficients of ECM converge to equilibrium statistically significant at 1% percent coefficient with a negative sign. According to Bannerjee et al (1998), the highly significant and error correction term further confirms the existence of a stable long-run relationship and coefficient of ecm_{t-1} were equal to -0.596 and imply that the deviation from the long term growth rate in PC corrected by 0.59% in model. In other words, the highly significant error correction term suggests that more than 0.59% of disequilibrium in the previous year corrected in the current year for model.

5. Conclusion

After 1991, India acquired huge capital inflows from the foreign countries. It has dismantled the interest rate, capital/current account convertibility, devaluation of rupee. The results showed that the population growth indicates negative sign with per capita GDP was decreased. Altering the exchange rate regime allowing significant increase volatility under market based exchange rate system due to major exchange rate in the world market. The volatility and misalignment of RER from its equilibrium level adversely affects the competitiveness and macroeconomic fundamental variable in developed and developing countries.

The study found that the REM and economic growth showed positive association between the variables. Further, the determinants of REM become important, a surge in capital flows lead to an increase in aggregate demand and rise in the price of non-traded goods that reflected in appreciation of the real exchange rate. In addition, excess capital flows led to nominal exchange rate appreciation. Increased the external openness of an economy then increased, demand for imported goods and

declined for demand of non-traded goods, the results to decline in the prices of non-trade goods and real exchange rate depreciation. The results showed that the long-run relationship between per capita economic growth rate the prime determinants of real exchange and economic growth.

Reference

1. Aguirre, A., and Calderon, C. (2005). *Real Exchange Rate Misalignment and economic Performance*, Central Bank of Chile Working Papers, No 315.
2. Balassa, B. (1964). *The Purchasing Power Parity Doctrine: A Reappraisal*, *Journal of Political Economy*, 584-596.
3. Bollerslev, T. (1986). *Generalized Autoregressive Conditional Heteroscedasticity*, *Journal of Econometrics*, 31,307-327.
4. Campa, M. (1993). *Entry by foreign firms in the U.S. under exchange rate uncertainty*, *The Review of Economics and Statistics*,75,614-22.
5. Cottani, J., Cavallo, D, and Kahn. S. (1990). *Real Exchange Rate Behavior and Economic Performance in LDCs*, *Economic Development and Cultural Change*, 39(1), 61–76.
6. Dixit, A., and Pindyck, R. (1994). *Investment under uncertainty*, Princeton University Press.
7. Domac, I., and Shabsigh, G. (1999). *Real Exchange Rate Behavior and Economic Growth: Evidence from Egypt, Jordan, Morocco, and Tunisia*, IMF Working Paper No. 99/40 (Washington: International Monetary Fund)
8. Drozd, L. A., and Nosal. J.B. (2008). *Understanding International Prices: Customers as Capital*. Staff Report no. 411, Federal Reserve Bank of Minneapolis
9. Engle, R. (1982). *Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of United Kingdom inflation*, *Econometrica*, 50, 987-1007.
10. Engle, R. F., and Granger, C. W. J. (1987). *Co-integration and error correction: representation, estimation and testing*, *Econometrica*,55, 251–276.
11. Fosu, A.K. (2000). *The international dimension of African economic growth*, Working Papers, 34, Center for International Development at Harvard University.
12. Ghura, D., and Grennes, T.J. (1993). *The real exchange rate and macroeconomic performance in Sub-Saharan Africa*, *Journal of Development Economics*, 42, 155-74.
13. Harberger, A. (2003). *Economic Growth and The Real Exchange Rate: Revisiting the Balassa- Samuelson Effect*, Paper prepared for a Conference organized by The Higher School of Economics, Moscow.
14. Johansen, S., and Juselius, K. (1990). *Maximum likelihood estimation and inference on co-integration with application to the demand for money*, *Oxford Bulletin of Economics and Statistics*, 52(2), 169-210.
15. Klaw, M. (1998). *Exchange rate regimes and inflation and output in Sub-Saharan countries*, BIS Working Papers, No. 53, Basle: Bank of International Settlements.
16. Kao, C. (1999). *Spurious Regression and Residual-Based Tests for Co-integration in Panel Data*, *Journal of Econometrics*, 90, 1-44.
17. Gala, P. (2008). *Real exchange rate levels and economic development: theoretical analysis and econometric evidence*, *Cambridge Journal of Economics*, 32(2), 273-288
18. Kandil M.(2004). *Exchange Rate Fluctuations and Economic Activity in Developing Countries: Theory and Evidence*, *Journal of Economic Development*, 29(1), 85-108.
19. Naseem N.A.M and Hamzah M.S. (2013) "Exchange Rate Misalignment and Economic Growth: Recent Evidence in Malaysia", *Pertanika Social Sciences & Humanities*, 21 (S), 47 – 66.
20. Pesaran, M.H., and Shin, Y. (1998). *An autoregressive distributed lag modeling approach to Cointegration Analysis*, in: Strom, S., Diamond, P. (eds.), *Centennial Volume of Ragnar Frisch*, Cambridge University Press.
21. Pedroni, P. (1999). *Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors*, *Oxford Bulletin of Economics and Statistics*, 61, 653–70.
22. Pesaran, M.H., Shin, Y., and Smith, R.J. (1996). *Testing for the existence of a long-run relationship*, DAE Working Paper No. 9622, Department of Applied Economics, University of Cambridge.
23. Prasad, E., Rajan, R.G., and Subramanian, A. (2007). *Foreign Capital and Economic Growth*, *Brookings Papers on Economic Activity*, 1.
24. Razin, O., and Collins, S.M. (1997). *Real exchange rate misalignment and economic growth*, Mimeo.
25. Rodrik, D. (2008). *The Real Exchange Rate and Economic Growth: Theory and Evidence*. Working Paper, No.0141, Weather head Center for International Affairs, Harvard University
26. World Bank (1984). *Towards sustained development in Sub-Saharan Africa*, New York Oxford University Press.
27. Wong, H.T., (2013). "Real exchange rate misalignment and economic growth in Malaysia", *Journal of Economic Studies*, 40(3), 298 - 313

¹The standard errors of co-integrating coefficients can be derived from delta-method.

The Role of SEBI in Indian Capital Market

Esha Gupta

Abstract

Generally people make plan some part of their income to invest. They may invest money in bank, shares, debentures and mutual funds or can have insurance policy. Generally, higher risk is associated with investments of stock market. For the protection of such investors a regulatory authority has been established called as SEBI by the government. The paper shows the role of SEBI (Securities and Exchange Board of India) as regulatory body for the protection of investors' money and the various functions performed by the SEBI. The Primary function of Securities and Exchange Board of India under the SEBI Act, 1992 is the protection of the investors' interest and the healthy development of Indian financial markets. It is very difficult task for the regulators to prevent the scams, regulating and monitoring each and every segment of the financial markets. SEBI had issued new guidelines for the protection of the investors through the Securities and Exchange Board of India (Disclosure and Investor Protection) Guidelines, 2000.

Key Words

Investment, Capital Market, Stock Exchange, Intermediaries and Insider Trading

Objectives Of The Study

1. To outline the role of Securities and Exchange Board of India in the capital markets
2. To know key functions of the SEBI

Introduction

The Securities and Exchange Board of India was established as an interim administrative body on 12 April 1988 by the Government of India. The Securities and the Exchange Board of India is the national regulatory body for the securities market, set up under the securities and Exchange Board of India Act, 1992, to protect the interest of investors in securities and to promote the development of, and to regulate the securities market and for matters connected therewith and incidental too.

SEBI is regulator to control Indian capital market. Since its establishment in 1992, it is doing hard work for protecting the interests of Indian investors. SEBI gets education from past cheating with naive investors of India. Now, SEBI is more strict with those who commit frauds in capital market.

SEBI as the watchdog of the industry has a crucial role in ensuring that the market participants perform their duties in accordance with the regulatory norms. The Stock Exchange as a responsible Self Regulatory Organization (SRO) functions to regulate the market and its prices as per the prevalent regulations. SEBI play complimentary roles to enhance the investor protection and the overall quality of the market.

The SEBI in regulating Indian capital market is very important because government of India can only open or take decision to open new stock exchange in India after getting advice from SEBI. If SEBI thinks that it will be against its rules and regulations, SEBI can ban on any stock exchange to trade in shares and stocks.

Its main objective was to promote orderly and healthy growth of securities and to provide protection to the investors.

The Ministry of Finance of the Government of India has overall

administrative control over its functions. On 30th January 1992, it was given a statutory status through an ordinance, which later on was replaced by Act of Parliament known as Securities and Exchange Board of India Act, 1992. SEBI is considered as watchdog of the securities market.

Reasons for the Establishment of SEBI:

During 1980s, there was tremendous growth in the capital market due to increasing participation of public. This led to many malpractices like Rigging of prices, unofficial premium on new issues, violation of rules and regulations of stock exchanges and listing requirements, delay in delivery of shares etc. by the brokers, merchant bankers, companies, investment consultants and others involved in the securities market.

This resulted in many investor grievances. Because of lack of proper penal provision and legislation, the government and the stock exchanges were not able to redress these grievances of the investors. This necessitated a need for a separate regulatory body, and hence Securities and Exchange Board of India was established

Mission of SEBI

Securities & Exchange Board of India (SEBI) formed under the SEBI Act, 1992 with the prime objective of:

- Protecting the interests of investors in securities,
- Registering and regulating the working of stock brokers, sub-brokers etc.
- to promote the development of Securities Market;
- to regulate the securities market
- For matters connected therewith or incidental thereto.
- Promoting and regulating self-regulatory organizations and
- Prohibiting fraudulent and unfair trade practices calling for information from, undertaking inspection, conducting inquiries and audits of the stock exchanges, intermediaries, self-regulatory organizations, mutual funds and other persons associated with the securities market and for matters connected therewith or incidental.

Board Management

The Central Government has constituted a Board by the name of SEBI under Section 3 of SEBI Act. The head office of SEBI is in Mumbai. SEBI may establish offices at other places in India. SEBI consists of the following members, namely:-

- (a) a Chairman;
- (b) 2 members from amongst the officials of the Ministry of the Central Government dealing with Finance and administration of Companies Act, 1956;
- (c) one member from amongst the officials of the Reserve Bank of India;
- (d) five other members of whom at least three shall be whole time members to be appointed by the Central Government.

The general superintendence, direction and management of the affairs of SEBI vests in a Board of Members, which exercises all powers and do all acts and things which may be exercised or done by SEBI.

The Chairman and members referred to in (a) and (d) above shall be appointed by the Central Government and the members referred to in (b) and (c) shall be nominated by the Central Government and the Reserve Bank respectively. The Chairman and the other members are from amongst the persons of ability, integrity and standing who have shown capacity in dealing with problems relating to securities market or have special knowledge or experience of law, finance, economics, accountancy, administration or in any other discipline which, in the opinion of the Central Government, shall be useful to SEBI.

Functions and Powers of SEBI

Chapter IV of Act highlights the Powers and Functions of SEBI

Regulatory Functions

1. Regulation of Business in the Stock Exchanges.
2. Registration and Regulation of the Working of Intermediaries and Mutual Funds, Venture Capital Funds & Collective Investment Schemes.

3. Prohibiting fraudulent and unfair trade practices and insider trading in the securities market.
4. Investor education and the training of intermediaries.
5. Inspection and inquiries.
6. Regulating substantial acquisition of shares and take-over.
7. Performing such functions and exercising such powers under the provisions of the Securities Contracts (Regulation) Act, 1956 as may be delegated to it by The Central Government;
8. Levying fees or other charges for carrying out the purposes of this section.

Developmental Functions

1. Promoting investors education and training of intermediaries.
2. Conducting research and publishing information useful to all market participants.
3. Promotion of fair practices and self regulatory organizations.

Capital Market

The capital market is a market for long-term funds both equity and debt-and funds raised within and outside of the country. The primary market refers to the long-term flow of funds from the surplus sector to the government and corporate sector (through primary issues) and to banks and non-banks financial intermediaries (through secondary issues). A primary issue of the corporate sector leads to capital information. The secondary market is a market for outstanding securities. Unlike primary issues in the primary market which result in capital information, the secondary market facilitates only liquidity and marketability of outstanding debt and equity instruments.

Capital Market in India

After the securities are issued in the primary market, they are traded in these secondary market by the investors. The

stock exchanges provide the necessary platform for trading in secondary market and also for clearing and settlement. The securities are traded, cleared and settled within the regulatory framework prescribed by the Exchanges and the SEBI. Till recently, it was mandatory for the companies to list their securities on the regional stock exchange nearest to their registered office, in order to provide opportunity to investors to invest in the securities of local companies. However, following the withdrawal of this restriction, the companies have an option to choose from any one of the existing stock exchanges in India to list their securities. Due to the earlier regulation requiring companies to get listed first at the regional stock exchange, there are in all 23 exchanges operating today in the country.

With the increased application of information technology, the trading platforms of all the stock exchanges are accessible from anywhere in the country through their trading terminals. However, the trading platform of NSE is also accessible through Internet. In a geographically widespread country like India, this has significantly expanded the reach of the exchanges to the homes of ordinary investors. As a result of the initiatives taken by the Government and the Regulators, the market microstructure has been refined and modernized. The securities market moved from T+3 settlement periods to T+2 rolling settlement with effect from April 1, 2003. Further, straight through processing has been made mandatory for all institutional trades executed on the stock exchange. RBI to settle inter-bank transactions online at real time mode has also introduced deal time gross settlement. These developments in the securities market provide the necessary impetus for growth and development, and thereby strengthen the emerging market economy in India.

Importance of Capital Market

The capital market serves a very useful purpose by pooling the capital resources of the country and making them available to the enterprising investors well developed capital markets augment resources by attracting and lending funds on the global scale. A developed capital market can solve this problem of paucity of funds. For an organized capital market can mobilize and pool together even the small and scattered savings and augment the availability of investible funds. While the rapid growth of capital markets, the growth of joint stock business has in its turn encouraged the development of capital markets. A developed capital market provides a number of

profitable investment opportunities for small savers

Power of SEBI in regulating Indian Capital Market

1. Power to make rules for controlling stock exchange: SEBI has power to make new rules for controlling stock exchange in India. For example, SEBI fixed the time of trading 9 AM and 5 PM in stock market.

2. To provide license to dealers and brokers: SEBI has power to provide license to dealers and brokers of capital market. If SEBI sees that any financial product is of capital nature, then SEBI can also control to that product and its dealers.

3. To check fraud in Capital Market: SEBI has many powers for stopping fraud in capital market. It can ban on the trading of those brokers who are involved in fraudulent and unfair trade practices relating to stock market. It can impose the penalties on capital market intermediaries if they involve in insider trading.

4. To Control the Merger, Acquisition and Takeover the companies: Many big companies in India want to create monopoly in capital market. So, these companies go for merging. SEBI sees whether this merger or acquisition is for development of business or not.

5. To audit the performance of stock market: SEBI can audit the performance of different Indian stock exchange for bringing transparency in the working of stock exchanges.

6. To make new rules on carry - forward transactions: Share trading transactions carry forward cannot exceed 25% of broker's total transactions. 90 days limit for carry forward.

7. To create relationship with ICAI: ICAI is the authority for making new auditors of companies. SEBI creates good relationship with ICAI for bringing more transparency in the auditing work of company accounts because audited financial statements are mirror to see the real face of company and after this investors can decide to invest or not to invest.

8. Introduction of derivative contracts on Volatility Index : For reducing the risk of investors, SEBI has now been decided to permit Stock Exchanges to introduce derivative contracts on Volatility Index,

9. To require report of Portfolio Management Activities:

SEBI has also power to require report of portfolio management to check the capital market performance. Recently, SEBI sent the letter to all Registered Portfolio Managers of India for demanding report.

10. To educate the investors: Time to time, SEBI arranges scheduled workshops to educate the investors.

The Capital Market in India

Raising capital by issuing securities is one of the many sources of funds available to the corporations. Companies issue securities capital (long term funds) to meet their capital expenditure like modernization, expansion and diversification. These securities are issued directly to the retail investors as well as the institutions. Capital market comprises of primary market and secondary market. Primary market is a place for issuing new securities and the mechanism involved is defined as primary market or new issue market. The primary market, however, does not have any specific physical geographic presence unlike the secondary market. The primary issues can be presented in the form of public issues, right issues and private placement. Thus, the primary market facilitates capital formation by issuing securities. The funds raised thus are utilized by company for its capital expenditure decisions. The primary market facilitates investment by investors. It mobilizes funds for the government, corporate and financial institutions. The financial intermediaries like underwriters, brokers and financial institutions facilitate the interaction between the corporation issuing securities and the investors desirous of investing in securities. The instrument of primary market are equity shares, preference shares, debentures etc. secondary market is a second hand market for trading of securities already issued in the primary market.

PRIMARY MARKET

Introduction

Primary market provides opportunity to issuers of securities, Government as well as corporate, to raise resources to meet their requirements of investment or discharge some obligation. The issuers create and issue fresh securities in exchange of funds through public issues or as private placement. They may issue the securities at face value or at a discount/premium and these securities may take a variety of forms such as equity,

debt or some hybrid instrument.

SEBI & PRIMARY MARKET:

Measures undertaken by SEBI:

- A. Entry norms
- B. Promoters' contribution
- C. Disclosure
- D. Book building
- E. Allocation of shares
- F. Market intermediaries

Role of SEBI with respect to Public Issues:

The Securities and Exchange Board of India (SEBI) govern the rules, regulations and procedures relating to public issues in India. Any company going public in India should get approval from SEBI before opening its IPO. Issuer companies lead managers submit the public issue prospectus to SEBI, provide clarification, make changes to the prospectus suggested by SEBI and get it approved. In simple words SEBI validate the IPO prospectus and make sure all the declaration made in this document are correct and also make sure that document has enough information to help investors to take decision before applying shares in an IPO. Primarily issues can be classified as a Public, Rights or preferential issues. Where public and rights issues involve a detailed procedure, private placements or preferential issues are relatively simpler.

Public issues can be further classified into initial Public offerings and further public offering. In a public offering, the issuer makes an offer for new investors to enter its shareholding family. The issuer company makes detailed disclosures as per the DIP guidelines in its offer document and offers it for subscription. These significant features are illustrated below:

Initial Public Offering (IPO) is when an unlisted company makes either a fresh issue of securities or an offer for sale of its existing securities or both for the first time to the public. This paves way for the listing and trading of the issuer's securities.

A Further Public Offering (FPO) is when already listed company makes either a fresh issue of securities to the public or an offer for sale to the public, through an offer document. An offer for sale in such scenario is allowed only if it is made to satisfy listing or continuous listing obligations. Rights Issue (RI) is when a listed company which proposes to issue fresh securities to its existing shareholders as on a record date. The rights are normally offered in a particular ratio to the number of securities held prior to the issue.

SECONDARY MARKET

Introduction

Secondary market is the place for sale and purchase of existing securities. It enables an investor to adjust his holdings of securities in response to changes in his assessment about risk and return. It also enables him to sell securities for cash to meet his liquidity needs. It essentially comprises of the stock exchanges, which provide platform for trading of securities and a host of intermediaries who assist in trading of securities and clearing and settlement of trades. The securities are traded, cleared and settled as per prescribed regulatory framework under the supervision of the Exchanges and oversight of SEBI.

Listing of Securities: -Listing means admission of securities of an issuer to trading privileges on a stock exchange through a formal agreement. The prime objective of admission to dealings on the Exchange is to provide liquidity and marketability to securities, as also to provide a mechanism for effective management of trading.

Stock Exchanges

According to Securities Contract Regulation Act 1956, a stock exchange can be defined as any body of individuals, whether incorporated or not, constituted for the purpose of assisting, regulating or controlling the business of buying, selling and dealing in securities. Thus, stock exchanges are the physical market for trading of securities. Following are the functions:

1. It enables individual/firms to invest their surplus funds into stock market by purchasing specified securities at specified rate.
2. It enables existing security holders to liquidate their investment any time they wish to.



3. It enables the business enterprises to raise money from market.

SEBI & SECONDARY MARKET: Reforms in the secondary market: - A. Governing board B. Infrastructure C. Settlement & clearing D. Debt market E. Price stabilization F. Delisting G. Brokers H. Insider Trading

Governing board

- 1. Brokers and non-brokers representation made 50:50
- 2. 60% of brokers in arbitration, disciplinary & default committees
- 3. for trading members 40% representation-

Infrastructure

On-line screen based trading terminals

Settlement & clearing

- 1. Weekly settlements
- 2. Auctions for non-delivered shares within 80 days of settlement
- 3. Advice to set up clearing houses, clearing corporation or settlement guarantee fund.
- 4. Warehousing facilities permitted by SEBI.

PERFECTIONS IN THE CAPITAL MARKET

An efficient capital market is the market in which the current market price of securities reflects all available information. No single investor can beat the market. Securities generate returns just equal to their risk adjusted rate. Weak forms of efficiency theory suggest that one cannot beat the market by knowing historical prices. Semi strong forms of efficiency suggest that one cannot consistently beat the market using publicly available information. No single investor can beat the market with the help of the information which is available to all. Strong form of the efficiency states that no information of any kind can be used to beat the market. Empirical evidence suggests that this form of efficiency cannot exist. Only higher advanced economies show fairly efficient capital market. The rest are imperfect capital markets.

The following features define the perfect capital market:

- There are no entry barriers.
- There are a large number of buyers and sellers.
- There are no transaction costs
- There is no tax difference on earnings.
- There is free trading concept.
- Information is freely available to all.
- No investor/member/dealer can outperform the market.
- No security is either overvalues or undervalued in the market.
- The current share price of any given company at any point of time is fair and reasonable.
- Investor's activities are logical and investors are rational in their approach.

Reasons for Establishment of SEBI:

With the growth in the dealings of stock markets, lot of malpractices also started in stock markets such as price rigging, 'unofficial premium on new issue, and delay in delivery of shares, violation of rules and regulations of stock exchange and listing requirements. Due to these malpractices the customers started losing confidence and faith in the stock exchange. So government of India decided to set up an agency or regulatory body known as Securities Exchange Board of India (SEBI).

ADVANTAGES OF SEBI

- A. It promotes healthy and orderly growth of securities market and protects investors.
- B. It helps in maintaining stedy flow of savings into capital market.
- C. It helps in regulating security market and ensures fair practice by issuers to help them raise resources at minimum

cost.

D. It promotes efficient services by brokers, merchant bankers and other intermediaries to make them professional and competitive.

E. It helps and contributes in promoting investor education, training of intermediaries and it conducts research and provides information to market participants.

F. SEBI operated to develop the capital market.

LIMITATIONS OF SEBI

A. No dent on price manipulation.

B. Poor rate of conviction and very few cases of exemplary penal action.

C. No due process for framing/changing regulations.

D. Waking up to trouble spots too late in the day.

E. Turning a blind eye in bullish market.

F. Implementation of existing disclosure norms inadequate.

G. No warning on US-64, MIPs, collective investment and finance schemes

H. Regulatory bias towards corporate sector and large investors.

I. Indications of extraneous pressures, including government.

J. No disclosure norms for mergers, demergers, and asset sell-offs inter-corporate transactions.

SEBI (STOCK BROKERS & SUB-BROKERS) REGULATIONS, 1992

In terms of regulation 2(g), "small investor" means any investor buying or selling securities on a cash transaction for a market value not exceeding rupees fifty thousand in aggregate on any day as shown in a contract note issued by the stock-broker.

Registration of Stock Broker

A stock broker applies in the prescribed format for grant of

a certificate through the stock Exchange or stock exchanges, as the case may be, of which he is admitted as a member (Regulation 3). The stock exchange forwards the application form to SEBI as early as possible as but not later than thirty days from the date of its receipt.

SEBI takes into account for considering the grant of a certificate all matters relating to buying, selling, or dealing in securities and in particular the following, namely, whether the stock broker:

(a) is eligible to be admitted as a member of a stock exchange,

(b) Has the necessary infrastructure like adequate office space, equipment and man power to effectively discharge his activities,

(c) Has any past experience in the business of buying, selling or dealing in securities,

(d) is subjected to disciplinary proceedings under the rules, regulations and bye-laws of a stock exchange with respect to his business as a stockbroker involving either himself or any of his partners, directors or employees, and

(e) Is a fit and proper person.

SEBI on being satisfied that the stock-broker is eligible, grants a certificate to the stock-broker and sends intimation to that effect to the stock exchange or stock exchanges, as the case may be. Where an application for grant of a certificate does not fulfill the requirements, SEBI may reject the application after giving a reasonable opportunity of being heard.

Registration of Sub-Broker

An application by a sub-broker for the grant of a certificate is made in the prescribed format accompanied by a recommendation letter from a stockbroker of a recognized stock exchange with whom he is to be affiliated along with two references including one from his banker (Regulation 11A). The application form is submitted to the stock exchange of which the stockbroker with whom he is to be affiliated is a member. The eligibility criteria for registration as a sub-broker are as follows:

(i) In the case of an individual:



- (a) The applicant is not less than 21 years of age,
- (b) The applicant has not been convicted of any offence involving fraud or dishonesty,
- (c) The applicant has at least passed 12th standard equivalent examination from an institution recognized by the Government, and **Provided** that SEBI may relax the educational qualifications on merits having regard to the applicant's experience.
- (d) The applicant is a fit and proper person.

(ii) In the case of partnership firm or a body corporate the partners or directors, as the case may be, shall comply with the following requirements:

- (a) The applicant is not less than 21 years of age,
- (b) The applicant has not been convicted of any offence involving fraud or dishonesty,
- (c) The applicant has at least passed 12th standard equivalent examination from an institution recognized by the Government. **Provided** that SEBI may relax the educational qualifications on merits having regard to the applicant's experience.

The stock exchange on receipt of an application, verifies the information contained therein and certifies that the applicant is eligible for registration. The stock exchange forwards the application form of such applicants who comply with all the requirements specified in the Regulations to SEBI as early as possible, but not later than thirty days from the date of its receipt. SEBI on being satisfied that the sub-broker is eligible, grants a certificate to the sub-broker and sends intimation to that effect to the stock exchange or stock Exchanges as the case may be. SEBI grants a certificate of registration to the appellant subject to the terms and conditions. Where an application does not fulfil the requirements, SEBI may reject the application after giving a reasonable opportunity of being heard. The sub-broker shall -

- (a) pay the fees as specified in Schedule III,
- (b) abide by the Code of Conduct specified in Schedule II,

- (c) enter into an agreement with the stock-broker for specifying the scope of his authority and responsibilities.
- (d) comply with the rules, regulations and bye-laws of the stock exchange.
- (e) not be affiliated to more than one stock broker of one stock exchange.

SEBI (PROHIBITION OF INSIDER TRADING) REGULATIONS, 1992

Insider trading is prohibited and is considered an offence vide SEBI (Insider Trading) Regulations, 1992. The definitions of some of the important terms are given below:

“Dealing in securities” means an act of subscribing, buying, selling or agreeing to subscribe, buy, sell or deal in any securities by any person either as principal or agent.

“Insider” means any person who, is or was connected with the company or is deemed to have been connected with the company, and who is reasonably expected to have access to unpublished price sensitive information in respect of securities of a company, or who has received or has had access to such unpublished price sensitive information.

“Connected Person” means any person who-

- (i) is a director, as defined in clause (13) of section 2 of the Companies Act, 1956 of a company, or is deemed to be a director of that company by virtue of sub-clause (10) of section 307 of that Act, or
- (ii) Occupies the position as an officer or an employee of the company or holds a position involving a professional or business relationship between himself and the company whether temporary or permanent and who may reasonably be expected to have an access to unpublished price sensitive information in relation to that company.

“Price sensitive information” means any information which relates directly or indirectly to a company and which if published is likely to materially affect the price of securities of that company. The following shall be deemed to be price sensitive information: -

- (i) periodical financial results of the company;
- (ii) intended declaration of dividends (both interim and final);
- (iii) issue of securities or buy-back of securities;
- (iv) any major expansion plans or execution of new projects;
- (v) amalgamation, mergers or takeovers;
- (vi) disposal of the whole or substantial part of the undertaking;
- (vii) any significant changes in policies, plans or operations of the company.

Unpublished means information which is not published by the company or its agents and is not specific in nature. Speculative reports in print or electronic media shall not be considered as published information.

Prohibition on dealing, communicating or counselling (Regulation 3)

No insider shall

- 1. either on his own behalf or on behalf of any other person, deal in securities of a company listed on any stock exchange when in possession of any unpublished price sensitive information;
- 2. Communicate, counsel or procure, directly or indirectly, any unpublished price sensitive information to any person who while in possession of such unpublished price sensitive information shall not deal in securities; Provided that nothing contained above shall be applied.

Conclusion

On the basis paper, we can say that SEBI play crucial role in the development of capital market. Government has set up a regulatory authority in order to protect the interest of the shareholder and for the smooth working of the capital market. SEBI introduced the regulations for primary and secondary market intermediaries, bringing them with in its regulatory

framework. Reforms by SEBI in the primary market included improved disclosure standards, introduction to the prudential norms and simplification of issue procedure.

References

Books

1. I.M. Pandey, "Financial Management", Vikas Publishing, New Delhi.
2. Prasanna Chandra, "Financial Management – Theory and Practice", Tata McGraw Hill, New Delhi.
3. M.P. Pandikumar, "Accounting & Finance for Managers", Excel Books, New Delhi.
4. Kapil Sheeba, "Financial Management" Pearson, New Delhi.

Websites

- <http://corporatelawreporter.com/2013/10/30/role-sebi-capital-market-developments-challenges>
- www.svtuition.org/2010/05/role-of-sebi-in-indian-capital-market.htm
- https://en.wikipedia.org/wiki/Securities_and_Exchange_Board_of_India

The Seasonal Anomalies in the Investors' Fear Gauge index

Imlak Shaikh

Abstract

This study examines the seasonal anomalies in the volatility index also known as Investors' fear-gauge-index. Unlike the anomalies reported for the stock indices, we also document presence of pronounced day-of-the-week, options expiration and month-of-the-year anomalies for the implied volatility index. The sample consists of daily closing values of India VIX ranging from November, 2007 to October, 2013. We employ the dummy ordinary least squares (DOLS) in a conditional volatility framework to analyze the various seasonal anomalies prevailing in the Indian securities market. The novel aspect of the work is that we examine volatility index that is associated with investors' fear and stock returns, and provide some insights on the application of EGARCH vs. GARCH model to analyze the information asymmetry. The empirical results show that Monday effect is present in the Indian securities market followed by options expiration effect and October and December effects. The practical implications of these anomalies hold importance to the informed trader, signal towards the market efficiency and abnormal capital gain resulting out of stylized patterns of implied volatility.

Key Words

Implied Volatility, Volatility Index, Nifty VIX (NVIX), Seasonal Anomalies, Investor-Fear-Gauge-Index, Day-of-The-Week, Month-of-The-Year, Options Expiration,

Introduction

The implied volatility index is the new measure of stock market volatility and measure of investor fear on the market performance. The India's first volatility index published in November, 2007 and also known as Nifty volatility index symbolically named as NVIX is constructed in similar fashion of the CBOE's volatility index. The NVIX is the model-free implied volatility index based on the highly liquid options based volatility index. The implied volatility index does not depend on any classical asset pricing model, and is derived from the series of in-the-money and out-of-the-money Nifty index options of cycle one month expiration. Hence, NVIX is the forward looking market expectation of Nifty stocks' volatility and measure of fear of investors for the near future. The Nifty volatility index is expressed in percentage term and is different from the traditional stock based indices. As NVIX is the stock markets' volatility index of horizon of 30 calendar day, Nifty index and NVIX are negatively associated.

The importance of implied volatility index increases day-by-day among the market participants, analysts, financial institutions and policy makers, the reason behind is that investors can predict the trend of market in the near future. The National Stock Exchange (NSE) of India limited regularly quotes the price of implied volatility for the underlying CNX Nifty equity index options and this is regularly published by the financial press.

This study examines the seasonal anomalies in the volatility index also known as Investors' fear-gauge-index. Unlike the anomalies reported for the stock indices, we also document

presence of pronounced day-of-the-week, options expiration and month-of-the-year anomalies for the implied volatility index. The sample consists of daily closing values of India VIX ranging from November, 2007 to October, 2013. We employ the dummy ordinary least squares (DOLS) in a conditional volatility framework to analyze the various seasonal anomalies prevailing in the Indian securities market. The novel aspect of the work is that we examine volatility index that is associated with investors' fear and stock returns, and provide some insights on the application of EGARCH vs. GARCH model to analyze the information asymmetry. The empirical results show that Monday effect is present in the Indian securities market followed by options expiration effect and October and December effects. The practical implications of these anomalies hold importance to the informed trader, signal towards the market efficiency and abnormal capital gain resulting out of stylized patterns of implied volatility.

Review of recent studies

The aim of the study is to analyze the implied volatility index in form of day-of-the-week, month-of-the-year and option expiration cycle effects.

The formal studies of seasonal anomalies are conducted by Schwert (1989; 1990), French (1980), Gibbons and Hess (1981), Keim and Stambaugh (1984) and Fleming *et al.* (1995). These studies well document the seasonality of stock index returns and conclude the presence of seasonal anomalies.

Some of the earlier studies like Cross (1973), Jaffe and Westerfield (1985), Aggarwal and Rivoli (1989) Lakonishok and Levi (1982) and Balaban *et al.* (2001) analyze the day-of-the-week effects and their empirical results has shown Monday and Friday effects. Particularly, these studies report significant negative returns on Monday, and Friday returns remain highest as compare to other days.

The month of the year anomalies found in the works of Rozeff and Kinney (1976), Gultekin and Gultekin (1983), Keim (1983), Jones *et al.* (1987) Ariel (1987) and Tong (1992) and Pandey

(2002), the January effect happens due to several reasons identified like, it occurs due to tax-motivated transaction, market participants intends to reduce their tax expenses by closing their bad positions, returns realized on small and large firms. Moreover, the literature evidences on the day-of-the-week and options expiration effects are come up in the studies (e.g. Fleming *et al.* 1995; Dowling, Muthuswamy 2005 and Frijns *et al.* 2010)

More recently, Fleming *et al.* (1995) describes how implied volatility index has been calculated, moreover they explain the behaviour of implied volatility over seven years of period in the form of day-of-week and on the options expiration. Their study strongly suggests the presence of seasonality and inter-temporal relation between implied volatility and stock index returns. In particular, they find an inverse and asymmetric relation among future stock market volatility and stock returns.

Dowling and Muthuswamy (2005) examine the properties of Australian implied volatility index (AVIX) in the form of seasonality and the information content of AVIX as the predictor of future volatility. They find strong seasonal anomalies and contemporaneous asymmetric relation between AVIX and stock returns. Similarly,

Frijns *et al.* (2010) revisits the study of Dowling and Muthuswamy (2005) and supports the previous work for the more recent period from 2002 to 2006. A great amount of literature we have been explored in the previous paragraph but very limited studies are based on the seasonal anomalies of implied volatility index, hence, this study is an attempt in this route.

Data description and model building

We explore the seasonal anomalies in the Indian securities market in the form of Nifty volatility index. Hence, we procure the data on NVIX from NSE for the period of November, 2007 to October, 2013. The dataset consist of daily closing values of NVIX. The descriptive statistics of NVIX is presented in Table 1.

Table 1 Summary statistics of NVIX

		India VIX close				VIX change		Numbers
		Mean	Max.	Min.	S.D.	Mean	S.D.	
Day-of-the-week	Monday	27.59	85.13	13.04	11.48	0.6126	3.77	298
	Tuesday	27.37	70.27	13.27	11.08	-0.1173	2.97	301
	Wednesday	27.57	70.62	13.32	10.81	-0.2661	2.78	296
	Thursday	26.46	69.26	13.07	10.08	-0.1543	1.96	292
	Friday	26.96	83.71	13.23	10.94	-0.1376	2.73	300
Options-expiration	-2 Days	28.07	64.66	13.04	11.63	-0.4794	3.69	144
	-1 Day	27.92	60.84	13.71	11.15	-0.5794	3.18	72
	Expi 'O'	26.90	65.55	13.52	10.76	-0.8878	2.59	72
	+1 Day	26.29	64.46	13.63	9.89	-0.7265	2.16	72
	+2 Days	26.56	67.5	13.63	10.46	-0.0974	2.73	144
Month-of-the-year	January	26.91	54.41	13.23	11.16	0.2111	2.30	127
	February	29.79	50.65	13.76	10.24	-0.0695	2.22	120
	March	25.90	44.44	13.07	8.23	-0.1202	1.94	122
	April	25.50	57.88	13.88	10.86	-0.0846	2.24	115
	May	27.64	83.71	15.55	11.98	0.0616	5.31	128
	June	26.61	62.05	16.73	9.41	-0.0192	2.92	128
	July	25.55	61.73	16.01	10.02	0.0128	3.22	134
	August	26.71	63.58	15.64	9.69	0.0230	3.71	125
	September	26.38	39.56	14.76	6.78	0.0392	1.58	123
	October	27.27	70.27	13.04	12.14	0.0947	2.78	122
	November	31.02	85.13	13.66	16.08	-0.0843	2.96	120
December	27.27	55.26	13.63	10.64	-0.2271	1.56	124	

Source: authors' calculation

Table 1 summarizes the NVIX in the form of its closing values and change. Starting with the descriptive measures calculated based on the day-of-the-week, the highest mean appear 27.59% for Monday, and NVIX to be reported maximum on Monday. The descriptive statistics also supports the Monday positive effects in the Indian securities market. The similar kind of results noted in case of first different of NVIX. On the options expiration day, the mean NVIX in change is -0.89, this indicate that on the day of options expiration volatility of the market falls by about 89 point basis with standard deviation of 2.59. On the counter part of other months the descriptive measures of each month shows that in the month of November the average NVIX was 31.02 percent with highest standard deviation of 2.96. To model these kinds of market anomalies following empirical strategy has been adopted.

To examine the various anomalies following dummy OLS model have been employed.

$$\Delta NVIX_t = \sum_{i=1}^5 \delta_i D_{it} + \gamma \Delta NVIX_{t-1} + e_t \quad (1)$$

Where $\Delta NVIX_t = NVIX_t - NVIX_{t-1}$; $i =$ Monday, Tuesday, Wednesday, Thursday, Friday

Here, $D_{it} = 1$, if Monday,
 $= 0$, otherwise

Implied volatility is calculated based on the options with one month of expiration cycle and it is the expectation of near future. The options on Nifty index expires on the last Thursday of the respective months, Nifty options are European style and cash settled. Hence, an attempt has been made to show that how NVIX behaves surround Thursday, the day of expiration of the respective one month contract. The eq. (1) is modified as

$$\Delta NVIX_t = \sum_{j=-2}^2 \varphi_j D_{jt} + \gamma \Delta NVIX_{t-1} + e_t \quad (2)$$

Where $j = -2, -1, 0, +1, +2$

$D_{jt} = 1$ if the day is last Thursday of the respective months
 $= 0$, otherwise

Moreover, to analyze the month of the year effect on implied volatility index following regression specification is used.

$$\Delta NVIX_t = \sum_{k=1}^{12} \pi_k D_{kt} + \gamma \Delta NVIX_{t-1} + e_t \quad (3)$$

$D_{kt} = 1$ if January

$= 0$, otherwise, like wise all the moth dummies are included.

If NVIX possess the market anomalies, then the estimated slopes π_k and γ should be different from zero and statistically significant.

The empirical model is estimated in the form of OLS and GARCH(1,1) framework. The rational and justification of application of simple OLS is that we investigate seasonal anomalies of volatility index, and there are good number of studies e.g. Fleming *et al.* (1995), Dowling and Muthuswamy (2005) and Frijns *et al.* (2010), they employed OLS model to examines the asymmetry of two indices, day-of-the-week effect and options expiration effects. In addition, we reported the Box-pierce Q-statistics (12) to test the null hypothesis of no autocorrelation in the residual. Moreover, we reported the diagnostic test of EGARCH vs GARCH model using the test proposed by Engle and Ng (1993).

4. Empirical results and discussion

Starting with the Table 2, reports the regression output of day-of-the-week effect on implied volatility index. It is evident from the table that Monday effect is at play. The slope of the Monday dummy appears to be 0.63 and positive statistically significant. The rest of the dummies to be appear negative but not statistically significant. But, when we estimate in the conditional volatility framework using GARCH (1,1) model, the slope of Monday (0.43), and Tuesday(-0.20), Thursday(-0.12), and Friday(-0.14) estimated to be statically significant. Based on the OLS results one can say that Monday effect is found in the Indian security market unlike the Monday effect seen in case of stock indices. The positive Monday effect signifies that NVIX rises by 63 point basis when the market opens after two days gape. Moreover, in the rest of the days, volatility remains normal and falls in the subsequent trading days. Looking at the GARCH (1,1) results apart from the Monday effect we can observe Tuesday, Thursday and Friday effects on India volatility index. The negative significant slope signifies that after Monday volatility falls significantly on the other trading day. The plausible reason might be that during the trading days options are quite enough to incorporate

the market wide information that is reflected in the investors' sentiment index.

Table 2 OLS estimation for day of the week effect

Regression Model	OLS		GARCH (1,1)	
	Estimate	p -value of t-stat	Estimate	p -value of t-stat
δ_{Monday}	0.6274	0.000	0.4289	0.000
δ_{Tuesday}	-0.1541	0.349	-0.2006	0.002
$\delta_{\text{Wednesday}}$	-0.2343	0.157	0.0398	0.539
δ_{Thursday}	-0.1631	0.326	-0.1166	0.093
δ_{Friday}	-0.1342	0.411	-0.1367	0.055
$\gamma \Delta \text{IVIX}_{t-1}$	-0.3191	0.000	-0.1256	0.001
θ_{ARCH}			0.2790	0.001
θ_{GARCH}			0.7944	0.000
LL			-2896.81	
Q-stat(12)			19.31	0.0813
Q ² -stat(12)			5.37	0.865
Diagnostic test (EGARCH vs. GARCH)				
t-test			t-stat	p-value
Sign Bias			0.15	0.878
Negative Size			0.44	0.661
Positive Size			0.91	0.364
Joint Test			1.16	0.763

Source: authors' calculation

Table 3 report the behavior of NVIX surrounding the options expiration. The OLS results show that on the day of expiration expected stock market volatility falls by 85 point basis, and surround the day of expiration no significant movement noticed. The GARCH (1,1) model explains that on the very next day of expiration the volatility of market falls significantly by 65 point

basis and on the second day it rises by 32 point basis.

Table 3 OLS estimation on options expiration

Regression Model	OLS		GARCH (1,1)	
Variables	Estimate	p -value of t-stat	Estimate	p -value of t-stat
$\varphi_{2 \text{ days}}$	-0.1603	0.616	-0.2237	0.128
$\varphi_{1 \text{ day}}$	-0.4938	0.355	0.2581	0.241
$\varphi_{\text{exp}'0'}$	-0.8582	0.012	-0.5546	0.000
$\varphi_{+1 \text{ day}}$	-1.2909	0.017	-0.6477	0.004
$\varphi_{+2 \text{ days}}$	0.5511	0.091	0.3170	0.020
$\gamma_{\Delta \text{VIXt-1}}$	-0.3256	0.000	-0.1648	0.000
θ_{ARCH}			0.2472	0.000
θ_{GARCH}			0.8152	0.000
LL			-2901.78	
Q-stat(12)			13.31	0.273
Q ² -stat(12)			4.36	0.929
Diagnostic test (EGARCH vs. GARCH)				
t-test			t-stat	p-value
Sign Bias			0.24	0.811
Negative Size			0.36	0.718
Positive Size			0.41	0.681
Joint Test			0.68	0.879

Source: authors' calculation

The month of the year effect is reported in Table 4, the OLS output shows that during January, July, August, September and October the volatility remain positive but not significantly rising. In addition, during February, March, April, May and June the NVIX falls but not at the quick rate. The GARCH (1,1) output explain that October and December month show the significant negative impact on investors' sentiment index. This signifies that during October and December there is a flow of good news in the India securities market, that yield positive return on the underlying index. The volatility feedback effect in form of positive returns generate the bullish rally in the market that result in to the fall of options prices, consequently the

volatility also goes downs.

Table 4 OLS estimation based on Month of the year

Regression Model	OLS		GARCH (1,1)	
Variables	Estimate	p -value of t-stat	Estimate	p -value of t-stat
π_{Jan}	0.2243	0.233	0.0199	0.744
π_{Feb}	-0.0660	0.733	0.0728	0.472
π_{Mar}	-0.1413	0.462	-0.1303	0.263
π_{Apr}	-0.0542	0.784	-0.0670	0.525
π_{May}	0.0672	0.720	0.1080	0.233
π_{Jun}	-0.0349	0.852	-0.0329	0.709
π_{Jul}	0.0213	0.907	-0.0524	0.455
π_{Aug}	0.0113	0.952	0.0280	0.646
π_{Sep}	0.0299	0.876	-0.0399	0.700
π_{Oct}	0.1039	0.588	-0.1667	0.020
π_{Nov}	-0.0828	0.669	-0.0420	0.710
π_{Dec}	-0.2311	0.225	-0.1394	0.041
$\gamma_{\Delta IVIX_{t-1}}$	-0.3188	0.000	-0.1119	0.000
θ_{ARCH}			0.2160	0.084
θ_{GARCH}			0.8208	0.000
LL			-2764.34	
Q-stat(12)			17.25	0.100
Q ² -stat(12)			5.05	0.887
Diagnostic test (EGARCH vs. GARCH)				
t-test			t-stat	p-value
Sign Bias			0.33	0.739
Negative Size			0.00	0.997
Positive Size			1.35	0.178
Joint Test			1.85	0.604

Source: authors' calculation

5. Conclusion and policy implications

The study examined the various market anomalies that prevailing in the Indian securities market. We modeled the market anomalies using the dummy regression model and conditional volatility framework. The study uncovers that day-of-the-week, options-expiration and month-of-the-year effects are at play in the Indian security market in the form of volatility index. The study confirms the outcome in line with the studies conducted for the stock indices. The empirical results show that Monday effect is present in the Indian securities market followed by options expiration effect and October and December effects. The practical/policy implications of these anomalies hold importance to the informed trader, signal towards the market efficiency and abnormal capital gain resulting out of stylized patterns of implied volatility. The present study can be extended based on intra-day high frequency data points and other deterministic patterns can be identified.

References

1. Aggarwal, R., & Rivoli, P. (1989). *Seasonal and Day of the Week Effects in Four Emerging Stock Markets. Financial review*, 24(4), 541-550.
2. Ariel, R. A. (1987). *A monthly effect in stock returns. Journal of Financial Economics*, 18(1), 161-174.
3. Balaban, E., Asli Bayar, & Kan, Ö. B. (2001). *Stock returns, seasonality and asymmetric conditional volatility in world equity markets. Applied Economics Letters*, 8(4), 263-268.
4. Cross, F. (1973). *The behavior of stock prices on Fridays and Mondays. Financial analysts journal*, 29(6), 67-69.
5. Dowling, S., & Muthuswamy, J. (2005). *The implied volatility of Australian index options. Review of Futures Markets*, 14(1), 117-155.
6. Engle, R. F., & Ng, V. K. (1993). *Measuring and testing the impact of news on volatility. The journal of finance*, 48(5), 1749-1778.
7. Fleming, J., Ostdiek, B., & Whaley, R. E. (1995). *Predicting stock market volatility: A new measure. Journal of Futures Markets*, 15(3), 265-302.
8. French, K. R., Schwert, G. W., & Stambaugh, R. F. (1987). *Expected stock returns and volatility. Journal of Financial Economics*, 19(1), 3-29.
9. Frijns, B., Tallau, C., & Tourani-Rad, A. (2010). *Australian Implied Volatility Index. jassa the finsia journal of applied finance*, 10 (1), 31-35.
10. Gibbons, M. R., & Hess, P. (1981). *Day of the week effects and asset returns. Journal of business*, 54(4), 579-596.
11. Gultekin, M. N., & Gultekin, N. B. (1983). *Stock market seasonality: International evidence. Journal of Financial Economics*, 12(4), 469-481.
12. Jaffe, J., & Westerfield, R. (1985). *The Week End Effect in Common Stock Returns: The International Evidence. The journal of finance*, 40(2), 433-454.
13. Jones, C. P., Douglas K. Pearce, & Wilson, J. W. (1987). *Can Tax Loss Selling Explain the January Effect? A Note. The Journal of Finance*, 42(2), 453-461.
14. Keim, D. B., & Stambaugh, R. F. (1984). *A further investigation of the weekend effect in stock returns. The journal of finance*, 39(3), 819-835.
15. Lakonishok, J., & Smidt, S. (1984). *Volume and turn-of-the-year behavior. Journal of Financial Economics*, 13(3), 435-455.
16. Pandey, I. M. (2002). *Is There Seasonality in the Sensex Monthly Returns? Working paper 2002: Indian Institute of Management Ahmedabad*, 1-17.
17. Rozeff, M. S., & Kinney, W. R. (1976). *Capital market seasonality: The case of stock returns. Journal of Financial Economics*, 3(4), 379-402.
18. Schwert, G. W. (1990). *Stock Volatility and the Crash of '87. Review of Financial Studies*, 3(1), 77-102.
19. Schwert, G. W. (1989). *Why does stock market volatility change over time? Journal of Finance*, 44(5), 1115-1153.
20. Tong, W. H. (1992). *An analysis of the January effect of United States, Taiwan and South Korean stock returns. Asia Pacific Journal of Management*, 9(2), 189-207.

About the Institute

The Institute of Cost Accountants of India (ICAI) is a statutory body set up under an Act of Parliament in the year 1959. The Institute as a part of its obligation, regulates the profession of Cost and Management Accountancy, enrolls students for its courses, provides coaching facilities to the students, organises professional development programmes for the members and undertakes research programmes in the field of Cost and Management Accountancy. The Institute pursues the vision of cost competitiveness, cost management, efficient use of resources and structured approach to cost accounting as the key drivers of the profession. In today's world, the profession of conventional accounting and auditing has taken a back seat and cost and management accountants increasingly contributing towards the management of scarce resources like funds, land and apply strategic decisions. This has opened up further scope and tremendous opportunities for cost accountants in India and abroad.

After an amendment passed by Parliament of India, the Institute is now renamed as "The Institute of Cost Accountants of India" from "The Institute of Cost and Works Accountants of India". This step is aimed towards synergising with the global management accounting bodies, sharing the best practices and it will be useful to large number of trans-national Indian companies operating from India and abroad to remain competitive. With the current emphasis on management of resources, the specialized knowledge of evaluating operating efficiency and strategic management the professionals are known as "Cost and Management Accountants (CMAs)". The Institution operates through four regional councils at Kolkata, Delhi, Mumbai and Chennai and 96 Chapters situated at important cities in the country as well as 9 Overseas Centre headquartered at Kolkata. It is under the administrative control of Ministry of Corporate Affairs, Government of India.

Our Institute apart from being a member of International Federation of Accountants (IFAC), South-Asian Federation of Accountants (SAFA), Confederation of Asian & Pacific Accountants (CAPA), National Advisory Committee on Accounting Standards (NACAS), and National Foundation for Corporate Governance (NFCG) is also a member of Government Accounting Standards Advisory Board (GASAB).

Detailed Guidelines for Contribution in 'Research Bulletin'

- ▶ The Research Bulletin (ISSN No. 2230-9241) is an official research publication of The Institute of Cost Accountants of India.
- ▶ The authors must declare that the article is the result of their faithful work.
- ▶ The article should preferably be relating to the original research work carried out during the last five years and not being considered for publication in any other research publication or journal.
- ▶ The manuscript including figures, table & references should be preferably within 5000 words for Research Papers including an abstract, 2000 words for Case Studies and 1000 words for Book Reviews.
- ▶ Soft Copy of the full paper should be submitted in double space, 12 fonts, Times New Roman, keeping a margin of 1 inch in four sides, MS Word (.doc) format.
- ▶ The Cover Page should contain the title of the paper, author's name, designation, official address, contact phone numbers, e-mail address.
- ▶ An abstract of not more than 150 words should highlight the findings of the research work. It should be in clean, unambiguous and concise English. Abbreviations should be avoided in the abstract.
- ▶ Title should be short, specific and informative.
- ▶ The main text should not contain name of the author and footnotes. References should be given at the end of the manuscript and should contain only those cited in the text of the manuscript.
- ▶ 5-6 key words suitable for indexing should be given in the alphabetical order.
- ▶ Figures and tables should be numbered consecutively and should appear near the text where they are first cited. The figures should be accommodated within two thirds of A4 size paper. Captions of the tables/figures/charts at the top and sources at the bottom are to be given. The heading of sections and sub-sections should start from the left hand margin.
- ▶ Two hard copies and one soft copy (in MS Word format) of the manuscript are to be sent.
- ▶ The contributions sent for publication are referred for blind review. Correspondence and proofs for correction, if required, will be sent to the first named author unless otherwise indicated. Corrected proofs should be returned within the specified days as may be communicated from Editorial Desk.
- ▶ The final decision on the acceptance or otherwise of the paper rests with the Editorial Board and it depends entirely on its standard and relevance. The final draft may be subjected to editorial amendment to suit the bulletin's requirement.
- ▶ No reprints of the published article will be supplied to the authors. However the authors will get a copy of the bulletin free of cost immediately after the publication.
- ▶ The contributors will receive the structured honorarium fixed by the Institute.
- ▶ The copy rights of the articles published in the bulletin lie with The Institute of Cost Accountants of India.
- ▶ All communications are to be sent at *research.bulletin@icmai.in*.



The Institute of Cost Accountants of India

(Statutory Body under an Act of Parliament)

www.icmai.in

Research Bulletin, Vol. 42, No. II (ISSN 2230 9241)

Call for Research Papers/Articles

We invite you to contribute research paper/ article for “Research Bulletin”, a peer-reviewed Quarterly Journal of The Institute of Cost Accountants of India. The aim of this bulletin is to share innovative achievements and practical experiences from diverse domains of management, from researchers, practitioners, academicians and professionals. This bulletin is dedicated to publish high quality research papers providing meaningful insights into the management content both in Indian as well as global context.

Research Bulletin is now a Quarterly Publication of the Institute. The next issue will be published in July, 2016.

Guidelines to submit full Paper

- *Soft Copy of the full paper should be submitted in double space, 12 font size, Times New Roman, keeping a margin of 1 inch in four sides, MS Word (.doc) format.*
- *Each paper should be preferably within 5000 words including all.*
- *An abstract of not more than 150 words should be attached.*
- *The cover page should contain the title of the paper, author's name, designation, official address, contact phone numbers, e-mail address.*

Papers are invited on the following topics, but not limited to:

- *Corporate Governance*
- *Financial Inclusion and Poverty Alleviation*
- *Organizational Emergence: Business Start-Up Issues*
- *Strategic Planning in New Ventures and Young SMEs*
- *Supply Chain Management: Integration and Globalization in the Age of e-Business*
- *NPA Management*
- *Human Resource Management*
- *Decision Models related to Contemporary issues in Management*
- *Boosting Agricultural Productivity through Credit Flow: Role of Retail and Commercial Banks*
- *GST in India*

Papers must be received within 5th June, 2016 in the following email id:

research.bulletin@icmai.in



THE INSTITUTE OF COST ACCOUNTANTS OF INDIA

(Statutory body under an Act of Parliament)

HEAD QUARTERS

CMA BHAWAN
12, Sudder Street, Kolkata-700 016
Tel: +91-33- 22521031/1034/1035/1492/1602/1619/7373 /7143
Fax: +91-33-22527993, 1026, 1723

DELHI OFFICE

CMA BHAWAN
3, Institutional Area, Lodhi Road, New Delhi - 110 003
Tel: + 91-11-24622156/57/58
Fax : + 91-11- 43583642

EDITORIAL OFFICE

CMA Bhawan, 4th Floor
84, Harish Mukherjee Road, Kolkata - 700 025
Tel: + 91-33-24540086/87/0184
Fax: + 91-33-24540063
Website : www.icmai-rnj.in

Behind Every Successful Business Decision, there is always a **CMA**