RESEARCH BULLETIN

The Institute of Cost Accountants of India

(Statutory body under an Act of Parliament)

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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.

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Foreword

I am in high spirits to bring forth the Research Bulletin, Volume-41, No. III, October 2015 issue of The Institute of Cost Accountants of India. I believe this volume will irrefutably enrich the thought process of the readers and prospective researchers in the fields of economics, management and accounting.

Microfinance Institutions (MFIs) intends to accomplish a dual mission – financial sustainability and affirmative social impact on the urban and rural poor communities that they serve. MFIs are on a path towards growth, profitability and sustainability. Both the function and activities of "internal audits" and "internal controls" are mitigation strategies for operating risks in MFIs that seek to prevent problems, institutional loss and may meet external regulatory requirements for MFIs. The CMAs can assist management to monitor the implementation of internal control system and even act as an Internal Auditor to detect problems before they become large and destructive to build the MFI's capacity to deliver its products and services sustainably to the community.

The bulletin comprises of comprehensively researched topics on a variety of segments of the Indian Economy authored by researchers, academicians and professors.

I wish the readers would love to go through them.

CMA P.V. Bhattad
President
The Institute of Cost Accountants of India

Chairman's Communiqué

I feel privileged to place before you the Research Bulletin, Vol.41, No.III, October issue of the Institute. Our Research Bulletin mainly emphasizes on empirical research articles and has wide readers from the fields of academics, research, corporate houses and practitioners.

I take this opportunity to express my appreciation for my fellow members of the Research, Innovation and IT Committee, esteemed members of the Review Board, the eminent contributors and the entire research team of the Institute for their earnest effort to publish this volume on time.

The present volume of the Research Bulletin contains varied issues of interest, like Stock Market, R & D Costs, Audit Committee, Internal Control, Capital Structure, Economic Empowerment, Human Resource Valuation, Financial Inclusion, etc.

I welcome the readers to tender their valuable feedback towards enrichment of Research Bulletin.

Suggestions for development 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!

It is our pleasure to bring out the current volume of the Research Bulletin, Vol.41 No.III, October, 2015 issue, an offering of the Directorate of Research & Journal of the Institute. 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 interest to the vitality in environmental, social, economical and market-related issues, so that the researchers and decision-makers can explore the surroundings, become familiar to the change in an effective manner and can take decisions consciously.

We are extremely happy to convey that our next issue of Research Bulletin, Vol.41, No. IV January, 2016 will be based on the theme *"MSMEs - Making in India"* which would be a collaborative publication in association with Entrepreneurship Development Institute of India, Gujarat.

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 thank all the contributors and reviewers of this important issue and hope our readers enjoy the articles.

CMA (Dr.) Debaprosanna Nandy
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Research, Journal & IT Committee 2015-16

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An Overview of Literature on Stock Market Anomalies

Parimal Kr. Sen

Debojyoti Das

Abstract

The journey of this research endeavor started with a vision to assimilate the extant literature on stock market anomalies. The widely scattered concepts were attempted to bring together to create a holistic canvas and to understand the expedition of the discipline. The primary objective behind this effort was to appreciate the classical theories, understand how the neoclassical theories came into existence and further to recognize the possible research lacunas which need to be addressed for development of a robust contemporary theory. The review consists of 50 research papers distributed on the basis of theme and chronology. The different anomaly situations were identified and classified under major heads. Based on the review some critical observations are indicated and a two-dimension plot-matrix was constructed to understand the time line of literature development in this domain.

Key Words

Stock Market, Stock Market Anomalies, Efficient Market Hypothesis (EMH)

Introduction

The extensive research literature and empirical findings of different stock market anomalies are excessively convincing and its influence cannot be blatantly negated by simply referring it as momentary mispricing according to the Efficient Market Hypothesis (EMH). A comprehensive analysis of the stock market data using pertinent methodologies can gauge the exceptions to the existing theories, which further necessitates for development of a contemporary and impending theory.

The theorization of pricing of capital assets can be principally catalogued in four categories. The *first school of thought* advocates random walk theory which argues that the movements of stock prices are randomly distributed. It implies that there would be no auto-correlation in stock prices. The theoretical extension of Random Walk Model (RMW) is EMH. EMH outlines a more logical reasoning in understanding the asset pricing in light of informational efficiency. In an informationally efficient market, current prices quickly absorb information and hence such mechanism does not provide scope for an investor to make abnormal returns

(Fama 1970).

The *second school of thought* support fundamental analysis which proclaims that market prices of stocks are fairly exhibiting the true intrinsic value of the stock. According to the proposition of the fundamental analysts the performance of economy, industry and firm are significant determinants of stock prices. Thus, it is essential for the investors to understand and react in accordance with the dynamics of micro and macro variables. In other words, the fundamental analysts believe that the likelihood of market imperfections or anomalies would be minimal as investors will have open access to relevant information and they are also capable to make decisions rationally.

The *third school of thought* is technical analysis which proposes that the stock prices will always follow a trend that can be estimated beforehand. It uses sophisticated tools and techniques for market data analysis. It also considers the behavioral aspects while making the financial decision.

The *fourth school of thought* contends the chaos theory, which is a mathematical concept, suggests it is possible to derive random results out of normal equation. In the domain of finance it means the movements of stock prices are too complex to predict. They move in a zigzag way.

The brief overview of above-mentioned thoughts provides a premise to discuss which theory applies to the real life stock market. However, it is prudent to consider a complementing relationship among them as all of them are backed by empirical evidences.

Stock Market Anomalies

A market anomaly (or market inefficiency) is a situation of distortion in price or rate of return of stocks on a financial market and assumed to contradict the axioms of the EMH. A market anomaly usually caused by: (i) structural factors (unfair competition, lack of market transparency and regulations), (ii) behavioral biases or irrational or impulsive actions of the economic agents and (iii) Calendar and other effects.

The semi-strong form of efficiency holds that the all publicly available information is readily absorbed in the stock prices and therefore an investor could not earn abnormal returns. The only way to generate more return is by taking additional risks, as a positive relationship between risk and return is expected to exist. However, the empirical findings have reflected inconsistencies in the theory of semi-strong form of efficiency. The further researches in this domain have acknowledged that there prevail imperfections in the market that distort the investor from incorporating the relevant information at relevant time. Such imperfections were broadly identified as the '*stock market anomalies*'.

The fundamental issue concerning the market anomalies is whether it is a long-term stable phenomenon based on which investment strategies can be framed or just a matter of temporary unique asset mispricing. The EMH opines that in the short-run there might exists market imperfections but in the long-run the all imperfections will be ruled out conforming to the maxims of perfectly efficient market. The efficiency of the

markets cannot be guaranteed for short-run. Even then an investor who has expertise in detecting the market anomalies and arbitrage opportunities will not be able to generate abnormal returns due to sporadic nature of such anomalies i.e. occurring at irregular intervals, scattered or isolated. The short-term asset mispricing does exist, and according to EMH, it is impossible to identify.

Types of Stock Market Anomalies

The market anomalies are a comprehensive and vast area. All types of anomalies cannot be documented given constraints. However, some of them can be sub-divided according to their very nature and unique characteristic features. They are categorized in Table 1.1.

In table 1.1 as represented six major anomalies heads covers around 33 anomaly states. To limit the scope of the study only these anomalies are dealt with. A comprehensive review of research literature is discussed in the subsequent chapters which is also the objective of the present study.

Basic Aim of the Study

The study is aimed at performing a comprehensive and critical review of literature on the subject focusing on the genesis of the problem and the research approaches adopted by researchers to counter such research problems. It further attempts to identify the areas in the domain which are more explored and the areas which require further attention.

Motivation of the Study

The subject-matter of stock market anomaly is a body of vast and extant literature. There are extensive research efforts and empirical findings to validate its existence in real life scenario. The research works are carried out on discrete sub-topics which are available in widely fragmented form. Thus to look at the holistic picture all scattered pieces should be joined together. So that the present status of the subject domain can be appraised and the need for a future study if realized can be carried out further.

Methodology Adopted

The following is the methodological technique applied to conduct the study:

Selection of Journals

To review the papers of conceptual relevance SCI/SSCI Indexed journals in the domain of finance and allied areas is selected. To cover some important phenomena and dynamics (both national and international) few other journals were also taken into consideration. A detailed list of journals considered for the study is presented as below:

Selection of Papers

The reviewed literature consists of both seminal and recent papers. The papers have been retrieved on the subject from the journal and research paper databases using keywords: *Stock Market Anomalies, Month Effect,*

Table 1.1: Categorization of Market Anomalies

Head	Sub-Head	Brief Description
Calendar Anomalies	*Month-of-the-Year Effect or January Effect*	A situation where the security prices increases in the month of January more than any other month.
	Turn-of-the-Year Effect	It exhibits a pattern of increased trading volumes and higher stock prices in the last week of December and first two weeks of January.
	Turn-of-the-Month Effect	It refers to the tendency of the stock prices to rise on the last trading day of the month and first three trading days of the next month.
	Weekend Effect	It describes the tendency of stock prices to decrease on Mondays, meaning that closing prices on Monday is lower than the closing prices on the previous Friday.
	Monday Effect	The tendency of the stocks to produce lower-than-average returns on Monday to other days of the week.
	Week-of-the-Month Effect	Stocks usually have higher returns during the first week of a month, than compared to last three weeks of the previous month.
	End-of-the-Day Effect or Hour-of-the-Day Effect	Stock prices and trading volumes tend to increase during last 15 minutes of a day.
	Holiday Effect	Stock markets usually tend to have higher abnormal returns before public holidays.
	School's Out Effect	Lowering of weekly stock turnover during the period of school vacation of children of retail investors.
	Ramadan/Holy Day Effect	Stock returns during Ramadan [ninth month in the Islamic (or Hijri) calendar] tend to be significantly higher and less volatile than during the rest of the year.

Contd.

Table 1.1: Categorization of Market Anomalies

Head	Sub-Head	Brief Description
	Wednesday Effect	It is a Friday-type-effect which occurs on Wednesdays in gulf countries as the trading week in Tadawul is Saturday to Wednesday.
	Summer Effect	There are evidences which show a rising stock price trend during summer season.
Firm-Specific Anomalies	Stock-split Effect	A stock split tends to increase the stock price of the company both before and after the stock split is announced.
	Dividend-Per-Price-Effect or Dividend-Yield Effect	The stocks with the higher expected dividend tend to outperform the market on an average.
	Size Effect	Smaller companies on a risk-adjusted basis have greater returns than their larger peers.
	Earnings Report Effect	An investor can profit from investing immediately when a firm reports because it takes some time for the market to absorb the new information.
	Low Price-Earnings(P/E) Ratio Effect	Returns are found to be higher in firms with lower P/E ratio.
	Low (P/E)/Growth [PEG] Ratio Effect	Similar to above phenomenon returns are found to be higher in firms with lower PEG ratio.
	Neglected Firm Effect	Firms that are neglected by the institutional investors usually produce higher returns than those covered. The ideal state occurs when stocks are considered and begins to be covered by analysts.

Contd.

Table 1.1: Categorization of Market Anomalies

Head	Sub-Head	Brief Description
	Momentum Effect	It argues that the stock price which was strongly going up in the past will probably continue to go up in the near future. The stocks which had outperformed peers on 3-12 month period tend to perform well also in future.
	Reversion to the Mean Long-Term Effect (Negative Autocorrelation)	Stock prices tend to reverse over long-cycles of time which implies that firms with low stock prices tend to become firms with higher stock prices over a longer period of time.
	Reversion to the Mean Short-Term Effect	Stocks that have outperformed in one month tend to under-perform in the next month (vice-versa).
	Index Effect	Stock prices tends to rise immediately once been added to the market indices.
	Initial Public Offerings (IPO) Effect	In the short run the underpricing of IPOs is a common phenomenon. However, there instance of underpricing for a period as long as three years.
Environmental Anomalies	Temperature Effect	Lower temperature can lead to aggression, while higher temperature can lead to both apathy and aggression. Aggression could result in more risk-taking while apathy could impede risk-taking. Thus at a lower temperature higher returns are expected to be generated and at higher temperature to be associated with higher or lower stock returns, depending on the trade-off between two competing effects.
	Air Pollution Effect	Air pollution has a negative correlation with stock returns.

Contd.

Table 1.1: Categorization of Market Anomalies

Head	Sub-Head	Brief Description
Psychological and Biology-Induced Anomalies	Weather and Biorhythmic Effect	Mood sates caused by weather and biorhythmic factors does affect the pricing of equities. A statistically significant relationship is found between equity returns and rain, daylight savings time changes etc.
	Black Friday or Friday 13th Effect	Black Fridays are expected to be negatively associated with equity returns given the negative superstition surrounding the day.
	Biological Chemicals Effects	The brain states induced by biological chemicals produced internally potentially contribute to mispricing in inefficient markets.
	Sports-Sentiment Effect	A local sports team loss leads to lower next day return for locally headquartered stocks and this impact increases for a surprise or critical game loss.
Celestial Anomalies	Lunar-Cycle Effect	Stock returns are lower on the days around a full moon than on the days around a new moon.
	Mars-Saturn Effect	Market performs significantly better when Mars and Saturn are opposed. Times when Mars and Saturn are struggling for dominance and their energies are polarized appeared to be particularly propitious times to invest in the market.
Political Anomalies	Change-in-Government Effect	The expectation of public at large towards a new government for socio-economic well-being would drive up of stock prices.

Source: Compiled by Authors

Table 2.1: List of Journals Referred

SCI/SSCI Indexed Journals	No. of Papers	Paper Code*
American Economic Review	1	21
Emerging Markets Review	2	36, 43
European Financial Management	1	24
Financial Analysts Journal	2	2, 23
International Review of Financial Analysis	3	25, 28, 39
Journal of Banking & Finance	6	13, 15, 16, 19, 26, 37
Journal of Economic Psychology	1	35
Journal of Empirical Finance	3	31, 32, 40
Journal of Finance	6	1, 10, 11, 17, 18, 20
Journal of Financial Economics	9	3, 4, 5, 6, 7, 8, 9, 12, 47
Journal of International Money and Finance	2	22, 29
Pacific-Basin Finance Journal	1	33
Review of Financial Studies	1	14
Vikalpa	1	27
Total	**39**	

Others	No. of Papers	Paper Code*
IIMS Journal of Management Science	1	34
International Journal of Economics and Finance	1	41
International Journal of Emerging Markets	1	30
International Journal of Management & Business Studies	1	38
Journal of Behavioral and Experimental Finance	1	49
MDI Vision	1	45
Perspectives on Financial Markets & Systems	1	44
Research Bulletin	1	50
The British Accounting Review	1	42
The Quarterly Review of Economics and Finance	2	46, 48
Total	**11**	

The papers reviewed has been distributed chronologically and coded accordingly from 1 to 50. (Refer Appendix 1)

Source: Compiled by Authors

Efficient Market Hypothesis, Calendar Anomalies, Day-of-the-week Effect, Seasonality Effect, Lunar Effect and Capital Markets. Many a times the reference of a paper is traced back. Out of all papers gathered, 39 papers from journals indexed in SCI/SSCI and 11 other papers were finalized keeping in mind the coherence of study and also due to time and resource constraints.

Sources of Papers Reviewed

The papers have been retrieved from Elsevier's Science Direct, Emerald Insight, JSTOR and Google Scholar databases using the above mentioned keywords. Physical copies some reputed journals were also accessed to be reviewed.

Distribution of Papers Reviewed

To facilitate a logical flow and uniformity in the study the varied and hetero-geneous groups were sub-divided into homogeneous sub-groups. The papers in this study are divided in two typologies based on: (i) Thematic Analysis (distribution based on theme) and (ii) Ageing Analysis (distribution based on time in ascending order). The analysis of reviewed papers in the upcoming chapters will be done based on this segregation.

Thematic Analysis

The topic "Stock Market Anomalies" has been sub-divided into six broad categories and the seminal or groundbreaking papers are classified under the head 'others'. Articles in which two or more anomaly concepts are covered, they are marked under each separate category more than once. The classification is strictly done based on its theme. Listed as below:

Table 2.2 List of Distribution Based on Theme

Theme	Paper Codes
Calendar Anomalies	2, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15, 16, 17, 19, 22, 25, 27, 29, 30, 34, 36, 37, 38, 42, 43, 44, 45, 46, 48, 49
Firm-Specific Anomalies	6, 8, 13, 20, 33, 41
Environmental Anomalies	21, 26, 28, 35, 47
Psychological and Biology-Induced Anomalies	39, 40
Celestial Anomalies	31, 32, 47
Political Anomalies	47, 50
Others	1, 18, 23, 24

Source: Compiled by Authors

Ageing Analysis

The study covers a time-period from 1970 to 2015 i.e. 45 years. The study period is divided into 3 equal phases of 15 years each. Then the reviewed papers are distributed according to chronological order. The analysis would help to capture the serial development of literature through a timeline.

Table 2.3: List of Distribution Based on Time

Phases	Time-Period	Paper Codes
Phase-I	1970-1985	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Phase-II	1986-2000	12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
Phase-III	2001-2015	25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50

Source: Compiled by Authors

Thus the discussion and analysis in the next chapter is grounded upon these two typical distributions. It is expected that this approach would help to continue the discussion in a structured form and will facilitate the logical flow.

Review based on Ageing Analysis

The timeline of development of the literature based on ageing analysis reflects an interesting fact. That is discussed as follows:

● **Phase I:** In phase I, mostly the research papers, either belongs to the category calendar anomaly or from the firm-specific anomalies. Thus they can be considered as the classical forms of anomalies.

● **Phase II:** In phase II, the trend remains the same, except for one literature on informational efficiency. In the meantime, the existing literature has developed newer dimensions and modification of olden theories. Thus they can be referred to as anomalies of neo-classical era.

● **Phase III:** In phase III, the newer phenomena such as environmental, celestial, psychological and biological anomalies has emerged to provide reasons for market inefficiency with a common interface of finance. Thus, they can be referred to as the forms of contemporary anomalies.

Coverage of the Journals

As given in the second chapter, the journals classified for the purpose of the survey are diagrammatically represented as below:

To maintain quality of survey and a balanced portfolio of journals, they were selected carefully. The portfolio consists of top-rated journals from different countries. Such as Journal of Finance from UK, Financial Analysts Journal, International Review of Financial Analysis from USA, Journal of Banking and Finance from Netherland etc. To maintain diversity, reputed Indian journals like Vikalpa, IIMS Journal of Management Science were also included. Feeling the need, some

Figure 3.1 : Classification of Journals
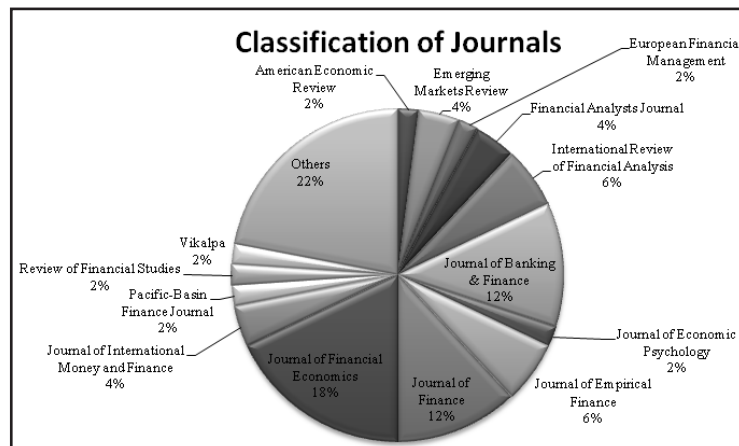
Source: Compiled by Authors

conceptually enriched but non-indexed journals were also taken into consideration.

Critical Observations

This section proposes to highlight the critical observations pointed out during the course of review. They are enlisted as below:

● **Whether the country-specific dynamics can be used to establish benchmarks?**

The most of the research papers referred to has used data that is from the American stock markets. Furthermore, the accepted canons of stock markets have also been developed in the western countries. Every country has its own pedagogical features, thus the theories might also differ. For instance (Raj and Kumari, 2006) suggests no January Effect is present

in Indian context; the underlying reason could be in India the tax year ends at 31st March. Thus in India a prevalent 'April Effect' can be expected rather than 'January Effect'. Regarding the negative Monday return (Raj and Kumari, 2006) again contradicted, they counter that rather negative returns occur on Tuesdays in Indian markets.

In another study by (Brown, Keim, Kleidon and Marsh, 1982) the findings were complex than expected, the tax year in Australia ends on 30th June, thus a prototype 'July Effect' can be expected. As a matter of fact, the market participants in Australia are not entitled to a tax loss deduction of $3000. But still a pronounced seasonality (on raw returns) is found to be occurred on January-December and July-August, with roughly larger for January and July.

● **Is it really anomaly?**

Lo and MacKinlay (1990) produced their work on data snooping which confers that "Test of financial asset pricing models may yield misleading inferences when properties of the data are used to construct the test statistic". Researchers fascinated to promote interesting concepts might be inadvertently employing wrong or biased methodological techniques. The subsequent re-iteration of the dataset with other relevant methodologies can only confirm the existence of the anomaly.

● **Can the celestial objects influence investor's behavior?**

(Yuan, Zheng and Zhu, 2006) and (Stephen, Keef and Khaled, 2010) proposes that there is significant correlation between stock returns and lunar phases. On new moon the stockholders tend to gain and in a situation of full moon investors tend to loose. (Marx, 2014) believes Mars and Saturn is very powerful predictor of anomaly performance. The market performs significantly better when Mars and Saturn are opposed. A time when Mars and Saturn are struggling for dominance and their energies are polarized appears to be the best time to outperform the market.

Other Observations

● Anomalies are temporary as the different studies produces different result and findings are also divergent. The period considered for

study can be a major underlying reason.

● 'Small-size' effect might exist because of the fact that investors expect a high risk-adjusted return as compared to that of stable stocks.

● Despite of tax-year end on a different month many countries reflect a 'January Effect'. The reason may be the investors tend to shed off their existing holdings at the year end and start afresh from January.

● Calendar anomalies are most prevalent and have a global imprint.

Timeline of the Papers Reviewed

By plotting the existing literature on a two dimension plane the areas that are newly emerged can be identified.

Figure 4.2 : Two Dimension Plot-Matrix

Refers to Reviewed Papers

Source: Compiled by Authors

Hence, the emerging areas can be identified out of this Plot-Matrix. It is clearly evident that majority of the study

in the literature of stock market anomalies pertains to calendar anomalies, and hence it is the most explored segment in all phases of time. The firm-specific anomaly follows to calendar anomalies. The emerging areas i.e. celestial, psychological, environmental and political are still at nascent stage and can be assumed to have further scope for scholarly contributions.

Limitations of the Study

The present study suffers some limitations which offer a room for further researches. Due to constraints only 50 papers could be reviewed on the overall discipline. The study can be narrowed to few anomalies and extensive study can

Appendix 1 : Chronological Coding of Papers Reviewed

Code	Paper Reviewed	Year
1	Efficient Capital Markets: A Review of Theory and Empirical Work	1970
2	Behavior of stock Prices on Fridays and Mondays	1973
3	Capital Market Seasonality: The Case of Stock Returns	1976
4	Stock returns and the Weekend Effect	1980
5	Stock Returns Seasonalities and the Tax-Loss Selling Hypothesis: Analysis of the Arguments and Australian Evidence	1982
6	New Evidence on the Nature of Size Related Anomalies in Stock Market	1982
7	The Anomalous Stock Market Behavior of Small Firms in January: Empirical Tests for Tax-Loss Selling Effects	1982
8	Size Related Anomalies and Stock Market Seasonality: Further Empirical Evidence	1982
9	Stock Market Seasonality: International Evidence	1983
10	A Further Investigation of the Weekend Effect in Stock Returns	1984
11	A Further Investigation of the Weekend Effect in Stock Returns: Discussion	1984
12	A Monthly Effect in Stock Returns	1986
13	Stock Market Anomalies: A Re-Assessment Based on UK Evidence	1989
14	The Weekend Effect in Information Releases: A Study of Earnings and Dividend Announcements	1989

Contd.

Appendix 1 : Chronological Coding of Papers Reviewed

Code	Paper Reviewed	Year
15	Is There a Monthly Effect in Stock Market Returns? Evidence from Foreign Countries	1989
16	The Italian Stock Market: Efficiency and Calendar Anomalies	1990
17	High Stock Returns Before Holidays: Existence and Evidence on Possible Causes	1990
18	Efficient Capital Markets: II	1991
19	Turn-of-Month and Pre-Holiday Effect on Stock Returns: Some International Evidence	1991
20	The Long-Run Performance of Initial Public Offerings	1991
21	Stock Prices and Wall Street Weather	1993
22	Anomalies or Illusions? Evidence from Stock Markets in Eighteen Countries	1994
23	Random Walks in Stock Market Prices	1995
24	A Brief History of Market Efficiency	1998
25	Elusive Anomalies in the Brazilian Stock Market	2001
26	Stock Market Returns: A Note on Temperature Anomaly	2004
27	Stock market Seasonality in an Emerging market	2004
28	Weather, Biorhythms, Beliefs and Stock Returns- Some Preliminary Irish Evidence	2005
29	Pre-Holiday Effects: International Evidence on the Decline and Reversal of a Stock Market Anomaly	2005
30	Day-of-the-Week and Other Market Anomalies in the Indian Stock Market	2006
31	Are Investors Moonstruck? Lunar Phases and Stock Returns	2006
32	Are Investors Moonstruck? Further International Evidences on Lunar Phases and Stock Returns	2010
33	Size Effect in January and Cultural Influences in an Emerging Stock Market: the Perspective of Behavioral Finance	2010
34	Seasonal Anomalies in Stock Returns: A study of Developed and Emerging Markets	2010

Contd.

Appendix 1 : Chronological Coding of Papers Reviewed

Code	Paper Reviewed	Year
35	Air Pollution and the Stock Returns in the US	2011
36	Calendar Anomalies in the Gulf Cooperation Council Stock Markets	2011
37	Fast Profits: Investor Sentiment and Stock Returns During Ramadan	2011
38	An Empirical Study on Seasonal Analysis in the Indian Stock market	2011
39	Biology-Induced Effects on Investor Psychology and Behavior	2012
40	Local Sports Sentiment and Returns of Locally Headquartered Stocks: A Firm-Level Analysis	2012
41	A Search for Rational Sources of Stock Return Anomalies: Evidence from India	2012
42	The School's Out Effect: A New Seasonal Anomaly	2012
43	Do Mutual Fund Managers Exploit the Ramadan Anomaly? Evidence from Turkey	2013
44	Study of Calendar Anomalies in Indian Stock Markets	2013
45	Stock Market Anomalies: Evidence from Emerging BRIC Markets	2014
46	Chinese Lunar New Year Effect in Asian Stock Markets, 1999-2012	2014
47	Predicting Anomaly Performance with Politics, the Weather, Global Warming, Sunspots and the Star	2014
48	Islamic Calendar Anomalies: Evidence from Pakistani Firm-Level Data	2015
49	The Holy Day Effect	2015
50	An Empirical Study on Impact of Political Events on Stock Market: Evidence from Recent Trends in India	2015

be done.

Conclusions

Given the evidences by way of gigantic base of literature on the concerned subject, the phenomena of anomalies cannot be underestimated. However the concepts should not also be exaggerated to produce super-imposed results. Due care should be taken while choosing the sample and methodological techniques. With reference to the list of existing anomalies, one can assume the presence of further anomalies. Only the diligent scholarly efforts can identify the hidden anomalies, if any.

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An Association of R&D Costs versus Capital Expenditure with Future Earnings Variability

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Abstract

The purpose of this paper is to examine the relationship between research and development expenditure and uncertainties of future earnings in India where firms are allowed to expense their research expenditure and capitalize development expenditure if certain conditions are fulfilled. We have obtained sample of 100 companies from S&P CNX 500 through CMEI prowess database. The study tested the predicting factors employing regression model. We found that R&D expenditure is statistically significant indicating that future earnings variability from R&D investment is higher than the future earnings variability due to capital expenditure.

Key Words

R&D costs, Capital Expenditure, Earnings Variability, Capitalization, Expensing

Introduction

There are numerous studies which demonstrate the association of R&D costs with earnings. Many studies provide evidence either in support or against the expensing method of accounting for R&D costs. U.S. GAAP (Statement of Financial Accounting Standards, SFAS, No. 2, 1974, requires firms to immediately expense their R&D expenditures, while International Accounting Standard (IAS) No. 9 (1978) allows firms to capitalize development expenditures and require expensing only research expenditures. Accounting decision of R&D expenditure whether to be expensed or capitalized is based on the arguments. Proponents of the expensing method are of the view that the expected benefits from R&D costs indicate high level uncertainties and the recognition of these expenditures as assets in the financial statements may give a wrong impression in the mind of investors and other concerned parties. They argue that there is lack of compelling evidence that R&D costs may generate future benefits to each firm and each instance (Statement of Financial Accounting Standard No.2). According to the Association for Investment Management and Research (AIRM 1993) and Financial Accounting Standard Board (FASB) "it is usually next to impossible to determine in any sensible and or codifiable manner exactly which costs provide future benefits and which do not". Further the expected benefits are very much unrelated to costs incurred and the information on the capitalized amount

of R&D expenditure is largely "irrelevant to the investments valuation process".

Opponents of expensing method of accounting argue that R&D costs have systematic influence on the market value of the firm that persists over time in form of intangible assets. Therefore, they advocate that R&D expenditure on an average generates future benefits (Hirschey and Weygandt 1985, Cockburn and Griliches 1988, Lev and Sougiannis1996 and Mohd et al.2006). According to this argument the benefits on Research and Development cost has lag between the investment made and output realized as R&D cost is a long-term investment, suggesting that these lag periods may vary between 3 to 4 years (Scherer 1965, Mansfield 1971, and Branch and Chichirau 2010). In the event of Research& Development costs treated as an asset will enhance value relevance of financial statements as many studies found capitalized development costs to be positively associated with stock and subsequent reported earnings, (Aboody and Lev 1998, Mohd et.al.2006).

By expensing its R&D costs firms may be conveying message to the investors as well as market that the firm is in good position and can handle the situations according to its needs. From another point of view by capitalizing its R&D costs firm might be communicating to the stakeholders and market that it has strong R&D project that will generate future economic benefits. To be 'expensed or capitalized' is a matter of choice for those who follow the accounting principles that permit them both ways either capitalized or expensed. Although efforts of adoption of IFRS have been made by IASB is on

peak and many countries are on the verge of its adoption or convergence. In India AS 38 converged with IAS 38 allows firms to expense their 'research' expenditures and capitalize 'development' expenditures as an intangible assets only if the development expenditures will most possibly generate future economic benefits, otherwise it will have to be expensed.

Literature Review

Accounting rules regarding R&D expenditure are an important issue for many nations of the world that must be explored by accounting standard setters to converge with international accounting standards. There are mainly two approaches of accounting for R&D investments namely capitalization and expensing. Proponents and opponents of expensing method or capitalizing method express their own views. These views are based on uncertainties of future outcome from R&D investments. Gaeremynch et al. (1998) studied the disclosure and capitalization spending to examine the differences and tested whether or not capitalization of R&D spending should be allowed. They suggest that the expenses of successful R&D activities are more likely to be capitalized as an asset in the balance sheet. Dhaliwal et al. (1999) examined the relationship between firm's investment opportunity set and management decision to capitalize or expense and found that high growth firms (the firms with fewer assets in place) are more likely to select the capitalization method of accounting choice for R&D expenses.

The debate on capitalisation versus expensing will continue amongst researchers and standard setters or

policy makers until they come with compelling evidence on a particular method of accounting for research and development. Many studies focusing on association of R&D costs and earnings have tried to explore the expected benefits of R&D costs and its value relevance and have evidence of significantly positive relationship between R&D costs and future benefits, which indicates that R&D investments generate future benefits. Consequently it is opined that increase in research and development expenditure is expected to translate into an increase in earnings. These studies tend to focus more on benefits from R&D costs and gave little attention on the uncertainty of future earnings from R&D costs. Earnings variability is an important aspect for the business and has been seen as index of firms earnings predictability, Luttman and Silhan (1993). We consider capital Expenditure comparable to R&D costs because of the similarities in nature of the expenditure as well as its accounting treatments assuming it as an important determinant of future earnings variability. As per US GAAP all R&D costs must be expensed for the reason that expected benefits from R&D costs have high degree of uncertainty. There have been many recent studies focusing on the association between R&D costs and the future earnings uncertainties. Susan and Robert (1994) examine the relationship between R&D expenditure and expected earnings and found direct relationship between R&D expenditure and future earnings. They also found that there is risk as well as requirement of long time period for getting expected reward from R&D investments. Aboody and lev.(1998), infer that R&D costs generate more future earnings than

earnings through capital expenditures. According to Kothari, Laguerre and Leone (1998), R&D investments generate far more uncertain future benefits than benefits from investments in plant, property and equipment (PP&E). This result is consistent again with the findings of Kothari, Laguerre and Leone (2002) on 'capitalisation versus expensing evidence on the uncertainty of future earnings from capital expenditures versus R&D outlays. Whereas Thomas et. al. (2010) found that the expensed portion of R&D costs is associated with highly uncertain earnings. Evidence shows that the variance effects of research and development cost is on an average more significant than their mean effect in bond valuation, and the risk from R&D costs dominates the benefits from R&D costs. However, Shi (2002)

And Amir et al. (2007) found that the impact of R&D costs on future performance significantly varies from industry to industry and time to time. The uncertainty of future earnings depends upon the productivity of R&D costs as high productivity is awarded with high uncertainty (Pandit et al. 2011). While some studies show that R&D expenditures do not generate more uncertain future benefits in comparison to capital expenditures (Asdemir et. al.2012, and Ciftci 2012). There are some other studies which find earnings reported in the financial statements are more variable when R&D spending changes significantly. Park C et al. (2014). A sharp and high volume of spending on R&D expenditure may cause decline in profitability as well as decline in riskiness of R&D spending. Curtis A et al 2015.

There is dearth of studies in this aspect of

accounting in Indian context. The reviews on capitalization versus expensing indicate the need for more research to examine the association between R&D expenditure and future earnings variability, specifically under new accounting standard in India.

Objective of the Study

The firms in converged Indian accounting settings are allowed to expense the research expenditure and capitalize their development expenditure as an intangible assets only if there is an apparent possibility that the development portion of R&D expenditure will generate future economic benefits and if there is doubt whether it will generate future economic benefits or not then development portion of research and development shall also be treated as expense. Although the settings on R&D has been condemned due to uncertainties of future earnings. The main objective of this study is to examine the association between Research and development expenditure and firms future earnings variability. We tried to check the firm's R&D spending in comparison with other capital expenditures and its earnings to know how these settings are suitable.

Hypothesis

The objective of the present study is to examine the relationship between R&D expenditure and firms future earnings and earning's variability that gives us the following hypotheses:

H1 Firms future earnings variability with R&D expenditure is higher than the earnings variability due to capital expenditure irrespective of accounting method used,

H2 Firms future earnings variability with capitalised R&D expenditure is higher than earnings variability due to capital expenditure.

The Model

Accounting under IAS 38 and Indian AS 38 allow only research expenditures to be expensed and development expenditures to be capitalized only when they meet certain criteria. This method of accounting has been criticised on ground of uncertainties of future earnings. Kothari et al. (2002) argued in support of expensing of R&D costs and provide evidence that R&D costs generate more uncertain benefits in comparison to capital expenditures i.e. Property Plant and Equipments (PP&E). The issues related to uncertainties of future benefits from R&D motivate us to investigate whether expensed R&D costs are more associated with higher future economic benefits or capitalized R&D costs as per Indian AS 38 which provides both method expensing as well as capitalizing following some conditions. The present study uses regression models that are used by the previous studies on the related research problems. Our study is based on the model used by Kothari et al. (2002).

1. $SD(Et+1, t+5) = \alpha + \beta_{1t} CapEx_t + \beta_{2t} R\&D_t$

$$+ \beta_{3t} MVt + \beta_{4t} Leverage_t + error_{t+1, t+5}$$

Where,

SD(Et+1,t+5) is the standard deviation of earnings per share (EPS), the SD is calculated using five annual EPS

observations for year t+1 through t+5, each earnings are deflated by book value (BV) of equity in panel A and by stock price in panel B.

CapEx$_t$ is the capital expenditure per share deflated by BV of Equity or Price;

R&D$_t$ is research and development per share deflated by BV of Equity or Price;

MV$_t$ is the natural logarithm for market capitalization of equity at the end of the year t;

Leverage is the ratio of long term debt divided by long-term debt plus shareholders equity at the end of the year t, calculated as, financial leverage = L.T debt/ (L.T+shareholders equity).

The present study uses 12 years annual financial statements data from (2001-2012) which were obtained from prowess data base. Panel data of 100 companies from S&P CNX 500 firms

collected and compiled after eliminating the firms with no R&D data available for the analysis during the whole sample period (2000-2012) though the study includes those firms having some missing value in a particular year. We replaced the missing value of such firms using replace missing value in spss. We also checked whether taking average of missing value will alter regression results or not and found normal. We examined whether uncertainty of future earnings from R&D investments are more than the uncertainty of future earnings from capital expenditures. We assume that a comparison of the coefficient among the variables will be as to indicate the comparative sensitivity of the uncertainty of earnings i.e. higher the coefficient higher the uncertainty (Fama and French 1992). As per this assumption if investments on R&D are expected to produce greater uncertain future earnings than capital expenditures, then R&D coefficient will be greater than the coefficient of capital expenditure.

Table 1: Correlation Matrix[a]

Panel A		Correlation coefficients variable scaled by B.V of equity			
Variable	**RDEX**	**CAPEX**	**ADVEX**	**MV**	**LEVERAGE**	**SDE**
RDEX	1.000000					
CAPEX	-0.024541	1.000000				
ADVEX	0.271172	0.002333	1.000000			
MV	0.034242	0.021835	0.026938	1.000000		
LEVERAGE	0.027194	-0.000622	-0.005666	-0.018580	1.000000	
SDE	0.126221	0.010620	0.063221	0.104411	0.081891	1.000000

[a] *Abbreviations used in the above correlation matrix are research and development expenditure(RDEX), capital expenditure (CAPEX), advertisement expenditure (ADVEX), market value(MV), leverage(LEVERAGE), standard deviation of earnings(SDE).*

Table 2: Correlation Matrix[b]

Panel B		Correlation coefficients variable scaled by Price			
Variable	**RDEX**	**CAPEX**	**ADVEX**	**MV**	**LEVERAGE**	**SDE**
RDEX	1.000000					
CAPEX	-0.013246	1.000000				
ADVEX	0.001695	-0.022792	1.000000			
MV	-0.080274	-0.012023	0.017087	1.000000		
LEVERAGE	0.039276	0.002695	-0.016537	-0.018580	1.000000	
SDE	0.030599	0.050255	0.004678	0.069357	0.029675	1.000000

[b] *Abbreviations used in the above correlation matrix are research and development expenditure (RDEX), capital expenditure (CAPEX), advertisement expenditure (ADVEX), market value (MV), leverage (LEVERAGE), standard deviation of earnings (SDE).*

The above correlation matrix in table 1 and 2 reports the relationship among the variables from both the panels. Panel A is deflated by book value of equity per share whereas panel B is deflated by closing price of the equity per share. Looking in panel A, We find research and development expenditure, is negatively correlated with capital expenditure, which indicates that any increase in research and development expenditure will cause to decrease in capital expenditure. At the same time the capital expenditure, advertisement expenditure and market value are negatively correlated with leverage. We notice here in panel A the variability in earnings represented by SDE is better explained by the variables R&D expenditure (RDEX), because the correlation coefficient is closer to 1, which indicates an increase in research and development expenditure will be accompanied with an increase in earnings variability. When the variables deflated by closing price per share in panel B the research and development is around negatively correlated with capital expenditure and market value implying research and development as substitute of capital expenditure. A very low correlation coefficient between

R&D and advertisement expenditure, implies that change in R&D does have negative effect on advertisement expenditure. There is positive correlation between research and development and standard deviations of earnings (SDE). SDE is better explained by market value. It seems earnings variability is positively correlated with R&D, capital expenditure and market value.

Regression Analysis and Results

The study uses 12 years annual financial statements data from (2001-2012).In order to find whether the R&D expenditure either current or capital affects earning variability the variable considered for the study are: Capital expenditures, Net Fixed Assets, advertisements expenditure, market value and leverage have been used as major determinants of earnings variability. Earnings variability is calculated as the standard deviations (SD) of five consecutive years EPS rolling year by year. A panel cross-sectional regression has run replicating the variables to examine the impacts of a particular variable on earnings variability. All the data have been arranged in two panels, panel 'A' and panel 'B'. Panel 'A' has been deflated by the book value of equity per share and panel 'B' has been deflated by closing price of the equity share to mitigate or control the heteroscadasticity in the regression.

Table 3 shows the regression results in panel A with the selected variables deflated by book value of the equity per share and the variables in panel B deflated by the closing price per share and other economic determinants of earning variability such as MV and leverage, are taken in the regression as

control variables. MV has been calculated as the natural logarithm of market value at the year-end t, where as leverage is the long term debt divided by L.T Debt plus shareholders' equity at the end of the year t. panel cross-sectional regression carried out taking the future earnings variability as dependent variable and R&D expenditure, capital expenditure and advertisement expenditure, MV and leverage as explanatory variables.

The table shows that the firms on an average spends 0.0626%, 0.1256% and 0.1944% of the book value of equity on R&D, capital expenditures and advertisements expenditure respectively implying that the spending on R&D is very low as compared to advertisement expenditure and capital expenditure. Median spending on of R&D is higher than capital expenditure showing 0.91 on R&D expenditure and R&D expenditure is almost same as compared to advertisement expenditure showing 0.19% on advertisement expenditure while the median spending on capital expenditure is nil. The average of standard deviation of earnings when it is deflated by book value of equity is 0.001% (0.109961) in panel A and 0.0004%(0.036245) in panel B when it is deflated by price of equity share Which shows Standard deviations of earnings deflated by book value of equity in panel A vary significantly as compared to the earnings deflated by price in panel B. Natural logarithm of market value and leverage are incorporated in the regression analysis as control variables, the average coefficient of both variables are strongly significant. The findings in panel A indicate R&D expenditure is statistically significant which support the first hypothesis set for

Model: $SD\,(E_{t+1,t+5}) = \alpha + \beta_{1t}R \& D_t + \beta_{2t}CapEx_t + \beta_{3t}ADVEX_t + \beta_{4t}MV_t + \beta_{5t}Leverage_t + error_{t+1,t+5}$ (1)

Table: 3 : Annual cross sectional regression

Variable	Description	Mean	t-statics	Std. deviation	Minimum	Median	Maximum
	Panel A : scaled by book value of equity per share						
RDT	R&D expenditure(capital and current)	6.267203	3.80411***	19.15143	0.000000	0.91044	325.9425
CAPEX	capital expenditure	12.56071	0.39691	102.8401	0.000000	0.000000	1667.81
ADVEX	Advertisement expenditure	19.44178	1.03004	140.3458	0.000000	0.199893	2267.621
MV	log market value	-0.11155	3.56430***	1.360634	-11.43433	0.165244	3.653724
LEVERAGE	L.T debt/L.T Debt+Shareholders equity	0.589651	2.82759***	3.758214	-80.63924	0.484273	58.69939
SDE	standard deviation of earnings	0.109961	00000	0.229248	00000	0.043705	2.581001
	Panel B : scaled by price						
RDT	R&D expenditure(capital and current)	1.962159	1.24605	8.437700	0.000000	0.262316	146.2204
CAPEX	capital expenditure	7.295145	1.78985*	64.65749	0.000000	0.000000	1202.690
ADVEX	Advertisement expenditure	1.756608	0.17456	6.931439	0.000000	0.040558	99.83010
MV	log market value	-0.11549	2.54148***	1.360634	-11.43433	0.165244	3.653724
LEVERAGE	L.T.debt/L.T debt+Shareholders equity	0.589651	1.02332	3.758214	-80.63924	0.484273	58.69939
SDE	standard deviation of earnings	0.036245	—	0.110041	0.000000	0.008801	1.913084

(*** Significant at 1% level,   ** Significant at 5% level,   * Significant at 10% level)

Table 4: Regression analysis with capitalized R&D and net fixed assets (NFA)

$$SD(E_{t+1,t+5}) = \alpha + \beta_{1t}CapR\&D_t + \beta_{2t}NFA_t + \beta_{3t}AdvEx_t + \beta_{4t}MV_t + \beta_{5t}Leverage_t + error_{t+1,t+5} \quad (2)$$

Variable	Description	Mean	t-statics	Std. deviation	Minimum	Median	Maximum
	Panel A : scaled by book value of equity per share						
CAPRD	Capitalized R&D expenditure	1.446892	4.45655***	6.789494	0.000000	0.025978	94.47103
NFA	Net Fixed Assets	238.8899	0.009916	1084.891	0.000000	40.48510	22971.95
VAR(E_{t+1,t+5})	Variance in earnings	29.90039	-3.05424***	45.47575	-148.2200	18.75500	716.3500
SDE	standard deviation of earnings	0.109961	-	0.229248	0.000000	0.043705	2.581001
	Panel B : scaled by price						
CAPRD	Capitalized R&D expenditure	0.572576	1.278048	4.031469	0.000000	0.008891	82.65565
NFA	Net Fix Assets	163.697	0.075014	1290.508	0.000000	13.81435	30829.48
ADVEX	Advertisement expenditure	1.756608	0.158702	6.931439	0.000000	0.040558	99.83010
MV	log market value	-0.115495	2.434790** *	1.360634	-11.43433	0.165244	3.653724
LEVERAGE	L.T.debt/L.T debt+Shareholders equity	0.589651	1.028114	3.758214	-80.63924	0.484273	58.69939

(*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level)

this study. The average coefficient on R&D is 6.27 (t-statistics=3.80). The t-test indicates that there is enough evidence to suggest that the average coefficient on total R&D expenditure is statistically significant as it is greater than the average coefficient on capital expenditure at p-value less than 0.01. The above evidence supports the hypothesis that future earnings variability as a result in investing in R&D is higher than the future earnings variability due to capital expenditure.

Table 4 replicate the regression using the capitalised research and development (CAPRD) costs and net fixed assets (NFA) instead of total R&D expenditure and capital expenditure respectively expecting that the coefficient of capitalised value of R&D costs may surpass on capital expenditure. CAPRD is the capitalised value of the R&D cost per share and NFA is the net fixed assets. The table shows that the firms on an average spends 0.014%,and 2.388% of the book value of equity on capitalized R&D, and capital expenditures (i.e. NFA) respectively, it also indicate that the spending on R&D as well as capitalization of R&D costs are very low as compared to capital expenditure (NFA). Median spending on of R&D is 0.00025% and capital expenditure is 0.4048% shows that spending on R&D is very low in comparison to capital expenditure. Average variance in earnings is 0.2990% and variance in median of earnings is 0.1875%. Whereas average capitalised R&D spending and spending on capital expenditure is 0.0057% and 1.6369% respectively in panel B showing the low spending of R&D in comparison to capital expenditure. The median spending on capital expenditure when deflated by price in

panel B is 0.1381% and on capitalised R&D is 0.00008% also showing the low capitalisation of R&D in comparison to capitalised R&D and advertisement expenditure. The results from panel A reports average coefficient on R&D is 1.45 (t-statistics = 4.46) and average coefficient on variance in earnings is 29.9 (t-statistics = -3.05) both are statistically significant indicating that there is enough evidence   to suggest that the earnings variability due to capitalised R&D is higher than the earnings variability arises from capital expenditure (NFA) at p-value less than 0.01 level of significant. Our finding on the basis of panel B deflated by price does not support the same in table 3 and 4 as market value and leverage are utilised as control variable(they two are not deflated). The average coefficient on mv in both tables is highly significant.

Findings

The present study examined the future earnings variability of the firms in Indian settings based on their research and development (R&D) spending. We found that spending on research and development by Indian firm is low in comparison to spending on capital expenditure and advertisement expenditure. As far as its influence on earnings is concerned despite low spending, R&D expenditure is statistically significant that support our assumption that future earnings variability due to R&D investment is higher than the future earnings variability due to capital expenditure. The analysis suggests that the investment in R&D enhances the earnings variability of a firm more than the earnings variability initiated by capital expenditure. Findings also suggest that the capitalised R&D cost are more associa-

ted with earnings variability implying that the firm with high R&D activities may bear high risk but at the same time it will lead the firms to earn high future returns assuming risk-return tradeoff. The evidence in this paper shows some light on the capitalising and expensing issue although based on this study we still cannot make clear agreement on this issue suggesting more focussed research in this area. The study may contribute to the current debate on accounting for R&D expenditure and its impact on earnings variability under Indian context.

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Association of Audit Committee Quality with Internal Control Quality: A Study of Select Indian Companies

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Abstract

The study focuses on the association between audit committee quality characteristics and internal control quality, so as to improve the quality of financial reporting by understanding and managing the audit committee characteristics. In this study, the concept of internal control quality and its association with audit committee characteristics by testing the hypothesis are presented in the context of select Indian companies.

Majority of the equity based listed companies at BSE have complied with the legal formalities like appointment of independent directors, number of meetings, size of the audit committee, legal and financial qualifications of the directors, as they were required for the listing at a stock exchange in India. The proportion of independent directors on audit committee and the proportion of directors on audit committee with legal qualifications have association with the internal control, but number of years the firm has been sharing information to the public, Proportion of financial expert on the audit committee, manager's educational background, managers with financial education background, number of directors on audit committee, number of audit committee meetings, firm age, geographic segments, growth and Constant were not influencing the internal control. Thus, it may be inferred that the companies may improve the internal control by managing the independent directors and directors with legal qualifications, as these characteristics have significant association with internal control.

Key words

Audit Committee, Internal Control Quality, Financial Reporting

Introduction

Audit committee, drawn from members of the Board of Directors of a Company and a Chairperson selected from these drawn members, was first conceived in 1939, during which a report from the New York Stock Exchange (NYSE) suggested that, "Where applicable, the selection of the independent auditors, by a special committee composed of directors, who are not officers of the company seems desirable"[1]. In India, Clause 49 of Stock Exchange Listing Agreement, 2005, state that all listed

companies should have an Audit Committee, and every public company having paid-up capital of not less than five crore of rupees shall constitute a committee of the Board known as Audit Committee.

The primary purpose of an audit committee is to provide oversight of the financial reporting process, the audit process, the system of internal controls and compliance with laws and regulations. More specifically, the Audit Committees assume a greater importance in the efficient running of a company because they are designed to help boards and directors in discharging their duties regarding the internal controls, which is known as the 'operating practices and procedures followed by an organization to achieve its goals and objectives, control loss or misuse of resources; reduce the risk of compromising the success of the organization through errors or irregularities. Internal Control systems provide a reasonable assurance about the achievement of the objectives of the company, especially with regard to reliability of the financial reporting, effectiveness and efficiency of operations and compliance with applicable laws and regulations[2].

Certified Institute of Management Accountants (CIMA)[3] defined Internal control as "the whole system of controls, financial and otherwise, established in order to provide reasonable assurance of: (a) effective and efficient operation; (b) internal financial control; (c) compliance with laws and regulations".
As per International Federation of Accountants (IFAC)[4], Internal control is "the process, designed, implemented

and maintained by those charged with governance, management and other personnel to provide reasonable assurance about the achievement of an entity's objectives with regard to reliability of financial reporting, effectiveness and efficiency of operations, and compliance with applicable laws and regulations."

The above expressions may reveal that the importance of financial Reporting in Internal Controls make Audit Committees as an integral and important part of Internal Control. Further, most of the internal control weakness disclosures are related to financial systems and procedures, involving financial closing processes, account reconciliation or inventory processes. Thus, broadly the internal control weaknesses are related to i) material weaknesses, ii) significant deficiency and iii) control deficiency. These weaknesses may be detected and reduced by the persons with financial knowledge.

As an Audit Committee assess periodically the organizational structure of the Internal Controls of a company, the internal audit activity may be improved effectively and efficiently to accomplish the organization goals. Further, an audit committee may be regarded as an integral part of internal control, as the Audit Committee may effectively deal with disagreements between the auditors and management, as its members may have a thorough understanding of the business, the associated risks, and the internal control environment of the company.

Since Internal Control director monitors

and measures the resources of an organization, and plays a vital role in detecting and preventing fraud and protecting the resources, an audit committee assumes an important part of Internal Control, as it is meant for the same purpose. In support of this, **Krishna**[5] expressed that the internal control of an organization is under the purview of its audit committee, and the audit committee plays an important monitoring role to assure the quality of financial reporting and corporate accounting; therefore, firms with high-quality audit committees are less likely to have internal control weaknesses than firms with low-quality audit committees.

In this context, the role of audit committee members assumes a greater importance in general, and the members with financial skill may effectively ensure the better internal control in particular. A considerable research interest has been generated on the effectiveness of audit committees in monitoring and controlling the internal control quality and a few of them are briefed below:

Literature Review

Dezoort (1998)[6] concluded that the Audit Committee members with experience made more internal control judgments as they were consistent in their judgments, had higher self-insight, higher consensus, and higher technical content levels for additional items offered, than the members without experience. **Krishnan (2005)**[7] concluded that independent audit committees, and audit committees with financial expertise are significantly less likely to be

associated with the incidence of internal control problems.

James, Fran and Gregory (2006)[8] stated that there is a statutory requirement for the independent auditor to assess and report on the effectiveness of the internal controls of the firms they audit, and found its negative impact on the securities markets, and recommended that formal internal control reporting be eliminated. **James and Jay (2006)**[9] found that the use of a questionnaire or a narrative documentation format impacted and enhanced the ability of auditors in identifying internal control design weakness. The questionnaire or documentation stimulated the existing internal control of the auditor that led to identifying internal control weaknesses. The findings suggested that the use of standardized internal control question-naire (ICQs) is useful in identifying internal control design weakness.

Krishnan and Visanathan (2007)[10] found that firms which report weaknesses in their internal controls are characterized by a higher number of meetings of the audit committee, a lower proportion of financial experts in the audit committee, and more auditor changes in the firms. **Zhang, Zhou and Zhou (2007)**[11] indicated that a relationship exists between audit committee quality, auditor independence, and internal control weaknesses, and concluded that firms that had audit committees with members having little financial and accounting experience are more identified with an internal control design weakness.

Albert (2008)[12] concluded that a material weakness in internal control

report is less when the same audit firm performed Financial Information System Design (FISD). *Jennings et al. (2008)*[13] revealed that, enhanced assurance that intentional misstatements do not exist, elevated protection to the public, but only under conditions of a strong corporate governance environment. *Hay et al. (2008)*[14] expressed that better internal control will lead to lower audit fees. However, their empirical results did not support this view, and it was concluded that that the relationship exists, but only in a relatively less-regulated environment. *Schneider and Church (2008)*[15] examined the effect of internal control reports on the assessments of the creditworthiness of a company by the lending officers, and concluded that the lenders' assessment of the risk of extending a line of credit, and the probability of extending the line of credit, are negatively affected when the company received an adverse internal control opinion as compared to an unqualified one, because an adverse internal control opinion weakens the importance assigned to the balance sheet and income statement in lending decisions and reduces lenders' confidence.

Arnold (2009)[16] concluded that the type of internal control opinion made no difference for either risk assessments or investment decisions of an individual. *Feng et al. (2009)*[17] concluded that internal control quality has an economically significant effect on internal management reports and thus, on decisions based on these figures. *Lopez et al. (2009)*[18] concluded that the opinion of the auditors on the internal controls over financial reporting provided financial statement users with

value-relevant information. *Santanu (2009)*[19] concluded the pervasiveness and severity of internal control problems, induce auditors to make an upward fee adjustment, but the remediation has only a moderating effect on pricing audit services.

Cullinan, Du and Jiang (2010)[20] found that more firms with a stock option compensation plan for the audit committee members reported internal control design weakness than firms without such a stock option plan for the audit committee members. *Jiang et al. (2010)*[21] concluded that a positive association existed between disclosures of material weaknesses and the propensity of auditors to issue a going concern opinion, suggesting that only the more severe type of internal control material weakness influences the going concern assessment.

Rose et al. (2011)[22] inferred from his study that firms audited by industry specialist auditors are more likely to report internal control design weaknesses than firms audited by non-specialist auditors. *Mithu and Sullivan, (2012)*[23] found that smaller firms pay proportionately more for the internal control audit than larger firms. *Pridgen and Wang (2012)*[24] found that hospitals, that had audit committees and employed one of the leading four audit firms, were associated with better internal control quality.

It may be perceived from the above review that firms with Audit Committees having little accounting and financial expertise or non-accounting and financial expertise are more likely to be identified with an internal control

weakness. In other words, independent audit committees and audit committees with more financial expertise are significantly less likely to be associated with the incidence of internal control problems. Since Audit Committees play such a crucial role in good Internal Control System, it becomes very important for Audit Committees to be equipped for being effective. However, the above review of literature may reveal that the studies were conducted by taking up one issue at a time and in a different environment. No study is provided on the analysis of effectiveness of select audit committee qualities on financial reporting quality in Indian context, hence, the present study is taken up to fill up the gap, with the following **research methodology** expressed in terms of objectives, sample design, tools and limitations, whereas, hypotheses and models adopted for the study are presented under the test of hypothesis:

Research Methodology

Objective: Examination of the relationship between Audit committee quality and internal control quality and measuring the effect of Audit committee characteristics quality on internal control quality.

Sample Design: There were 15916 companies listed at Bombay Stock Exchange as on 8/11/2012, of which, there were 3879 companies based on equity and listing, out of which 133 companies are selected randomly and information relating to financial year 2002-03 to 2011-12 are considered for this study. This research uses the following formula given Bill Godden[9] as

the study uses descriptive statistics dealing with probability and the population is finite, to justify the size of sample:

$$SS = \frac{Z^2 \times (p) \times (1 - p)}{C^2}$$

SS - Sample Size for Infinite Population (where the population is greater than 50,000)

Z - Z-value (e.g., 1.96 for a 95 percent confidence level)

P - Percentage of population picking a choice, expressed as decimal (e.g., 0.10 percentage)

C - Confidence interval, expressed as decimal (e.g., .05 = +/- 5 percentage points)

Z - Values (Cumulative Normal Probability Table) represent the probability that a sample will fall within a certain distribution.

Z - Value for 95% confidence level is 1.96

The computation of sample size is as follows:

$$SS = \frac{1.96 * 1.96 * (0.1) * (0.9)}{(0.5) * (0.5)}$$

$$= \frac{3.8417 * 0.5 * 0.5}{0.0025}$$

SS = 138

Sample Size - Finite Population (where the population is less than 50,000)

$$New\ SS = \frac{SS}{(1+(\frac{ss-1}{pop}))}$$

Pop = Population (3879)

Note: Sample size is calculated, using the infinite population formula and then the sample size is calculated for a finite population as,

$$New\ SS = \frac{138}{(1+(\frac{138-1}{3879}))}$$

New SS = 133

In this study, as public limited companies having a paid-up capital of at least Rs. 5 crore, shall constitute a Committee of the Board known as Audit Committee (As required by section 292A of the Companies Act.1956), the only listed companies which have Audit Committees are considered.

Data Collection and Analytical Tools: The data, related to the select characteristics and terms used in the models for analysis are collected from the annual reports of the select companies and notes and statements given in them. The period of the study is 10 years, i.e., from 2002-'03 to 2011-'12.

The study uses Pearson Correlation Coefficient, Regression analysis to establish the relationship between the variables. Omnibus Test of Model Coefficients based on Chi-Square value and Wald chi-square test are used to test the effect of the independent variable on the dependent variable and to test the stated hypotheses. Statistical Software-SPSS is used for the purpose of processing data to arrive at relevant measures of analysis.

Limitations: i) As the study is limited to 133 equity based companies listed at Bombay Stock Exchange (BSE) and selected on the basis of Bill Godden principle, the results may not represent of the entire industry or the economy; **ii)** The study is based on secondary data only and confined to analyze the same for establishing the relationship to understand the impact of select factors on audit committee quality; **iii)** The data analyzed by the models developed by the various authors, academicians, and researchers, after modifying them according to the need of the study, thus, sometimes the process of modifications may not truly represent the desired phenomenon; **iv)** There may be various characteristics that determine the audit committee quality, but the study considered only a few audit committee quality characteristics, such as, independency, size, accounting and legal qualifications of members and number of audit committee meetings.

Test of Hypothesis

The null hypothesis set for the test the association between audit committee quality and internal control quality is as,

H_{04}: There is no association between audit committee quality and internal control quality.

The study uses logit analysis prepared by *Ling, L.et al*[26] to examine the association ship of audit committee with internal control weaknesses and is presented in the following equation-I:

ICW = β_0 + β_1ACfin + β_2CEOpower + β_3ACfin*CEOpower + β_4Firmage + β_5G-seg +β_6Growth + β_7ACSize + β_8ACmtg + ϵ_{it}
—— --------------------------- I

ICW - 1 if the auditor issues an adverse internal control opinion, and;

0 if the auditor issues a favourable opinion.

ACfin - Proportion of financial expert on the audit committee, where a financial expert is defined as an individual with experience as a public accountant, auditor, principal or chief financial officer, controller, or principal or chief accounting officer.

CEO power is defined with the manager's educational background. It is measured on five point scale as below and a score of:

1 is allotted to the CEO if his/her educational background under-graduation,

2 if he/she is a post graduate from conventional university in India,

3 if he/she is a post-graduate from a centre of excellence in India like IIT (Indian institute of Technology) or IIM (Indian Institute of Management),

4 if he/she is a post-graduate from abroad and

5 if he/she has PhD degree.

Firmage - Number of years the firm has been sharing information to the public.

G-Seg - Geographic segments

Growth - Sales growth defined as the difference between current year sales and prior year sales deflated by prior year assets.

ACsize - Number of directors on audit committee

ACmtg - Number of audit committee meetings.

$\varepsilon_{i,t}$ is Error term in year t for firm i.

β_0 is a constant

β is the slope (also called the regression coefficient)

The above logit analysis equation by Ling, L. et al has not considered terms representing Independence of Audit Committee members and Legal experience of the Committee members and the same are included due to which the equation-I is slightly modified and presented below as equation-II;

$$ICW = \beta_0 + \beta_1 ACfin + \beta_2 CEOpower + \beta_3 ACfin*CEOpower + \beta_4 ACSIZE + \beta_5 ACmetg + \beta_6 ACIND + \beta_7 ACLEGEX + \beta_8 Firmage + \beta_9 G\text{-}seg + \beta_{10} Growth + \varepsilon_{it} \text{ ----------------- II}$$

In additional to the notation given earlier, the notation for other terms is presented below:

ACIND is proportion of independent directors on audit committee.

ACLEGEX is proportion of directors on audit committee with legal qualifications.

The data collected from the records of the select companies are analyzed with the help of the above stated logit analysis equation and the mean, standard of devotions of different terms

of internal control quality and audit committee quality are presented in the below table-1:

Table -1: Mean and Standard Deviation of Audit Committee Quality and Internal Control Quality

No.	Variables	N	Mean	Std. Deviation
1	Acfin	1330	0.60	0.076
2	CEOpower	1330	1.88	1.207
3	ACfin* CEOpower	1330	1.12	0.734
4	Acsize	1330	3.73	0.956
5	Acmtg	1330	4.55	1.435
6	ACIND	1330	0.79	0.202
7	ACLEGEX	1330	0.286	0.059
8	Firmage	1330	21.60	3.069
9	G-seg	1330	23.73	168.35
10	Growth	1330	0.057	0.332
11	Valid N	1330		

Source: Data extracted from Annual reports

The following inferences may be drawn from the above table:

i) The mean and standard deviation values of the other terms, related to audit committee characteristics, of the equation such as, ACIND, ACLEGEX, ACACCEX, ACMEET and ACSIZE reveal that the most of the equity based listed companies at BSE under study, have complied with the legal formalities like appointment of independent directors, meetings, size of the audit committee, legal qualifications and financial qualifications of the directors, without which companies may not be listed at a stock exchange in India.

ii) The average scores of the CEOs of the units under study is just 1.88, which is less than the score of 2 allotted for a post-graduation in the equation. It shows that a majority of CEOs in the firms under study are undergraduates, barring a post-graduation from conventional universities. The low standard deviation of 1.2 shows that there is no significant dispersal from the average facts.

iii) The mean value of audit committee member with financial expertise and CEO power (AcfinCEOpower) is 1.123 times, and the standard deviation is 0.73 times. This moderate standard deviation shows that there is a considerable dispersal of the variable of audit committee financial expertise vis-à-vis power of the CEOs, in the firms under study.

iv) The mean value of firm age is 21. 6 years and standard deviation value is 3.06 years. The values show that the firms are aged near about 21 years.

v) The average value of number of geographic segments (G-seg) is about 23.73 branches, whereas the standard deviation for the same is 168.3. A close examination of the data states that there is a high standard deviation due to the fact that banking companies like Axis Bank have high number of branches, and companies like

Scooters India Ltd. have just 2 branches.

vi) The Compounded Average Growth (CAGR) rate of sales for the study period is 5.7%. The standard deviation is 33%, showing that some of the companies have high sales growth rate and the other have lowest sales growth. This difference in growth may be attributed to the nature of the business and policies of the companies.

From the above analysis of the sample data, it may be concluded that the most of the equity based listed companies at BSE under study have, complied with the legal formalities like appointment of independent members, members with legal qualification and financial experts on audit committee, education background of CEO power, tenure of the computerization and geographical segments, without which companies cannot be listed at a stock exchange in India. Further, it may be understood that the number of audit committee meetings is a legal requirement and have shown more than the requirement. Further, the sales growth and growth in assets base indicate that there is a significant expansion of the business units, and growth in the geographical spread of the companies.

As stated earlier, the internal control quality is measured by assigning scores as '1' for adverse and '0' for favorable audit opinion. The collected scores are summarized and presented in the following table-.2:

Table-2: Internal Control Quality

Observed		Predicted		
		ICW		Percentage Correct
		0	1	
ICW	0	1180	0	100.0
	1	150	0	0.0
Overall Percentage				88.7

Source: Data extracted from Annual reports

In the above table, the columns are the two predicted values of the dependent, while the rows are the two observed (actual) values of the dependent. In a perfect model, all cases will be on the diagonal and the overall percent correct will be 100%. In this study, 88.7% of auditors issued a favorable internal control opinion, 11.3% auditors issued an adverse internal control opinion. This may state that the majority of companies have a strong internal control quality. The association between the audit committee quality and internal control quality is examined with omnibus test as presented in the following table-3.

Table-3: Omnibus test of Audit Committee Quality and Internal Control Quality

	Chi-square	df	Sig.
Model	39.211	10	0.000

Source: Data extracted from Annual reports

The table above shows the Omnibus Test of Model Coefficients based on

Chi-Square value at 10 degrees of freedom is 39.211, and the p < 0.05. Hence, the null hypothesis is rejected i.e there is no significant difference in mean value of audit committee characteristics and internal control quality indicators. Thus, it may be concluded that the existence of an association ship between the independent variables and the dependent variable was established. Further, the terms of audit committee characteristics and internal control weakness are examined closely and whether these independent terms make better prediction of the dependent variable or not, analyzed with the help of Wald chi-square test. The values used for the purpose are presented in the following table-4:

Table-4: Effectiveness of Audit Committee Quality and Internal Control quality

	B	S.E.	Wald	Df	Sig.
Acfin	-0.082	2.143	.001	1	0.969
CEOpower	0.924	0.595	2.416	1	0.120
ACfinCEOpower	-1.682	1.014	2.753	1	0.097
Acsize	0.088	0.121	0.525	1	0.469
Acmtg	-0.032	0.078	0.168	1	0.682
ACIND	-2.006	0.417	23.112	1	0.000
ACLEGEX	0.215	1.912	10.571	1	0.001
Firmage	0.002	0.030	0.004	1	0.950
G-seg	-0.001	0.002	0.588	1	0.443
Growth	-0.022	0.249	0.008	1	0.928
Constant	-2.346	1.820	1.661	1	0.197

Source: Data extracted from Annual reports

Table-4 indicates that except ACIND and ACLEGEX, the null hypotheses for all other variables, such as, ACfin, CEOpower, ACfinCEOpower, ACsize, ACmtg, Firmage, G_Seg, Growth and Constant are accepted. In other words, regarding the ACIND and ACLEGEX, H_0 is rejected, from which it may be concluded that there is a significant difference between internal control and some of the audit committee characteristics, such as, ACIND and ACLEGEX.

Conclusions

The above analysis conclude that independent directors (ACIND) and directors with legal qualifications (ACLEGEX) have association with the internal control, but directors with financial qualifications (ACfin), manager's educational background (CEOpower), managers with financial qualifications (ACfinCEOpower), size of the audit committee (Acsize), number of audit committee meetings (Acmtg),

Firmage, number of meetings (G_Seg), Growth and Constant have no association with the internal control. Thus, it may be inferred that the companies may improve the internal control by taking more independent directors with legal qualifications, as these characteristics have significant association with internal control.

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Capital Structure Practices - Empirical Evidence from Indian Corporates

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Abstract

Capital structure practices/decisions assume vital significance in corporate financial management as they influence both return and risk of equity owners of corporate enterprises. Whereas excessive use of debt may endanger their very survival, a conservative policy with regard to debt deprives them of its advantages to magnify the equity rates of return. The objective of this paper is to have an in-depth examination of the debt component in the capital structure/financing decision practices pursued by the 166 non-financial companies (constituting the BSE 200 index of the Bombay Stock Exchange (BSE) over the period 2001-2011; the selected sample represented 84.32 per cent of the total market capitalization on the BSE, as on April 1, 2010 (Source: Bombay Stock Exchange (BSE) web - site). The period of the study is of particular importance because of the recession (originating due to the US financial crisis) that impacted the world economy towards the second -half of 2008.

Key Words

Capital Structure, Capital Structure Ratios, Debt Component

Introduction

Capital structure decisions, if made judiciously, have the capability of enhancing the returns of the company. There have been certain significant changes in the way companies plan their capital structure over time. What has been the case/evidence on capital structure decisions of the Indian corporate firms is the primary focus of this paper. The objective of this paper is to have an in-depth examination of the debt component in the capital structure /financing decision practices pursued by the 166 non-financial companies (constituting the BSE 200 index of the Bombay Stock Exchange (BSE) over the period 2001-2011. For better exposition, this paper is divided into six sections. Section I carries the introduction. Section II contains a detailed literature review related to capital structure decisions. Section III outlines the scope and methodology. Section IV describes the capital structure practices in terms of major capital structure ratios. The other equally important aspects to examine capital structure practices also constitute the subject matter of this section. The major factors affecting

capital structure choices are listed in Section V. Section VI contains concluding observations.

Literature Review

Since the seminal work of Modigliani and Miller (MM) in 1958 stating that the impact of financing on the value of the firm (under certain assumptions) is irrelevant, the literature has been expanded by many theoretical and empirical contributions. Much of the emphasis has been placed on releasing the assumptions made by MM, in particular, by taking into account corporate taxes, personal taxes (Miller, 1977), bankruptcy costs (Titman, 1984), agency costs and informational asymmetries (Myers, 1984). According to Weston and Brigham (1992), the optimal capital structure was the one that maximized the market value of the firm's outstanding shares.

Preference of Equity over Debt

Gaud et al. (2005) and Ebaid (2009) concluded that short-term debt-to-assets ratio and total debt-to-assets ratio had negative relationships with the firm's performance (measured in terms of return on assets ratio).

Preference of Debt over Equity

Donaldson (1961) was perhaps the first to have described firms' preferences for internal funds over external funds, and firms' preferences for issuing debt over equity. Chang et al. (2009) concluded that long-term debt was the most important source of capital in comparison to short-term and/or con-vertible debt. Margaritis and Psillaki (2010) and Afza and Hussain (2011) observed that leverage had significant impact on the performance of the firms.

Relevant Factors in Choosing Equity vis-a-vis Debt

Jung et al. (1996) showed that firms used equity to finance their growth as such financing reduced agency costs between shareholders and managers, whereas firms with less growth opportunities used debt as it instilled financial discipline (Jensen, 1986; Stulz, 1990).

Faulkender and Petersen (2006) found that the desired level of leverage was low in firms due to the monitoring costs. Vasiliou and Daskalakis (2009) investigated differences in institutional characteristics and the resultant debt/equity choice of firms. Korteweg and Arthur (2010) analyzed that the net benefits to the firms increased with low debt-leverage firms but the benefits subsequently decreased as the leverage increased. Haque et al. (2011) surveyed that better corporate governance in firms resulted in lower agency costs. Kayo and Kimura (2011) assessed the importance of characteristics of a firm, industry and country on the variance of firm leverage.

Determinants of Capital Structure

Empirical studies reported a positive relationship between size and leverage (Rajan and Zingales, 1995; Booth et al., 2001; Frank and Goyal, 2003). Less conclusive results were reported by other authors (Kremp et al., 1999; Titman and Wessels, 1988). Profitable firms had more internal financing and therefore a negative relationship existed between leverage and profitability (Rajan and Zingales, 1995; Booth et al., 2001).Most

empirical studies observed positive relationship between collaterals and the level of debt (Rajan and Zingales, 1995; Kremp et al., 1999; Frank and Goyal, 2003).

Many authors included a measure of risk as an explanatory variable at the debt level (Titman and Wessels, 1988; Kremp et al., 1999; Booth et al., 2001). Bancel and Mittoo (2004) in their survey of European firms concluded that there were differences in capital structures based on dimensions like legal system and cost of capital. Brounen et al. (2004) examined the capital structure practices among four European countries and compared results with those of Graham and Harvey (2001) for US firms, and Bancel and Mittoo (2004) for large European publicly listed firms. Chang et al. (2009) concluded that growth was the most important factor in the choice of capital structure.

Pecking order theory

According to pecking order theory, firms adopt a hierarchical order of financing preferences; internal financing was preferred to external financing (Myers, 1984; Shyam-Sunder and Myers, 1999; Agca and Mozumdar, 2007; Lemmon and Zender, 2010). Larger firms exhibited greater pecking order behavior than smaller firms (Fama and French, 2002).

Scope and Methodology

The Bombay Stock Exchange BSE 200 index comprises of the top 200 companies listed with the Bombay Stock Exchange, based on their market capitalization. Out of these 200 companies, 34 companies were affilia-

ted to the financial sector (as on April 1, 2010, the date of sample selection); the scope of this study is limited to the 166 non-financial BSE 200 companies engaged in manufacturing and service rendering businesses.

The relevant data (secondary) were collected from the Capitaline database, for eleven years (2001-2011). The other secondary data sources used to substantiate any missing data were the Bombay Stock Exchange's website and the company's annual reports. The eleven years period of the study is divided into two sub-periods/phases to ascertain whether there has been any significant change in financing pattern of the companies over the years. For the purpose of the analysis, the first six years, w.e.f. April 1, 2000 to March 31, 2006 (for brevity referred to as 2000-2001 to 2005-2006) are referred to as phase 1 and the next five years, w.e.f. April 1, 2006 to March 31, 2011 (referred to as 2006-2007 to 2010-2011) as phase 2.

The rationale behind phase 2 beginning from April 1, 2006 is the Securities and Exchange Board of India (SEBI) regulation mandating the adherence of clause 49 (on corporate governance) by all listed companies, from April 1, 2006. Phase 1 and phase 2 are considered two independent samples. The 't' test has been administered to assess whether financing pattern changed during the second phase compared to the first phase, for the sample companies.

The period of the study is of particular importance because of the recession (originating due to the US financial crisis) that impacted the world economy towards the second-half of 2008.

Consequently, the last five years of the study (2005-2006 to 2010-2011) have been divided into two sub-phases to ascertain the impact of recession. The two years from 2005-2006 to 2007-2008 denote the pre-recession phase (Phase 3) and the subsequent three years (2008-2009 to 2010-2011) denote the post-recession phase (Phase 4) for the purpose of this study.

To study trends and its implications, the descriptive statistical values/positional values, i.e., mean, standard deviation, coefficient of variation, skew, kurtosis, median, quartile 1 and quartile 3 have been computed for each year.

The research instrument for primary data consisted of a mailed question-naire (Paolo et al., 2009). However, the initial response (in our case) was very poor; only eight companies responded. It is believed that follow-ups increase the response rate (Fox et al., 1988). Subsequently two reminders, one through post and other through email were sent to the remaining companies. Personal contacts were also established with the companies located in and around Delhi. This part of the analysis is based on 31 responses received out of 166 after 2 reminders (a response rate of 18.67 per cent).

Prima-facie, the response rate may be seen as low; however, the number of respondents and the response rate are similar to previous studies using a similar method (Jain and Kumar, 1997; Jain and Yadav, 2000; Jain and Yadav, 2005). Also, considering that the survey was addressed to time-constrained CFOs, as well as the commercial sensitivity of some of the requested information, perhaps, this may be considered a good and adequate response (Templeton et al., 1997).

The entire set of data has been analyzed using Microsoft Excel spreadsheets and the statistics software SPSS, namely, Statistical Package for Social Sciences.

It is pertinent to state here that the authors have conducted three more studies in the past (Jain and Kumar, 1997; Jain and Yadav, 2000 and Jain and Yadav, 2005) spanning from 1991-2003. An effort has been made to link the findings of these studies with the current one with the aim to establish trends (if any) in certain aspects of capital structure decision-making over the past two decades (to provide a broader perspective).

Capital Structure Ratios

The objective of this section is to examine the financing pattern/policies of the sample of 166 non-financial BSE 200 companies. The major ratios used for the purpose of analysis are debt-equity ratio and total debt-to-total assets (net of depreciation and other intangible and fictitious assets) ratio. In the context of these ratios, current liabilities were also included in computing total external obligations/debt (Sen, 1979).

The corporate enterprises, prior to the economic liberalization of 1991, had debt dominated/ lop-sided capital structures which on consideration of the canons of corporate financing, was highly imprudent (Khan, 2011). For the purpose of analysis, book values (as shown in the balance sheet) have been employed (Chakraborty, 1977).

Gross Debt-Equity (D/E) Ratio

Relevant data in terms of mean, standard deviation, coefficient of variation, skew, kurtosis, median and quartiles (1 and 3) for 2001-2011 are presented in Table 1. The D/E ratio of the sample companies lies in the range of 1.07 to 1.37 during 2001-2011. The mean value of greater than one (1.24) for the eleven-year period covered by the study signifies that debt has been a major source of financing for the sample of non-financial BSE 200 companies. This finding, however, is in sharp contrast to the nearly 2:1 debt-equity ratio reported by Jain and Kumar (1997) on Indian private sector enterprises for the period 1985-1995; on the contrary, it is similar to the findings of later studies of Jain and Yadav (2000) on Indian private sector enterprises for a period of 1991-1998, which reported an average D/E ratio of 1.45 and of Jain and Yadav (2005) on Indian public sector enterprises over a period of 1991-2003, indicating a D/E ratio of 1.16. By and large (based on these studies), it appears safe to conclude that debt levels are reducing in Indian corporate enterprises over time. Figure1 exhibits the trend of the D/E ratios.

Standard deviation and coefficient of variation figures indicate high degree of volatility within the sample. Skew denotes that very few companies reported high values of D/E ratio (supported by kurtosis as well). However, there is no statistically significant change in the capital structure choices in phase 2 over phase 1 as well as phase 4 over phase 3 (evident through the paired samples t-test) indicating perhaps that the individual companies in the sample exhibited a varying range of D/E mix in their capital structures through the period of the study. This is also an indication of unique capital structures being followed by the sample companies and no uniform D/E mix emerging as the choice of majority of companies in framing their capital structure policies.

The frequency distribution (Table 2) of the D/E ratio is insightful. The companies having a D/E ratio of 0-1 showed a dip in the year 2003 but then has increased substantially towards around 50 per cent of the sample companies in the subsequent years of phase 2. The companies having a debt-equity ratio of 2-5 have shown a decrease in proportion in phase 2 vis-à-vis phase 1. From the distribution, it is evident that companies have decreased debt in their capital structure from high proportions towards lower proportions.

Further, it was desired to understand the long-term vis-à-vis short-term components of the total debt of the sample companies. Therefore, long-term debt-to-equity and short-term obligations-to-equity ratios were calculated separately and analyzed.

Long-term Debt-Equity (LTD/E) Ratio

Relevant data in terms of mean, standard deviation, coefficient of variation, skew, kurtosis, median and quartiles (1 and 3) for 2001-2011 are presented in Table 3. The LTD/E ratio of the sample companies lies in the range of 0.52 to 0.71 during 2001-2011. The mean value of less than one (0.60) for the eleven-year period covered by the study signifies that long-term debt has been relatively less important vis-à-vis equity as a source of financing for the

Table 1: Mean, Standard Deviation, Coefficient of Variation, Skew, Kurtosis, Median and Quartile Values of Debt-Equity Ratio of Sample Companies, 2001-2011

Year Ending*	Number	Mean	Standard Deviation	Coefficient of Variation (%)	Skew	Kurtosis	Median	Quartile 1	Quartile 3
2001	128	1.18	0.95	80.36	1.38	2.29	1.01	0.49	1.63
2002	137	1.37	1.09	79.60	1.00	0.59	1.08	0.56	2.07
2003	135	1.27	0.98	77.16	0.98	0.63	1.13	0.47	1.84
2004	140	1.34	1.07	79.48	1.07	0.71	1.19	0.52	1.86
2005	150	1.33	1.03	77.09	1.11	0.90	1.12	0.49	1.84
2006	154	1.30	0.92	70.79	0.80	0.05	1.11	0.57	1.82
2007	158	1.27	0.91	72.13	1.10	1.31	1.12	0.54	1.77
2008	159	1.13	0.86	76.11	1.29	1.98	0.93	0.52	1.53
2009	160	1.23	1.00	81.35	1.41	2.49	0.97	0.47	1.67
2010	156	1.07	0.80	74.92	0.87	0.13	0.86	0.45	1.55
2011	164	1.15	0.97	84.05	1.36	1.80	0.87	0.44	1.63
2001-2011	149	1.24	0.96	77.55	1.13	1.17	1.04	0.50	1.75

Contd.

Table 1: Mean, Standard Deviation, Coefficient of Variation, Skew, Kurtosis, Median and Quartile Values of Debt-Equity Ratio of Sample Companies, 2001-2011

Year Ending*	Number	Mean	Standard Deviation	Coefficient of Variation (%)	Skew	Kurtosis	Median	Quartile 1	Quartile 3
Phase 1 (2000-2001 to 2005-2006)	141	1.30	1.01	77.41	1.06	0.86	1.11	0.52	1.85
Phase 2 (2006-2007 to 2010-2011)	159	1.17	0.91	77.71	1.21	1.54	0.95	0.48	1.63
Phase 3 (2006-2007 to 2007-2008)	159	1.20	0.89	74.12	1.19	1.65	1.03	0.53	1.65
Phase 4 (2008-2009 to 2010-2011)	160	1.15	0.92	80.11	1.21	1.47	0.90	0.45	1.62

*The Indian financial year begins on April 1 and ends on March 31 of the following year. The same holds true for all subsequent tables and notations.

Paired Differences								
	Mean	Standard Deviation	Standard Error Mean	Lower	Upper	t	df	Significance (2-tailed)
Phase 1 – Phase 2	0.12800	0.15057	0.06733	-0.05895	0.31495	1.901	160	0.130
Phase 3 – Phase 4	0.28163	3.63167	0.28187	-0.27491	0.83818	0.999	165	0.319

*In the paired t-test, in case the value of significance (2-tailed) is 0.05 or less, the alternate hypothesis that there is significant difference in two phases is accepted; when its value exceeds 0.05, the alternate hypothesis is rejected implying that there is no significant difference in the two phases.

Figure 1: Mean Values of Debt-Equity Ratio of Sample Companies, 2001-2011
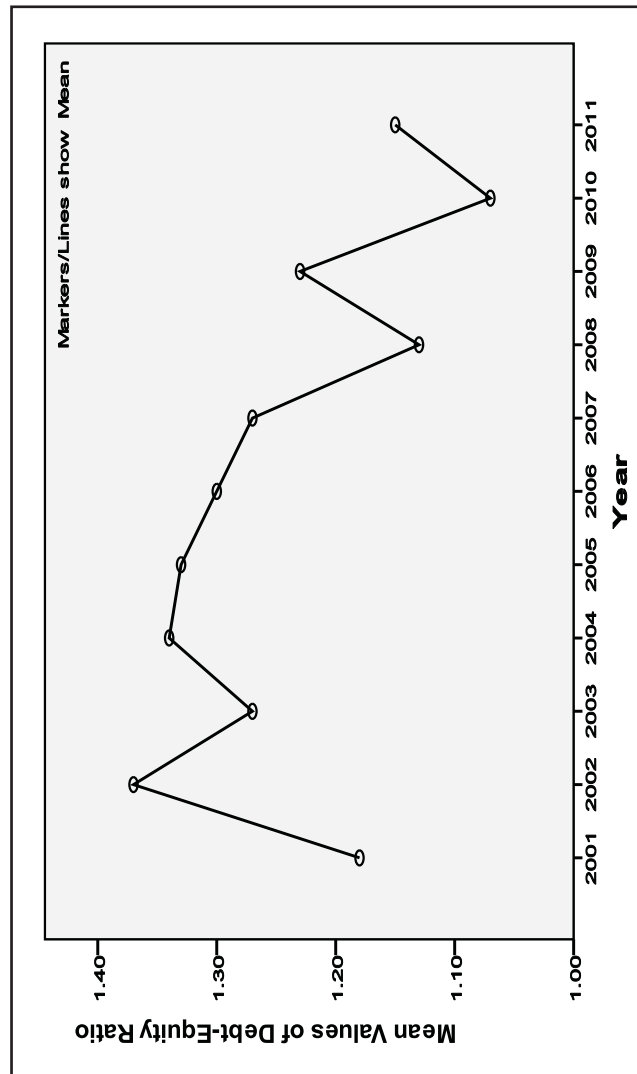
Table 2: Frequency Distribution of Debt-Equity Ratio of Sample Companies, 2001-2011

(Figures are in percentages)

Debt - equity ratio	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-1	45.14	40.94	38.06	41.94	40.63	45.34	43.29	49.40	50.30	54.60	56.97
1-2	29.86	26.17	31.61	28.39	35.00	31.68	35.98	32.74	27.54	27.61	26.67
2-5	14.58	24.83	18.06	20.00	18.13	18.63	17.68	12.50	18.56	13.50	15.76
5-10	3.47	2.68	6.45	5.81	3.75	1.86	1.83	2.98	1.20	2.45	0.61
Above 10	4.86	3.36	2.58	1.94	1.25	0.62	0.61	1.19	1.20	0.61	0.00

Note: (i) Frequency distribution data includes extreme values also. It applies to all tables related to frequency distribution data. A few companies having negative D/E ratios (ranging from 0 per cent to -3.23 per cent over the period of the study) have been excluded from the analysis (frequency distribution). Hence, the total does not tally to 100.

Figure 2: Mean Values of Long-term Debt-Equity Ratio of Sample Companies, 2001-2011
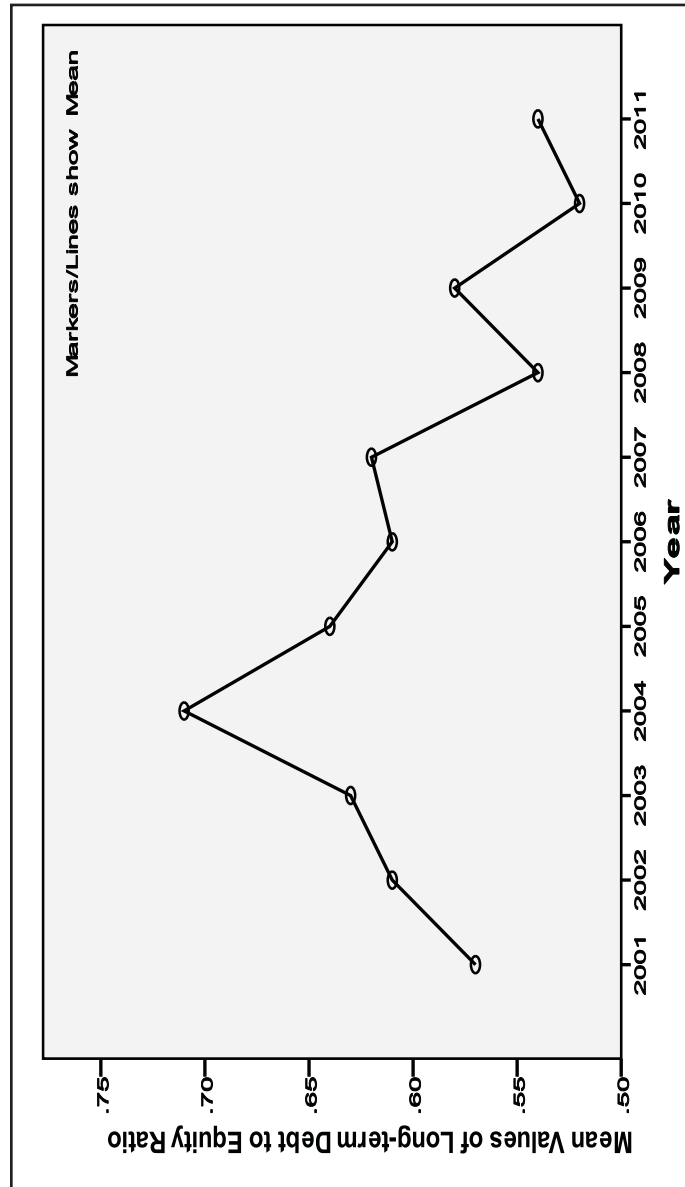
sample of non-financial BSE 200 companies. Standard deviation and coefficient of variation figures indicate high degree of volatility within the sample. As with the D/E ratio, the skew and kurtosis again indicate that only few companies reported a high value of LTD/E ratio. There is no statistically significant change in the capital structure choices in phase 2 over phase 1 as well as phase 4 over phase 3 (evident through the paired samples t-test). Figure 2 exhibits the trend of the LTD/E ratios.

The frequency distribution (Table 4) of the LTD/E ratio is revealing. The percentage of companies having a LTD/E ratio of 0-1 has hovered around 62.26 to 72.39 over the period of the study. The companies having a long-term debt-equity ratio of 5-10 have shown a decrease in proportion in phase 2 vis-à-vis phase 1 with a value of 0 per cent in 2011.

Short-term Obligations-Equity (STO/E) Ratio

Relevant data for 2001-2011 (and the four phases) are presented in Table 5. The STO/E ratio of the sample companies lies in the range of 0.64 to 0.99 during 2001-2011. The mean value 0.80 for the eleven-year period covered by the study signifies that short-term obligations have been the larger component than long-term debt for the sample companies. Standard deviation and coefficient of variation figures indicate high degree of volatility within the sample. Keeping in with the D/E and LTD/E ratios, the skew and kurtosis again indicate that few companies recorded large values of STD/E ratio. However, there is a statistically significant change

in the share of short-term obligations as a component of debt in phase 2 over phase 1 as well as phase 4 over phase 3 (evident through the paired samples t-test) indicating that the sample companies exhibit a varying range of STO/E mix in their capital structures throughout the period of the study. Figure 3 exhibits the trend of the STO/E ratios.

The frequency distribution (Table 6) of the STO/E ratio indicates that majority of the companies have a STO/E ratio of less than 2. Also, the percentage of companies having a STO/E ratio of 0-1 has hovered between 57.79 per cent in 2003 to 78.18 in 2011. The companies having a debt-equity ratio of 5-10 have shown an increase in proportion in phase 2 vis-à-vis phase 1 with a value of 0 per cent in 2001.

By and large, after considering the three ratios, and after comparing the findings with the three earlier studies, it appears that the Indian companies have offloaded debt (in their capital structure) in favor of equity (over time, i.e., the past two decades (1991-2011)). Also, within debt, there appears to be a shift from long-term debt to short-term debt instruments.

There seems to be an almost even split in the opinion of sample companies on whether debt is likely to be the mainstay of the sample companies in the future also. It is eloquently borne out the relevant data contained in Table 7, which indicates that nearly half of the sample companies hold the view that the debt-equity ratio should be maintained around 2:1 or higher than 2:1. This is similar to the survey findings of Jain and Yadav (2000) on private sector enterprises and Jain

Table 3: Mean, Standard Deviation, Coefficient of Variation, Skew, Kurtosis, Median and Quartile Values of Long-term Debt-Equity Ratio of Sample Companies, 2001-2011

Year Ending	Number	Mean	Standard Deviation	Coefficient of Variation (%)	Skew	Kurtosis	Median	Quartile 1	Quartile 3
2001	133	0.57	0.71	124.48	2.46	8.12	0.35	0.07	0.75
2002	139	0.61	0.76	124.11	2.07	5.19	0.41	0.05	0.80
2003	142	0.63	0.84	134.65	2.22	5.66	0.35	0.02	0.78
2004	149	0.71	0.93	131.21	2.24	5.83	0.42	0.05	0.93
2005	155	0.64	0.75	117.01	1.92	5.26	0.45	0.04	0.92
2006	160	0.61	0.72	118.28	2.24	8.09	0.41	0.03	0.96
2007	160	0.62	0.72	115.36	1.94	5.57	0.43	0.06	0.91
2008	164	0.54	0.65	120.40	2.21	6.69	0.35	0.05	0.82
2009	161	0.58	0.66	113.34	1.75	3.93	0.40	0.05	0.90
2010	162	0.52	0.57	111.55	1.60	2.96	0.37	0.04	0.80
2011	163	0.54	0.63	116.35	1.86	3.95	0.33	0.07	0.77
2001-2011	153	0.60	0.72	120.61	2.05	5.57	0.39	0.05	0.85

Contd.

Table 3: Mean, Standard Deviation, Coefficient of Variation, Skew, Kurtosis, Median and Quartile Values of Long-term Debt-Equity Ratio of Sample Companies, 2001-2011

Year Ending	Number	Mean	Standard Deviation	Coefficient of Variation (%)	Skew	Kurtosis	Median	Quartile 1	Quartile 3
Phase 1 (2000-2001 to 2005-2006)	146	0.63	0.78	124.96	2.19	6.36	0.40	0.04	0.86
Phase 2 (2006-2007 to 2010-2011)	162	0.56	0.65	115.40	1.87	4.62	0.37	0.05	0.84
Phase 3 (2006-2007 to 2007-2008)	162	0.58	0.68	117.88	2.07	6.13	0.39	0.06	0.86
Phase 4 (2008-2009 to 2010-2011)	162	0.55	0.62	113.75	1.74	3.61	0.37	0.05	0.82

	Paired Differences					t	df	Significance (2-tailed)
	Mean	Standard Deviation	Standard Error Mean	Lower	Upper			
Phase 1 – Phase 2	0.07200	0.08672	0.03878	-0.03567	0.17967	1.857	160	0.137
Phase 3 – Phase 4	-0.00973	0.37314	0.02905	-0.06709	0.04763	-0.335	164	0.738

Table 4: Frequency Distribution of Long-term Debt-Equity Ratio of Sample Companies, 2001-2011

(Figures are in percentages)

Long-term debt - equity ratio	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-1	67.38	67.79	65.58	62.58	62.26	62.73	67.48	71.69	68.07	72.29	72.39
1-2	11.35	8.72	9.09	14.19	16.98	19.25	15.34	12.05	15.66	10.24	11.04
2-5	4.26	7.38	7.14	8.39	5.03	3.73	5.52	3.61	3.01	3.61	4.29
5-10	2.13	1.34	3.25	1.29	0.00	0.00	0.61	0.00	1.20	0.60	0.00
Above 10	1.42	4.03	1.30	0.00	0.63	0.00	0.00	0.00	0.00	0.60	0.00

Note: A few companies having negative LTD/E ratios (ranging from -10.07 to -14.47 per cent over the period of the study) have been excluded from the analysis (frequency distribution). Hence, the total does not tally to 100.

Table 5: Mean, Standard Deviation, Coefficient of Variation, Skew, Kurtosis, Median and Quartile Values of Short-term Obligations-Equity Ratio of Sample Companies, 2001-2011

Year Ending	Number	Mean	Standard Deviation	Coefficient of Variation (%)	Skew	Kurtosis	Median	Quartile 1	Quartile 3
2001	137	0.90	0.95	106.51	2.01	3.97	0.59	0.28	1.13
2002	144	0.99	1.01	101.87	1.95	4.11	0.68	0.27	1.25
2003	146	0.92	0.88	95.72	2.08	5.88	0.69	0.28	1.35
2004	148	0.90	0.84	93.19	1.93	5.05	0.62	0.30	1.29
2005	153	0.85	0.78	91.36	1.58	2.30	0.56	0.30	1.08
2006	157	0.82	0.70	86.05	1.47	1.75	0.58	0.35	1.02
2007	159	0.77	0.68	87.92	1.99	6.19	0.57	0.30	1.00
2008	162	0.69	0.63	90.08	1.76	3.93	0.49	0.26	0.91
2009	162	0.71	0.68	96.71	2.17	6.91	0.51	0.25	0.98
2010	162	0.64	0.63	98.24	1.80	3.38	0.41	0.22	0.88
2011	164	0.66	0.64	96.99	1.57	2.01	0.43	0.23	0.81
2001-2011	154	0.80	0.77	94.97	1.85	4.13	0.56	0.28	1.06

Contd.

Table 5: Mean, Standard Deviation, Coefficient of Variation, Skew, Kurtosis, Median and Quartile Values of Short-term Obligations-Equity Ratio of Sample Companies, 2001-2011

Year Ending	Number	Mean	Standard Deviation	Coefficient of Variation (%)	Skew	Kurtosis	Median	Quartile 1	Quartile 3
Phase 1 (2000-2001 to 2005-2006)	148	0.90	0.86	95.78	1.84	3.84	0.62	0.30	1.19
Phase 2 (2006-2007 to 2010-2011)	162	0.69	0.65	93.99	1.86	4.48	0.48	0.25	0.92
Phase 3 (2006-2007 to 2007-2008)	161	0.73	0.65	89.00	1.87	5.06	0.53	0.28	0.96
Phase 4 (2008-2009 to 2010-2011)	163	0.67	0.65	97.31	1.85	4.10	0.45	0.23	0.89

	Paired Differences						df	Significance (2-tailed)
	Mean	Standard Deviation	Standard Error Mean	Lower	Upper			
Phase 1 – Phase 2	0.20119	0.68661	0.05395	0.09466	0.30772	3.729	161	0.000
Phase 3 – Phase 4	0.05873	0.52604	0.04108	-0.02238	0.13984	1.430	163	0.155

Figure 3: Mean Values of Short-term Obligations-Equity Ratio of Sample Companies, 2001-2011
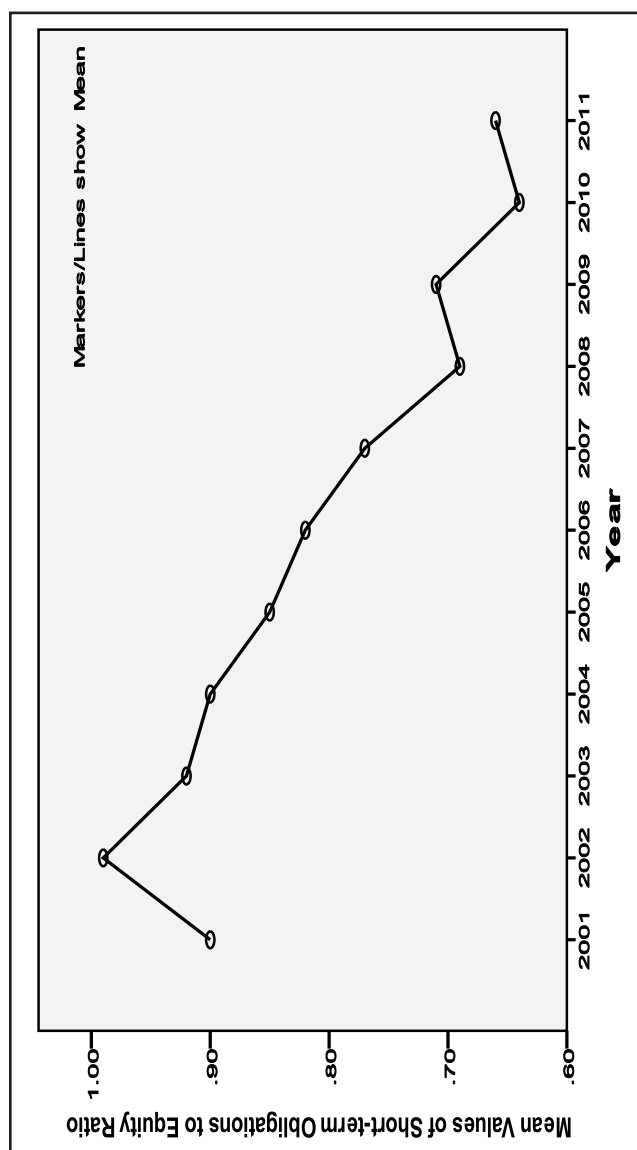
Table 6: Frequency Distribution of Short-term Obligations-Equity Ratio of Sample Companies, 2001-2011

(Figures are in percentages)

Short-term obligations - equity ratio	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-1	70.92	58.39	57.79	59.35	64.78	71.43	72.39	74.10	73.49	76.51	78.18
1-2	14.18	26.17	25.97	25.16	21.38	16.77	19.02	18.67	18.07	16.27	16.36
2-5	10.64	10.74	8.44	9.03	7.55	8.07	5.52	4.22	5.42	4.22	4.24
5-10	0.00	1.34	1.30	1.29	1.89	0.62	1.23	1.81	1.81	1.81	0.61
Above 10	1.42	0.67	0.65	1.29	0.63	0.62	0.00	0.00	0.00	0.00	0.00

Note: Frequency distribution data includes extreme values also. It applies to all tables related to frequency distribution data. A few companies having negative STO/E ratios (ranging from 0 to -5.19 per cent over the period of the study) have been excluded from the analysis (frequency distribution). Hence, the total does not tally to 100.

and Yadav (2005) on public sector undertakings where nearly half of the sample companies preferred to have a D/E ratio of 2:1 or more.

Table 7: Opinion Regarding Desired Level of Debt-Equity Ratio to be Maintained by Sample Companies

Debt-equity ratio should be maintained around	Percentage
Less than 1	17.39
1:1	34.78
2:1	43.47
3:1	4.34
Greater than 3	0.00

The survey also sought from the sample companies the probable reasons for their preference for debt (if any). The survey identifies the two major reasons: (i) debt is cheaper than equity and (ii) debt is more flexible an instrument than equity in terms of callability clause, repayment schedule, etc (Table 8). This is similar to the findings of Jain and Kumar (1997) and Jain and Yadav (2005).

Table 8: Reasons for Preferring Debt Over Equity as Cited by Sample Companies

Reasons for preferring debt over equity	Percentage
Debt is cheaper than equity	50.00 (30.76)
Debt is more flexible than equity in terms of callability clause, repayment schedules, etc.	46.15 (19.23)
It is easier to raise debt as investors are risk averse and equity is risk capital	23.07 (3.84)
The perceived advantage of flexibility in payment of dividend is more illusory than real	3.84 (-)
Any other*	15.38 (15.38)

Notes: (i) Figures in brackets indicate that the reason mentioned has been cited exclusively by the respondents. (-) indicates not even one BSE 200 company uses the technique exclusively.

(ii) These notes are applicable to all other tables prepared on the basis of survey.

* Includes 'debt provides tax shelter'; it implies that debt is cheaper than equity.

It was of equal interest to ascertain the reasons of practicing managers of the sample companies for raising more equity (Table 9). 'Firm can go for projects involving higher risk' and 'firm is in a better position to face downturns' have been mentioned as the two major factors for the preference of equity. The factors "flexibility in paying dividends" and "the firm is not under obligations to pay dividends" are no longer the favored factors for raising equity. It is a sign of growing professionalism among the finance managers of the sample companies. In earlier studies carried out in India, the factor "equity capital does not carry cost" has been cited as a major reason of using equity by a sizeable number of private corporate firms in

India and south-east Asia (Jain and Kumar, 1997).

Table 9: Reasons for Using Predominantly More Equity as Cited by Sample Companies

Reasons for using predominantly more equity	Percentage
Equity is easy to raise	18.75
Firm is not under obligations to pay dividends	0.00
There is flexibility in paying dividends	0.00
Any other*	81.25

*Includes 'firm can go for projects involving higher risk' and 'firm is in a better position to face downturns'.

These factors are in conformity with sound principles of financial management to be followed in designing capital structure. These factors reinforce the earlier contention of greater professionalism in managing sample companies.

It appears from the above that the sample companies are quite conscious of the advantages accruing from using equity; they also seem to be equally cautious being beset with debt dominated capital structure. Perhaps, the sample companies are now more conscious about the bankruptcy costs associated with large debt (Titman, 1984), lower agency costs due to greater equity and informational asymmetries and their impact on capital structures (Myers, 1984). For these reasons, perhaps, the majority of sample companies (62.50 per cent) have stated that debt should not be tapped to the maximum extent (Table 10). The above findings are also similar to the findings of an earlier study of the public sector enterprises in India (Jain and Yadav, 2005).

Table 10: Opinion Regarding Utilization of Debt to Maximum Extent by Sample Companies

Debt should be tapped to maximum extent	Percentage
Yes	37.50
No	62.50

Factors Affecting Capital Structure Choice

The majority of the sample companies in the survey endorses that capital structure has been affected (towards relatively more equity) in the wake of India's liberalization and globalization (Tables 11 and 12).

Table 11: Opinion Regarding Changes Affected in the Capital Structure of the Company, in the wake of Liberalization of the Country's Economy and Globalization

Option	Percentage
Yes	48.14
Expected in near future	7.40
No	44.44

A shift towards more equity in the capital structure of the companies is an indication of the increasingly important role that the capital markets of the country are to play in raising finance for the companies.

Table 12: Nature of Changes (if any) in the Capital Structure of the Company, in the wake of Liberalization of the Country's Economy and Globalization

Option	Percentage
More Equity	53.84
More Debt	46.15

It is corroborated by the fact that nearly 60 per cent of the respondent companies state that capital markets are increasingly being tapped to raise finance (Table 13).

Table 13: Extent of Dependence on the Capital Market in the wake of Opening Up of the Economy

Option	Percentage
Increased	59.09
Remains unchanged	31.81
Decreased	9.09

The survey highlights financial risk, stability in sales and profits and corporate control as the three majorjor factors governing the capital structure decision of Indian corporate (Table 14).

These findings are similar to the findings of Bancel and Mittoo (2004), Vasiliou and Daskalakis (2009), Chang et al. (2009) and Kayo and Kimura (2011).

Concluding Observations

The study succinctly brings to fore that debt (which was the most important constituent of corporate financing in pre-economic liberalization) is steadily being replaced by equity for the majority of the sample companies in India. Equity financing reduces agency costs (Jung et al., 1996) and helps in dealing with informational asymmetries (Myers, 1984). These perhaps could also be important contributors to the increasing preference of equity vis-à-vis debt.

Also, the sample companies seem to be well conscious of the downside of a debt dominated capital structure. This gets support from many aspects indicated by the survey: (i) retained earnings have been cited as the most preferred source by the sample companies; (ii) the majority of the sample companies opine that debt should not be used to the maximum extent; and (iii) while favoring equity they have stated, inter-alia, the enterprise is in better position to face bad periods compared to firms having high D/E ratio and the companies can go for projects involving higher risk. These findings of the survey lead us to believe that there is an emerging trend towards equity financing taking a dominant role (erstwhile occupied by debt) in corporate financing (in the times to come).

The sample companies (having profitable operations) in view of large internal cash accruals at their disposal to meet their investment requirements, are using less amount of debt as external financing requirement not because they have low target debt ratios, but because of preference for internally

Table 14: Opinion of the Company Regarding the Importance of the Following Factors in the Capital Structure Decision (1. Very Important, 2. Important, 3. Not So Important, 4. Not At All Important)

Factors	1	2	3	4	Total
Financial risk	65.38	19.23	15.38	0.00	100.00
Stability in sales/profits	53.84	26.92	15.38	3.84	100.00
Corporate control	48.00	40.00	4.00	8.00	100.00
State of the capital market	40.00	36.00	12.00	12.00	100.00
Business/Operational risk	40.00	56.00	4.00	0.00	100.00
Regulatory framework	40.00	44.00	8.00	8.00	100.00
Restrictions imposed by lenders	20.00	20.00	36.00	24.00	100.00
Corporate tax	20.00	60.00	16.00	4.00	100.00

Note: Cost of servicing debt/equity was another option but was not accorded any rank.

generated funds. This again flouts sound tenets of finance theory. Such firms, due to favorable financial leverage, could have magnified their RoR (rate of return) for their equity owners by employing higher debt. In this regard, hence, the tax-shield on interest is now being regarded as a secondary consideration in designing capital structure.

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Economic Empowerment and Women-owned Micro and Small Enterprises in India - A Study with special reference to Engineering Sector of Howrah, West Bengal

Manidipa Das Gupta

Abstract

In any developing country like India, Micro, Small and Medium Enterprises (MSMEs) specially Micro and Small Enterprises (MSEs) are considered to be most vibrant sector with high potentiality in introducing appraising level of production, export promotion and employment generation at nominal capital base. These efforts of MSEs welcome socio-economic development in our society in different dimensions. If MSEs are attached with the marginalized women section of our society, they will invite gender inclusion in entrepreneurial operation. Women-owned MSEs spread their hands in empowering the very gender from all corners specially economic, the energizing source of other areas of empowerment. In India, women-owned MSEs are found to be very nominal in comparison with the male-owned ones. Amongst different states of India, West Bengal (WB) is taken as a significant contributor so far as the number of women-owned MSEs and their performance are concerned. In overall performance of MSEs, WB always appreciates the role of engineering sector of Howrah, formerly known as Birmingham of the East. Though men dominated, the engineering MSEs of Howrah also found women owner-

ship under their purview which are constantly empowering the women attached with these with their economic performance irrespective of having some troubles sometimes. But the scale of smoothness in operation of women-owned engineering MSEs sometimes varies based on the gender combination in ownership i.e. women in ownership with men which will have high impact on the level of empowerment of the women-owners attached with different natures of ownership. The present paper, therefore, aims at focusing on the scale of empowerment of the women-owners of MSEs in association with the nature of entrepreneurship and also recommending some suggestions in this very respect.

Key Words

Economic Empowerment, Micro and Small Enterprises, Women-owned Micro and Small Enterprises, Engineering, Howrah

Introduction

India, the developing country since its very independence is tremendously suffering due to unemployment and

underemployment and resultantly for poverty, socio-economic unrest, disparity etc. Therefore, somehow to resolve the contemporaneous socio-economic hazards, self-employment creation is considered to be the main way out. In this very context, Micro and Small Enterprises (MSEs) [formerly known as Tiny and Small Scale Industry (SSI)] can be regarded as the most vibrant entrepreneurial platform which offers self-employment opportunity with nominal amount of investment in plant and machineries, net worth and input for production level and introduced huge contribution in employment generation (8758242 persons[1]) with high level of production (₹ 747031.53 crore[1]), export promotion (₹ 76073.95 crore[2]) and gross value addition (₹ 275700.65[3]).

MSEs can add more flavor in the socio-economic development of the society if they can invite women to take part in the self-employment generating practices. Women participation in ownership level (at maturity proportion at more than 51%) is firmly regarded as a means to gain women self-respect, self-esteem and self-confidence with economic freedom in all of their domestic and external socio-economic fields of activity. With this promotional effort, MSEs can form a better gender inclusive atmosphere in the ownership pattern and empowers the women in multifaceted dimensions out of which financial/economic perspective is the main notable one, for its ever supportive role in other areas of empowerment. Women-owned MSEs, with the passage of time and education extend their kitchen-oriented activities of 3 Ps (Pickle,

Powder and Paddad) to modern 3Es (Energy, Electronics and Engineering) (Goyal and Parkash, 2011). But women-owned MSEs have to bear more enduring effort to survive successfully in the competitive arena than that of their men counterpart. In the entrepreneurial effort, the main constraint to women entrepreneur is nothing but that is they are women. They have to fight against different functional mismanagement due to several genders insensitive avoidable/unavoidable circumstantial issues out of which financial bottlenecks in different dimensions are especially mentionable.

In India, West Bengal (WB) claims special attention due to the remarkable performance of MSEs which makes it as a most promising contributor in this respect in the Eastern Region and a notable performer in the national level[4]. Besides, WB carries a significant proportion of women in the ownership level of MSEs which is considered as premier in India[5]. In the enduring performance of MSEs in national level, WB appreciates the role of engineering sector of Howrah, the former Birmingham of the East[6]. Though MSEs Engineering sector (specially light one) of Howrah is mainly male-dominated, women are also found to take their footsteps very primitively which upgrades their socio-economic status but side-by-side throw a forceful challenge in their very way of survival in different functional areas of which finance-related issues consider special emphasis. Therefore, a focus can be thrown

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1 All India Fourth Census Report, Office of the Development Commissioner, Ministry of MSME, 2006-2007
2 ibid
3 ibid
4 ibid
5 WB contains 20.80 lakh unregistered and 64611 registered working MSMEs of which 2.05 lakh and 4.42 thousand are owned by women respectively just after Tamil Nadu and Kerala (All India Fourth Census Report, 2006-2007)
6 Howrah contains 9489 registered MSMEs just after Kolkata 12601 (MSME Development Institute, Kolkata, 2011-2012)

to measure the condition of women-owned engineering MSEs in Howrah or how well the women owners of the men dominated respective area can be empowered economically.

The remainder parts of the present study are designed into seven sections. Section 2 narrates the related literature in this regard. The objective of the study here is designed in Section 3. The theoretical aspects with practical evidence of women empowerment and women ownership in Micro, Small and Medium Enterprises (MSME) in India are focused in Section 4. Section 5 highlights the methodology portion of this study. Section 6 exhibits the analysis, interpretation and findings of the study. The conclusion and recommendations are reflected in Section 7.

Review of the related literature

Present study has been constructed with the support of different books, periodical and other research work. The literature reviewed till date can be enumerated as follows.

According to Malhotra et. al. (2002) and later on UNDP Report (2008b), women would be empowered if they could have the capacity to recognize and utlilise the accessed assets individually or collectively in their own interest. Narayan (2002) and after that Golla et. al. (2011) reviewed the concept of economic empowerment in this re-spect. As per Vijayakumar and Naresh (2013), since fifth five year plan women role is being recognized with a market shift approach from women welfare to women development and employ-ment. Some researchers (Palaniappan et. al., 2012; Sharma et. al., 2012; Shah,

2013; Vijayakumar and Jaychitra, 2013) gave high importance to MSMEs for their promotional attitude towards including culturally backward section of our society in the mains-treaming economic activities. Okafor and Mordi (2010), Pines et.al. (2010) found different environmen-tal factors in women owned MSME which would have positive and negative correlation with it and thus could be defined as motivating and hindering factors respectively. As per their opinion, in developing country, 'necessity' would be considered as the main motivating factor behind women participation in enterprises. But women in India have to face tremendous trouble in their entrepreneurial opera-tion mainly due to the orthodox and traditional socio cultural environment, lack of education, technical skill etc. Bekele and Worku (2008), Imyxai and Takashi (2010) found gender difference in accessing credit, particularly formal credit, government policy and lack of innovation as the main hindering factors in the partici-pation of women in the very enterprises which would make the women-owned MSMEs underperformed comparing to male-owned ones. In this issue, some researchers (Stevenson and Onge, 2005; Rajalakshmi, 2014; Devi, 2015) sugges-ted to frame self-developmental goals from the end of women-owned units and also from the part of government to fill up the discrimination between male and female-owned units.

Thus based on the related literature so far been reviewed, it can be found out that no significant study here has been made to detect the level of economic empowerment of women owners of MSEs in India specifically in engineering MSEs of Howrah. Therefore, based on the

research gap the present study has been taken into consideration.

Objective of the present paper

The objectives of the present paper can be structured as follows:

- To examine how far the women in ownership of different nature (like sole proprietorship etc.) in engineering MSEs of Howrah are being economically empowered,

- To recommend some suggestions for further improvement in this context.

Women Empowerment and Women Ownership in MSMEs in India - An Overview

Women comprise special roles in developing socio-economic environment of a country. Through participating in entrepreneurial effort, they ensure empowerment in their own surface. 'Empowerment' can be considered as a way to have 'social inclusion'[7] of the marginalized excluded group of society and can be defined as the enhancement of asset and capabilities of diverse individuals and groups to engage, influence and hold accountable the institutions which affect them (Narayan, 20002). UNDP (2008) com-mented here that women empower-ment can be justified if they have the sense of self-worth and also several rights to choices, power to control their own lives and ability to influence the direction of social change etc. (UNDP, 2008b).

Several researchers (Malhotra, et.al., 2002) in this context, have detected the major components of women empowerment, measured in different areas like economic, socio-cultural, familial/interpersonal, legal, political, psychological where different contributories are found under two main broad groups - Household and Community. In this regard, the economic strength and freedom enhance the capability of women to up skip the effect of other areas of empowerment. In this context, Malhotra, et. al. (2002) identified total eight contributory elements under women economic empowerment. In Household group of economic empowerment three elements - Women's Control over Income, Contribution to Family Support, Access to and Control of Family Resources are fiund, while the Community group holds eight elements - Women access to employment, Ownership of Assets and Land, Access to Credit, Access to Market, Involvement and/or representation in local market. Women can economically be empowered if they have both the ability to succeed and advance economically with the adequate resources to compete in markets and the power to make and act with the benefit from economic activities and abilities to make and act on decisions and control resources and profit (Golla et. al., 2011).

Women participation in ownership of MSEs[8] ensures the appraising scale of empowerment with nominal input base. In India, women participation in large

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7 The removal of institutional barriers and enhancement of incentives to increase the access of diverse individuals and groups to assets and development opportunities (Narayan, 2002)

8 Manufacturing Micro, Small and Medium Enterprises should have investment in plant and machineries to the extent of ₹ 25 lakh and ₹ 25 lakh to ₹ 5 crore and ₹ 5 crore to ₹ 10 crore respectively, while the service rendering MSEs should have the maximum limit of investment in equipment of ₹ 10 lakh and ₹ 10 lakh to ₹ 2 crore and ₹ 2 crore to ₹ 5 crore respectively [Micro, Small and Medium Enterprises Development (MSMED) Act, 2006]

and medium scale ownership is at its primitive stage. Maximum number of women owners is found to be attached with MSEs only. As per the Fourth Census Report (2006-2007), only 13.72% of total Micro, Small and Medium Enterprises (MSMEs) sector were found under the ownership of women of which 99.95% was in MSEs. The concerned census report also commented that the maximum number of women-owned MSMEs was found in manufacturing, perennial and proprietary as per nature of activity, operation and type of organization respectively (Table - 1).

Table 1: Women-Owned MSMEs in India   (no. in thousand)

Characteristics	Women	Men
Enterprise		
Micro	210.66	1274.10
Small	3.88	72.65
Medium	0.11	2.57
Total	**214.65**	**1349.32**
Activity		
Manufacturing	108.34	1049.39
Service	87.96	262.37
Repairing	18.36	252.21
Total	**214.66**	**156.97**
Operation		1305.65
Perennial	208.47	
Seasonal	5.33	41.06
Casual	0.86	2.61
Total	**214.66**	**1349.32**
Type of Organisation		
Proprietorship	184.70	1224.06
Partnership	5.62	57.11
Private Ltd. Company	2.48	40.94
Public Ltd. Company	0.79	7.60
Cooperative	1.09	3.63
Others	19.97	15.99
Total	**214.65**	**1349.33**

Source: All India Fourth Census Report (2006-2007)   .

Methodology of the present paper Study

Methodology followed in the present study is predominantly a **Descriptive** one with an intensive **investigation and careful analysis.** Beside the secondary sources, data of the present paper have also been collected through **primary survey** (January 2013 to September

2013) among **34 registered** (DIC, Howrah, 2006-2007 to 2010-2011) **women-owned urban light engineering MSEs**[9] containing 52 women owners in their ownership structure. Primary survey has been conducted in the urban areas clustered in Beneras Road, Belilious Road, Panchanantala, Malipan-chgara, Shealdanga and Kamar-danga. The units have been selected randomly through simple random sampling method from 50 total population of units with 70 women owners of the same parameters. The contributories of women economic empowerment could be detected with reference to different research studies (Malhotra, et.al, 2012; Golla et. al, 2011).

The samples have been visited perso-nally and information have been collected through interview and questionnaire. In the questionnaire, the women-owners of the surveyed sample units[10] were asked to specify the degree of contribution of the elements of economic empowerment (Figure - 1) in empowering the women owners. In this context, to specify this, a 5 point Rating Scale (1 = not contributory at all, 2 = not very contributory, 3 = somewhat contributory, 4 = contributory and 5 = highly contributory) has been used.

Therefore, to have concrete response of the surveyed samples, a 5 point rating scale have been summarised in three categories as follows.

(i) Not Contributory (1)

(ii) Not Fully Contributory {Not Very Contributory (2) + Somewhat Contributory (3)} and

(iii) Fully Contributory {Contributory (4) + Highly Contributory (5)}

The data obtained through primary survey have been tabulated and analysed using non-parametric Chi-Square (χ^2) test (Snedecor and Irwin Formula) to ascertain the degree of association between the contributory elements of economic empowerment with nature of ownership like sole proprietorship etc.

The formula used in the present study, with the change of notations, stands as follows.

$$\chi^2 = T^2 / T_A T_B \left[\left\{ \sum \left(a_i^2 / T_i \right) - T_A^2 / T \right\} \right]$$

{Goulden, (Second Ed.)}

Here, T (in place of G) = Total surveyed sample units, T_A (in place of C_1) = Total of Group A, T_B (in place of C_2) = Total of Group B, T_i (in place of R_i) = Total number of sample units in specific rank, a_i / T_i = Number of surveyed sample units in the specific ranking / corresponding total number of sample units.

This formula has been used to test the hypothesis for degree of freedom (d.f.) 3 i.e. (no. of rows - 1).

Analysis, Testing and Findings of the Study

I. Analysis

● Ownership Patterns of the surveyed sample units: In the surveyed sample units, beside Sole Proprietorship (SP),

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9 *Units were taken as the surveyed sample ones. Women-owned Engineering MSEs were found mainly in urban areas. So to get information conveniently, the areas have been chosen.*
10 *Here, the term 'surveyed sample units' means surveyed sample women-owned Micro and Small engineering units.*

women ownership has also concentrated under Partnership (Pt.) and Private Limited Company (Pvt.) ownership patterns, clubbed under 'other than SP' units. But in Pt. and Pvt., no sole ownership of women has been detected. They were in joint ownership with their men counter parts. In the ownership structure of Pt. and Pvt., 40% (16 persons) and 27.27% (15 persons) of the total ownership have been occupied by women (Table - 2).

- Contributory elements of economic empowerment of women-owned engineering MSEs

In economic empowerment related issues, **5 contributories** under two groups, Household (2 contributories) and Community (3 contributories) have been detected as significant ones holding at least **51 percent, i.e., majority responses in their favour i.e. in fully responsible** category of the five-point rating scale [4 (responsible) and/or 5 (highly responsible)]. The concerned five contributories are (a) Women Control over Income, (b) Contribution to family support, (c) Access to Employment, (d) Access to Credit and (e) Involvement and/or representation in the local market (Table - 3). Among the 5 contributories, **Women Control over Income** has been found as the most significant one, containing **76.92%** responses of the total surveyed sample units in the fully responsible category (Table - 3). Therefore, the study would be continued with the significant contributories under two groups - 'Household' and 'Community' and the dimension, 'nature of ownership' with two sub-dimensions - Sole Proprietorship (SP) and Other than SP (Partnership and Private Ltd. Company) (Figure - 1).

Table - 2: Ownership Pattern Surveyed Sample Units

Ownership Pattern	Units having Women Ownership (number)	Women Owners (number)			
		Solely Owned	Owned with men		Total
			Women	Men	
SP	21	21	-	-	21
Pt.	8	-	16	24	40
Pvt.	5	-	15	40	55
Total	34	21	31	64	116 (52 women, 64 men)

Source: Primary Survey (January 2013 – September 2013)
SP = Sole Proprietorship, Pt.= Partnership, Pvt.= Private Limited Company

Table - 3: Reponses of the surveyed samples on the contributory elements of economic empowerment

(in number)

Area	Contributory Elements	Not Responsible at all (1)	Not Fully Responsible			Fully Responsible		
			2	3	Total (2+3)	4	5	Total (4+5)
Household	Women Control Over Income	4 (7.69%)	2 (3.85%)	6 (11.54%)	8 (15.38%)	10 (19.23%)	30 (57.69%)	40 (76.92%)
	Contribution to Family Support	4 (7.69%)	3 (7.69%)	7 (13.46%)	10 (19.23%)	20 (38.46%)	18 (34.62%)	38 (73.08%)
	Access and Control of Family Resource	20 (38.46%)	12 (7.69%)	8 (15.38%)	20 (38.46%)	8 (15.38%)	4 (7.69%)	12 (23.08%)
	Women Access to Employment	22 (55%)	13 (7.69%)	2 (3.85%)	15 (28.85%)	12 (23.08%)	3 (5.77%)	15 (28.85%)
	Ownership of Assets and Land	16 (30.77%)	20 (7.69%)	6 (11.54%)	26 (50.00%)	6 (11.54%)	4 (7.69%)	10 (19.23%)
Community	Access to Credit	5 (9.62%)	5 (9.62%)	10 (19.23%)	15 (28.85%)	27 (19.23%)	5 (42.31%)	32 (61.54%)
	Access to Market	10 (19.23%)	2 (3.85%)	4 (7.69%)	6 (11.54%)	16 (30.77%)	20 (38.46%)	36 (69.23%)
	Involvement and/or representation in Local Market	10 (19.23%)	5 (9.62%)	5 (9.62%)	10 (19.23%)	15 (28.85%)	17 (32.69%)	42 (61.54%)

Source: Primary Survey (January 2013 – September 2013)
**Note:** Figures in parenthesis specify the percentage of responding samples (52 persons) responded in favour of the particular contributory of economic empowerment in the point of 5 point rating scale.
Contributory Elements here have been adapted from the study of Malhotra et. al.

Figure - 1: Contributories of economic empowerment of women-owned engineering MSEs and Dimension of the study
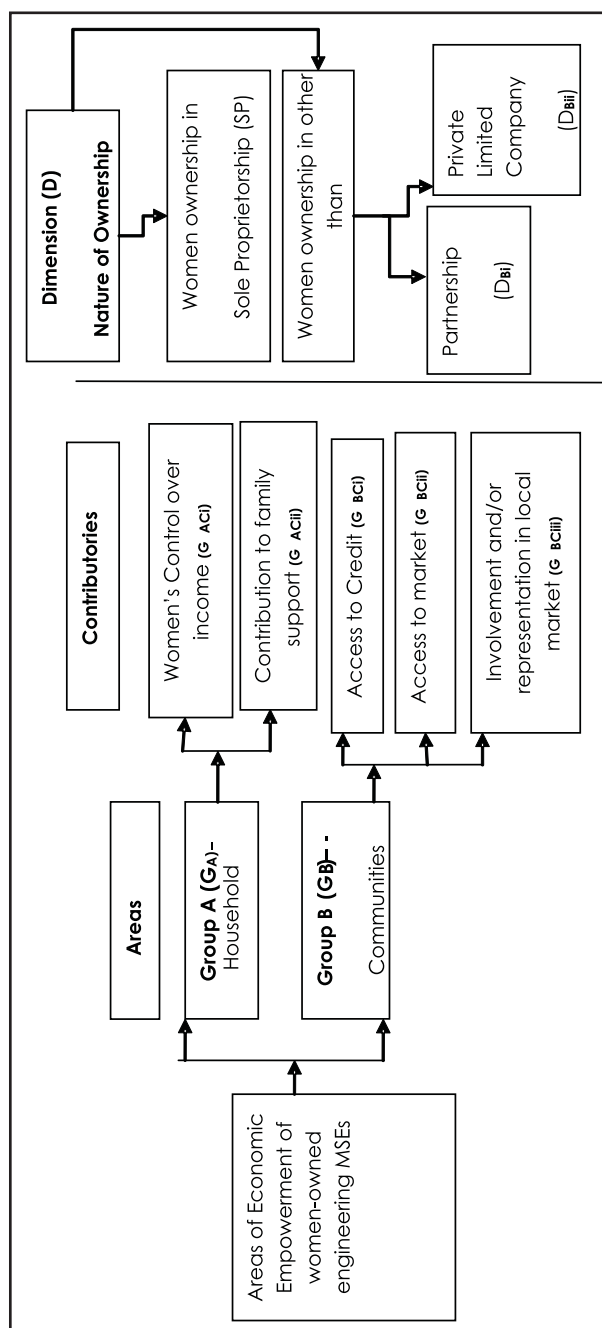
II. Hypotheses Framing and Testing

Considering the dimensions of the study in mind, the following hypotheses can be inferred;

H_{01}: There is no significant association between the degree of contribution of the elements of economic empowerment under the group of 'Household' and the nature of ownership of the women-owned engineering MSEs in empowering the women owners economically.

H_{02}: There is no significant association between the degree of contribution of the elements of economic empowerment under the group of 'Community' and the nature of ownership of the women-owned engineering MSEs in empowering the women owners economically.

It may be mentioned in this context that, the responses of the concerned responding samples to 2 point to 5 point of the rating scale (i.e., not very contributory, somewhat contributory, contributory and highly contributory) have been considered ignoring the responses to point 1 (not contributory at all) since it indicates the number of respondents not pointing out any of the contributing elements as significant one.

The response patterns of the concerned units of the one dimension on the respective contributory elements of economic empowerment and the results of hypotheses testing are presented in Table - 4.

As per the responses of the surveyed samples (Table - 4), H0 has been rejected for the first two contributory elements under the group Community i.e. Access to Credit and Access to Market, while in the other element of this group i.e. Involvement and/or representation in Local Market and all the elements under 'Household' group, no significant association has been found in between concerned contributory elements and nature of ownership.

III. Findings:

Women ownership under SP (DA) have responded in favour of the contributory elements under Community group with rejected H0, lesser than the other group of ownership i.e. in other than SP (DB). DA, in this context, has to perform all of their professional operation solely without any administrative help of other owners. In this context, they may not be able to approach all the financial institutions to arrange credit finance or in this matter, banks etc. may not be assure regarding the credibility aspects of the women owners of the very units having lesser manpower strength. Moreover, banks or other financial institutions may not have any assurance on the successful operation of the enterprise owned and operated solely by women. All these make the concerned group lesser responsive in the favour of the contributory element 'access to credit' than DB which can have the support of male owners in their finance related matters. In the same line, DA individually may not be able to access market by meeting supplier and customer constantly due to lack of manpower support in administration. Moreover, they may not distribute their products in market through different channels due to lack of information and marketing

Table-4: Responses of the surveyed samples on the contributory elements of economic empowerment and Results of Hypotheses Testing (H_{01}, H_{02})

Areas	Contributories	Not Fully Responsible						Fully Responsible						Results of χ2	Comment*
		(DA)			(DB)			(DA)			(DB)				
		2	3	Total	2	3	Total	4	5	Total	4	5	Total		
Household (GA)	Women's Control over income (G$_{ACI}$)	4.76	14.28	19.08	3.70	11.11	14.81	23.81	57.14	80.95	18.52	66.67	85.19	0.45	A (5%)
	Contribution to family support (G$_{ACII}$)	4.76	14.29	19.05	7.41	14.81	22.22	37.04	33.33	70.37	37.04	40.74	77.78	0.62	A (5%)
Community (GB)	**Access to Credit (G$_{BCI}$)**	19.05	42.86	61.91	3.85	3.85	7.70	33.33	4.76	38.09	76.92	15.38	92.30	17.87	R (1%)
	Access to market (G$_{BCII}$)	9.52	14.29	23.81	0	4.76	4.76	23.81	47.62	71.43	47.62	47.62	95.24	9.4	R (5%)
	Involvement and/or representation in local market (G$_{BCIII}$)	14.29	14.29	28.58	9.52	9.52	19.04	28.57	42.86	71.53	42.86	38.10	80.96	1.04	A(5%)

P value for 3 d.f. at 5 percentage level of significance is 7.81 and at 1 percentage level of significance is 11.34. The figure in parenthesis of Comment column shows the level of significance at which the hypothesis is accepted or rejected.

DA = Women Ownership in Sole Proprietorship. DB = Women Ownership Other than Sole Proprietorship

Here, the percentage of units has been calculated on the total number of responding samples (52) in fully and not fully responsible categories, omitting the point 1, as it has not reflected any percentage of responsibility of causes behind sickness of the concerned units.

knowledge. Sometimes, they have to consider costlier distribution channel which force them to bear huge burden. These hazards may be overcome by other group of respondents who may have the assistance of other men owners in administration and may opt also for suggestion with active involvements in marketing related matters.

SP units generally are found to suffer hugely in their functional operation than other types of unit mainly due to lack of administrative and manpower support which may be aggravated in women ownership. In this study, the women owners in SP thus face troubles in financial and market-related issues mainly for collection of adequate amount of credit which may make them lesser empowered in economic area than the other group of respondents. This may give a view that in engineering MSEs of Howrah, if women ownership is found with men (Pt. and Pvt. in the study), they would be more economically empowered than the women having sole ownership.

Conclusion and Recommendations

In any society, women-owned MSEs are facing tremendous challenge mainly due to gender blind or gender insensitive macroeconomic policies, complex tax policies and compliance procedures, complex registration and licensing procedures, lack of socio-cultural acceptance for the role of women entrepreneurs, limited access to appropriate business premises etc. (Stevenson and St. Onge, 2005). This situation is reflected in India by the deteriorating number and condition of women-owned working MSMEs (7.36%

of 361.76 lakh MSMEs have been detected to be women-owned as per Fourth Census Report, 2006-2007, while 10.11% as per Third Census Report, 2001-2002). All these issues, therefore, hinder the positive effect of women ownership i.e. empowerment in different angles.

As per the present study, though the women owned engineering MSEs of Howrah to some extent offer economic empowerment to the women owners under its purview, the degree varies significantly on the basis of the ownership pattern i.e. SP and Other than SP. The women-owners of SP units do not even know the varied financial source from where they can easily avail of their required fund. They cannot forecast their financial requirement for which prompt approach to financial institutions may not be possible for them. Moreover, the units cannot maintain the papers required to get credit from the financial institutions. Besides, the lack of training in marketing, advertisement skills etc. make the women owners lesser economically empowered than the other group of respondents. All these make the flavor of women empower-ment in the respective units in economi-cal ground partial and may prove the fact that women in engineering MSEs without getting participation of men in ownership may not be empowered to the fullest possible extent in the area of economy. Moreover, the women owners cannot cope up with the strict competition due to their lack of professionalism.

Now to get the full essence of women empowerment in economic area, the following recommendations may be offered to the respective associated parties.

RESEARCH BULLETIN

The Financial Institutions may (i) introduce special venture capital financing and factoring service to women-owned unit specifically SP one, (ii) build up a strict monitoring cell to look forward the performance in credit financing to the respective group of owners and set up a grievance redressal cell in connection therewith and incidental thereto, (iii) train up the women owners in maintaining records easily to get loan advance and also help them to assess the financial requirement, (iv) organize seminar, workshop for the women entrepreneurs to make them know about the different schemes launched for them, (v) publish special bulletin on the source of finance and terms and conditions on these.

The Authoritative Institutions may (i) implement special training programme for the women owners on marketing their products commercially at reasonable cost of advertisement, (ii) organize special trade fare for the women owners, (iii) arrange seminar, workshop etc. for making the women owners aware of all the recent marketing principles.

The Women Owners should (i) be aware of the declared programme of the respective assisting financial and training institutions and participate there as per their requirement.

Therefore, it is the resposnibiity of all the associated parties of women-owned engineering MSEs of Howrah to empower the associated women to the fullest extent which finally establish its step strongly in the field of men dominated engineering world and thus welcome firmly socio-financial inclusion of economically excluded gender of our society, women.

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Financial Performance Analysis of Select Pharmaceutical Companies in India: An Application of TOPSIS Method

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Abstract

The aim of this study is to analyse the financial performance of select twenty eight NSE listed pharmaceutical companies during the period 2001-2012 with the help of TOPSIS method. Accordingly, Shannon's entropy method has been used to determine the weights of select seven accounting ratios. In our entire study, highest performance has been observed for Glaxosmit and Ajanta Pharma has obtained the lowest position as per the ranking of the composite index. It is further observed that, for the other sample companies during the study period, high statistically significant association has been observed between composite index based ranking and liquidity as well as efficiency, though low significant association has been observed between profitability based ranking and composite index.

Key Words

Shannoy's Entropy, TOPSIS

Introduction

Financial performance analysis refers to an assessment of the viability, stability and profitability of a business. It provides a summarized result of the financial position and operations of a firm and reflects the strength and weakness of a company. Financial performance is a picture of a company's financial ability to achieve financial targets and a reflection of the condition of the company's management to the public (Anthony and Gouvindarajan 2002). For the measurement of financial performance of the company, one of the most important traditional methods is the ratio analysis. A ratio is defined as the indicated quotient of two mathematical expressions and as the relationship between two or more things. In the financial analysis, a ratio is used as a benchmark for evaluation of the financial position and performance of a firm (Pandey, 2005).

In this study, three broad categories of ratios, (namely, liquidity ratios, profitability ratios and efficiency ratios) have been computed in order to measure the financial performance of the select Pharmaceutical companies. However, it is very difficult to construct a single set of ranking based on these three indicators because liquidity, profitability and efficiency do not move in the same direction. In this context, we have used Multi Criteria Decision Making (MCDM) approach and it has been used for integration of the results of

different ratios to make an overall judgement. In the context of multiple non-commensurable and conflicting criteria, different units of measurement among the criteria, and the presence of quite different alternatives MCDM is the most appropriate approach. There are different methods in MCDA, namely, weighted sum model (WSM), weighted product model (WPM), Analytic Hierarchy Process (AHP), ELECTRE (Elimination and Choice Translating Reality) method, TOPSIS (Technique for Order Preference by Similarly to Ideal Solution) method etc. Among the different methods of MCDA approach, Technique for Order Performance by Similarity to an Ideal Solution (TOPSIS) has been applied in our study to construct a single index of ratios. as it can be considered as one of the most widely accepted modern variants. TOPSIS, developed by Hwang and Yoon in 1981, is an effective method to contribute in decision-making processes of businesses. In the TOPSIS approach, the most-preferred alternative is not only the one closest to the positive ideal solution but it is also the one with longest distance from the negative ideal solution (Kazan and Ozdemir, 2014). In other words, in this method, the selected alternative should have the shortest distance from the ideal solution and the extreme distance from the anti-ideal solution in some geometrical sense. TOPSIS has been applied in our study as it can be considered as one of the most widely accepted modern variants in MCDA approach. Besides, this method is easily understandable and the computation involved in TOPSIS is not very much complicated as compared to other methods. In this paper, a modest attempt has been made to examine the financial position (in terms of liquidity, efficiency, and profitability ratios) of the select Pharmaceutical companies in India and assign final rank of the select companies on the basis of TOPSIS method and compare the result with the rankings based on traditional ratio analysis.

Survey of literature

In 1970's, the MODM (Multiple Objective Decision Making) approach was first used in operations research and decision theory areas, and later on, it was applied to the financing area as well with its ability to combine both qualitative and quantitative criteria. In the MODM environment, the TOPSIS can be employed to judge the financial performance of any business unit. The TOPSIS method is easy to apply, and is capable of providing evaluation by different criteria and creating performance index or score [Kazan, 2014]. According to Hwang and Yoon (1981), founders of the TOPSIS method, it is an effective method to contribute in decision-making processes of businesses and there exist a number of studies using this method. The available literature on TOPSIS method may be classified broadly into three categories. Some of the literatures mainly concerned with the application of TOPSIS method using different weighting schemes. Some of other literatures used TOPSIS method to find out new strategy for investment. Beside this, a noticeable number of researchers investigated the financial performance on the basis of TOPSIS and other relevant ratios.

Olson (2004) found out several applications of TOPSIS method using different weighting schemes and

different distance matrix and compared results of different sets of weights. He observed that TOPSIS was not only more accurate, but also was quite close to accuracy. Hung and Chen (2009) proposed a new fuzzy TOPSIS decision making model using entropy weight for dealing with multiple criteria decision making (MCDM) problems under intuitionistic fuzzy environment. To obtain the weighted fuzzy decision matrix, Shannon's entropy was used by them. Özer et al. (2010) used the Data Envelopment Analysis (DEA), Cluster Analysis and TOPSIS Analysis on food industry for the years 2007- 2008. They concluded that results yielded from the cluster analysis conflicted with the results from other analyses. Ghosh (2011) evaluated faculty performance in engineering education by applying Analytic Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). Kazan (2014) used TOPSIS method to analyze financial statements of fourteen large-scale conglomerates which were traded at Istanbul Stock Exchange (ISE) over the period 2009-2011. In his study, CRITIC METHOD was used to calculate weights of nineteen financial ratios.

Khodam et al. (2008) established multi criteria decision approach by using TOPSIS method in order to find out new strategy to attract more investments in Refah Bank of Iran. Dumanoğlu and VeErgul (2010) compared the success of the eleven tech companies which are listed on ISE during 2006-2009 by using TOPSIS method. Angelo et al. (2012) dealt with the AHP to find weights of SWOT groups and weights of sub-factors within each groups; and they used TOPSIS methodology to determine

strategies priority. Sue-Fen and Ching-Hsue (2012) proposed an objective based attributes selection method to solve group multiple attributes decision making problem. Jafarnejad and Salimi (2013) evaluated supplier and decision importance of a manufacturer business firm (automobile firm) in global market by using TOPSIS method. Joshi and Kumar (2014) compared the different rankings on portfolio selection problem of four organizations: Bajaj Steel, H.D.F.C. Bank, Tata Steel and Infotech Enterprises. For that, they proposed an intuitionistic fuzzy TOPSIS method for multi-criteria decision making (MCDM) problem to rank the alternatives.

Kim et al.(1997) applied TOPSIS method to evaluate financial investment in advance manufacturing sectors. Feng and Ve Wang (2000) evaluated the performance of airline companies by using TOPSIS method on 22 variables as transport and financial indicators of five Taiwanese airline companies. They found out that the financial indicators prove to have more impact. Yurdakul and İç (2003) studied financial performance of large-scale automotive companies traded on Istanbul Stock Exchange (ISE) by using TOPSIS method on seven financial ratios during the period 1998-2001. Kalogeras et al. (2005) analysed the financial performance of Greek agricultural food firms by considering multi criteria decision aid and also observed an overall ranking of the examined firm's performance. Eleren and Karagül (2008) used TOPSIS method for determining year of economic success and crisis in Turkey during the period 1986-2006. Bülbül and VeKöse (2009) applied TOPSIS and ELECTRE methods by using eight ratios to evaluate financial performance of

select companies in of ISE-listed food industry during the period 2005-2008. Demireli (2010) investigated performance of public banks activating in Turkey on the period 2001-2007, by using TOPSIS method with the help of 10 most used ratios. Ergul and VeAkel (2010) used eight financial ratios to analyze six companies on Financial Leasing Industry during the period 2005-2008 and concluded a parallel result at crisis periods. Akyuz et al. (2011) evaluated financial performance of an ISE-listed ceramics company over the period of 1999-2008 by using TOPSIS method on nineteen financial ratios. Hamid and Eldin (2012) presented a model based decision support system (DSS) for evaluation of performance. For measuring financial performance, they used financial ratios and TOPSIS. Moradzadehfard et al. (2012) evaluated the performance of the firms by using financial ratios and proposed a new integrated approach for evaluating performance of metal industry in Tehran stock exchange. Proposed approach was based on Shannon's entropy and TOPSIS methods. Shannon's entropy method was used in determining the weights of the criteria and then, rankings of the firms were determined by TOPSIS method. Hosseini et al. (2013) examined the financial performance of the top-50 listed companies on Tehran Stock Exchange (TSE) for the years 2009- 2011 in terms of their liquidity, operation, leverage and profitability ratios using combined approach AHP-TOPSIS (Analytic Hierarchy Process TOPSIS). İŞSEVEROĞLU1 and SEZER (2015) analysed financial performances of the companies by TOPSIS method using financial tables of the sixteen pension and life-pension companies during the

period 2008-2012. To the best of our knowledge, there exists no study that examined the financial performance of the NSE listed pharmaceutical companies based on multi criteria decision approach, particularly TOPSIS. In this paper we have ranked the companies by using TOPSIS method on seven ratios during the period 2001-2012 and compare the result with the rankings based on traditional ratio analysis.

Objectives of the Study

The objectives of our study are to analyze the financial performanceof NSE listed pharmaceutical companies on the basis of TOPSIS method and compare the rankings of select companies on the basis of TOPSIS and broad categories of ratio.

Database

According to the objectives our study, we have chosen the pharmaceutical companies that are listed in National Stock Exchange (NSE) during the period of 2001-2002 to 2011-2012. This period has been chosen for the study as the volume of transactions was very high and the availability of data is quite good because of wide disclosure from secondary sources of information.

There are eight two pharmaceutical companies listed in NSE stock exchange during the study period. Out of them, we have found out data of fiftysix companies during the period 2001-02 to 2011-12. In our study, after selecting the companies, we have selected 50% (fixed proportion) of the total companies in this industry on the basis of simple random sampling technique and selected twenty-eight companies are -

Ajanta Pharma, Aurobindo Pharm, Aventis Pharma, Cadila Health, Cipla, Dr Reddy's Labs, Elder Pharma, FDC, Glaxosmit, Glenmark Pharma, Ipca Labs., Jagsonpal Pharma, J B Chem & Pharma, Jubilant Life, Kopran, Lyka Labs, Merck, Morepen Labs., Natco Pharma, Pfizer, Piramal Health, Ranbaxy Labs, Shasun Pharma., Sun Pharma. Inds, Torrent Pharma., Unichem Labs., Wockhardt and Wyeth; and other remaining companies have been excluded from the study.

After elimination of these companies, in order to examine the their financial position on the basis of traditional accounting measures, the basic data on different financial variables, such as net sales, net profit, net worth, current assets, current liabilities, bank overdraft, inventory, total assets, fixed asset, investment, capital employed, reported net profit (net income), operating income, etc. have been collected from the sources like daily issues of Economic Times, Prowess of CMIE and Capital line database over the last eleven years (i.e. from 1st April 2001 to 31st March, 2012).

Data Analysis and Interpretation

In order to examine financial position of the select companies under study, three aspects namely, liquidity, efficiency and profitability positions have been considered. The liquidity position of the company has been judged based on current ratio and quick ratio. For measuring the efficiency of the company, net sales to total assets (NSTA) and net sales to net worth (NSNW) have been computed and to analyze the company's profitability

position, three ratios, namely return on investments (ROI), earnings per share (EPS) and net profit to total assets (NPTA) have been considered in this study. For each of these ratios (liquidity, profitability and efficiency) Geometric Mean (GM) or Arithmetic Mean (AM) has been considered for average value of the ratios over the years under study. GM has been used for getting average value of ratios in most of the cases, whereas AM has only been used in those situation when negative values of the ratios are obtained.

Next, the Spearman's rank correlation coefficients have been calculated between each pair of ratios (liquidity, efficiency and profitability), which are found significant in all of the cases (not reported). Next, we have added the ranks of the concerned ratios of each group and we have again allotted the ranks in descending order to construct a single set of ranking for each group of the ratios year wise during the study period. The computed values of these ratios and the rank of the companies under pharmaceutical industry based on each broad group of ratio have been depicted in Table 1.

From Table-1, it has been observed from the rank of the liquidity ratio that, first position among the sample companies under pharmaceutical industry has been obtained by the Glaxosmit, whereas lowest rank has been observed for Jagsonpal Pharm. Though as per liquidity and efficiency rankings, Lyka Labs has obtained the second and fourth position respectively, but lowest rank has been observed for it as per profitability based ranking. The highest ranking as per profitability index has

Table 1: Computed Average Values of Ratios along Rankings of Select Companies underPharmaceutical Industry for the Period 2001-2012

Company	Liquidity ratios (LR)		Rank(LR)	Profitability ratios(PR)			Rank(PR)	Efficiency ratios(ER)		Rank (ER)
	CR	QR		NPTA	ROI	EPS		NSTA	NSNW	
Ajanta Pharma	1.07	-0.65	27	0.05	0.10	11.76	21	0.39	1.47	22
Aurobindo Pharm	1.06	0.06	24	0.08	0.14	35.26	7	0.55	1.97	12
Aventis Pharma	1.65	1.11	4	0.24	0.37	59.05	2	1.49	1.61	7
Cadila Health	1.28	0.44	14	0.12	0.19	19.92	16	0.64	1.44	17
Cipla	1.46	0.16	17	0.14	0.26	21.98	13	0.55	1.01	26
Dr Reddy's Labs	1.22	0.58	11	0.16	0.17	41.36	4	1.15	1.65	9
Elder Pharma	1.42	-0.22	22	0.52	0.13	19.73	15	3.90	6.55	1
FDC	1.31	0.18	19	0.19	0.28	6.45	25	0.70	1.65	14
Glaxosmit	3.48	3.00	1	0.28	0.44	42.62	3	0.78	1.23	19
GlenmarkPharma	1.08	0.34	20	0.25	0.16	12.15	20	1.79	2.83	3
Ipca Labs.	1.20	-0.23	26	0.15	0.20	34.64	8	0.98	2.24	5
Jagsonpal Pharm	1.54	-1.93	28	0.30	0.14	7.79	24	1.44	6.03	2
J B Chem& Phar	1.30	0.44	12	0.10	0.20	17.87	17	0.56	1.09	24
Jubilant Life	1.46	0.70	8	0.07	0.15	24.32	11	0.57	2.46	8
Kopran	1.05	0.28	21	0.03	0.02	1.82	27	-0.78	2.23	27
Lyka Labs	2.08	1.89	2	-0.02	0.09	0.81	28	0.93	3.04	4
Merck	1.83	0.60	5	0.22	0.32	36.45	6	0.68	1.38	18
Morepen Labs.	1.08	0.04	24	-0.03	-0.01	3.37	26	0.75	0.93	23
NatcoPharma	1.07	0.11	23	0.07	0.14	8.14	23	0.40	1.21	25
Pfizer	1.59	0.82	6	0.19	0.37	40.88	5	0.52	1.59	16

Contd.

Table 1: Computed Average Values of Ratios along Rankings of Select Companies underPharmaceutical Industry for the Period 2001-2012

Company	Liquidity ratios (LR)		Rank(LR)	Profitability ratios(PR)			Rank(PR)	Efficiency ratios(ER)		Rank (ER)
	CR	QR		NPTA	ROI	EPS		NSTA	NSNW	
Piramal Health	1.32	0.56	10	0.21	0.34	85.88	1	0.56	2.00	11
Ranbaxy Labs	1.53	0.64	7	0.08	0.11	17.30	18	0.81	1.65	13
ShasunPharma.	1.11	0.58	15	0.08	0.14	11.68	22	0.64	2.47	6
Sun Pharma.Inds	1.60	0.12	13	0.22	0.24	31.29	9	0.92	0.95	21
Torrent Pharma.	1.23	0.35	18	0.14	0.22	21.30	14	0.64	1.61	15
Unichem Labs.	1.26	0.38	16	0.20	0.26	23.86	12	0.76	1.82	10
Wockhardt	1.34	0.60	9	0.08	0.13	16.99	19	0.63	-2.25	28
Wyeth	2.13	0.89	3	0.24	0.36	28.01	10	0.67	1.31	20

Notes: CR = Current Ratio; QR = Quick Ratio; NPTA= Net Profit to Total Assets; ROI = Return on Investments; NSTA = Net Sales to Total Assets and NSNW = Net Sales to Net Worth

been observed for Piramal Health. As per efficiency based ranking, Elder Pharma has obtained the first position whereas lowest rank has been observed for Wockhardt during the period under study. However, it is very difficult to draw any conclusive remarks jointly from these three broad categories of ratio.

Accordingly, Technique for Order Performance by Similarity to an Ideal Solution (TOPSIS) method has been used in our study to construct a simple composite index of ratios.

According to this method, the best alternative would be the one that is nearest to the positive ideal solution and farthest from the negative ideal solution (Benitez, Martin, & Roman, 2007). The positive ideal solution refers to a solution that maximizes the benefit criteria and minimizes the cost criteria, whereas the negative ideal solution is a solution that maximizes the cost criteria and minimizes the benefit criteria (Wang & Elhag, 2006). In short, the positive ideal solution consists of all best values attainable of criteria, whereas the negative ideal solution is composed of all worst values attainable of criteria (Wang, 2007). TOPSIS method is proposed for evaluating the financial performance of the sample companies under pharmaceutical industry, considering financial ratios and weights of the criteria. By this way, the ranking of the companies according to their general performance is obtained.

In this method, we have found out weight of the ratios for each of the industry separately before using TOPSIS. Shannon's entropy method is one of the most popular methods for finding weights in TOPSIS method. "Entropy

weight is a parameter that describes how much different alternatives approach one another in respect to a certain attribute" (Moradzadehfard et al.,2012). The procedure of Shannon's entropy applied in the present study, has been discussed below:

First of all, standardization of the factors (i.e. ratios) has been done because of the different scales upon which criteria are measured. For this purpose, we have used UNDP (United Nations Development Programme) value driven method, which computes the standardized scores of the select ratios for each of the companies under a particular industry with the help of the following formula.

$$P_{ij} = \frac{x_{ij} - x_j^{min}}{x_j^{max} - x_j^{min}}$$

where i = 1,2,----,n (n = Total number of ratios) and j = 1, 2,------,m (m=Total numbers of companies); P_{ij} = standardized score for the ith alternative (i.e., a particular ratio) and jth criterion (i.e., a particular company); x_{ij} = raw score = An index of the ith ratio with respect to the jth company; x_j^{min} = minimum value of x_j and x_j^{max} = maximum value x_j and standardized scores range from 0 to 1.

Next, we have computed entropy of ith ratio (h_i), where $h_i = -h_0 \Sigma_{j=1}^{m} P_{ij}\ lnP_{ij}$; where h_0= entropy constant and is equal to $ln\ m)^{-1}$ and $P_{ij}.lnP_{ij}$ defined as 0 if P_{ij} = 0; m = Total number of companies in this industry.

Then, we have measured degree of diversification of ith ratio, (d_i) = 1- h_i.

After that we have calculated the

weight of ith ratio (W_i),[i.e., the degree of importance of ith attribute], by using the formula $w_i = {d_i} / {\sum_{i=1}^{n} d_i}$

According to this method, entropy of ith ratio (h_i), degree of diversification of ith ratio (d_i) and weight of ith ratio (W_i) in our study are disclosed in Table 2.Weight of

current ratio has been lowest for the pharmaceutical industry (11%) under the study, whereas the highest weight (15.7%) has been found out for net sales to total assets. Nearly same weights have also been observed for quick ratio and net sales to net worth ratio.

Table 2: Results of h_i, d_i and W_i based on Shannon Entropy Measures for the Ratios of Pharmaceutical Industries

Pharmaceutical Industry	CR	QR	NPTA	ROI	EPS	NSTA	NSNW
h_i	-1.769	-2.683	-2.552	-2.404	-2.317	-2.804	-2.679
d_i	2.769	3.683	3.552	3.404	3.317	3.804	3.679
W_i	0.114	0.152	0.147	0.141	0.137	0.157	0.152

Notes: CR = Current Ratio; QR = Quick Ratio; NPTA= Net Profit to Total Assets; ROI = Return on Investments; NSTA = Net Sales to Total Assets and NSNW = Net Sales to Net Worth

After computing the weights of each seven ratios by Shannon entropy method, we have found out the composite index of ratios by TOPSIS during the period under study. TOPSIS consists of the following steps:

Step 1. In the first step normalized decision matrix (r_{ij}) has been calculated for pharmaceutical industry, using by the formula

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{j=1}^{m} x_{ij}}} \quad \forall, i, j; x_{ij} = \text{An index of the ith}$$

ratio with respect to the jth company;

Step 2. Next, weighted normalized decision matrix has been calculated by $v_{ij} = w_i . r_{ij}$, $\forall i, j$ where $\sum w_i = 1$

Step 3. In this part determination of ideal and anti- ideal solution has been done by following way

$A^* = \{v_1^*, --v_m^*\}$ positive ideal solution;

Where $v_i^* = \{(\max_i v_{ij} | J \in C_b), (\min_i v_{ij} | J \in C_c)\}$

$A^- = \{v_1^-, --v_m^-\} = $ anti ideal solution;

where $v_1^- = \{(\min_i v_{ij} | J \in C_b),$

$$(\max_i v_{ij} | J \in C_c)\}$$

where C_b associated with benefit criteria (larger-the-better type)andC_c associated with cost criteria(smaller-the-better type).

Step 4 By using the m-dimensional Euclidean distance, separation measure (ideal separation and negative separation) has been computed which are given as,

Ideal separation solution,

$$S_i^* = \sqrt{\sum_{j=1}^{m}\left(v_{ij}- v_j^*\right)^2};\ \forall\, i$$

Negative separation solution,

$$S_i^- = \sqrt{\sum_{j=1}^{m}\left(v_{ij}- v_j^-\right)^2};\ \forall\, i$$

Step 5. Ideal and negative ideal separation measures are used to calculate relative closeness of each decision point to the ideal solution $(CI)_i$, by using the following formula for pharmaceutical industry-

$$(CI)_i^* = \frac{S_i^-}{S_i^* + S_i^*}\ ,\ 0\le (CI)_i^* \le 1$$

where $(CI)_i^* =1$ implying absolute closeness of the relevant decision point to the ideal solution and $(CI)_i^* = 0$ indicates implying absolute closeness of the relevant decision point to the anti ideal solution

Step 6. Rank the companies (industry wise) as per the descending values of $(CI)_i^*$, i.e., the larger index value obtains the first position and smallest index value comes in last position.

In our study, based on the average values of the respective ratios (depicted in Table-1), normalized decision matrix (r_{ij}), weighted normalized decision matrix(w_{ij}), have been calculated which are disclosed in Table-3.

According to this analysis, the best alternative would be the one that is nearest to the positive ideal solution and farthest from the negative ideal solution (Benitez, Martin, & Roman, 2007). The results of Euclidean distance for positive ideal solution (S^+), negative ideal solution (S^-), composite index and rank of the companies under pharmaceutical industry based on their financial performances (ratios) are presented in Table 4.

Table-3: Computed Values of Decision Matrix and Weighted Normalized Decision Matrix

Company	Decision Matrix(r_{ij})							Weighted Normalized Decision Matrix ($w_{ij}r_{ij}$)						
	CR	QR	NPTA	ROI	EPS	NSTA	NSNW	CR	QR	NPTA	ROI	EPS	NSTA	NSNW
Ajanta Pharma	0.132	-0.135	0.049	0.082	0.073	0.066	0.114	0.015	-0.021	0.007	0.012	0.010	0.010	0.017
Aurobindo Pharm	0.131	0.012	0.079	0.115	0.219	0.093	0.153	0.015	0.002	0.012	0.016	0.030	0.015	0.023
Aventis Pharma	0.203	0.231	0.237	0.305	0.366	0.252	0.125	0.023	0.035	0.035	0.043	0.050	0.040	0.019
Cadila Health	0.158	0.092	0.119	0.157	0.124	0.108	0.112	0.018	0.014	0.017	0.022	0.017	0.017	0.017
Cipla	0.180	0.033	0.139	0.214	0.136	0.093	0.078	0.021	0.005	0.020	0.030	0.019	0.015	0.012
Dr Reddy's Labs	0.150	0.121	0.158	0.140	0.257	0.195	0.128	0.017	0.018	0.023	0.020	0.035	0.031	0.019
Elder Pharma	0.175	-0.046	0.515	0.107	0.122	0.660	0.509	0.020	-0.007	0.075	0.015	0.017	0.104	0.077
FDC	0.161	0.037	0.188	0.231	0.040	0.119	0.128	0.018	0.006	0.028	0.032	0.005	0.019	0.019
Glaxosmit	0.429	0.625	0.277	0.363	0.264	0.132	0.096	0.049	0.095	0.041	0.051	0.036	0.021	0.015

Contd.

Table-3: Computed Values of Decision Matrix and Weighted Normalized Decision Matrix

Company	Decision Matrix(r_ij)							Weighted Normalized Decision Matrix (w_ij.r_ij)						
	CR	QR	NPTA	ROI	EPS	NSTA	NSNW	CR	QR	NPTA	ROI	EPS	NSTA	NSNW
GlenmarkPharma	0.133	0.071	0.247	0.132	0.075	0.303	0.220	0.015	0.011	0.036	0.019	0.010	0.048	0.033
Ipca Labs.	0.148	-0.048	0.148	0.165	0.215	0.166	0.174	0.017	-0.007	0.022	0.023	0.029	0.026	0.026
Jagsonpal Pharm	0.190	-0.402	0.297	0.115	0.048	0.244	0.469	0.022	-0.061	0.044	0.016	0.007	0.038	0.071
J B Chem& Phar	0.160	0.092	0.099	0.165	0.111	0.095	0.085	0.018	0.014	0.015	0.023	0.015	0.015	0.013
Jubilant Life	0.180	0.146	0.069	0.124	0.151	0.097	0.191	0.021	0.022	0.010	0.017	0.021	0.015	0.029
Kopran	0.129	0.058	0.030	0.016	0.011	-0.132	0.173	0.015	0.009	0.004	0.002	0.002	-0.021	0.026
Lyka Labs	0.256	0.394	-0.020	0.074	0.005	0.157	0.236	0.029	0.060	-0.003	0.010	0.001	0.025	0.036
Merck	0.226	0.125	0.218	0.264	0.226	0.115	0.107	0.026	0.019	0.032	0.037	0.031	0.018	0.016
Morepen Labs.	0.133	0.008	-0.030	-0.008	0.021	0.127	0.072	0.015	0.001	-0.004	-0.001	0.003	0.020	0.011
NatcoPharma	0.132	0.023	0.069	0.115	0.050	0.068	0.094	0.015	0.003	0.010	0.016	0.007	0.011	0.014
Pfizer	0.196	0.171	0.188	0.305	0.254	0.088	0.124	0.022	0.026	0.028	0.043	0.035	0.014	0.019
Piramal Health	0.163	0.117	0.208	0.280	0.533	0.095	0.155	0.019	0.018	0.030	0.039	0.073	0.015	0.024
Ranbaxy Labs	0.189	0.133	0.079	0.091	0.107	0.137	0.128	0.022	0.020	0.012	0.013	0.015	0.022	0.019
ShasunPharma.	0.137	0.121	0.079	0.115	0.072	0.108	0.192	0.016	0.018	0.012	0.016	0.010	0.017	0.029
Sun Pharma.Inds	0.197	0.025	0.218	0.198	0.194	0.156	0.074	0.023	0.004	0.032	0.028	0.027	0.024	0.011
Torrent Pharma.	0.152	0.073	0.139	0.181	0.132	0.108	0.125	0.017	0.011	0.020	0.026	0.018	0.017	0.019
Unichem Labs.	0.155	0.079	0.198	0.214	0.148	0.129	0.141	0.018	0.012	0.029	0.030	0.020	0.020	0.021
Wockhardt	0.165	0.125	0.079	0.107	0.105	0.107	-0.175	0.019	0.019	0.012	0.015	0.014	0.017	-0.027
Wyeth	0.263	0.185	0.237	0.297	0.174	0.113	0.102	0.030	0.028	0.035	0.042	0.024	0.018	0.015
Positive Ideal Solution (A*)								0.049	0.095	0.075	0.051	0.073	0.104	0.077
Negative Ideal Solution (A-)								0.015	-0.061	-0.004	-0.001	0.001	-0.021	-0.027

Table-4: Results of TOPSIS Analysis- Ranking of the Companies for Pharmaceutical Industry according to the Composite Index during the period 2001-2012.

Company	Positive Ideal (S+)	Negative Ideal(S-)	Composite Index(CI)	Rank
Ajanta Pharma	0.192	0.070	0.267	28
Aurobindo Pharm	0.167	0.096	0.364	23
Aventis Pharma	0.118	0.145	0.550	3
Cadila Health	0.161	0.101	0.385	18
Cipla	0.166	0.095	0.364	22
Dr Reddy's Labs	0.144	0.116	0.446	9
Elder Pharma	0.125	0.190	0.603	2
FDC	0.163	0.102	0.383	20
Glaxosmit	0.116	0.187	0.618	1
GlenmarkPharma	0.141	0.125	0.470	6
Ipca Labs.	0.160	0.100	0.384	19
Jagsonpal Pharm	0.190	0.125	0.398	15
J B Chem&Pharma	0.166	0.098	0.372	21
Jubilant Life	0.156	0.111	0.415	12
Kopran	0.198	0.088	0.308	26
Lyka Labs	0.150	0.145	0.491	4
Merck	0.146	0.117	0.444	10
Morepen Labs.	0.188	0.083	0.307	27
NatcoPharma	0.179	0.086	0.324	25
Pfizer	0.144	0.123	0.459	8
Piramal Health	0.141	0.135	0.489	5
Ranbaxy Labs	0.159	0.106	0.399	13
ShasunPharma.	0.162	0.107	0.399	14
Sun Pharma.Inds	0.156	0.103	0.398	16
Torrent Pharma.	0.160	0.102	0.388	17
Unichem Labs.	0.153	0.109	0.416	11
Wockhardt	0.184	0.092	0.335	24
Wyeth	0.142	0.124	0.466	7

Notes: CI = Composite Index based on liquidity, profitability and efficiency ratio, S^+= Positive ideal solution and S^- = negative ideal solution

According to the composite index liquidity, profitability and efficiency ratios, it has been observed that financial performances have not been well for some of the leading companies like Pfizer, Dr Reddy's Labs, Ranbaxy Labs and Cadila Health; whereas Glaxosmit has obtained the first position, which is followed by Elder Pharma and Aventis Pharma respectively. Ajanta Pharma has obtained the lowest position among the samples. As per the composite index performance, Cipla has not been up to the markand has obtained twentysecond position among the samples during the period under study.

Next, we have computed the Spearman rank correlation coefficient between composite index based ranking and each broad groups of ratio based ranking which are presented in Table-5.

	Liquidity and Composite index	Profitability and Composite Index	Efficiency and Composite Index
Spearman Rank Correlation Coefficient	0.626*	0.498*	0.614*

Notes: *Significance at 1% level

It has been observed that Spearman rank correlation coefficients between each group of ratio and composite index are significant at 1% level; though a higher association has been observed between liquidity based ranking and composite index based raking.

Conclusion

In our study, we have computed year-wise liquidity, profitability and efficiency ratios of the select companies under the pharmaceutical industry. Then we have computed the average values of the ratios and examined the performances of the companies based on their rankings of each broad categories ratio (namely, liquidity, profitability and efficiency). For the construction of single set of rankings based on broad categories of ratio, we have applied Technique for Order Performance by Similarity to an Ideal Solution (TOPSIS) method.

It has been observed from our study that, highest performance has been observed for Glaxosmit as per composite index based ranking, which is also similar with the efficiency based ranking. In our entire study, Ajanta Pharma has obtained the lowest position as per the ranking of the composite index. It is further observed that, for the other sample companies during the study period, high statistically significant association has been observed between composite index based ranking and liquidity as well as efficiency, though low significant association has been observed between profitability based ranking and composite index. However, to draw more accurate inference in this area, one should measure financial performances of the companies by taking more ratios from different industries.

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Productivity Gains from Technological Intensity-
A Study of Two Iron and Steel Companies in
India

Mohit Kumar Kolay

Abstract

The productivity achievement due to technological progress has been studied here for two steel plants in India. One steel plant is more than hundred year old from the private sector, and the other one is the giant public sector group of plants fifty to sixty years old. Technological progress has been measured by technological intensity in terms of gross block in plant and infrastructure per unit of saleable steel production. The impact of technological intensity has been assessed by productivity of three factors, namely, the quality of steel production, energy consumption, and the manpower productivity. Each factor productivity, total factor productivity, and operating profitability has been examined for their functional relationship with technological intensity. The average technological intensity of the private sector plant has been 50% higher than the public sector one. The average productivity of the private sector plant has been higher, 34% on quality, 7% on energy, and 49% on manpower, 32% on total factor productivity, and 62% on operating profitability. Polynomial function explains strong relationship of factor productivity levels with technological intensity, particularly for the private sector steel plant.

Introduction

Investment growth and technological progress have been the key driver behind the high performing Asian economies as reflected by the World Bank (1993) in its book, The East Asian Miracle: Economic Growth and Public Policy. The Indian economy has also its fair share of growth and development. It has gone through tremendous changes on all fronts over the last six decades since independence. The Structural Adjustment Program of the government in the early nineties does away with red tape and state control bringing competition and ushering in global players, thus moving from regulation-nationalization-protection to liberalization-privatization-globalization. With massive investments in infrastructure and education sectors in the country's eleventh five-year plan (2007-2012), the Indian economy has been on a path of success through technological upgradation and manpower development. Its GDP growth rate was 7.4% during 2014-15 as compared to world

average GDP growth rate of 3.4%. The availability of skilled manpower from world-class elite technology and management institutes at a comparatively cheaper rate provide the matching foundation for gaining the benefits in both the manufacturing and the services sector to move forward on technology arena. The rising income level of the country's billion-plus population indeed provides a unique market opportunity, the third largest in the world to facilitate India's growth process in technology and the economy.

If we look at the world steel sector (key to sustainable development of the world economy), excess production capacity prevailed in 2013, production of 1649 million tonnes of steel outweigh the global consumption of 1586 million tonnes As per World Steel Association Report, global steel demand is expected to grow by 0.5% and 1.4% in 2015 and 2016 respectively. Such a slow expected growth rate has been mainly due to economic declaration of China, the number one steel producer in the world. World steel production grew to 1665 million tonnes during 2014 of which China produced 49.4%. However, China's steel demand has been forecast a negative growth of 0.5% during both 2015 and 2016, thus resulting a very nominal growth of global steel demand. On the contrary, India's steel demand as per World Association Report is expected to grow 6.2% in 2015 and 7.3% in 2016. In fact, India has recently improved its position to third place in the world steel production behind China and Japan, leaving the US at the fourth place. This has been mainly due to 70% of India's billion plus population consumes only 13 kg of steel per head as of now and an all-India

average consumption is 58 kg per head as against the global average of 225 kg per head. In fact, Indian domestic steel market has lot of potentials for growth and development. The installed steel capacity of India has been augmented by 14% during 2014-15 while the global steel output shows only 3% growth. India's steel production has been increased from 33 million tonne in 2004 to 81 million tonne in 2013, registering a growth rate of 16% pa on an average. However, on technology front, when Japan has been implementing cokeless iron making procedures through Direct Iron Ore Smelting (DIOS) process reducing the cost of molten iron production by about 10% and reduce emission of carbon dioxide by by 5-10%, India has been still struggling to go a long way to catch up with global benchmark. The DIOS process requires no doubt extensive process modifications, and may prove to be very expensive for Indian scenario, but to move forward to catch up with global benchmark on productivity front, average blast furnaces productivity (2 Ton per mtere3) 33% lower, coke consumption (550 kg per Ton of hot metal) 47% higher, energy consumption (6.25 Gcal per tonne of crude steel) 26% higher, and carbon dioxide emission (2.9 tonne per tonne of crude steel) 61% higher (Ernst & Young World Steel Report, 2014). Post 2001, India has emerged as the world's largest producer of sponge iron accounting for 20% of global output, but it has brought with it unprecedented levels of pollution in Karnataka, Andhra Pradesh, Orissa and Chattrisgarh. A study of 60 steel units in India over the period 1989 to 1996 (Sahoo, 2004) reveals that despite technological up-gradation, there has been a decline in productivity growth due to growing

inefficiency over the period. In such a scenario of technological progress and up-gradation in the iron and steel sector in India, one may wonder how Tata Steel, a hundred-plus year old steel company has not only become the world's sixth largest steel company over time but is also the world's lowest cost steel producer since 2001 along with Korea. As against the best managed Tata Steel in the private sector, SAIL, the giant multi-unit steel plant in the public sector having half of its age has also been augmenting its capacity and implementing various product and process innovations to improve upon its productivity and gradually reduce its staggering manpower base. The present paper aims at analyzing how the two steel plants are moving ahead on the technology front to continue to improve upon their operating profitability through their best efforts in three vital areas like quality of steel output, the economy in energy consumption, and the manpower productivity that govern the success of any steel plant in India.

Technological intensity and productivity gains

Since the seminal work of Solow (1957), when labor and capital explained only 13% of US output, the unexplained part of 87% has been casually identified with growth of residual productivity as reflection of technological progress. In macroeconomics, it is an umbrella term containing everything that could not be traced back to the accumulation of factors of production, included in the aggregate production function used to measure the total factor productivity of technological progress. Malmquist index using the production function compares the technological progress and productivity between two countries. Kaldor's growth model (Kaldor, 1957 and Kaldor & Mirlees, 1962) attempted to investigate the level of induced technical progress by linking the rate of technical progress to the rate of investment in the economy over time. Johansen (1959), Arrow (1962), Kaldor & Mirlees (1962), Phelps (1961 & 1963), Salter (1960), Solow (1956, 1957 & 1970) and others have considered embodiment of technical progress in newer machinery and capital investments and proposed vintage growth models. In fact, the output growth using Cobb-Douglas production function occurs due to a combination of one or more of three factors, rise in input/resource use (a lateral movement on the 2-dimensional input-output plane), improvement in technology (upward shift of the production frontier), and thirdly, an improvement in technological efficiency (movement from a sub-frontier position towards the frontier).

At an organizational level, considerable efforts have been made in the past to assess the underlying technology of the plant and infrastructures based on the performance measure particularly in the fields of health care, chemicals, and information processing (Attenpohl, 1987; McGivney & Schneider, 1988; Reynolds, 1989; Wilensky, 1990; Chambers, 1991; Kilpatrick, Dhir, & Sanders, 1991; Ghosal & Nair-Reichert, 2009; Khalid & Fawad, 2012; and Yang et al, 2014). The scale of operations of the plant is indeed a fundamental measure of performance as agreed to by one and all, but the design and operational parameters of the technology as considered in the performance measure may be really causal in nature, and may not reflect the end result performance (Kolay, 1994;

Neely, Gregory & Platts, 1995). That which is finally important is to meet the requirements of customers in time with the desired level of quality of supplies at an affordable price contributes towards profitability and productivity of any organization.

The iron and steel industry is indeed technology intensive sector with a huge initial capital outlay that defines the installed capacity of the steel plant. Besides capacity expansion, techno-logical up-gradation plays a very dominant role to add value and improve productivity of iron and steel making. In Indian context, it is a well known fact that iron ore available in India has more of alumina and silica content, so also the coking coal which has much more ash content. In fact, 60-65% of coking coal requirement for steel plant requirement of India is imported now-a-days. But the use of obsolete technology has been the crux of the story for low productivity of Indian iron and steel plants. Hot blast temperature in some blast furnaces goes below 1000 degree centigrade; lack of high top pressure operation; level of oxygen enrichment of hot blast, limited use of agglomerates in the blast furnaces burden; open hearth process of steel making instead of LD converter, lower proportion of continuous cast billets, etc are some dominant causes for relatively low level of productivity of steel plants in India. As the plant and infrastructure wear out over time, newer technology emerges in the market, and more importantly, research and develop-ment in the global steel market comes up with product and process innova-tions, it becomes paramount that iron and steel plants gradually try to modernize their plant facilities in phases,

besides substantial expenditure every year on normal and special repairs and maintenance. At each and every stage of iron and steel making, modernization and up-gradation need to take place in their captive mines and collieries, coke ovens, sinter and pelletizing plant, blast furnaces, steel making and rolling stages to improve upon quantity and quality of production and cost effectiveness towards sustained competitiveness and profitability in both domestic and export market. Additional investments in plant and infrastructure over time are made naturally for two reasons: i) capacity expansion, and ii) technological up-gradation through product and process innovations. Large volume production no doubt leads to economy of scale, and cost reduction, however, the level of technological up-gradation can fairly be reflected at an aggregate level by the extent of investments in plant and infrastructure per unit of steel produc-tion. This may be defined as techno-logical intensity which is at the apex of the productivity and sustainability function of any steel plant. The techno-logical intensity will govern the quality of steel output, and the quality and section extras for downstream rolling of various flat and non-flat products. This will in turn govern the market competitiveness, and the operating profitability. Besides quality of steel production, it will govern the operating cost function. Amongst the operating cost elements, energy consumption assumes special signifi-cance in iron and steel making. Steel production involves many heating, cooling, melting, and solidification cycles. In fact, the specific energy consumption for steel plants in India has been 40% more than the global benchmark (energy consumption varying from 6 to 6.5 Gcal/tcs as against

global average of 4.4 to 4.5 Gcal/tcs). This makes imperative for any steel plant in India to specially focus on energy and economy department to control and reduce energy consumption. Even as per the companies act, the audited annual accounts in India need to report the details of energy conservation measures taken during each year and the additional investments and proposals made for reducing the energy consumption as disclosure of particulars in the Report of Board of Directors rules, 1988. Another important area of concern is the man manage-ment and the manpower productivity that needs special attention to reduce cost and improve operating profita-bility. In fact, steel output per employee in Indian scenario centers around hardly

100 tonne per man on an average as against 980 of Japan and 1345 of Korea. Thus, to compare the performance and productivity of steel plants in India due to growth in technological infrastruc-ture, and the operating profitability, the present paper focuses on technolo-gical intensity of steel plants as the dominant causal variable that results in their operating profitability though three dominant factor productivity levels pertaining to: i) steel quality, ii) energy productivity, and iii) manpower productivity, as presented in the **Figure-1.** Using this framework, the gain in productivity of two steel plants from respective technological intensity has been compared in the new millennium over the period 2000-01 to 2013-14.

Figure-1: Technological intensity and resultant productivity framework
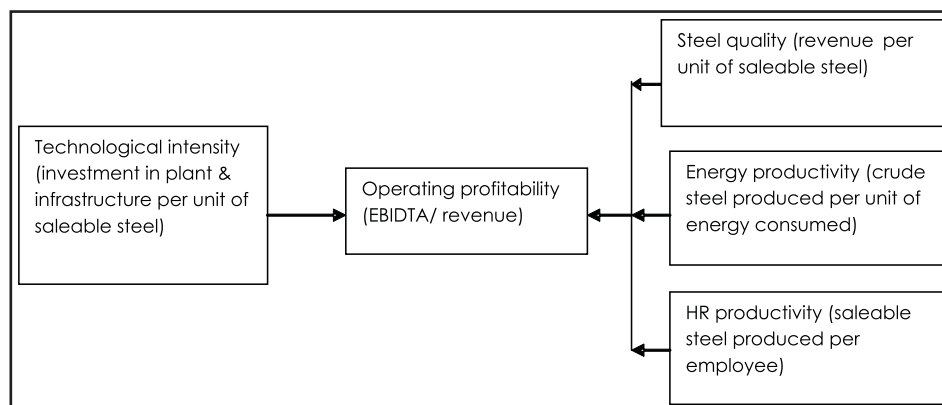
Study of two steel plants in India

Introducing Tisco:

Tata Iron & Steel Company Limited (herein called **Tisco** as popularly known): Jamshetji Tata, Inspired by the notion, "The nation which gains control of iron soon acquires control of gold"

converted his dream to reality when Tisco was floated in 1907. Its first blast furnace was blown in 1911 and the first ingot was rolled out in February 2012. Tata carried out a 2 million tonne expansion program during 1955-58. The year 1983 saw the beginning of modernization of the steel works that was implemented in four phases. Tisco is

among the lowest cost steel producers in the world along with Korea since 2001. World Steel Dynamics has twice ranked the company as the World's Best Steel Maker (2005 & 2006). In 2005 it made its first major overseas investment in Nat Steel Asia for stronger manufacturing and marketing footprint in South East Asia. Now, Tisco is a big business conglomerate through merger and acquisitions with 55% of its capital is deployed overseas to produce 65% of its total steel and 70% of its total revenue. But the heart is still at Tatanagar, Jamshedpur, from where the long journey began more than hundred years earlier and the case study here will pertain only to the original parent company as the stand-alone unit with present installed capacity of 9.7 million tonne per annum.

Introducing SAIL:

Steel Authority of India Limited (herein called **SAIL** as popularly known): SAIL came up much later in the fifties and sixties over time as the giant public sector steel plant as envisioned by Pandit Jawaharlal Nehru, the first prime minister of independent India with its four major steel plants at Bhilai, Bokaro, Rourkela, and Durgapur. Burnpur unit with 2.5 million tonne capacity has recently been integrated as its fifth major steel plant. SAIL being a Maharatna Company, has emerged as a synonym for steel with a present installed capacity of 14 million tonne per annum. SAIL plants also have been going through gradual expansion and modernization program. Its 4060 m3 Blast Furnace at Rourkela commissio-ned in 2013 is the largest operating furnace in the country. Recently, it has developed its vision 2025 which will steer

the company to increase its production capacity of hot metal to 50 million tonne. However, being a public sector company, efficiency and effectiveness is a big question mark in some units of SAIL. In particular, SAIL has a huge manpower base (more than 1.57 lakhs of employees in 2000-01), its manpower productivity has been very low hardly 105 tonne per man per year in 2000-01 as compared 980 of Japan and 1350 of Korea. Over the years however, it has started reducing its manpower, and has started making profit again from 2003-04.

Analysis of comparative performance

Tisco amongst the lowest cost steel producers in the world:

On analysis of performance of two steel plants over fourteen-year period, year ending 31st March 2001 to year ending 31st March 2014 (herein referred to as 2001 to 2014, as in the Table-1).

The crude steel production of 3.57 million tonne of Tisco during 2001 has been only at 35% of corresponding SAIL's figure, but production of Tisco has grown at 12.06% per year compared to growth rate of only 2.44% of SAIL, thereby enabling Tisco attaining 68% of SAIL's volume of production by the year 2014. On the saleable steel front, the picture is very similar, 12.44% growth of Tisco as compared to 2.52% of SAIL, thereby enabling Tisco to escalate its saleable steel production from 35% of SAIL's figure in 2001 to 69% in 2014. As regards revenue earning, Tisco has improved its comparative position from 48% to 91% of SAIL's figure, but more remarkably, its operating profit has been improved from 81% of SAIL in 2001 to 2.3 times of

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Table-1: Performance data from published annual reports of Tisco (Stand alone) and SAIL

| Year ending 31st March	Crude steel ('000T)	Saleable steel ('000T)	Revenue (INR billion)	Opt. profit (INR billion)	Energy consumption (Gcal/tcs)	Total number of employees	Gross block (INR billion)
TATA STEEL							
2001	3566	3413	78.10	17.57	7.531	48821	112.58
2002	3749	3596	76.83	13.57	7.260	46234	117.42
2003	4098	3975	98.44	23.52	6.975	43248	123.94
2004	4224	4076	120.70	36.36	7.065	41211	132.69
2005	4104	4074	160.53	61.93	7.012	39648	149.58
2006	4731	4551	173.99	61.86	6.959	38182	164.71
2007	5046	4929	201.96	74.07	6.717	37205	184.27
2008	5014	4858	225.27	85.59	6.655	35870	207.47
2009	5646	5375	271.52	94.42	6.587	34918	234.44
2010	6564	6439	276.12	98.06	6.125	34440	260.44
2011	6855	6691	330.79	122.24	6.006	34912	283.32
2012	7132	6970	384.03	124.23	6.097	35793	393.99
2013	8130	7941	432.32	120.28	6.083	35905	471.17
2014	9155	8931	470.97	136.05	6.017	36199	580.16
Growth %	12.06	12.44	38.69	51.87	-1.55	-1.99	31.95
SAIL							
2001	10306	9703	162.33	21.67	7.93	156719	269.16
2002	10467	9697	155.02	10.11	7.69	147601	271.99
2003	11087	10352	192.07	21.65	7.50	137496	275.34
2004	11828	11026	241.78	46.52	7.46	131910	276.84
2005	12459	11030	318.05	110.97	7.29	126857	280.43
2006	13471	12051	322.80	73.81	7.24	138211	293.60
2007	13506	12581	391.89	109.66	7.16	132973	299.13
2008	13964	13044	455.55	129.55	6.95	128804	309.23
2009	13411	12494	487.38	109.46	6.74	121295	327.29

Contd.

Table-1: Performance data from published annual reports of Tisco (Stand alone) and SAIL

Year ending 31st March	Crude steel ('000T)	Saleable steel ('000T)	Revenue (INR billion)	Opt. profit (INR billion)	Energy consumption (Gcal/tcs)	Total number of employees	Gross block (INR billion)
2010	13506	12632	439.35	118.71	6.72	116950	353.96
2011	13761	12887	470.41	90.30	6.79	111475	382.63
2012	13350	12400	503.48	76.58	6.86	106004	399.57
2013	13417	12385	493.50	56.21	6.68	101878	409.18
2014	13579	12880	518.66	59.09	6.59	97897	523.60
Growth %	2.44	2.52	16.89	13.28	-1.30	-2.89	7.27

SAIL's figure by the end of the study period. That makes Tisco being amongst the lowest cost steel producers in the world along with Korea.

Technological intensity as the dominant resource

Tisco is known for its best man management practices, but the real answer behind such cost effectiveness and operating profit of Tisco lies on its excellence in technological innovations and plant modernizations. The investments in plant and infrastructure resource base in terms of gross block has been increased by Tisco from INR billion 113 in 2001 to 580 by the end of 2014 as against INR billion 269 to 524 of SAIL, thus reflecting a growth rate of 31.95% pa of Tisco as compared to 7.27% pa of SAIL in their respective technology base. Consequently, the technological intensity, herein defined as investments in gross block in plant and infrastructure per unit of saleable steel production has been increased by Tisco from 33 in 2001 to 65 in 2014 in terms of INR million per 1000 tonne of saleable steel as against an increase from 28 to 41 for SAIL during the same period, thus widening the gap between them, elevating Tisco from 18% higher in the beginning to 60% higher by the end of the study period. The technological intensity indices (assuming the lowest technological intensity of 23.71INR million per 1000 tonne of saleable steel of SAIL during 2008 as 100) of two steel plants are presented in the Figure-2 reflecting an average technological intensity index of 178 of Tisco as against 119 of SAIL during the study period.

Figure-2
Technological intensity index

Figure-3
Steel Quality Index
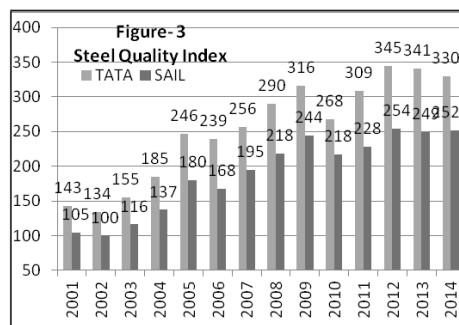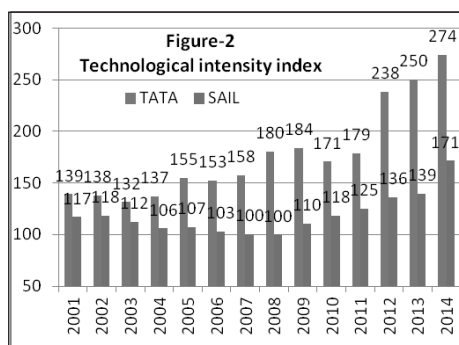
Improvement on steel quality front

On the output front, the most important parameter is the quality of steel that governs the success of any iron and steel plant in the market place. Steel quality is reflected here by surrogate measure in terms of revenue earned per unit of saleable steel. For Tisco, it varies in INR million per 1000 tonne of saleable steel from 23 in 2001 to 53 in 2014 as against from 17 to 40 for SAIL during the study period. Steel quality indices (assuming the lowest figure of 15.99 of SAIL in 2002 as 100) for two steel plants are compared in the **Figure-3** with an average steel quality index of 254 of Tisco as against 190 of SAIL giving an edge of 34% on steel quality to Tisco over SAIL

Economy in energy consumption

On the use of energy, both steel companies have been implementing different energy saving proposals to control and reduce their energy consumption gradually over the years, Tisco reduced by 20.05% (in Gcal/tcs from 7.53 in 2001 to 6.02 in 2014), whereas SAIL by 16.90% from 7.93 to 6.59. Consequently, energy productivity has been improved by both companies during the period, Tisco from 13.28 to 16.62, whereas SAIL from 12.61 to 14.10 in terms of tcs/100Gcal. Assuming the lowest energy productivity of 12.61 of SAIL in 2001 as 100, the **Figure-4** reflects the comparative energy productivity indices of two steel plants with an average of 120 of Tisco compared to 112 of SAIL giving a marginal edge of 7% on energy economy to Tisco over SAIL.

Figure-4
Energy productivity index


Figure-5
HR productivity index
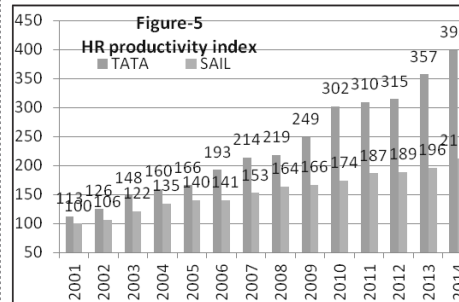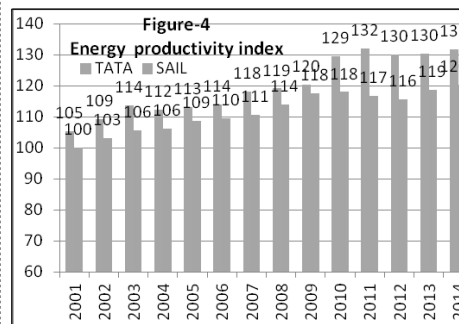
Improvement in manpower productivity

On manpower productivity front, to narrow down a wide gap from the global benchmark, both companies have been reducing their manpower strength gradually over time, Tisco reduced its number of employees by 25.85% from 48821 in 2001 to 36199 in 2014, whereas SAIL by 37.53% from its staggering figure of 156719 in 2001 to 97897 in 2014. Instead of partial analysis of works and services manpower productivity in terms of crude steel output, here organizational total human resource (HR) productivity has been defined in terms of saleable steel output divided by the total number of employees. Tisco has been able to improve its HR productivity from 69.91 in 2001 to 246.72 in 2014 as against SAIL's figure improved from 61.91 to 131.57 during the corresponding period. Assuming the lowest figure of HR productivity of 61.91 of SAIL in 2001 as 100), the **Figure-5** compares the HR productivity indices of two steel plants with an average of 233 of Tisco compared to 156 of SAIL, giving an edge of 49% on HR productivity to Tisco over SAIL.

Improvement in total productivity and consequent operating profitability

Integrating the productivity of three dominant factors of quality, energy, and HR, the average total factor productivity varies from 120 in 2001 to 287 in 2014 for Tisco with an average of 202 as against variation from 102 to 195 for SAIL with an average of 153, thus with an edge of 32% to Tisco over SAIL as reflected in the **Figure-6**. Now, let us examine the operating profitability

scenario of two steel plants over the years. It is interesting to note that the year 2002 has been the worst and the year 2005 the best year for operating profitability achievements of both steel plants. Operating profitability of Tisco varies from a minimum of 17.66% in 2002 to a maximum of 38.58% in 2005 with an average of 31.38% for the entire study period as against SAIL's variation from a minimum of 6.52% in 2002 to a maximum of 34.89% in 2005 with an average of 19.37%. Based on the lowest figure of 6.52% of SAIL in 2002 as 100, **Figure-7** reflects the comparative trends of their operating profitability indices with an average of 481 of Tisco as against 297 of SAIL, giving an edge of 62% to Tisco over SAIL.

Figure-6
Total factor productivity index

Figure-7 Operating profitability index
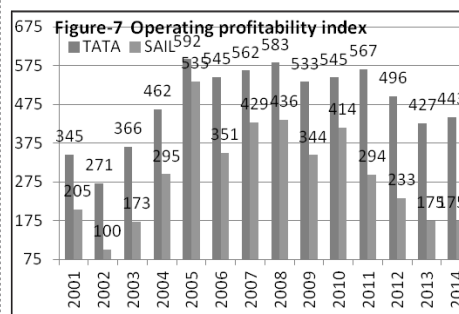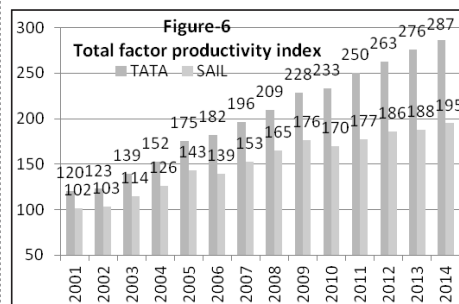
As it is expected that operating profitability should be proportional to total productivity of three dominant

factors of steel quality, energy economy and HR productivity, its proportionality constant for Tisco and SAIL shows a strong correlation of 0.75 as shown in the **Figure-8**, thus confirming the validity of three factor productivity framework to explain the resultant operating profitability scenario of two steel plants under study.
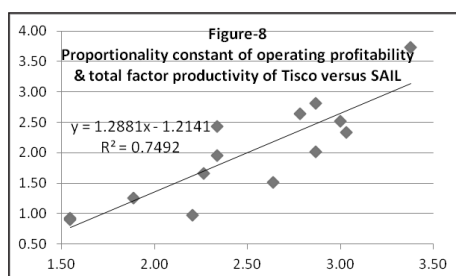

Figure-8
Proportionality constant of operating profitability & total factor productivity of Tisco versus SAIL

$y = 1.2881x - 1.2141$
$R^2 = 0.7492$

Table-2: Productivity achievement with technological intensity- R2 values for different functions

	Linear	Exponential	Logarithmic	Polynomial	Power
Quality productivity with Technological intensity					
Tisco	0.6958	0.6096	0.7745	0.9422	0.6911
SAIL	0.2113	0.1491	0.2000	0.2176	0.1367
Energy productivity with Technological intensity					
Tisco	0.6546	0.6480	0.6994	0.7532	0.6946
SAIL	0.2568	0.2417	0.2443	0.2647	0.2291
HR productivity with Technological intensity					
Tisco	0.8261	0.7447	0.8539	0.8605	0.7931
SAIL	0.3991	0.3016	0.3799	0.4112	0.2834
Total three factor productivity with Technological intensity					
Tisco	0.8063	0.7251	0.8607	0.9185	0.7908
SAIL	0.2806	0.2170	0.2664	0.2891	0.2025
Operating profitability with Technological intensity					
Tisco	0.0162	0.0321	0.0415	0.5506	0.0633
SAIL	0.3195	0.2793	0.3502	0.4179	0.3071

Functional relationship of productivity gains with technological intensity

Now, the level of productivity achievement of two steel plants in relation to their respective technological intensity has been examined using five different functions: i) linear, ii) exponential, iii) logarithmic, iv) polynomial, and v) power with their respective R2 values as in the Table-2.

From the Table-2, it is evident that polynomial function is the best fit to relate each of the three factor productivity, total productivity as well as operating profitability with technological intensity. Using the polynomial function, the correlation coefficient for each of the three factor productivity as

well as for the total factor productivity has been much more significant for Tisco as compared to much lower figure for SAIL. This clearly indicates that technological intensity has a much stronger bearing on productivity achievements of Tisco unlike SAIL, where the focus of technological intensity has been more on economy of large scale operations. Operating profitability has been correlated with the total factor productivity level to a great extent as tested earlier. This is observed to be more or less valid for SAIL when both are more or less weakly correlated with technological intensity. However, operating profitability for Tisco has been much weakly correlated with technological intensity (correlation coefficient of 0.55) unlike the strong correlation of total factor productivity with technological intensity (correlation coefficient of 0.92). This clearly indicates that behind Tisco's distinct differential success in operating profitability on top of three factor total productivity of quality, energy and the HR, there must be some other residual resource base in addition to technological intensity. The 'Efficient' public image of Tisco built over the years compared to 'Ineffective' public sector like SAIL may possibly be some such residual resource base to account for its differential level of operating profitability.

Conclusions

Steel production of India has been on accelerating path to meet potential demand for its billion plus population as against almost stagnant global steel production scenario and negative growth rate of of China's steel production, the world number one steel producer. However, the productivity level of Indian steel plants has a long way to improve to become comparable with global benchmark. To boost production and productivity, technological up-gradation of Indian iron and steel sector is indeed important in its resource constrained economic scenario. The present study analyzes the technological progress of two steel companies, how the hundred year old plant has been modernizing its plant to improve productivity to acquire a place in the global scenario as one of the lowest cost steel producers, whereas the giant public sector plant has been going in for economy from large scale operations still with its huge manpower base. The three factor productivity model based on the quality, the energy, and the HR has been the snapshot view of operational effectiveness and productivity scenario of two steel plants here. Technological progress being the most dominant resource particularly for steel plant productivity level, it has been interesting to study here functional relationship of technological intensity with productivity achievements. However, the impact of external resource bases like the suppliers, the customers, strategic alliance, and the public image could also be considered along with technological intensity as causal factor for productivity achieve-ments. Here the study has been restricted to three-factor productivity achievement level because of techno-logical intensity, however, further study could be made into different process improvements starting from mines and collieries, iron and steel making, and rolling mills for finished steel thereby identifying the specific areas for further improvement for each of the two steel plants. Here the study has been restricted to three-factor productivity

achievements of two steel companies, Tisco and SAIL for inter-firm comparison using their available published annual reports, however, SAIL being a conglomeration of five steel plants, a separate study could be made of inter-plant productivity comparison from technological intensity of its constituent steel plants.

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Public Expenditure on Education, Human Capital and Empowerment of Women

Abstract

Difference in human capital between men and women is considered as one of the major factors that perpetuate gender wage inequality. The paper examines the effects of govern-mental policies regarding public provision of education on gender based wage inequality. A two-sector full-employment model is developed where the human capital endowments of men and women are different, with the latter being typically less. Comparative static exercises show that increase in public expenditure on education with equal allocation across gender, may aggravate gender wage inequality; on the other hand, higher public expenditure with greater allocation towards education of women may narrow down the gender wage gap. The results indicate that governmental discrimination in favour of women in provision of education might compensate for the social discrimination against women in access to education and ensure empowerment of women.

Keywords

Gender Wage Inequality; Human Capital; Public Expenditure

Ujjaini Mukhopadhyay

Introduction

A significant impediment for women in developing countries is economic disadvantage in the labour market. It manifests itself through gender wage inequality, which generally refers to the average difference in hourly earnings of men and women. Women's wages represent between 70 and 90 per cent of men's wages, with even lower ratios in some Asian and Latin American countries (ILO, 2009). According to World Bank data, the average gender wage differential in India was 24.85% in 2009-10. The existing literature identifies disparities in human capital and skill across gender as one of the major factors in triggering gender wage inequality and posing a threat to economic empowerment of women.

The prerequisite of economic empowerment of women is the possession of skills and resources to compete in labour market, so as to ensure pay equality. It is necessary for women to have equality in human capital, which refers to education, skill and training. However, in developing countries there exist remarkable disparities in human capital formation between men and women that perpetuate gender wage gaps.

The basic reasons for this gender gap in human capital are mainly threefold: first,

in many developing countries, like India, children living in rural or remote areas, still lack access to a safe, nearby school with quality learning opportunities. Being female exacerbates an already difficult situation, since shortcomings in educational infrastructure like lack of toilet facilities, female teachers, etc. make education hardly conducive for girls.

Secondly, due to financial constraints in most families in developing countries, parents face a trade-off while deciding on provision of education to boys and girls. In these countries, with typically no social security or state pension, male children still provide old age support to their parents while any benefits of a daughter's education are obtained by her in-laws. Thus while expenditure on boys' schooling results in benefits for the parents, expenditure on girls' schooling does not. Social customs like dowry, in fact, add to the cost of bringing up girls and act as deterrent to girls' education for cash constrained households. In other words, there is an asymmetry in parental incentives to educate sons and daughters (Gandhi Kingdon, 2002).

Thirdly, women take the major responsibility of household work, childrearing, and caring for elders, which substantially diminishes the energy and time that they could spend on paid work, and increases the probability of job interruptions. Hence, women cannot benefit as much as men from additional investment in education (Schilt and Wiswall, 2008). In fact, women tend to concentrate in sectors and jobs that allow them flexibility in timings, entry and exit and typically induce them to opt for low paying informal sector jobs.

In developing countries, education is largely provided by the government. Although private schools and educational institutions are growing at fast pace, public provision of education is still a pervasive phenomenon in these countries. In order to improve school infrastructure and provide incentives for enrolment and retention in schools, governments have been augmenting their overall budgetary allocation for education. For example, in order to achieve universal of elementary education in India, the government has undertaken various policy measures and interventions like Operation Blackboard, Mid-Day Meal Scheme, Sarva Shiksha Abhiyan, etc. Moreover, to remove the social bottlenecks and ease off the financial burden of families in sending daughters for education, governments have also embarked on various gender-centric policies to allocate specific proportions of their budget exclusively for education of women. For example in India, in the state of Bihar, girls have been provided free uniforms and free bicycles for travelling to school. In Bangladesh, the Female Stipend Program is targeted towards education of girls. Conditional cash transfer programs have been undertaken in Latin American countries like Ecuador, Nicaragua and Brazil.

Hence in countries where there exist gender based social discrimination in access to education and human capital (due to financial or infrastructural deficiencies), the governments often resort to initiating discrimination favouring women in public provision of education. This is accomplished by directing public educational invest-ment to women by way of providing incentives, subsidies and infrastructures especially for girls.

While this policy can be justified on the grounds of ensuring gender equity in education and externalities in the form of positive effect of mother's education on children's schooling and health (Schultz, 2003), it also becomes imperative to examine whether the women specific education policies can have favourable effects on gender wage inequality as well.

The objective of the present paper is to theoretically examine the effects of governmental policies regarding public provision of education on gender based wage inequality. A two-sector full-employment model is developed where both male and female labour are employed. The human capital endowments of men and women are different, with the latter being typically less. Comparative static exercises show that increase in public expenditure on education with equal allocation irrespective of gender, may raise gender wage inequality, while higher public expenditure with greater allocation towards education of women may have a favourable effect on the gender wage gap. Thus governmental discrimination in favour of women in provision of education might compensate for the social discrimination against women in access to education and ensure empowerment of women.

The Model

A full employment economy is considered to consist of two sectors - sector 1 and sector 2. Both the sectors use male labour (M), female labour (F) and capital (K) to produce goods X_1 and X_2. It is assumed that sector 2 is more capital-intensive than sector 1. All the three factors are fully employed and are perfectly mobile between the two sectors. The male and female workers earn different wages (per productive unit), denoted by W_M and W_F respectively. Production functions exhibit constant returns to scale with diminishing marginal productivity to each factor.

The following symbols are used in the formal presentation of the model.

M = male population; F = female population; K = capital stock; θ_{ji} = distributive share of the j th input in the i th sector, i =1, 2; j =M, F, K; λ_{ji} = proportion of the j th input employed in the i th sector, i =1, 2; j = M, F, K; S_{jk}^{i} = the degree of substitution between factors j and k in the i th sector, i =1,2; $\wedge$ = proportionate change, for example, $\hat{X}_1 = (dX_1 / X_1)$.

Let h_M and h_F denote the human capital of men and women respectively. Human capital is formed by education and job experience. It is assumed that education is entirely provided by the government and hence depends on the amount of public spending on education (E) that may take the form of education subsidy or expenditure on school infrastructure. The benefits of government spending on education are received by both male and female. However, to compensate for the gender specific infrastructural needs and discrimination against women in access to education owing to social reasons, the government allocates α proportion of the total spending on education exclusively for girls, while the rest (1- α) proportion is spent for boys. It may be noted that the Government of India has undertaken various schemes like distribution of bicycles, construction of

girls' toilet, recruitment of more female teachers, scholarships for girl child, etc. in order to promote education for girls. These schemes lead to infrastructure development conducive for education of girls, while stipends and other incentives address the financial constraints of households.

The human capital function of a representative female worker is given by

$$h_F = a_F + S_F(\alpha E) \qquad (1)$$

Here a_F depicts the human capital of women due to job experience and is independent of E ; $S_F > 0$ denotes the responsiveness of human capital of women to public spending targeted towards girls.

The human capital function of a representative male worker is given by

$$h_M = a_M + S_M\{(1-\alpha)E\} \qquad (2)$$

Here a_M depicts the human capital of men due to experience in job market while $S_M > 0$ is the responsiveness of human capital of men to overall public spending on education.

It is assumed that $a_M > a_F$ since owing to their domestic and reproductory responsibilities women face frequent interruptions in jobs and hence possess lower human capital attributable to job experience. Also, $S_M > S_F$ owing to social discrimination on the basis of gender, whereby girls are allowed lesser access to education by their parents than boys.

The general equilibrium is represented by the following set of equations.

$$W_M a_{M1} + W_F a_{F1} + r a_{K1} = P_1 \qquad (3)$$

$$W_M a_{M2} + W_F a_{F2} \; r a_{K2} = P_2 \qquad (4)$$

Equations (3) and (4) are the usual price-unit cost equality conditions in the two sectors of the economy operating in perfectly competitive markets, respectively. Here, a_{Ki} denotes the capital output ratio in the i th sector, $i = 1, 2$; a_{Mi} is the male labour-output ratio in the i th sector, $i = 1, 2$; a_{Fi} denotes the female labour output ratio in the i th sector, $i = 1, 2$; P_i are the price of the i th good, $i = 1, 2$; W_M and W_F are the competitive wage rates (per productive unit) of male and female labour; and r is the return to capital.

Complete utilization of capital implies

$$a_{K1}X_1 + a_{K2}X_2 = K \qquad (5)$$

Here, X_i denotes the output level of the i th sector, $i = 1, 2$; K is the endowment of capital in the economy.

Full employment of male and female labour implies respectively

$$a_{M1}X_1 + a_{M2}X_2 = h_M M \qquad (6)$$

$$a_{F1}X_1 + a_{F2}X_2 = h_F F \qquad (7)$$

Using (1) and (2) in (6) and (7), one gets

$$a_{M1}X_1 + a_{M2}X_2 = \{a_M + S_M\{(1-\alpha)E\}\}M \quad (6.1)$$

$$a_{F1}X_1 + a_{F2}X_2 = \{a_F + S_F(\alpha E)\}F \qquad (7.1)$$

Here it is assumed that M and F are the number of male and female labour.

The public spending on education is

financed by taxing the rental income of capitalists. Thus,

$$E = \beta rK \qquad (8)$$

where β is the tax rate and rK depicts the total rental income. The government raises β in order to increase its public spending on education.

There are eight endogenous variables: W_M, W_F, r, X_1, X_2, E, h_M and h_F that can be solved from equations (1)-(5), (6.1), (7.1) and (8). This is an indecomposable system, where the factor prices cannot be solved from the price system alone. Therefore, any change in the factor endowments affect factor prices, which in turn, affect the per unit input requirements, $a_{ij}s$ in each sector.

Let us assume that sector 2 is more capital intensive than sector 1. This implies that $(\lambda_{M1}+\lambda_{F1})\lambda_{K2} > (\lambda_{M2}+\lambda_{F2})\lambda_{K1}$ and/or $(\theta_{M1} + \theta_{F1})\theta_{K2} > (\theta_{M2} + \theta_{F2})\theta_{K1}$. It is also assumed that sector 2 is more male labour intensive vis-ávis sector 1 implying $\lambda_{M2}\lambda_{F1} > \lambda_{M1}\lambda_{F2}$ and/or $\theta_{M2} \theta_{F1} > \theta_{M1}\theta_{F2}$.

Since the public policy on education affects the human capital of both men and women, affecting their productivity, the gender wage inequality, (W_i) should be measured by the following expression:

$$W_i = W_M h_M - W_F h_F \qquad (9)$$

Effects of an increase in overall public spending on education

Case I: No discrimination across gender in provision of public education, i.e. $\alpha = 1 - \alpha = 1/2$

Suppose the government allocates equal proportion of public funds for provision of education to girls and boys $(0.5E = E/2$ to each group). An increase in the overall public provision of education, E, raises the level of schooling and boosts the human capital and productivities of both men and women. However, owing to lower access to education for girls $(S_M > S_F)$, the rise in their human capital is less than boys. Given the demand, the increases in productivities of men and women reduce W_M and W_F. Now if the net rise in male labour supply (in productivity units) exceeds that of female labour supply, fall in W_M is more than that in W_F, so that the producers substitute capital and female labour with more of male labour, thus raising the demand for male labour and their wages, W_M (under the sufficient conditions as depicted in (A.10.2). The demand for capital and female labour reduces so that r and W_F falls. The effect on gender wage inequality depends on the effects on the wages of male and female labour and their respective human capital. The gender wage inequality aggravates under the sufficient conditions depicted in (A.10.2) in the Appendix.

This establishes the following pro-position[1]:

Proposition 1: *An increase in the overall allocation for public expenditure on education may aggravate gender wage inequality if the allocation of funds to men and women are equal.*

Case II: Discrimination in provision of public spending on education in favour of women, i.e. $\alpha > (1-\alpha)$

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[1] For mathematical proof, see Appendix.

Now, suppose the government allocates higher proportion of its funds with the specific target to educate women. This implies that there is discriminatory allocation of public fund for education in favour of women $\alpha > (1-\alpha)$. An increase in E inflicts two effects on the productivity of men and women. First, since there exists discrimination against women in access to education ($S_M > S_F$), rise in productivity of women is less than that of men; secondly, since there is governmental discrimination in provision of education in favour of women $\alpha > (1-\alpha)$, the productivity hike in women is higher. Given the demand for male and female labour, both W_M and W_F fall, due to rises in their productivity. However, if the female labour supply (in productivity units) increases more than that of male labour supply, fall in W_F is more than that in W_M. The producers substitute capital and male labour with more of female labour, so that the demand for female labour and their wages, W_F goes up (A.10.3). The net effect on gender wage inequality depends on the effects on the wages of male and female labour and changes in their human capital. The gender wage inequality declines under the sufficient conditions depicted in (A.13) in the Appendix.

Hence the following proposition follows[2]:

Proposition 2: *An increase in the allocation of public expenditure, with a higher proportion targeted particularly towards education of women may have favourable effect on gender wage inequality.*

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[2] *See Appendix for mathematical proof.*

Concluding Remarks

Differences in education and human capital are often cited as the primary reasons behind gender wage inequality. In most developing countries, education is provided by the government. Governments often adopt two types of policies regarding allocation of funds for public provision of education: (i) equal allocation for girls and boys and (ii) allocation of a higher proportion for education of women. It becomes imperative to ascertain which of the policies can be more favourable for gender wage inequality, particularly in countries where there exist discrepancies in access to education across gender due to various social bottlenecks. The paper develops a two-sector full-employment model where the human capital endowments of men and women are different, with the latter being typically less. Comparative static exercises show that increase in public expenditure on education with equal allocation irrespective of gender, may raise gender wage inequality; on the other hand, higher public expenditure with greater allocation towards education of women may have a favourable effect on the gender wage gap. Hence governmental discrimination in favour of women in provision of education might compensate for the social discrimination against women in access to education and ensure empowerment of women.

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Appendix

Total differentiation of (3) and (4) and use of envelope conditions[3] yields

$$\theta_{M1}\hat{W}_M + \theta_{F1}\hat{W}_F + \theta_{K1}\hat{r} = 0 \qquad (A.1)$$

$$\theta_{M2}\hat{W}_M + \theta_{F2}\hat{W}_F + \theta_{K2}\hat{r} = 0 \qquad (A.2)$$

Solving (A.1) and (A.2) by Cramer's rule, we get

$$\hat{W}_M = (\hat{r}/|\theta|)[\theta_{F1}\theta_{K2} - \theta_{K1}\theta_{F2}] \quad (A.3)$$

$$\hat{W}_F = (\hat{r}/|\theta|)[\theta_{K1}\theta_{M2} - \theta_{M1}\theta_{K2}] \quad (A.4)$$

where $|\theta| = \theta_{M1}\theta_{F2} - \theta_{M2}\theta_{F1} < 0$

Totally differentiating (1) and (2) gives

$$h_M\hat{h}_M = S_M(\alpha\, E\, \hat{E}) \qquad (A.5)$$

$$h_F\hat{h}_F = \{S_F(1-\alpha)\, E\, \hat{E}\} \qquad (A.6)$$

Total differentiation of (5), (6.1) and (7.1), use of (A.3) and (A.4) and rearrangement gives,

$$\lambda_{K1}\hat{X}_1 + \lambda_{K2}\hat{X}_2 = -A_1\hat{r} \qquad (A.7)$$

$$\lambda_{M1}\hat{X}_1 + \lambda_{M2}\hat{X}_2 + A_2\hat{r} = S_M(\alpha E\hat{E}) \quad (A.8)$$

$$\lambda_{F1}\hat{X}_1 + \lambda_{F2}\hat{X}_2 + A_3\hat{r} = \{S_F(1-\alpha)E\hat{E}\} \quad (A.9)$$

Solving (A.7), (A.8) and (A.9) by Cramer's Rule, we get

$$\hat{r} = ((E\hat{E}/|\lambda|)[\alpha S_F\{\lambda_{K1}\lambda_{M2} - \lambda_{K2}\lambda_{M1}\}$$

$$+(1-\alpha)S_M\{\lambda_{K2}\lambda_{F1} - \lambda_{K1}\lambda_{F2}\}] \quad (A.10)$$

where

$$|\lambda| = A_1(\lambda_{M1}\lambda_{F2} - \lambda_{M2}\lambda_{F1}) + A_2$$

$$(\lambda_{F1}\lambda_{K2} - \lambda_{K1}\lambda_{F2}) + A_3(\lambda_{K1}\lambda_{M2} - \lambda_{M1}\lambda_{K2})$$

and

$$A_1 = [(\lambda_{K1}S^1_{KM} + \lambda_{K2}S^2_{KM})$$

$$\{\theta_{F1}(\theta_{K2} + \theta_{M2}) - \theta_{F2}(\theta_{K1} + \theta_{M1})\}$$

$$+(\lambda_{K1}S^1_{KF} + \lambda_{K2}S^2_{KF})\{\theta_{M2}(\theta_{K1} + \theta_{F1})$$

$$-\theta_{M1}(\theta_{K2} + \theta_{F2})\}]$$

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[3]*It may be noted that producers in each industry choose techniques of production so as to minimize unit costs. This leads to the condition that the distributive-share weighted average of changes in input-output coefficients along the unit isoquant in each industry must vanish near the cost-minimization point. This states that an isocost line is tangent to the unit isoquant. In mathematical terms, for example, cost minimization condition in sector 2 may be written as: $\theta_{F2}\hat{a}_{F2} + \theta_{K2}\hat{a}_{K2} = 0$ These are called the envelope conditions. See Caves, Frankel and Jones (1990) and/or Chaudhuri and Mukhopadhyay (2009).*

$$A_2 = [(\lambda_{M1}S^1_{MF} + \lambda_{M2}S^2_{MF})$$

$$\{\theta_{K1}(\theta_{F2} + \theta_{M2}) - \theta_{K2}(\theta_{F1} + \theta_{M1})\}$$

$$+ (\lambda_{M1}S^1_{MK} + \lambda_{M2}S^2_{MK})]$$

$$\{\theta_{F2}(\theta_{K1} + \theta_{M1}) - \theta_{F1}(\theta_{K2} + \theta_{M2})\}]$$

$$A_3 = [(\lambda_{F1}S^1_{FM} + \lambda_{F2}S^2_{FM})$$

$$\{\theta_{K2}(\theta_{F1} + \theta_{M1}) - \theta_{K1}(\theta_{F2} + \theta_{M2})\}$$

$$+ (\lambda_{F1}S^1_{FK} + \lambda_{F2}S_{F2}S^2_{FK})$$

$$\{\theta_{M1}(\theta_{K2} + \theta_{F2}) - \theta_{M2}(\theta_{K1} + \theta_{F1})\}]$$

It is evident that

$$A_1 > 0 \ if \ \frac{\theta_{M2}}{\theta_{F2}} > \frac{S^i_{KM}}{S^i_{KF}} > \frac{\theta_{M1}}{\theta_{F1}} \ ; \ i = 1,2$$

$$A_2 < 0$$

$$A_3 > 0 \ if \ \frac{\theta_{M1}}{\theta_{K1}} > \frac{S^i_{FM}}{S^i_{FF}} > \frac{\theta_{M2}}{\theta_{K2}} \ ; \ i = 1,2$$

Hence $|\lambda| < 0$ if the above conditions hold.

By totally differentiating (9) we have

$$W_1\hat{W}_1 = W_M h_M (\hat{W}_M + \hat{h}_M)$$

$$- W_F h_F (\hat{W}_F + \hat{h}_F) \quad (9.1)$$

Effects of an increase in overall public provision of education

It is assumed that $\hat{E} > 0$.

Case I: $\alpha = 1 - \alpha = 1/2$

From (A.10), we get

$$\hat{r} = (E\hat{E}/2|\lambda|)[S_F\{\lambda_{K1}\lambda_{M2} - \lambda_{K2}\lambda_{M1}\}$$

$$+ S_M\{\lambda_{K2}\lambda_{F1} - \lambda_{K1}\lambda_{F2}\}] \quad (A.10.1)$$

$$\hat{r} < 0 \ if \ S_F\{\lambda_{K1}\lambda_{M2} - \lambda_{K2}\lambda_{M1}\}$$

$$< S_M\{\lambda_{K2}\lambda_{F1} - \lambda_{K1}\lambda_{F2}\} \quad (A.10.2)$$

From (A.3) and (A.4), we get

$$\hat{W}_M > 0, \ \hat{W}_F < 0 \ and \ (\hat{W}_M - \hat{W}_F) > 0$$

Use of (A.3), (A.4), (A.5), (A.6) and (A.10) in (9.1) yields

$$W_1\hat{W}_1 = (E\hat{E}/(2|\theta\|\lambda|))[\lambda_{K1}(S_F\lambda_{M2}$$

$$- S_M\lambda_{F2}) + \lambda_{K2}(S_M\lambda_{F1} - S_F\lambda_{M1})\}$$

$$\{W_M h_M (\theta_{K2}\theta_{F1} - \theta_{K1}\theta_{F2})$$

$$- W_F h_F (\theta_{K1}\theta_{M2} - \theta_{M1}\theta_{K2})\}$$

$$+ |\theta\|\lambda|\{W_M h_M S_M - W_F h_F S_F\}] \quad (A.11)$$

Since $S_M > S_F$, it implies that $h_M > h_F$ and $W_M > W_F$. Hence $W_M h_M S_M > W_F h_F S_F$.

From (A.11) it is evident that

$$\hat{W}_t > 0 \ \text{if condition (A.10.2) holds.}$$

Case II: $\alpha > 1 - \alpha$

From (A.10), we get $\hat{r} > 0$ if

$$\alpha S_F\{\lambda_{K1}\lambda_{M2} - \lambda_{K2}\lambda_{M1}\}$$

$$> (1 - \alpha)S_M\{\lambda_{K2}\lambda_{F1} - \lambda_{K1}\lambda_{F2}\} \quad (A.10.3)$$

The above condition is possible if

$$\frac{S_F}{S_M} > \frac{(1-\alpha)}{\alpha}$$

From (A.3) and (A.4), we get

$(\hat{W}_M < 0, \hat{W}_F > 0$ and $(\hat{W}_M - \hat{W}_F) < 0$

Use of (A.3), (A.4), (A.5), (A.6) and (A.10) in (9.1) yields

$W_1 \hat{W}_1 = (E\hat{E} / (|\theta| |\lambda|))[\{\lambda_{K1}(\alpha S_F \lambda_{M2}$

$-(1-\alpha) S_M \lambda_{F2}) + \lambda_{K2}((1-\alpha)$

$S_M \lambda_{F1} - \alpha S_F \lambda_{M1})\}$

$\{W_M h_M (\theta_{K2} \theta_{F1} - \theta_{K1} \theta_{F2})$

$-W_F h_F (\theta_{K1} \theta_{M2} - \theta_{M1} \theta_{K2})\}$

$+ |\theta| |\lambda| \{W_M h_M (1-\alpha) S_M - W_F h_F \alpha S_F\}]$

$$(A.12)$$

Hence from (A.12) it is evident that

$\hat{W}_t < 0$ if (i) condition (A.10.3) holds and

$$(ii) \quad \frac{S_F}{S_M} > \frac{(1-\alpha)}{\alpha} \qquad (A.13)$$

'Relationship' in Small Firm Finance: A Study of Small Enterprises in West Bengal

Indrani Dasgupta

Abstract

The small and medium enterprise (SME) sector provides an impetus to economic development; yet, their operations and growth are often constrained by their limited ability in obtaining credit. Financial intermediation theory demonstrates that asymmetric information plays an important role in debt contract negotiations between the bank and the firm. Small firms are further vulnerable because of their sole dependence on financial institutions/banks for external funding. These firms do not have access to public capital markets. Under the given situation, a good relationship of the entrepreneur with the lenders could be a source of soft information about the firm that would help mitigate the information problems in small firm finance.

In order to crystallize this research issue, this paper has used data collected from 100 small firms, selected from two districts of West Bengal, having filed EM II with the DIC, Government of India as per the MSMED Act 2006, during the five year period 2010-2014.

The final results reveal a statistically significant positive relation between financial leverage of the sampled firms and the quality of their relationship with the lenders (measu-red by a score on a specially cons-tructed Relationship Index). There-fore, we may infer that small firms incapable (or reluctant) of disclosing information (hard information) to the debt providers will have an incentive to build a relationship with their lenders in order to minimize the financial problem.

Key Words

Small and Medium Enterprise (SME), Finance, Lending Technologies.

Introduction

The issue of credit availability to small firms has garnered world-wide concern recently. One of the most common imperfections in the credit market is the incidence of information asymmetry[i] between lenders and borrowers. This is especially the case with small enter-prises[ii]. As a consequence, lending ins-titutions who do not know the real value of investment projects proposed by smaller firms *(adverse selection)* cannot be sure how the proposed funds will be applied *(moral hazard)*. The poor quality of financial information produced by smaller enterprises is mainly responsible for such imperfection.

Small firms are further vulnerable because of their dependence on finan-cial institutions for external funding.

These firms simply do not have access to public capital markets. As a result, shocks to the banking system can have a significant impact on the supply of credit to small businesses. Thus, small firms are subject to funding problems in equilibrium and these problems may be exacerbated during periods of disequilibrium in financial markets.

Academic literature and observations of business practices indicate that the typical financing pattern of the small business follows a hierarchy with sources requiring information disclosure placed lower in the order of preference. The entrepreneurs in order to avoid the adversities of information asymmetry prefer internal financing as it requires minimum or no information about the firm or the entrepreneur, followed by the short term debt (being less affected by information asymmetry) and finally long term debt (being most effected by information asymmetry).

Relationship lending is a powerful technology to combat the problem of information and thereby the credit availability in small business and is the main subject of this paper. Under relationship lending, banks acquire information over time through contact with the firm, its owner, and its local community on a variety of dimensions and use this information in their decisions about the availability and terms of credit to the firm.

Information can be both 'hard' (financial) and 'soft' (non-financial)[iii] and asymmetry arises when the financer assumes the firms (borrowers) to possess better quality and quantity of information than itself. Hard information can be relatively easily gathered,

stored, evaluated and transmitted to third parties while soft information is difficult to handle. Moreover, the notion of soft information is not well-defined in the literature. Therefore the problem of asymmetry with the soft information is even more critical as its disclosure cannot be made through papers and documents. Relationship between the two parties largely helps to mitigate the information imbalance.

Empirical studies of small business lending are often consistent with the importance of strong relationships. Stronger relationships, are empirically associated with lower loan interest rates (eg, Berger and Udell, 1995; Harhoff and Korting, 1998a), reduced collateral requirements (eg, Berger and Udell, 1995; Harhoff and Korting, 1998a), lower dependence on trade debt (eg, Petersen and Rajan, 1994, 1995), greater protection against the interest rate cycle (eg, Berlin and Mester, 1998; Ferri and Messori, 2000) and *increased credit availability* (eg, Cole, 1998).

In this backdrop the paper attempts to verify how far relationship between banks/financial institutions and the small businesses help in obtaining external finance by mitigating the problem of information asymmetry. The remaining paper is organised into four sections. Following this Section which gives a formal introduction to the research issue; Section Two provides a snapshot of the Indian small business scenario emphasising upon their financing issues. Section Three introduces the two primary lending technologies and reviews relevant literature thereby bringing out the research gap. The data base and the data collection technique also form a part of this Section. In Section

Four an empirical study of the data is conducted to draw out the significance (if any) of relationship (of the firms with the potential lenders) in obtaining external finance. Section Five draws out conclusions.

A Snapshot of the Indian Scenario

In India the SME sector contributes eight per cent of GDP, comprises 50 per cent of the total exports, 45 per cent of total industrial employment. The sector accounts for 95 per cent of all industrial units producing over 6000 items which range from simple consumer goods to highly sophisticated end-products[iv]. It is one of the most crucial sectors in the Indian economy especially in regards to creating job (largest employer of human resources after agriculture) in rural and semi-rural areas where more than 70 per cent[v] of the total population lives. Despite the importance to the economy, most SMEs in India are not able to stand up to the challenges of globalisation, mainly because of difficulties in the area of finance (Srinivas, 2005).

Banks are the dominant channel for providing funds to industry in India. However their importance in funding smaller firms is even more pronounced since most small and medium enterprises (SMEs) are not able to access the capital markets for funds (Thampy, 2010). But here too, information acts as an important decision criterion and acquisition of the required information from the borrowers poses a challenge for banks as borrowers have more information than the lender about the projects (Myers and Majluf, 1984).

Access to finance has been considered the major bottleneck[vi] in the growth of SMEs in India (Lader, 1996; Thampy, 2010) as it is the root cause for all other problems faced by the small business sector. Thampy (2010) examines the major issues in the financing of SMEs in the Indian context, such as the information asymmetry facing banks and the efficacy of measures such as credit scoring for SMEs. Poor profitability and lack of access to formal capital markets and institutions result in heavy dependence on alternative informal financing channels in India. Financial assistance from friends and families accounts for a major proportion of the alternative finance, followed by trade credit extended by the suppliers of raw material and labour. Only a small percentage of the SME units are able to access institutional finance while most of the others depend primarily on internally generated funds and/or informal financing channels[vii]. The challenge for banks is therefore to bridge the information asymmetry so as to take the appropriate lending decision so that the good firms are not financially constrained, and at the same time, cut down on exposures to bad credit risks. Whether transaction lending would be adequate to address the information issues or would lending have to be based on a relationship with the SME, using both 'hard' and 'soft' information purposes this study.

Lending Technologies

Lending technologies can be distinguished based on different dimensions such as the primary source of information, screening and underwriting policies/ procedures, structure of the loan contracts, and monitoring strategies and mechanisms (Berger and Udell

2006). Among others, two main lending technologies used to finance small and medium enterprises (SMEs) can be primarily distinguished by the type of information bank (lender) uses in granting and monitoring the loan. On the one hand, *transaction-based lending technologies* are primarily based on borrowers' *hard quantitative information,* such as the strength of the financial statement or the value of their assets, which are relatively easy to document and transfer. On the other hand, *relationship lending* is primarily based on borrowers' *soft qualitative information,* such as the entrepreneurs' characteristics including skill and integrity, which are difficult to verify.

Transaction based lending, specifically asset based lending i.e., acquisition of loan through pledging of collateral is a widespread and important basis of the credit acquisition process (Berger and Udell 1990). Moreover, the use of personal collateral and commitments is a common feature of many small business credit contracts. The relation- ship between SMEs and banks is often characterized by asymmetric informa- tion, adverse selection and moral hazard problems. These information problems eventually may lead to the problem of credit rationing, which could be mitigated by the use of collateral in the credit contract (e.g. Stiglitz and Weiss 1981; Bester 1985; Besanko and Thakor 1987; Freel 2007).

However, an extensive literature (Boot 2000) discusses the role of relationship lending in solving asymmetric informa- tion problems between borrower and lender. The proximity between lender and borrower is expected to facilitate ex ante screening and ex post monito-

ring and, as such, could mitigate informational asymmetries.

Relationship lending implies the existence of specific information on the borrower, which is available only to the financial intermediary and the customer (Diamond, 1984). This privacy encour- ages the entrepreneur to transmit data (Bhattacharya and Chiesa, 1995; Rheinbaben and Ruckes, 2004) and the bank to carry out costly monitoring work (Cole 1998; Boot 2000). As a consequ- ence, relationship lending should improve the bank's knowledge of the characteristics of both the firm and its projects, making it less risky for the bank to grant a loan. For the borrower, this should facilitate an increased availa- bility of debt and a lower cost of capital (Petersen and Rajan, 1994; Berger et al. 2001).

Literature provides evidence of the significance of relationship in loan acquisition by SMEs globally. However similar study is limited in the Indian scenario especially with respect to West Bengal. Having 5668 MSMEs[viii] to its credit West Bengal provides a suitable platform for conducting such study.

Data has been collected from a sample of 100 small enterprises, distributed over the two districts of Kolkata and 24 Parganas (South) in the state of West Bengal, India, following stratified random sampling method. The strata comprise of manufacturing and service sectors and the reference period is 2010- 2014. A structured questionnaire was used to gather data on the demo- graphy of the entrepreneur, profile of the firms, basic financial parameters and perception of the entrepreneurs about the constraints on raising external

debt and relationship as a means to overcome such constraints. The entrepreneurs recorded their opinions on a five point scale with degrees ranging from 1 ('strongly disagree') to 5 ('strongly agree'). When using the likert scaling technique, the scale values assigned to each statement are summated to yield a total score for each respondent. The average of this score is then calculated to measure the respondent's overall view towards the given point (Kothari, 2004).

Analysis of the Data Collected

On examining the general profile of the sample, it appeared to be skewed towards manufacturing activity and limited form of ownership with predominantly male directors. The sample is evenly distributed with respect to the value of asset and sales. A small percentage of the sampled firms are more than 30 years old, the rest young ones. As regards to financing, 31 percent of the sampled firms does not use external finance (short term or long term debt) and 69 percent use both internal and external sources of finance in varied proportion.

The study proceeds to look into the issue of relationship of the firm with the debt providers as a criterion in debt acquisition. To evaluate the perception of the respondents on their relationship with the lenders, a summative model has been used to calculate a score on the Relationship Index (RI) of each respondent on the following statements as gathered on the likert scale (1= strongly disagree and 5= strongly agree).

$$\text{RI of a respondent} = \frac{\sum_{g=1}^{n} R_g - \sum_{b=1}^{n} R_b}{n}$$

Where, n = number of statements

R_g = *response of one entrepreneur on statement indicating good relation*

R_b = *response of one entrepreneur on statement indicating bad relation*

- *Entrepreneur's relation with the bank is important in acquiring loans*
- *Bank manager helps in crisis*
- *Bank manager gives positive suggestions*
- *Have confidence in the advice of bank manager*
- *Rely on bank for changing financial needs*

Good Relation

- *Bank manager does not understand small business*
- *Prefer to avoid contact with bank*
- *Bank manager is not interested in the business*
- *Feel intimidated when dealing with bank*
- *Bank offers standard financial small business product*

Bad Relation

The first five statements have been grouped under the category of 'good relation' and the next five statements have been categorized under 'bad relation'. A negative score (calculated through the summative model) indicates unsatisfactory relationship between the firm and the lenders

(unfavourable for loan procurement), whereas a positive score indicates a relationship of good quality (favourable for loan procurement).

The Relationship Index score so derived is contrasted against the debt usage pattern of the sampled firms.

Table 1: Debt Usage and Quality of Relationship of the Sampled Firms

Debt Usage	Relationship Scores							Per Cent
	Bad Relation		Good Relation					
	<=0	Per Cent	>0-1	>1-2	>2	Total (%)	Total	
No	11		7	8	5		31	
Yes	18	**26**	22	19	10 (67%)	**51 (74%)**	69	100
Total	29		29	27	15 (100%)	71	100	

Source: Likert scale, Survey 2010-2014

Table 1 show that 67 per cent of the enterprises having highest score (greater than two) on relationship issues have procured debt. Moreover of the 69 firms having debt in their capital structure 74 percent (51 firms) exhibits positive score on Relation Index. This may be an indication of the importance of relationship in debt acquisition especially in case of small informationally opaque firms.

But the data set shows a certain percentage (26 per cent) of the sampled firms that uses debt in spite of their poor relationship with the lenders. This contradicts the acquired assumption. With an intention to mitigate this contradiction we make an in depth analysis of the other parameters considered by the lenders in providing loan (some of them being value of total assets, sales turnover etc.) to the firms. The analysis reveals that of these 18 firms, 55 per cent possess total assets above ₹ 200 lac (categorized as bigger of the smaller firms) and 67 per cent of them have sales turnover above ₹ 200 lac (categorized as bigger of the smaller firms)[ix]. Therefore we may assume the value of total asset and the sales turnover of the firms to have played an important role in loan acquisition in the absence of a good quality relation with the lenders[x]. Again we further observe that some of the sampled firms in spite of their good relationship with the lenders do not use debt. This could be justified from the context of the demand-side issue[xi] of capital structure of small firms (Bhaird and Lucey, 2006) and other external issues.

The importance of a good relation with

the lending institution has already been established by studying the perception of the respondents. However to strengthen this proposition cluster analysis and simple descriptive analysis of the data is delved into.

For this purpose, the firms have been categorized into homogeneous groups with respect to their capital structure into 'predominantly equity' (with approximately 92 per cent internal equity in total capital), 'moderate debt' (with approximately 53 per cent debt in the total capital) and 'predominantly debt' (with approximately 64 per cent debt in the total capital) with the help of cluster analysis.

Table 2: Descriptive Statistics of the Factors

Variables	Clusters	N	Mean	Std. Deviation	Std. Error
REL	Predominantly equity	61	0.3418	1.50469	0.19266
	Moderate debt	25	0.74	1.31038	0.26208
	Predominantly debt	14	1.1464	1.66473	0.44492
	Total	100	0.554	1.49615	0.14962

The mean score (in Table 2) of Relationship Index show that the clusters of the firms with higher leverage have higher relationship scores (1.14 for 'predominantly debt'). The lowest mean score on Relationship Index of 0.34 is reported by the cluster of firms who are 'predominantly equity'.

These observations may therefore lead to the understanding that relationship of the firm with the lenders is an important prerequisite in debt acquisition. This may be because as prolonged relationship between the firm and the lenders improve the lender's knowledge of the characteristics of both the firm and its projects, granting of loan to the small firms becomes less risky for them.

Conclusion

By questioning entrepreneurs through the primary survey about their perception about the need for information disclosure and its influence on debt acquisition, we find evidence that the respondents not only confirm information asymmetry to be a major constraint in external loan acquisition but also communicate their perception about their cordial relations with banks/lenders to be the best supplement of the information deficit. The sampled firms who agree to the importance of relationship are probably the ones who maintain a good and healthy relation with their banker and are thus awarded with a better financial leverage. The firms probably overcome the inherent opaqueness in information by maintaining a good relation with their prospective loan providers. The lenders on the other hand, access 'soft' information about the firm which supple-ments the absence of authenticated financial statement based 'hard' information. This makes them less apprehensive about

adverse selection and moral hazard.

A prolonged relationship with the bankers therefore facilitates availability of external finance by compensating for the information imbalance and reducing the chances of adverse selection. Relationship lending is therefore one very important prerequisite in acquisition of debt under condition of asymmetric information. It is an important technique adopted to bridge the gap of information between the firm and the prospective lenders.

Notes

i The term 'information asymmetry' was first used by George Akerlof in his work 'The Market for Lemons' in 1970. This situation was first described by Kenneth J. Arrow in a seminal article on health care in 1963 entitled "Uncertainty and the Welfare Economics of Medical Care," in the American Economic Review.

ii Small and medium enterprises face certain other issues (unlike their larger counterparts) which pose financing challenges for these entities (Welsh and White, 1981; Berger and Udell, 1998; Scherr and Hulburt, 2001) as demonstrated by higher earnings volatility and failure rates. They also have shorter asset maturities and are featured with greater growth opportunities (Scherr and Hulburt, 2001). Information asymmetry is perhaps the most important characteristic defining small business finance (Berger and Udell, 1998). This is probably because of the lack of transparency in the SME sector arising due to the absence of mandatory publication of the audited financial statements and publicly visible contracts.

iii Soft information refers to any kind of data other than the relatively transparent public information about the firm such as financial statements or the availability of collateral (Garc a-Appendini, 2007). Hard information typically refers to the borrower's financial statements and payment information while soft information refers to the borrower's management skills (competence, education, leadership and credibility), the product-market position and his strategy.

iv Government of India, Ministry of MSME, Annual Report 2010-2011

v Third All India Census of SSI, 2001

vi In the World Bank's Enterprise Surveys' standardized dataset for 2006-2009, 31 percent of firm owners around the world report access to finance as a major constraint to current operations of the firm.

vii The Fourth All India Census of MSME (2006-2007) reported that only 11.21 percent of the registered MSMEs availed institutional finance, while only 4.8 percent of the unregistered units had access to bank finance. Almost 95 per cent of the unregistered small enterprises were deprived of the institutional credit and were dependent upon self finance or borrowed funds from friends, relatives and money-lenders.

viii Source: Office of Director of Cottage and Small Scale Industries, Govt. of West Bengal, 2007 Re-named as Directorate of Micro and Small Scale Enterprises (MSSE)

ix There are some other parameters (not analysed in this study) which are considered important by the lenders while sanctioning loan applications of the small firms. Moreover government intervention often plays an important role in loan acquisition by the small sector. These probably may have helped the other firms (among the 18 firms who are not the bigger among the small firms) in acquiring loan.

x Therefore in the absence of relationship lending, transaction-based lending facilitates acquisition of finance by the sampled firms.

xi Small firms owners are often reluctant to demand credit in order to avoid third party interference and out of the fear of control dilution. In the sample under study some of the entrepreneurs expressed reluctance in using debt as they thought the process of debt acquisition and repayment to be hazardous issues. There were even some underqualified entrepreneurs who were ignorant to the procedure of debt procurement

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Socio-Economic Empowerment of Women Self Help Groups in Jammu, India

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Abstract

The present study is the outcome of an ex-post evaluation of the Self-Help Groups (SHG) promoted and formed by the Non-government organizations (NGOs) and District rural development agency (DRDA), Jammu & Kashmir. The study evaluated the impact of socio-economic factors on women empowerment of SHG members in Jammu Region of India. It estimated a structural equation model (SEM) and correct for ordinality in the data to account for the impact of the latent factors on women's empower-ment. The SEM results reveal that for the SHG members, the economic factor is the most effective in empo-wering women. Greater autonomy and social attitudes also have a signifi-cant impact on women empower-ment.

Key Words

Women Empowerment, Micro-finance, Structural Equation Model, Self-Help Groups, Jammu, India.

Introduction

Empowerment of women indicates increased involvement in decision-making and it is with this process through which people experience themselves to be competent of taking decisions and the right to do so (Kabeer, 2001). Individual empowerment can further lead to alteration in existing institutions and standards, however, without the combined empowerment, the indivi-dual empowerment and alternatives are restricted. It is also related to the perceptions of social capital and community focused development with which it is sometimes puzzled. Krishna (2003) explained empowerment by increasing the ability of individuals or groups to build efficient development and life alternatives and then to renovate these options into desired acts and results. It is by nature a procedure and/or result. In contrast, social capital includes social organizations such as networks, norms and inter-personal belief that assist coordination for shared benefit. Microfinance programmes generally target women with the unambiguous goal of empowering them. There are different fundamental motivations for practising women empowerment. Few disagree that

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women are amongst the poorest and the most susceptible of the neglected and thus assisting them should be a main concern. While, others consider that investing in women's potential empower them to build alternatives that is not only a precious goal in itself but it also adds to a better economic development.

Hashemi et.al (1996) examined whether women's admittance to credit had any impact on their lives, irrespective of who had the administrative control. The outcomes suggested that women's access to loan contributes considerably to the extent of the economic contributions informed by women, to the probability of an enhancement in asset belonging to them, to an increase in their use of purchasing power, and in their political and legal knowledge as well as in compound empowerment index. It also concluded that access to loan was also combined with elevated levels of mobility, involvement in major decision making and political participation for particular credit institutes.

Puhazhendhi & Satyasai (2002) conducted an exhaustive research on Empowerment of rural women via SHGs. The sample selected for study was 223 SHGs executing in 11 states across the country. For evaluating the impact of the programme, pre-SHG and post-SHG positions were measured. Data on diverse economic and social facets such as asset composition, income, behavioural changes, social empowerment etc. was collected and analysed to assess the impact. The study concluded that SHG as institutional preparation could positively add to the economic and social empowerment of

the poor. Titus (2002) examined the encouragement of women entrepreneurs through SHGs. Women entrepreneurs who had started small enterprises expanded them into large-size units. SHGs have also made readymade garments and exported them. However most of the SHGs had not been able to attain up to the managerial and technical skills, and to manage the labour force. They had dual role load, gender bias, lack of Professionalism and the like.

Dhavamani (2010) analyzed the empowerment of the women through SHGs in Sattur Taluk of district Virudhunagar. Proportionate random sampling technique had been used to collect the primary data. Out of the total groups of 398, functioning in Sattur Taluk under 3 NGOs, 10 per cent of groups (40) were selected from each NGO. From each group, only three members had been selected randomly in order to get accurate information about the group. It had been concluded that the women had enhanced access to financial resources, more power for entering into the power composition, more association through social affiliations and involvement, more self-motivation and self-confidence, and additional say in the family issues. It has also been examined that little increases in women's income also leads to a decrease in male involvement to definite types of household overheads. Rahman (1999) via anthropological approach with in detail interviews, participant remarks, case studies and a domestic survey in a village, found that between 40 per cent and 70 per cent of the loans distributed to the women are used by the partner and that the stress within the household increased leading

to domestic hostility.

Aghion and Morduch (2005) elucidated that microfinance empowers women through alterations in household choices, and negotiating power, by enhancing overall sources, concerning the returns on human capital and controlling the features and standards. Acknowledged by the household negotiating literature, researchers relate women's empowerment to the economic empowerment by microfinance (Browning and Chiappori 1998; Ashraf, Karlan, and Yin 2006). Browning and Chiappori (1998) argue that enhancing the virtual value of women time and her financial income increases her negotiating power to allot resources among the household and empowers her. It also guides larger investment in housing, education and diet of children (Duflo 2003).

Others emphasize the social impact of microfinance on greater autonomy (Anderson and Eswaran 2005; Goetz and Gupta 1996), political and awareness and social insertion (Aghion and Morduch 2005; Dijkstra 2002; Beteta 2006; Bardhan and Klasen 1999). SHG formation and frequent group meetings give women an opportunity to escape the usual routine and discuss their related burdens, allocate their issues, giving them the occasion to examine whether the core issues go beyond individual mistake or accountability (Townsend 1999). Changes in the attitude of women through societal pressure from SHPIs and other SHG members can change thoughts within the household, and can also guide to bigger empowerment. Lastly, women's empowerment is not just a conclusion, but a course of action (Johnson 2005;

Kabeer 1999). Moreover, aspects such as legal and regulatory outline and social norms and culture also have a significant impact on the empowerment process (Beteta 2006). Bali and Wallentin (2009) defined women empowerment as the procedure in which women effectively develop their well-being given the South-Asian context. Within South-Asian society, not all actions that increase welfare of a woman are essentially empowering in themselves (Bali and Wallentin 2009; Bali 2007). For example, activities such as enhance-ment in the nutrition of children, shows the way to greater competence in the woman's role within the household but also fall under her present role within the existing rules.

However, in order to estimate women's latent empowerment, there is a need to trust on observed factors that confine the addition in empowerment. Bali (2007) and Bali and Wallentin (2009) elucidate that it is only when women's welfare increases through involvement in non-traditional spheres, that one can say that women are empowered. Decisions such as family planning, buying and selling of assets, use of birth control, children's marriage and the verdict to send a girl child to school still stay outside the sphere of women in South Asia (Kabeer 1999).

Women "empowerment" has gradually turn out to be a strategic objective, together as an end to itself and as a way to accomplishing other growth objectives. Particularly microfinance has frequently been disagreed, but not lacking argument, to be an instrument for women empowerment. Ashraf et al. (2010) using a randomized controlled trial examined whether access to and

advertising of an independently held dedicated savings product led to an increase in women decision-making authority surrounded by the family and found encouraging impacts, predominantly for women who had underneath median decision-making authority in the bottom line, and this led to a move toward female-oriented durables goods bought in the family. Finally, it is significant to appreciate that process of empowerment as an optimistic impact on the women empowerment may take some time.

Empowering Women through SHGs

Empirical evidence from previous research demonstrates that the economic and social impact of microfinance empowers women (Bali and Wallentin 2009 & 2011; Pitt and Khandker 1998; Pitt, Khandker, and Cartwright 2006; Goetz and Gupta 1996; Aghion and Morduch 2005; Dijkstra 2002; Anderson and Eswaran 2005; Bardhan and Klasen 1999; Beteta 2006). Examining this further for Indian SHGs, it has been examined whether it is the microfinance related economic factors or the non-economic factors that are more effective in women's empowerment. The main reason to examine the disaggregated economic and noneconomic microfinance impact on empowerment of women is that, as researchers note, empowering women is a multi-dimensional process (Kabeer 1999; Johnson 2005; Malhotra and Mather 1997). Some of them suggest that the economic impact of microfinance empowers a woman through an increase in her income, which raises her negotiating power to distribute reserves contained by the family circle. Others emphasize the

social impact of microfinance in terms of greater autonomy, awareness and political and social inclusion as being more effective in women's empowerment.

The present study follows Bali Swain and Wallentin (2009 and 2011), in defining women's empowerment as a process through which a woman effectively improves her well being within society. Using the Structural Equation Model (SEM), the study estimated the impact of microfinance-related economic and non-economic factors on the empowerment of women. It considered latent factors encompassing women's economic empowerment, social attitudes, autonomy, communication, political and network participation and education level. Each of the latent variables of women's empowerment is measured by the observed decision-making variables that indicate enhanced involvement in the conventionally male conquered regions where women from South Asia do not usually have a say. These indicators include family planning decision, buying and selling of property, sending daughter to school, children's marriage decision and use of birth control.

The latent factors of women's empowerment: economic; autonomy; network, communication and political involvement; social attitude; and education are further computed by the examined signs, wherein economic factors are measured through: share of household income, primary activity, independent savings, investment to develop home, assurance to meet economic disaster and organizing loan and other efforts. Autonomy factor is measured through: purchase of raw material, plan work and

reaction to emotional abuse. Network, communication and political participation is measured through: officials SHG members have met, communication, knowledge about women reservation, contribution in village politics, verbal abuse and alteration in family violence. Social attitude is measured through: treatment by spouse, response to physical abuse, response to emotional abuse, taking part in family decisions, enhancement in self-confidence, verbal abuse and change in family violence. Further the education level of the sample members was taken as the last latent factor of women's empowerment. These latent factors are measured by a set of observed ordinal variables. The analysis is based on unique cross-section data on SHG women members.

Structural Equation Model (SEM)

For correctly assessing the impact of diverse latent components on women empowerment, a structural equation model is estimated. This model is presented by the path diagram in Figure 1. The model consists of two parts: the measurement and structural parts. The measurement model, towards the right in Figure 1, measures the latent women empowerment variables (in the ellipses) by its respective observed indicators (in rectangles). These indicators capture our definition of empowerment of women surrounded with the South-Asian background. The various latent components (economic and non-economic factors) of women empowerment are calculated by the observed 20 indicators (in rectangles) on the left-hand area of Figure 1. The relationship between the latent factors and their respective observed variables is indicated by the arrows. The dimension errors are symbolized by the arrows that point to all of the indicators.

This model is indicated by the middle component of the path diagram. The straight single-headed arrows stand for the causal relation between the latent economic and non-economic factors and the latent women's empowerment variable (We). The path diagram in Figure 1 corresponds to the following synchronized equations structure (Joreskog and Sorbom 1999).

$$x = \Lambda^x \xi + \delta \qquad (1)$$

$$y = \Lambda^y \eta + \varepsilon \qquad (2)$$

$$\eta = \Gamma \xi + \zeta \qquad (3)$$

Ist equation symbolizes the dimension model for the latent components of women empowerment (ξ), where x is the vector of determines for the latent component of women empowerment, Λ^x is the vector of factor loadings and δ is the vector of dimension errors connected through the relevant signs. The dimension model matches to the left part of the path diagram (Figure 1).

The latent women's empowerment is represented by η and is computed by the indicator vector y as presented by means of equation (2), where Λ^y is the vector of factor loadings and ε is the vector of quantity errors related through y. The dimension model matches to the right-hand part of Figure 1.

Equation (3) is the SEM model, that specifies the latent women empowerment (η) depends on the vector of latent component (ξ), or the

economic and non-economic factors, where Γ is the vector of latent regression coefficients and ζ is the error word. The statistical significance of the latent regression coefficients thus point out which latent component has a noteworthy impact empowerment of women.

Figure-1: Path Diagram for the General Women Empowerment Model.
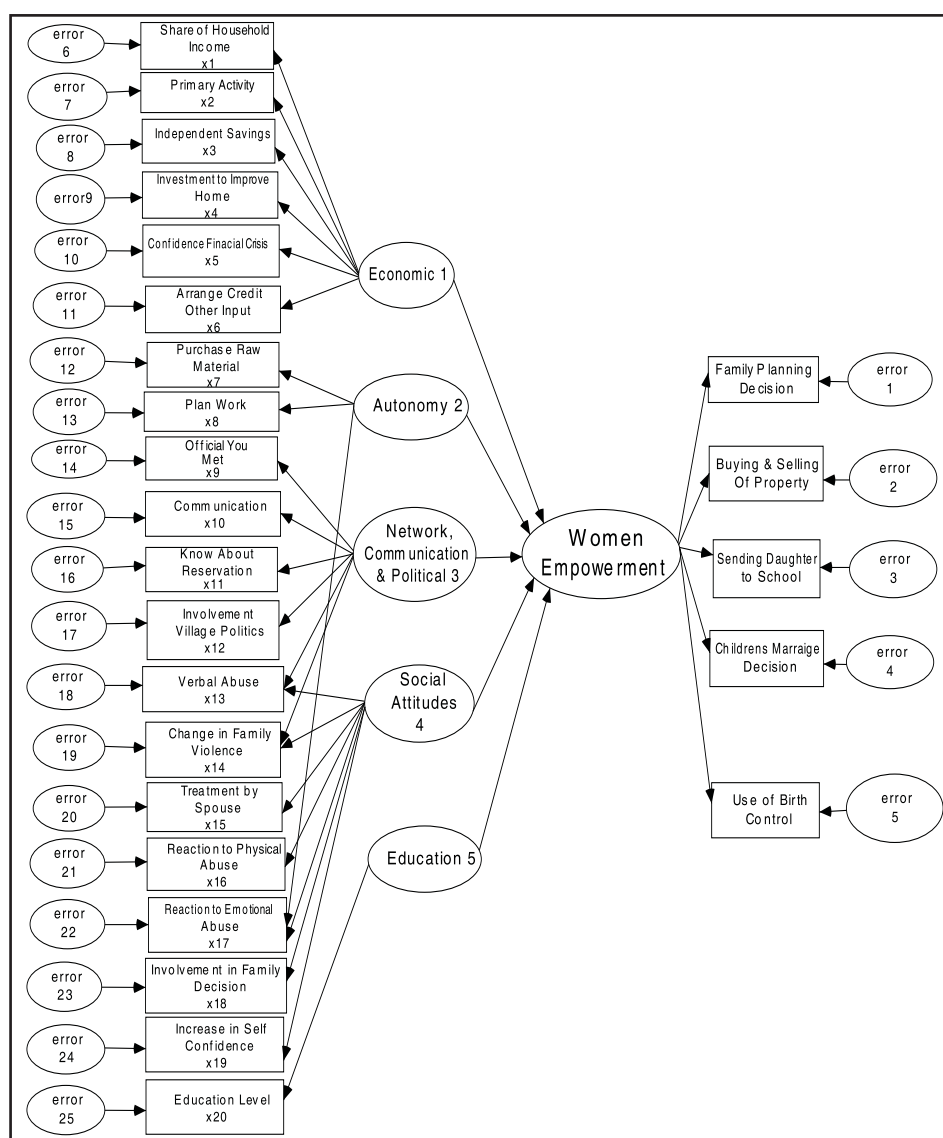
Demographic Characteristics

The model estimation is based on data collected as an element of study to inspect the Self Help Group - Bank Linkage Programme (SHG-BLP) in Jammu Region. The family survey make use of a quasi-experimental devise, with a pre-coded questionnaire to gather data for nine distinct districts of Jammu region of J&K state of India, in Jan-June 2012 namely Jammu, Kathua, Samba, Udhumpur, Reasi, Doda, Ramban, Rajouri and Poonch. Within the state, the study evaded districts with above and below publicity of SHGs and merely estimated SHGs with excellent functioning ties.

Table 1 presents the characteristics of the respondents who participated in the Self-Help Group programme. Most of the SHG members are within the age group of 31-50 and on an average are about 39.7 years old. A large percentage of the respondents are economically active, most of whom are engaged in farm or farm related activities (78.02 per cent). Approximately 19 per cent are the main earners in the household with about 61.3 per cent of respondents reporting an increase in their own income.

Table-1: Descriptive Statistics

Variable name	All SHGs mean
Age of respondent (yrs.)	39.74
Percentage of SHG members that are main earners of the household	18.95
Percentage of SHG members that are earning	80.68
Percentage of SHG members that are literate	72.92
Percentage of SHG members engaged in farm activity and agricultural wage labour	78.02
Percentage of SHG members with increase in household income after joining SHGs*	63.9
Percentage of SHG members with increase in own income after joining SHGs*	61.3
Sample size	960

*These percentages are based on binary questions, as asked from the SHG members during Jan-June 2012

As described in Table 2, the latent women's empowerment variable is measured by the observed decision-making variables that indicate raised involvement in the conventionally male-centric regions where women of South Asia do not usually have a say. Examining these indicators in Table 2, it is found that after joining SHGs about 25 per cent of the respondents indicate that participation in family planning decisions had increased, while 35 per cent reported use of birth control measures. Buying and selling of property shows an increased participation by 17 per cent of SHG members. Women members also reported an increased involvement (upto 23 per cent) in sending daughters to school.

The latent factors of women's empowerment: economic; autonomy; network, political and communication involvement; social attitude; and education; are computed by the examined parameters as presented in Table 2. The first column corresponds to the variable names in Figure 1 and lists the observed indicators used to measure each of the latent factors. Column 2 describes the exact question that was asked to the SHG respondent. The coding of their responses is given in column 3 while the proportions of the responses to each of these coded categories are presented in column 4.

The economic factor is measured by the proportion of resources that the SHG members control and the economic activities that they are engaged in. Most of the members are economically active and are principally engaged in agriculture and related activities. Surprisingly 88 per cent of the members reported that they have independent savings which they control after joining SHGs. The respondents are also substantially confident about meeting financial crisis in the family (86 per cent) and arranging credit and other inputs in time of need (63 per cent). About 23 per cent reported substantial home improvements and repairs after joining SHGs. Their degree of autonomy is represented by their independence in taking crucial work-related decisions (61 per cent), planning and implementation related to work (51 per cent) and their resistance to psychological and emotional abuse. About half of them reported having offered resistance of varied levels.

Networking, awareness, communication and political involvement is determined by the amount of officials that the members have talked to, the communication skills of the respondent, their participation and awareness in the neighbouring village politics and their response to abuse and mistreatment within the household. On average, each member has met at least one official and most of them (73 per cent) are fairly confident in communicating and raising their concerns within the group meetings. More than half the group members are aware of the reservations, in the local political institutions and job, for women and 36 per cent have been involved in village level politics. Greater awareness towards women rights are also reflected in their resistance to verbal abuse and domestic violence.

Social attitudes and changes therein are measured by the treatment of the respondent by her spouse, her reaction to physical, psychological and emotional abuse, and increasing resistance in reaction to such attitudes. Other measurement variables include the increase in the level of self-confidence (86 per cent) due to non-economic factors and greater involvement in all family decisions (47 per cent). Finally, the level of educational attainment in measures the contribution of education towards empowerment of women members.

Estimated Results of SEM

This segment presents and converses the outcomes of the estimated structural equation model (SEM) of women's empowerment to determine which of the latent factors have a noteworthy impact on empowerment of women. It first examines the results from the dimension model, which states how the latent

Table-2: Description of observed indicators to measure latent variables

(1) Observed Indicators	(2) Questions asked to the SHG respondent	(3) Coding	(4) Proportion
1.Women's Empowerment			
Family planning decision	After Joining SHG, has your involvement in the decision making on family planning increased?	1.Yes 0. No	1 = 0.25 0 = 0.75
Buying & selling of property	After Joining SHG, has your involvement in the decision making on buying & selling of property increased?	1.Yes 0. No	1 = 0.17 0 = 0.83
Sending daughter to school	After Joining SHG, has your involvement in the decision making on sending your daughter to school increased?	1.Yes 0. No	1 = 0.23 0 = 0.77
Children's marriage decision	After Joining SHG, has your involvement in the decision maki ng of your children's marriage increased?	1.Yes 0. No	1 = 0.30 0 = 0.70
Use of birth control	Have you used birth control measures?	1.Yes 0. No	1 = 0.35 0 = 0.65
2. Economic			
Share of household income	Members Income as a proportion of the household income	1.Less than 20% 2. 20-40% 3. 40-60% 4. 60-80% 5. 80-100%	1 =0.45 2 =0.43 3 =0.07 4 =0.03 5 =0.02

Contd.

Table-2: Description of observed indicators to measure latent variables

(1) Observed Indicators	(2) Questions asked to the SHG respondent	(3) Coding	(4) Proportion
Primary Activity	Primary Activity of the SHG members	1.Don't work 2.Farm activity 3.Self-employment in non-farm activity 4.Agricultural wage labourer 5.Non-farm employment 6.Others 7.No response	1 =0.15 2 =0.32 3 =0.04 4 =0.24 5 =0.18 6 =0.04 7 =0.03
Independent Savings	After joining SHG, Do you have independent savings which you control?	1.Yes 0. No	1 = 0.88 0 = 0.12
Investment to improve home	After joining SHG, have you made any repairs, improvements or additions in their home that cost more than Rs. 5000?	1.Yes 0. No	1 = 0.23 0 = 0.77
Confidence to meet financial crisis	Are you more confident of meeting financial crisis in the family after joining the group?	1.Yes 0. No	1 = 0.86 0 = 0.14
Arranging credit and other input	Are you able to arrange the credit and inputs in time?	1.Yes 0. No	1 = 0.63 0 = 0.37
3. Autonomy			
Purchase of raw material	Do you take crucial decisions in purchase of raw materials, pricing of the product of your activity?	1.Yes 0. No	1 = 0.61 0 = 0.39

Contd.

Table-2: Description of observed indicators to measure latent variables

(1) Observed Indicators	(2) Questions asked to the SHG respondent	(3) Coding	(4) Proportion
Plan work	Do you plan your work related activities and get things done by others?	1.Yes 0. No	1 = 0.51 0 = 0.49
Reaction to emotional abuse	What would you do in the following situation in your family - psychological and emotional abuse?	1.Submit yourself 2.Do nothing 3.Resist 4.Give warning 5.Lodge complain with SHG or take their help	1 =0.07 2 =0.42 3 =0.22 4 =0.11 5 =0.18
4. Network, communication, awareness and political participation			
Officials you have met	How many officials from bank, government, etc. have you met and spoken to?	Mean (standard deviation)	1.49 (0.97)
Communication	How do you communicate in the meetings?	1.Talks freely 2.Sometimes talks 3.Hesitates to talk and hence does not talk 4.Talks only if asked	1 =0.42 2 =0.31 3 =0.16 4 =0.11
Know about reservation	Do you know that women have reservations in panchayats and jobs?	1.Yes 0. No	1 = 0.53 0 = 0.47
Involvement in village politics	Do you get involved in village level politics?	1.Yes 0. No	1 = 0.36 0 = 0.64

Contd.

Table-2: Description of observed indicators to measure latent variables

(1) Observed Indicators	(2) Questions asked to the SHG respondent	(3) Coding	(4) Proportion
Verbal abuse	What would you do in the following situation in your family – verbal abuse?	1.Submit yourself 2.Do nothing 3.Resist 4.Give warning 5.Lodge complain with SHG or take their help	1 =0.17 2 =0.22 3 =0.34 4 =0.06 5 =0.21
Change in family violence	Is there any change in family violence since joining SHG?	1.Increased 2.No change 3.Decreased 4.Never had any violence	1 =0.10 2 =0.05 3 =0.23 4 =0.62
5. Social Attitude			
Treatment by spouse	After joining SHGs, how is the treatment of your spouse towards you?	1.Less respectful 2.Usual 3.More respectful	1 =0.05 2 =0.50 3 =0.45
Reaction to physical abuse	What would you do in the following situation in your family – beating/physical abuse?	1.Submit yourself 2.Do nothing 3.Resist 4.Give warning 5.Lodge complain with SHG or take their help	1 =0.12 2 =0.40 3 =0.25 4 =0.06 5 =0.17
Reaction to emotional abuse	What would you do in the following situation in your family – emotional and psychological abuse?	1.Submit yourself 2.Do nothing 3.Resist 4.Give warning 5.Lodge complain with SHG or take their help	1 =0.07 2 =0.42 3 =0.22 4 =0.11 5 =0.18

Contd.

Table-2: Description of observed indicators to measure latent variables

(1) Observed Indicators	(2) Questions asked to the SHG respondent	(3) Coding	(4) Proportion
Involvement in family decisions	After joining SHG, has your involvement in all the decisions of the family increased?	1.Yes 0. No	1 = 0.47 0 = 0.53
Increase in self confidence	After joining SHG, has your self confidence	1.Increased 2.Deacreased 3.Same as before	1 = 0.86 2 = 0.04 3 = 0.10
Verbal abuse	What would you do in the following situation in your family - verbal abuse?	1.Submit yourself 2.Do nothing 3.Resist 4.Give warning 5.Lodge complain with SHG or take their help	1 =0.17 2 =0.22 3 =0.34 4 =0.06 5 =0.21
Change in family violence	Is there any change in family violence since joining SHG?	1.Increased 2.No change 3.Decreased 4.Never had any violence	1 =0.10 2 =0.05 3 =0.23 4 =0.62
6. Education			
Education Level	Education level after joining SHG	1.Cannot read or write 2.No schooling but can sign your name 3.No schooling but can read a letter 4.No schooling but can read & write a letter 5.Primary Schooling 6.Secondary Schooling 7.College	1 = 0.30 2 = 0.30 3 = 0.05 4 = 0.01 5 = 0.15 6 = 0.18 7 = 0.01

Source: Primary Data

variables are computed in terms of the observed (calculated) variables and explains their consistency and strength. Table 3 provides the estimated parameters of the measurement model. The coefficients indicate the linear causal relationship between the observed variables (xi) and the latent factors (i). The statistical significance of the coefficient indicates that the observed variable measures the latent variables. As expected, most of the observed indicators are significant and are valid measures of the latent factors, although it is surprising that the coefficient for members earning relative to household earning was not significant. This might be partially explained by the literature available on society and gender which explains that admission to reserves is different as of control over them, and merely the last can be believed a parameter of control (Malhotra and Mather 1997). Eswaran and Anderson (2005) also emphasize that earning needs to be in the women's control- not now created by them - so as to impact their sniping power in the family.

Table 4 shows the parameter assess and some of the fit indices for the structural model of women empowerment for the SHG members. The coefficients are normalized and may perhaps thus be understood on both consequence and level. The fit of the structural equation model can be calculated by investigating the Normed Fit Index (NFI), the Root Mean Square Error of Approximation (RMSEA) and the Satorra-Bentler scaled chi-square goodness of fit index. NFI is an assessment that rescales chi-square to contrast a confined model with a full model using a subjective baseline null model. RMSEA believes the error of

rough calculation in the inhabitants and discovers how fine the model, with unidentified but best selected factor values, fitted in the population covariance matrix. The estimated Satorra-Bentler scaled chi-square in Table 4 indicates that the fit of the model is not exact. However, the RMSEA and NFI disclose that the model has a fine approximate fit, which entails that our approximations are reliable.

The results confirm that the economic factor has the most significant impact on empowering SHG women. Loans provided within the SHGs enable the members to create additional economic opportunities and generate income. It thereby increases their bargaining and decision-making power within the household and leads to women empowerment.

Better autonomy in terms of independent planning, management and decision making at work and greater propensity for intolerance of negativity at home also significantly contribute to empowering women. Provision of managerial training and awareness creation activities by SHPIs leads to greater exposure and changes in social attitudes.

Social attitudes of the respondent, her spouse and other members of the household, also play a critical role. Moreover, the process of group formation, frequent group meetings, support of group members and the involvement of SHG members in village development activities creates confidence and changes in the attitude of the respondents and their household members.

Table-3 : Estimated parameters of the measurement model for women empowerment and factors of women empowerment

Factors Observed → Indicators ↓	Women's empowerment	Economic	Autonomy	Network, communication & political	Social attitudes	Education
Family planning decision	0.25 (4.17)***	-	-	-	-	-
Child's marriage decision	0.78 (3.38)***	-	-	-	-	-
Property decisions	-0.31(6.23)***	-	-	-	-	-
Sending daughter to school	-0.091 (1.37)		-	-	-	-
Birth control decision	0.0072(0.17)	-	-	-	-	-
Primary activity	-	0.12(2.31)***	-	-	-	-
Controls independent savings	-	0.26(5.63)***	-	-	-	-
Makes decision to repair home	-	0.23(3.93)***	-	-	-	-
Confident of meeting financial crisis	-	0.67(13.34)***	-	-	-	-

Contd.

Table-3 : Estimated parameters of the measurement model for women empowerment and factors of women empowerment

Factors Observed ↓ ↓ Indicators ↓	Women's empowerment	Economic	Autonomy	Network, communication & political	Social attitudes	Education
Able to arrange credit and input in time	-	0.73(13.58)***	-			
Member income as proportion of household income	-	0.047(0.82)	-	-	-	-
Takes crucial decisions related to purchase of raw material	-	-	0.23(3.29)***	-	-	-
Plans work related activities herself	-	-	0.34(4.27)***	-	-	-
Reaction to emotional abuse	-	-	0.89(41.29)***	-	0.29(3.78)***	-
No. of officials met & talked to	-	-	-	0.79(21.87)***	-	-
Communicat ion skills	-	-	-	0.69(14.97)***	-	-

Contd.

Table-3 : Estimated parameters of the measurement model for women empowerment and factors of women empowerment

Factors Observed Indicators →	Women's empowerment	Economic	Autonomy	Network, communication & political	Social attitudes	Education
Awareness about reservation of women in political institutions and jobs	-	-	-	0.71(19.39)***	-	-
Involvement in local village politics	-	-	-	0.87(29.87)***	-	-
Reaction to verbal abuse	-	-	-	0.62(14.68)***	0.013(0.27)	-
Change in family violence	-	-	-	0.023(0.67)	0.034(23.63)***	-
Changes in treatment of your spouse	-	-	-	-	0.83(31.29)***	-
Reaction to physical abuse	-	-	-	-	0.91(44.37)***	-
Increased involvement in family decisions	-	-	-	-	0.19(3.78)***	-

Contd.

Table-3 : Estimated parameters of the measurement model for women empowerment and factors of women empowerment

Factors Observed Indicators →	Women's empowerment	Economic	Autonomy	Network, communication & political	Social attitudes	Education
Changes in self confidence	-	-	-	-	-0.0089(0.16)	-
Education Level	-	-	-	-	-	1(59.89)***

*** Significant at the 1% level. T-statistics in parentheses. Analysis based on 960 SHG members*

Table-4: Estimated parameters of the women's empowerment structural model for the SHG members

Latent factors of women's empowerment	Coefficients (absolute t-value)
Economic	0.57 (5.37)***
Autonomy	0.29 (3.43)***
Network, communication and political participation	0.089 (0.91)
Social attitudes	0.34 (3.79)***
Education	-0.069 (0.69)
Model Fit	
Satorra-Bentler scaled Chi-Square	χ^2 = 1232.67 df = 297
RMSEA	0.07
NFI	0.89

*** Significant at the 1% level. T-statistics in parentheses. Analysis based on 960 SHG members*

Of these three significant factors, empowerment by economic factor is the most effective. In fact, economic factors are twice as effective in empowering women as member's autonomy. The social attitudes are also crucial but are about two-thirds as effective as the economic factors in terms of their contribution to women empowerment.

Education is statistically non-significant in the estimated model. This is not entirely surprising. Stromquist (2002) describes that children going to formal schooling does not essentially initiate empowerment. He further disagrees that empowerment of women is promising more in the course of non-formal schooling programmes. Women NGOs provide alternative avenues which encourage methodical discovering occasions via workshops on matters such as domestic violence, reproductive health and gender subordination, and offer the occasion for women to talk about their issues among others. Networking, communication and political participation are non-significant, although they may be critical in the long run. The study does not interpret the statistical insignificance of these factors as unimportant in women's empowerment. Rather, it is expected that education; networking and political participation will indeed in the long run have an optimistic impact, which cannot be observed in a span of few years.

Factors Empowering Women SHGs in Jammu Region

The study evaluated which factors, economic or non-economic, are more effective in impacting the empower-ment of women SHG members. The main results vibrate with related research that economic factors have the greatest direct impact on empowering women. This confirms that programmes such as SHGs, which mainly focus on income generation by women in low-income households, have the double advantage of leading to an improved economic situation of the respondent and being the most effective factor in empowering women. Greater autonomy and changes in social attitudes also lead to the empowerment of women, although the magnitude of their impact is, relatively, smaller than that by the economic factor.

The focus on income generation should continue as the primary objective of the SHG programme. The results clearly indicate that participation in an economic activity, the opportunity to access credit and arranging crucial inputs play a significant role in empowering women. Greater confidence to meet the financial crisis and having independent savings is also empowering. Thus, the provision of 'simple' microfinance through its economic impact remains the most important cause for promoting women empowerment of SHG members.

Social attitudes and forward moves towards greater autonomy are also critical in empowering SHG members. Some researchers have stressed that provision of credit is not enough in itself, for greater empowerment women also need to control and take decisions related to their credit, resources and work (Goetz and Gupta 1996; Anderson and Eswaran 2005; Malhotra and Mather 1997). The SHPIs through the SHGs can make substantial contributions

towards this by strictly monitoring if the loans are being used by the woman and not by others or male members of her household. Microfinance 'Plus' programme with SHPIs providing additional services to the SHG member should be encouraged. SHPIs may undertake activities such as informing SHG members about women's rights including legal, political and social, creating general awareness about improving attitudes towards women and introducing women to the existing government programs and opportunities that they can avail. Provision of education, increased political participation and better communication surely also have a vital role to take part in the long-run empowerment process. In terms of implementation, the study can significantly contribute by providing reliable evidence to the policy makers of the state of J&K and India both.

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Testing for Linear and Non-Linear Causality in Spot and Future Prices of National Multi-Commodity Indices

Paresh Shah

Abstract

The present study investigates the linear and nonlinear causality between spot and future prices of three national indices maintained by Multi Commodity Exchange of India Ltd. (MCX). The data covers periods from September 1, 2013 to August 30, 2014. Researcher has applied nonparametric test for nonlinear causality after controlling for well-known calendar effects and long-run trends. The empirical results using both traditional and nonlinear causality tests indicate a stronger flow of information from futures to spot market and vice-versa. The research study result which confirms that future market is playing the role on the prices of spot market and vice versa.

Key Words

Nonparametric Nonlinear Causality, F Test, Chi-Square Test, Kurtosis, Skewness, Spot Prices, Future Prices, Price Discovery

Introduction

Commodity trading in India has a long history. In fact, commodity trading in India has started much before it started in many other countries. However, years of foreign rule, droughts and periods of scarcity and Government policies caused the commodity trading in India to diminish. Commodity trading was, however, restarted in India recently. Today, apart from numerous regional exchanges, India has six national commodity exchanges namely, Multi Commodity Exchange of India Ltd. (MCX), National Commodity and Derivatives Exchange Ltd. (NCDEX), National Multi-Commodity Exchange (NMCE) and Indian Commodity Exchange (ICEX), the ACE Derivatives exchange (ACE) and the Universal commodity exchange (UCX). The regulatory body is Forward Markets Commission (FMC), set up in 1953. The exchanges are regulated by the Forward Markets Commission. Indian markets have recently thrown open a new avenue for retail investors and traders to participate in commodity derivatives.

The commodity derivatives were reintroduced in Indian economy after realization of its role played in price discovery and risk management especially in the post liberalization era. In the LPG era, the government policies were more oriented towards free market economy following the setup of national wide commodity exchanges.

However, its usefulness in price risk hedging and price discovery is still not clear. The present study aims at studying

the nature of Indian commodity futures market in terms of price discovery and efficiency. Price discovery is considered as a major function of commodity future market as future price serves as market expectation of subsequent spot price. This price discovery function implies that the future and spot markets are systematically related in the short run and in the long run.

Further the issue of commodity market efficiency is a critical issue under efficient markets, new information is impounded simultaneously into cash and future markets. In other words, financial market pricing theory states that market efficiency is a function of how fast and how much information is reflected in prices. The rate at which prices exhibit market information is the rate at which this information is disseminated to market participants. However, various institutional factors such as liquidity, transaction cost, and market restrictions may produce an empirical lead - lag relationship between price changes in the two markets.

Thus, temporal relationship between spot and future prices can be used as preliminary evidence for and against the price discovery and efficiency of the commodity derivatives market.

For the purpose of this research study, researcher has selected and used three futures and spot indices maintained by MCX to comment on the price discovery function and efficiency of commodity derivative market. The selected indices are namely MCX-ENERGY, MCXAGRI and MCXMETAL represent each commodity group.

MCX is India's first listed exchange, is a state-of-the-art, commodity futures exchange that facilitates online trading, and clearing and settlement of commodity futures transactions, there by providing a platform for risk management. The Exchange, which started operations in November 2003, operates within the regulatory framework of the Forward Contracts (Regulation) Act, 1952. It offers trading in varied commodity futures contracts across segments including bullion, ferrous and non-ferrous metals, energy and agricultural commodities. MCX is India's leading commodity futures exchange with a market share of about 82.82 per cent in terms of the value of commodity futures contracts traded in 9M FY2014-15.

The Exchange's flagship index, the MCXCOMDEX, is a real-time composite commodity futures price index which gives information on market movements in key commodities. Other commodity indices developed by the exchange include MCXAGRI, MCXENERGY, and MCXMETAL.

Spot–future parity is a parity condition that should theoretically hold, or opportunities for arbitrage exist. Spot–future parity is an application of the law of one price. The parity condition is that if an asset can be purchased today and held until the exercise of a futures contract, the value of the future should equal the current spot price adjusted for the cost of money, dividends, "convenience yield" and any carrying costs (such as storage).

Literature Review

Hernandez and Torero (2010) have

examined the relationship between spot and future prices of agricultural commodities. They have taken data for corn, wheat and soybeans. For corn and soybeans they have taken data for January 1994 – July 2009 and for hard and soft wheat they have taken data for January 1998 – July 2009. They have tested following null hypothesis: 1) Future returns does not result spot returns 2) Spot returns does not result future returns. They concluded that changes in futures prices lead changes in spot prices more often than the reverse.

Sony, Tarun (2012) has examined the linear and non-linear causality in Spot and Future prices of Notional Multi-commodity indices by covering two periods June 2005 to June 2008 and July 2008 to November 2011. Soni has taken multi commodity indices like MCXS-ENERGY, MCXSMETAL, and MCXSAGRI. From the result, researcher has found that both traditional and nonlinear causality tests indicate the stronger flow of information from future to spot markets and spot to future markets. The empirical findings from both linear and nonlinear causality indicate a stronger flow of information from futures to spot as causality from future to spot is not rejected in complete study.

Problem Statement

Is there a relationship between spot and future prices of MCXENERGY MCX-METAL and MCXAGRI?

Research Objectives

This research study is an attempt to examine the role played by an Indian Commodity Derivative market in price discovery by doing causality analysis

between future prices and spot prices for three notional indices maintained by MCX. This study examines the relationship between spot and futures prices of energy (MCXENERGY), metal (MCX-METAL) and agriculture commodities (MCX AGRI).

To know the relationship between spot and future market of commodity market and to find out whether spot affects the future and/or future affects the spot.

The major purpose of study is to find the relationship between spot and future prices of commodity market. Considering that the futures price is the price specified in an agreement (futures contract) to deliver a specified quantity of a commodity at a specific future date, whereas the spot price is the cash price for immediate purchase and sale of the commodity. Researcher expects a close relationship between the prices of futures contracts and spot prices. In particular, an explicit relationship between spot and futures prices can be derived by doing this research.

The result of this research study would support to predict expected spot or future prices based on the relationship between spot and future prices and it will also helps the market participants for price risk hedging.

Research Methodologies

Researcher has used recent spot and future price data for MCXENERGY, MCXMETAL and MCXAGRI. Researcher has used different tests to empirically uncover the direction of information flows between spot and futures prices. The motive is to make some inferences about the direction of information flows

between spot and futures markets. The study will help in predicting expected spot or future prices based on the relationship between spot and future prices. These findings also contribute to the debate on alternative instruments to address excessive volatility in energy, metal and agricultural products or commodities markets.

Data Selection

For this purpose, researcher has selected and adopted two different views:
1. Spot prices do not lead or lead to change in future prices of MCX Energy, MCX Metal, and MCX Agriculture.
2. Future prices do not lead or lead to change in spot prices of MCX Energy, MCX Metal, and MCX Agriculture.

Researcher has collected sample of 288 data; considering the consistency of data based, 2 sample data of each

categories are eliminated. Hence for research study, 286 data of all three types of group of commodities are considered. As Indian economy, has faced high level of inflation in economy relating to food grains products, etc., researcher has decided to take the data of pertinent period only. Past historical level, the volume of commodity futures has been affected by so many other factors, hence the duration chosen very carefully. Duration for which we have taken data is 1st Sept, 2013 to 30th Aug, 2014. The data has been taken from MCX website. Additionally other secondary data were used such as various books, various websites, report submitted by BSE, RBI, SEBI and their committees.

Statistical Tools

Statistical tools used in this research study are depicted in Table 1; indicates the statistical test (Test) name and its symbol.

Table 1: Statistical Test name and its symbols

Name of Test	Symbol	Name of Test	Symbol
Cronbach's Coefficient of Alpha	α	Pearson's Correlation Coefficient	r^a
Coefficient of Determination	R	F test	ξ
Durbin-Watson- Dependent variable - Spot Price	Ωs	Durbin-Watson-Dependent variable - Forward Price	Ωf
Mean - Spot Price	$\ddot{x} s$	Mean - Forward Price	$\ddot{x} f$
Median - Spot Price	$\text{м} s$	Median - Forward Price	$\text{м} f$
Mode - Spot Price	$\text{ʃ} s$	Mode - Forward Price	$\text{ʃ} f$
Standard Deviation - Spot Price	σs	Standard Deviation - Forward Price	σf
Friedman's Chi-square	$\ddot{Ӂ}^2$	T test	$\dagger^b$
Kurtosis - Spot Price	$\text{К} s$	Kurtosis - Forward Price	$\text{К} f$
Skewness - Spot Price	$\text{ꞅ} s$	Skewness - Forward Price	$\text{ꞅ} f$

Research Design

Causal research is quantitative in nature and it attempts to define whether a relationship is causal through experimentation and it also leads to help in understand which variables are the causes and which variables are the effects. The main objective is to find whether spot is affecting future prices or future is affecting spot prices, so causal research is very relevant for this research study.

Cronbach's Coefficient of Alpha is a test of the consistency of respondent's answers to all the items in a measure. The interitem consistency and reliability is measured by Cronbach's alpha. *Coefficient of Determination* provides information about goodness of fit of the regression model. It is a statistical measure of how well the regression line approximates the real data.

Durbin-Watson test is a test that tests the residual from a linear regression or multiple regressions are independent. It is a test to verify the auto correlation. *Mean* is used to find the average of sample of 286 day prices. *Median* is to find the middle value in our data set which will help us in reducing the effect of outliers. *Mode* is the value that appears most often in a set of data. In other words, it is the value that is most likely to be sampled. *Standard Deviation* offers an index of the spread of a distribution or the variability in the data. It is commonly used measure of dispersion.

Skewness is a measure of symmetry or more precisely the lack of symmetry. *Kurtosis* is a parameter that describes the shape of a random variable's probability distribution. *Friedman's Chi-*

square is a test of goodness of fit, and also tests for the independence of test. It is a test of how well the observed data supports the assumption about the distribution of a sample. Chi-square is different from other statistical test that the degree of freedom (d.f.) that determines the critical value is not based on sample size. Rather, in a chi-square test, the d.f. is based on the number of categories in the study.[3] *T test* is used to test the equality of two sample means is carried out using the assumptions that variances are equal, or not equal. The regression has been used to find out the linear relationship between two variables and predict the value of the dependent variable for individuals for whom some information concerning the explanatory variables is available, or in order to estimate the effect of some explanatory variable on the dependent variable.

Researcher has also used *ANOVA* test to know if there is any difference between groups on some variable. It tests if the value of a single variable differs significantly among three or more levels of a factor. To determine the statistically significant difference between the means in two unrelated groups, researcher has used T test. Researcher has also used chi square test as one categorical variable from a single population is available. It also determines whether sample data are consistent with a hypothesized distribution. *F test* shows whether two sample variances differ from each other or are from the same population.

Hypotheses

Following six types of hypothesis are formed to study the impact of spot price

on future price, and future price on spot price, for three different groups of commodities, i.e., Energy, Metal and Agriculture.

1) H_{10}: Spot prices do not lead to change in future prices of MCX-ENERGY.
   H_{11}: Spot prices lead to change in future prices of MCXENERGY.
2) H_{20}: Spot prices do not lead to change in future prices of MCX-METAL.
   H_{21}: Spot prices lead to change in future prices of MCXMETAL.
3) H_{30}: Spot prices do not lead to change in future prices of MCXAGRI.
   H_{31}: Spot prices lead to change in future prices of MCXAGRI.
4) H_{40}: Future prices do not lead to change in spot prices of MCXENERGY.
   H_{41}: Future prices lead to change in spot prices of MCXENERGY.
5) H_{50}: Future prices do not lead to change in spot prices of MCXMETAL.
   H_{51}: Future prices lead to change in spot prices of MCXMETAL.
6) H_{60}: Future prices do not lead to change in spot prices of MCXAGRI.
   H_{61}: Future prices lead to change in spot prices of MCXAGRI.

Findings and Analysis

Following findings and analyses are undertaken through the application of Excel Spread Sheet along with SPSS- 22 on the data collected based on 286 sample studies (n) for each three types of group of commodities. Hence, Total Sample studies are 1716{(286x2) x 3}.

MCX Energy

Table 2 below indicates the necessary results of sample studies for MCX Energy by studying the relationship between spot, expected future rate (expected spot rate in future) and actual future rate run.

Table 2: Results of MCX Energy

Symbol	Value of Test	Symbol	Value of Test	Symbol	Value of Test
α	0.972	r^a	0.946	R	0.895
ξ	30.824	Ωs	0.831	Ωf	0.841
$\ddot{X} s$	4289	$\ddot{X} f$	4303	μs	4265
μf	4282	$\jmath s$	4914	$\jmath f$	4546
Σs	183	Σf	175	$\ddot{X}^2$	14.231
$\dagger^b$	49.341	$K s$	1.481	$K f$	3.028
$\S s$	0.871	$\S f$	1.160	N	286
a: Based on normal approximation					
b: Using the asymptotic standard error assuming the null hypothesis					
Regression					

ANOVA - F Test		D.F.	M.S.	F Cal.(ξ)	F Critical	Sig. (β)
	Between Groups	241	36851	30.824	1.72384E-10	0.000
	Within Groups	44	1163			

α is 0.972 and is very closer to 1; hence supports the highest level of the internal consistency and reliability. The R is 0.895 which indicates that 90% of variations in the prices of spot and future are explained by future and spot respectively. In other words, the regression model fits the data perfectly. $\ddot{x}$s is Rs. 4289 and $\ddot{x}$f is Rs. 4303. Лs is Rs. 4914 appears maximum time and Лf is Rs. 4546 appears more time. Here Spot and future prices are positively skewed as their value is greater than zero. It means that most values of Spot and future are concentrated on right of mean. The said conclusion is also supported by Ҡ and Ѕ.

Also the fluctuation in a year in spot prices were 183 and for future prices 175. Ωs is 0.831 and Ωf is 0.841 which are less than 1.65 hence indicates that spot and future rates are positively correlated.

Spot to future and future to spot, has been measured through the t test and F test. The ϯ value works out to 49.341; which is greater than the 5% level of significance value of 1.960; it indicates that H_{10} and H_{40} not accepted. Hence the H_{11} and H_{41} are accepted. The same conclusion is also being supported by F test. The F calculated value is greater than the critical value and β is 0.000.

Hence it can be concluded that Spot prices lead to change in future prices of MCXENERGY and Future prices lead to change in spot prices of MCXENERGY. The same result is also supported by $Ж^2$ (calculated value is 14.231 which is higher than the critical value (3.841) at 5% level of significance with df 1).

MCX Metal:

Table 3 below indicates the necessary results of sample studies for MCX Metal by studying the relationship between spot, expected future rate (expected spot rate in future) and actual future rate run.

Table 3: Results of MCX Metal

Symbol	Value of Test	Symbol	Value of Test	Symbol	Value of Test
α	0.980	r^a	0.961	R	0.924
ξ	42.640	Ωs	0.777	Ωf	0.799
$\ddot{x}$ s	4836	$\ddot{x}$ f	4840	Ms	4830
Mf	4839	Лs	5208	Лf	5009
Σs	151	Σf	170	$Ж^2$	1.373
ϯ^b	58.823	Ҡs	1.481	Ҡf	4.200
Ѕs	0.282	Ѕf	0.812	N	286
a: Based on normal approximation					
b: Using the asymptotic standard error assuming the null hypothesis					
Regression					
ANOVA - F Test		D.F.	M.S.	F Cal.(ξ)	F Critical (*f*)	Sig. (β)
	Between Groups	262	24624	42.640	2.85E-08	0.000
	Within Groups	23	577			

α is 0.980 and is very closer to 1; hence supports the highest level of the internal consistency and reliability. The R is 0.924 which indicates that 92% of variations in the prices of spot and future are explained by future and spot respectively. In other words, the regression model fits the data to the extent of 92%. In Other words, the other factors only affect to the extent of 8%. $\ddot{x}s$ is Rs. 4836 and $\ddot{x}f$ is Rs. 4840. $\jmath s$ is Rs. 5208 appears maximum time and $\jmath f$ is Rs. 5009 appears more time. Here spot prices and future prices are positively skewed as their value is greater than zero. Also the fluctuation in a year in spot prices were 151 and for future prices 170.

Ωs is 0.777 and Ωf is 0.799 which are less than 1.65 hence indicates that spot and future rates are positively correlated. Spot to future and future to spot, has been measured through the t test and F test. The $\dagger$ value works out to 58.823;

which is greater than the 5% level of significance value of 1.960; it indicates that H_{20} and H_{50} not accepted. Hence the H_{21} and H_{51} are accepted. The same conclusion is also being supported by F test. The F calculated value is greater than the critical value and β is 0.000.

Hence it can be concluded that Spot prices lead to change in future prices of MCX Metal; and Future prices lead to change in spot prices of MCX Metal. The same result is also supported by $\ddot{\mathcal{K}}^2$ (calculated value is 1.373 which is higher than the critical value (2.85E-08) at 5% level of significance with df 1).

MCX Agriculture

Table 4 below indicates the necessary results of sample studies for MCX Agriculture by studying the relationship between spot, expected future rate (expected spot rate in future) and actual future rate run.

Table 4: Results of MCX Agriculture

Symbol	Value of Test	Symbol	Value of Test	Symbol	Value of Test
α	0.820	r^a	0.705	R	0.497
ξ	54.532	Ωs	0.044	Ωf	0.045
$\ddot{x}s$	3095	$\ddot{x}f$	2478	$\text{M}s$	3075
$\text{M}f$	2476	$\jmath s$	3239	$\jmath f$	2537
Σs	102	Σf	123	$\ddot{\mathcal{K}}^2$	280.282
$\dagger^b$	16.803	$\mathcal{K}s$	(1.066)	$\mathcal{K}f$	0.580
$\S s$	0.067	$\S f$	(0.468)	N	286
a: Based on normal approximation					
b: Using the asymptotic standard error assuming the null hypothesis					
Regression					

ANOVA - F Test		D.F.	M.S.	F Cal.(ξ)	F Critical (*f*)	Sig. (β)
	Between Groups	277	10708	54.532	2.02	0.000
	Within Groups	8	196			

α is 0.820 and is considered as good; hence indicates the good level of internal consistency and reliability. The R is 0.497 which indicates that 50% of variations in the prices of spot and future are explained by future and spot respectively. In other words, the regression model fits the data to the extent of 50%. Other words, the other factors like speculation, belief in monsoon, etc. affect the prices. $\ddot{x}$s is Rs. 3095 and $\ddot{x}$f is Rs. 2478. $\int$s is Rs. 3239 appears maximum time and $\int$f is Rs. 2537 appears more time. Here future prices are positively skewed as their value is greater than zero. While the spot prices are negatively skewed, it means that most values of Spot are concentrated on left of mean. Also the fluctuation in a year in spot prices were 102 and for future prices 123.

Ωs is 0.044 and Ωf is 0.045 which are less than 1.65 hence indicates that spot and future rates are positively moderately correlated. Spot to future and future to spot, has been measured through the t test and F test. The $\dagger$ value works out to 16.803; which is greater than the 5% level of significance value of 1.960; it indicates that H_{30} and H_{60} not accepted. Hence the H_{31} and H_{61} are accepted.

The same conclusion is also being supported by F test. The F calculated value is greater than the critical value and β is 0.000. Hence it can be concluded that Spot prices lead to change in future prices of MCX Agriculture and Future prices lead to change in spot prices of MCX Agriculture. The same result is also supported by $\ddot{x}^2$ (calculated value is 280 which is higher than the critical value (3.841) at 5% level of significance with df 1).

Conclusion

From the above research study, and statistical calculation, it is quite proved that, a direct and positive relationship has been seen between spot price and future price of commodity under study in MCX.

The group of commodities, i.e., Metal and Energy has been depending on each other to the extent of 90 % or more than that. In case of Agricultural commodities the relationship is seen only to the extent of 50%. The other variables like speculation, arbitrage opportunities, transaction costs, government policies, etc. affecting the future prices based on spot price, and spot price based on future prices, to the extent of maximum 10% and 50% in case of metal and energy; and agricultural commodities respectively. Hence it can also be concluded that, on account of MCX volume, the agricultural sector in Indian economy has seen inflation level to some extent, keeping ceteris paribus.

In case of Energy, metal, and Agriculture commodities in MCX market positively skewed relationship exists between spot prices and future prices.

Areas of Further Research

It would be very interesting to conduct Granger test on these indices which will give more accurate results. Such accurate results can be useful for regulators when crucial policy decisions regarding curbing inflation are to be taken as future prices can provide signals to the policy makers about the expected future spot price thereby helping them to take decisions effectively and efficiently.

In this study, data used is of one year. If more number of day's data for more years', then it might conflict with the current result and give more accurate result than before.

Limitation of Research:

The limitations of the study are that the analysis is purely based on the secondary data. So, any error in the secondary data might also affect the study undertaken.

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Value of Human Resources: A Study of Indian IT Industry

Abstract

In these ever changing times, there is a growing criticism that traditional balance sheets do not take into account certain intangible factors like employees skills, talent, etc. The paper "Value of Human Resources: A Study of Indian IT Industry" tends to highlight these hidden parameters of employees of chosen four IT industries and the value these resources add to the organisation's economic growth. The ever increasing market demands can be catered to and competitive atmosphere can be created only by investing into an organisation's talent pool. For an organisation, an employee should always come first and necessarily before the customer. The earlier the organisation realises this, the better it is equipped to handle rising market competition and growing attrition rates.

Key Words

Organisation, Employee, Compensation, Intangible, Values, Leadership, Talent.

Ashwini Purohit

Introduction

Human resource of an organisation has, over the years, proved to be one of the most indispensable, no, the only indispensable resource, that an organisation can possess! There is yet no machine or technology that can substitute intellectual, social, emotional or spiritual capital belonging to the Human Resource Asset. An organisation scales up achieved height of success when it creates a balanced amalgamation of this Human Capital Asset.

Economic Value of Human Resources

Economist Theodore Schultz who invented the term "Human Capital" believed that human capital was like any other type of capital that could be invested in through education, training and enhanced benefits that will lead to an improvement in the quality and level of production in an organisation. The term human capital coined by Schultz, an economist, reflects interest in improving the plight of the world's under developed countries. His claim was that improving the welfare of poor people did not depend on land, equipment, or energy, but only on knowledge. He called this qualitative aspect of economics "human capital." In business terms, human capital is described as a combination of factors such as the following:

1. The traits one brings to the job- intelligence, energy, positive atti- tude, reliability, commitment.

2. One's ability to learn-aptitude, ima- gination, creativity, and what is often called "street smartness."

3. One's motivation to share informa- tion and knowledge- team spirit and goal.

Today economy is recovering. An employee today has multiple employment options by hopping jobs. Research and statistics show that most job hopping happen in the service sector where the acceptable turnover rates are around 30-40 % on an average. This is because, the most important element in a service industry is human resource and unless this resource is adequately motivated will not be able to sustain the pressures of delivering results. Ascertaining human value of an employee therefore is of prime importance and valuing this human resource above all other intangible assets necessary. The good news is that measuring the value of human capital today is possible.

Economic Value of Human Resource is in a broader sense is the "added value" created out of an investment that goes into developing a human asset. Where,

● Investment = Education, Training & Enhanced Benefits

● Output = Revenue

Literature Review

During the first decade of the twenty- first century, human resource manage- ment (HRM) thinking and practice have evolved in significant new directions. Issues and approaches that were previously seen in many organisations as being peripheral have moved to center stage as HR agendas have been adjusted to take account of develop- ments in the business environment. Ideas developed in the 1990s have moved from 'fringe' or 'fad' status to occupying a pivotal role in many organisations' HR strategies. This is true of employer branding, the use of balanced scorecards, the fostering of positive psychological contracts, and provision of flexible benefits and the range of activities collectively comprising 'e-HR'. Older, more-established approaches have been reconfigured and often relabelled to make them fit in the contemporary world. Workforce plann- ing has thus been reinvented as talent management, pay administration has metamorphosed into total reward management, equal opportunities has become diversity management, while terms such as coaching, mentoring, competencies and business partnering have been accorded specific defini- tions in our professional vocabulary. We have also seen the emergence of some genuinely new areas of research and practice, such as strengths based performance management, formal strategies aimed at fostering well-being and happiness at work and the evolving employee engagement agenda. Last, but not least, we have seen the development of a situation in which the need to adapt, evolve and restructure is a constant presence in many organisa- tions.

In short, HRM can largely be explained as a response on the part of organisa- tions to a newfound freedom to mana-

ge their workforces in the way that they wanted to. Fewer compromises had to be made, allowing decisions to be made and strategies to be established and which operated exclusively in the long-term interests of organisations. This transition is being driven by a number of key trends including: global interdependence; diverse, diffuse, and asymmetrical security threats; rapidly evolving science and technology; dramatic shifts in the age and composition of the population; important quality of life issues; the changing nature of our economy; and evolving government structures and concepts.

Human Resource Management: Study of companies belonging to IT industry

Taking the example of IT industry, in an IT Industry, the entire focus is on creating and sustaining the ever increasing talent pool. IT Industry being highly human centric comprises skilled, and creative workforce with the power of converting human talent power into IT revenues. Choosing IT industry thus proves to be an ideal case study to analyse the concept of economic value by examining the relationship between the investments in human resources vis-à-vis the revenue generated by this humanpower. The

companies considered for the study are Tata Consultancy Services, Infosys, Tech Mahindra and Wipro. The inputs and outputs are examined by corelating the employee benefit expenses and revenue from operations and analysed on various vital financial parameters. The evaluation is done on the basis of the data for the financial years comprising 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15.

In addition to the above mentioned financial parameters upon which this research paper is based, the concept of minimax analysis has been introduced by the researcher. The analysis presented in this research paper also significantly dwells upon calculating and presenting the economic value and economic worth of an employee working in an IT organisation, the explanation of which has been explicitly discussed in the subsequent paragraphs.

Revenue from Operations

Revenue from Operations is considered as the key driver of growth for every enterprise. The comparative figures of Revenue relating to the companies under study are tabulated in table 1.

Table 1: Revenue from Operations   Rs. crores

Company	2010-11	2011-12	2012-13	2013-14	2014-15	CAGR
Tata Consultancy Services	37324.51	48893.83	62989.48	81809.36	94648.41	20.45%
Infosys	27501	31254	36765	44341	53319	14.16%
Tech Mahindra	4965.5	5243	6001.9	16295.1	19162.7	31.01%
Wipro	26300.5	31803.4	33226.5	38757.2	41209.8	9.40%

TCS continues to maintain its position as the market leader with higher growth in terms of absolute figures. The absolute figures have multiplied from Rs. 37324.51 crores in 2010-11 to Rs. 94648.41 crores in 2014-15 computing to a CAGR of 20.45%. Infosys exhibits fair growth with a CAGR of 14.16% whereas Wipro shows a nominal growth of 9.40%. Tech Mahindra, recovering from the Satyam tangle, displays a pickup with a phenomenal growth movement from Rs. 4965.5 crores for 2010-11 to Rs. 19162.7 crores for 2014-15, thus posting a jump of over 250% for the fiscal for 2013-14 and the highest CAGR of 31.01%.

The growth of TCS over the years has been attributed to its adaptability in providing innovative customer specific solutions, powered by best in class processes and engaged work force. There has been almost a six fold increase in the employee base from 45714 in fiscal 2005 to 300464 in fiscal 2014. The company has consistently encouraged talent management, leadership development and talent retention. In order to implement this, TCS has rolled out a program called "Inspire" for its budding employees. This program continues to identify and develop high potential employees for leadership roles. Potential leaders are nurtured through training and coaching and given challenging roles to build leadership capability.

The phenomenal growth, in relation to Tech Mahindra, arises from the Merger between Tech Mahindra and Mahindra Satyam that became effective from 24th June 2013. The merger helped significantly to increase the scale of operations of the Company and diversify the revenue base while strengthening the Balance sheet and cash flows.

Profit After Tax

Profit After Tax is construed as the ultimate bottom line of Financial Performance. Table 2 furnishes the data concerning the Profit After Tax.

Table 2 : Profit After Tax

Rs. crores

Company	2010-11	2011-12	2012-13	2013-14	2014-15	CAGR
Tata Consultancy Services	9068.04	10413.49	13917.31	19163.87	19852.18	16.97%
Infosys	6835	8322	9429	10656	12372	12.60%
Tech Mahindra	696.7	460.6	652.5	2685.5	2256.2	26.49%
Wipro	4843.7	4685.1	5650.2	7387.4	8193.1	11.08%

The values for TCS for Profit After Tax are found to be highest in the table when compared with other three companies. TCS grew from RS 9068.04 crores in 2010-11 to Rs 19852.18 crores in 2014-15 with a CAGR of 16.97%. In contrast to the revenue figures, Wipro posted a growth of 11.08% in PAT, whereas Infosys displayed a growth of 12.60%. Tech Mahindra's continues superb performance can again be attributed to the takeover of Satyam where the PAT for the fiscal year 2010-11 has grown suddenly from Rs 696.7 crores to Rs 2256.2 crores in the fiscal year 2014-15 thus displaying a very high CAGR of 26.49%.

TCS asserts its leadership by posting the highest PAT for all the years under reference. The company, as stated in its annual reports, has reported an impressive growth and control in the overseas market comprising Europe, Latin America, Asia Pacific and Middle East. The contribution of these new markets to the total revenue almost doubled from 6.18% in 2005 to 11.63% in 2014 leading to a greater PAT for the overall company. This was possible only because of TCS's ability to address customers' continuous evolving requirements where service offerings were channeled in a customised manner. Therefore revenues from new services have shown a new impressive 37 fold record growth since fiscal 2006.

The success in productivity drive for TCS realised into impressive growth in profitability too whereby PBT has also grown almost 10 times during the period from Rs 2634 crores in FY 2005 to Rs 25402 in FY 2014 and the net worth gone up from Rs 3478 in 2005 to Rs 49195 in 2014.

Employee Productivity

India is widely recognised as the premier destination for offshore technology services. According to the NASSCOM press release issued by IT BPO services, export revenues from India are expected to grow by 15 % by the end of 2015 fiscal year andthe domestic revenues to grow at the rate of 9 % to 12 % compared to fiscal year 2014.

This is only because of the growing contributions from the Indian IT industry which has effectively invested in developing the Human Resources' skills that has made India a favourite global destination for employing their IT services.

One of the handy tools that can be adopted to measure the employee performance is Employee Productivity which may be computed by dividing the Revenue from Operations with the Cost of Employees. Table 3 depicts values for Employee Productivity.

TCS with the highest Employee Productivity is far ahead of the other organisations and tends to remain near constant during the period under reference. In an industry, where the basic inputs are Human Resources, TCS has been able to draw the best. There are several reasons which can be attributed to this achievement.

TCS' rigorous focus is on Talent Engagement, Deployment on the right projects, role and career progression and benchmarked compensation and benefits transferred to source and retaining the right talent. These advantages are evident from the drop

Table 3 : Employee Productivity (ratio)

Company	2010-11	2011-12	2012-13	2013-14	2014-15	Average
Tata Consultancy Services	2.6948	2.8074	2.6202	2.7396	2.4456	2.6615
Infosys	1.8511	2.0199	1.8445	1.8210	1.789	1.8651
Tech Mahindra	2.5545	2.3292	2.3876	2.3374	2.6610	2.45394
Wipro	2.4046	2.3892	2.0892	2.1135	2.089	2.2171

in the attrition rate from 14.4% in 2010-11 to 12.2% in 2011-12 with a leading market retention rate of 88.7%. The company has created a performance driven environment where innovation is encouraged, performance is recognised and employees are motivated to realise their potential.

TCS also remained the highest human power recruiter in FY 2014 in the industry with a gross addition of 61,200 employees out of which 14,320 were recruited outside India. The company thus has proven to have considerably invested in the upgradation of their technical, domain and leadership capabilities for creating an organisation of tomorrow.

The average Employee Prodctivity for Tech Mahindra stands at 2.45394 followed by TCS. Post the merger of Mahindra Satyam in 2013 the HR policies and processes have been strengthened to stay relevant to changing demographics, enhancing organisation agility by creating robust business and people models with the supporting organisation.

Tech Mahindra has also been a pioneer in promoting gender diversity in the industry and hence is seen as a preferred career destination for many a women associates. Tech Mahindra has been deliriously working towards providing a competitive compensation, empowering associates at all the levels resulting in the drop in the attrition rate from 20% to 18% leading to a better employee productivity.

Wipro follows TCS in the average Employee Productivity with a score of 2.2171. At Wipro, like any other service organisation, employees form the core of an organisation. Wipro were amongst the first to adopt an employee stock purchase plan and employee stock option plan. Wipro promotes and adheres to a cohesive and holistic approach to the well being of its employees including physical, emotional and mental well being. Work-life balance at Wipro is perceived as a focus on all aspects governing the normal well being for all employees.

The end of the table for Employee Productivity is occupied by Infosys with a

average score of 1.8651. In order to create world class services, Infosys has always believed its professionals to be the most important assets. The quality and level of service that is desired of an professional is brought out only through various competency development programmes by recruiting the right people and investing in them through employee benefit programmes.

Revenue Per 1000 employees

Financial productivity apart, numerical productivity too is important to achieve commendable performance. It has been the convention in IT industry to compute the numerical productivity by working out the 'Revenue per 1000 employees.'Table 4 depicts the values for Revenue earned by organisations per 1000 employees.

Table 4 - Revenue /1000 employees

Rs crores

Company	2010-11	2011-12	2012-13	2013-14	2014-15	Average
Tata Consultancy Services	202.188	159.71	228.06	272.27	296.094	231.664
Infosys	210.220	208.36	234.63	276.43	302.62	246.452
Tech Mahindra	121.81	70.74	72.21	182.18	185.539	126.496
Wipro	214.899	233.98	227.87	265.36	260.463	240.514

Infosys exhibits the highest value in the table for Revenue per 1000 employees. This is then followed by Wipro, TCS and Tech Mahindra. It is note worthy that as was seen in table 3 amongst competitors Infosys posts lower financial productivity, whereas it leads the table in terms of numerical productivity. Here is a catch that may be reasoned out to the Economic Value of the Employees.

The Global Talent Pool built by Infosys by recruiting new students from premier institutes, universities and colleges in India and through a rigorous selection process involving a series of aptitude tests and interviews helps Infosys in identifying the best applicants. Competency Development of Infosys' employees continues to be a key area of strategic focus for them. In order to align with the needs of growing strategies, Infosys has launched new programs while keeping with the changes in use of technology in education. This is done through the flagship industry academia partnership program.

Wipro follows Infosys in the table with Rs 240.514 crores revenue per employee. Wipro possesses a very young workforce with 62% of their employees at an average age of less than 30 years. Wipro as of 31st March 2014 had a workforce of

1,40,000 employees and the voluntary attrition rate dropped to 13.7% from 15.1% from the previous years. Another reason for higher revenue per 1000 employees is the encouraging gender diversity where 31% of Wipro's employees constitute women.

TCS ranks third in the table with Rs 231.664 crores "Revenue generated per 1000 employees." TCS Co-Innovation Network maintains an active portfolio of emerging technology partners and has introduced about 200 companies to TCS business. Ten active alliances are maintained with leading university research departments for progress in areas such as computational life sciences, computational materials sciences, data sciences, cyberphysical systems, design and more. Employee development is carried out through incessant training programmesthrough out the year and several such alliances support and facilitate in the steady flow of revenue for the organisation.

Tech Mahindra stands at the bottom of the table with revenue per 1000 employees as Rs 126.496 crores. Tech Mahindra has invested in several programmes called as AIP (Academic Interface Programme) for developing faculty for academic institutes, improv-ing employability of students and developing curricula as per industry requirements in order to gain higher revenue for the organisation. The company has also been partnering with the central government and five state governments in establishing IITs. The company strives to improve revenue generation by employees by develop-ing high potential leadership roles.

All the above discussed examples point to the fact that for an organisation to develop, grow and sustain need to keep investing in the development of their internal customers, i.e. the employees. An employee that has been motivated through training and developmental activities will go a long way in contribu-ting to the organisation's revenue basket thus becoming the most indispensable resource for the organisation. The Human Resource.

Avg PAT /1000 employees

Table 5 depicts values computed after multiplying the average age of the employee with average PAT / 1000 employees for a period of three years.

Table 5 : Avg PAT per 1000 employees

Rs crores

Company	2010-11	2011-12	2012-13	2013-14	2014-15	Average PAT/ 1000 Employees
Tata Consultancy Services	45.656	46.004	50.389	63.78	62.104	53.586
Infosys	63.281	56.47	58.17	63.55	70.220	**62.338**
Tech Mahindra	18.174	6.214	7.85	30.02	21.845	16.820
Wipro	39.57	34.47	38.74	50.58	51.783	43.028

The values derived after calculations prove that Infosys ranks highest amongst the four IT companies conside-red in the discussion with an average value of Rs 62.338 crores followed by TCS with a value of Rs 53.586 crores and Wipro and Tech Mahindra at Rs 43.028 crores and Rs 16.820 crores respectively.

Economic Value and Economic Worth of an employee of an organisation

Table 6 comprises calculations and analysis for ascertaining the total Economic value and Economic Worth of employees working in an IT organisation.

Generally, the age of an employee with an IT organisation, retiring from work is believed to be 55 years. Taking forward the analysis on this premise, the economic value of the employee is calculated by multiplying theaverage employee cost by the balance number of years of that employee remaining with the organisation.

Similarly, the Economic Worth is calcula-ted by multiplying the average PAT for the stipulated period of 2010 to 2015 by the balance number of years with the organisation.

From the above table, it is found that Tata Consultancy Services tops the chart in both the parameters. The total economic value of employees of TCS is found to be Rs650122.41crores and the total economic worth to be Rs376557.43crores for an employee for the balance number of years that the employee would spend with the organisation assuming an uniform level of performance displayed by him in

terms of showing consistent output. This implies that for an organisation to be performing and successful, it is important to continue investing in the training, development and growth of the employees.

TCS has taken steps to ensure that this happens. TCS has been at the leading edge of the Digital revolution since its inception and has been investing steadily across the spectrum of technologies and domainled solutions. New concepts like service-as-a-software, agile platforms and artificial intelligence have played a bigger role in the IT enterprise and the organisation is well positioned to play a significant role in this journey. With over 319,000 professionals across 60 countries to achieve this, TCS has built a Digital organisation that is perpetually learning. On an average an employee at TCS spends 10.3 days on training in twelve months. Over the last one year, TCSers, including the 23,875 graduates hired, have undergone 2.59 million days of online training in technologies and domains and over 72,000 new certifications have been granted to them. The simplified processes have empowered employees in their ability to control more aspects of their working lives.

Min-Max

Table 7 depicts Mini Max numbers of IT companies discussed above in terms of their highest and lowest performances with reference to Revenue from Operations, PAT, Employee Productivity, Revenue per 1000 employees & PAT / 1000 employees

Table 6: Economic Value & Economic Worth of Human Resources in Rscrores

Company	(2010-2015) Average Employee cost for the organisation (a)	(2010-2015) Average PAT For the organisation (b)	Average age of the Employee (In years) (c)	Balance term left with the organisation (In years) = (55-c) (d)	Economic Value of Human resources =(a x d) (e)	Economic Worth of Human resources =(b xd) (f)
Tata Consultancy Services	25004.708	14482.978	29	26	650122.41	376557.43
Infosys	22878.8	9522.8	27	28	640606.4	266638.4
Tech Mahindra	4176.26	1350.3	31	24	100230.24	32407.2
Wipro	15643.38	6151.9	27	28	438014.64	172253.2

Table 7 : Min- Max Chart

Particulars	Max	Min
Revenue	TCS (94648.41)	Tech Mahindra (5243)
Profit after tax	TCS (19852.18)	Tech Mahindra (460.6)
Employee Productivity	TCS (2.8074)	Infosys (1.821)
Income /1000 employees	Infosys (302.62)	Tech Mahindra (70.74)
PAT /1000 employees	Infosys (70.220)	Tech Mahindra (6.214)

From the table it is seen that out of total 5 parameters that have been analysed and discussed above, TCS has the highest value in terms of Revenue, PAT, Employee Productivity and Income / 1000 employees.

However, it is surprising to note that Infosys records the highest value for PAT amongst all the four companies for the total period from 2010 to 2015. This highlights that increased or elevated profit is basically a positive outcome because of higher focus on developing the human capital of the organisation. Infosys thus has been able to achieve a revenue growth of 7.1% from the earlier year.

According to statistics available, at Infosys, improved human capital engagement and higher employability from 76.4% to 80.9% led to significant improvement in operating margins from 24% to 25.9% The heartening fact is that, this improvement is inspite of stepped up investments in the business through increased compensation to the employees of Infosys through a salary hike and promotion to substantial number of performing employees. The variable salary payout also has been increased from 64% to 86% and the headcount has gone up from 160,405 to 176,187.This corroborates that increased investment in employees, by providing attractive compensation packages and opportunities for growth and promotion along with an increased ease of doing business through simplified internal processes lead to improved PAT figures thereby ascertaining significant employee contributions in increasing the revenue. This also has led to a substantial reduction in the attrition rate of employees from 23.4% to13.4%while the number of employees quitting Infosys has been reduced by more than an half from May 2014 to March 2015.

Conclusion

Valuing human capital is a growing criterion in the balance sheets of companies today as it influences a company's value and future growth prospects. Since the IT industry is human centric, the value of employees gains importance as earnings are based on the per-employee per hour billing model and profitability is linked to the value added by the workforce.

This research article strongly supports the concept of investing in the organisation's Human Capital. Or in other words, the amount of growth and development that an organisation seeks is directly proportional to the amount of investment that goes into motivating the human resource of the organisation which is carried out through investment in the employee's Education, Training & Enhanced Benefits. The resulting output is enhanced revenue generation leading to improvement in the quality and level of production in an organisation.

In one of his most popular speeches on Human Resources Asset, Narayana Murthy, Infosys Founder said, "Our core corporate assets walk out every evening. It is our duty to make sure that these assets return in the morning mentally and physically enthusiastic and energetic."

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Women Representation in Boardrooms: Do they just Arrive? An Indian Experience

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Aanchal Amitabh

Abstract

This paper seeks to study the current status of women representation on corporate boards as well as focuses on understanding the innumerable initiatives taken by countries across the globe towards empowering women. It aims at mulling over the various coherent issues and challenges hindering the female participation in boardrooms and suggests the course of action to accelerate the pace of advancement and to speed the transition of women in boardrooms. For this purpose both qualitative and quantitative methods has been employed. Firstly, we prepare a table that provides a bird's eye view of the current status of the female directors' participation of both selected advanced and emerging economies across the globe including India by revisiting the each country profile, reports, surveys conducted by recognized and reputed agencies worldwide and reviewing the prior research work. Secondly, a cross- sectional analysis has been done by statistically analyzing the data of 100 samples of companies listed on BSE (Bombay Stock Exchange). It is found that majority of Indian companies' boardrooms comprise only one female director and this phenomenon remains constant during the study period. Moreover, number of companies with at least one women director on boards has been increased drastically and characterized with relatively larger sized boards and better performance in most of the years. Hence, promoting women workforce participation at each level of the work can yield big development payoffs. It can bring a rich talent pool with different ideologies and experiences for driving firm innovation and productivity.

Key Words

Gender Diversity, Women Quota, Gender Equality, Clause 49, India

Introduction

Gender Diversity has largely remained as alien concept in most boardrooms across the globe. Globally, in 2012, the labor force participation rate (ages 15-64) was 82 percent for men compared to 55 percent for women (World Development Indicators). Getting gender diversity and inclusion as a main stream component for the governance of corporations requisite for sustainable

development and overall progress and this is more than just a gender issue. In recent years, corporate governance advocates and shareholder activists support that gender diversity leads to more variety in opinion, experiences, competencies and skills on boards. Research has found that diverse perspectives lead to more balanced, innovative and robust decisions, efficient oversight of financial matters, prudent risk management and enhance accountability to share holders. The OEDC's final version of the Principles of Corporate Governance (being revised in 2014/15 under the auspices of the OECD Committee) includes a first reference to director diversity. Questions have been raised as to whether legislation or quotas can be the solution.

Research Questions and Methodology

In this study an attempt has been made to assess to what extent female workforce participation in boardrooms across the globe including India. Further, what kind of initiatives has been taken towards promoting gender diversity? For this purpose both qualitative and quantitative methods has been employed. Firstly, we prepare a table that provides a bird's eye view of the current status of the female directors' participation of both selected advanced and emerging economies across the globe including India by revisiting the each country profile and reports and surveys conducted by recognized and reputed agencies worldwide. Secondly, to statistically analyse the presence of female directors participation on Indian board-rooms total 100 companies listed on BSE (Bombay Stock Exchange) have been

considered out of which 50 companies are 50 companies are mid-cap companies with market capita-lization ranging from Rs. 2,000 crore to Rs. 10,000 crore. The companies with either large cap or mid cap market capitalization selected because these are more likely to have the resources and motivation to take advantage of the opportunity to adopt good corporate governance practices. Data has been gathered through companies' reports, financial reports, quarterly reports, other documents and company websites etc. The scope of the study covers five financial years viz., 2008-09, 2009-10, 2010-2011, 2011-2012 and 2012-13. Descriptive statistics used in this study consist of maximum, minimum, mean, median and standard deviation to describe the nature of data. To measure the year-wise variation in the mean values of variables, a non- parametric test- Kruskal- Wallis test has been used as an alternative to the one-way analysis of variance as distribution is not normal. Lastly, a comparative analysis has been conducted by categorizing the data into two group i.e. companies with at least one female directors on boards and companies with on women director on boards of companies listed in India.

Why Women in Boardrooms?

There is ongoing dialogue and debate outside and inside corporate board-rooms about the diversity in manage-ment and inclusion of women on boards (e.g., Adams and Ferreira, 2009; Bart and McQueen, 2013). The importance of diversity in top management, especially gender equity, is thought to lead to better managed companies on a variety of dimensions (Bear et al., 2010). The Asia-Pacific region continues to lose

between 42 and 47 billion dollars a year in GDP due to the lack of participation of talented women in the workforce (Inderfurth, K. F., and Khambatta, P., 2012). Research has shown that the inclusion of female directors has a direct and positive impact on a company's profits and risk management. Women board directors also broaden a company's market knowledge as well as raise its profile. In fact, some studies provides support for nudging in with one woman on a board, rather than barging in with three women on the premise that women are well-educated, contributing members of organizations, and effective managers. For instance, some research suggests that women are generally more advanced in negotiating, empathizing, and working behind the scenes to facilitate better cooperation in the workplace (Guy and Newman. 2004). Gender diversity in senior leadership has been associated with higher company profits (Herring, C., 2009). The Grant Thornton International Business Report indicates that the share of women in senior management roles globally is only 24 percent (Grant Thornton. 2013. Women in senior management: Setting the stage for growth. Washington, DC: Grant Thornton).

They are also consumers who buy and have much decision making power in the marketplace. For instance, in the United States, for example, women account for almost 70 percent of car purchasing decisions[1]. This phenomenon is now spreading in Asian markets too. However, not all women are alike, just as not all men are alike

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[1] Asking Smarter Questions, Marketing to Women: Surprising Stats Show Purchasing Power & Influence, <http://www.a ski ngsmarterquestions.com/marketing-to-women-surprising-stats-show-purchasing-power-influence>.

(Zaichkowsky, J. L, 2014). Women everywhere are seen as being key to driving improvements in access to education and healthcare in the society and overall economic development and progress, and yet barely present in many of the boardrooms of the world's largest companies. Ignoring the talent of half the population is surely not the ideal way to build board effectiveness.

Boardroom Gender Diversity and Initiatives: A Global Perspective

There are few issues of corporate governance that have expanded so far over such a small period of time: from the introduction of the first boardroom quota for female directors in Norway in 2005, to similar quotas in many parts of Europe in 2010 and 2011, to legislation or policy in India, Malaysia, and the Middle East in 2012, support for boardroom gender diversity has surprised many by how fast and far it has spread. According to the GMI Report of 2011, the countries with the highest percentage of companies that had at least one female director were Finland (100%), Sweden (100%) and Norway (96%). South Africa is notable amongst emerging market economies as it recorded a high percentage in this category as well (91.1%). By a wide margin, the worst markets were persistent underperformers Japan (9.9%), South Korea (15.4%). Norway has the highest aggregate percentage of female directors (35.6%). Countries with the largest percentage of companies with boards comprising at least three women directors were Sweden (55.0%), Norway (52.0%) and South Africa (33.3%). Markets in which GMI had coverage of at least 20 companies, and had no companies (0%) with at least

Table: 1 Status of Gender Diversity in Advanced and Emerging Economies

SN	Country	Quotas	Current Status**(percentage of board seats held by women)	Gender Diversity in Action
A.				Advanced Economies:
1.	Australia	No gender quota	15.1	In 2010 the ASX governance council recommended all ASX-listed companies to disclose the gender objectives as well as their progress against these objectives in the annual reports. They also need to disclose the proportion of women on the board and in senior management roles.
2.	France	40 per (w.e.f. January, 2017)	29.9	In August, 2014, quota legislation for boardroom gender diversity was reinforced by the Gender Equality Law which states that with effect from January, 1, 2017, there must be at least 40 per cent representation of both genders on the board of the companies.[2] As a result, in June, 2013, AFEP-MEDEF, representing the largest listed companies in France also made some amendments including the target of 40 per cent quota by April, 2016 subject to comply or explain basis.

Contd.

2 Here, the following category of companies must comply with the rules a) Companies whose shares are admitted to trading on a regulated market. (b) Companies, listed or not, with revenues or total assets over 50 million euros, employing at least 500 people (250 people effective January 1, 2020) for three consecutive years. Moreover, for companies with boards comprising eight directors or fewer, the difference between the number of directors of each gender should not be higher than two (French Commercial Code Article L 225-18-1)

3 This year in March, the German parliament passed legislation requiring listed companies that have employee representation on their supervisory boards to allocate 30 percent of nonexecutive board seats to women from 2016 onward.

Table: 1 Status of Gender Diversity in Advanced and Emerging Economies

SN	Country	Quotas	Current Status**f(percentage of board seats held by women)	Gender Diversity in Action
3.	Germany	Mandatory quota of 30 percent from 2016 onward.[2]	18.3	The German corporate governance code (2014) for listed companies contains various recommendations to promote greater gender diversity on supervisory and management boards of directors
4.	Japan	No Quota	2.4	According to the Principle 2.4 for ensuring Diversity, Including Active Participation of Women of Japan's Corporate Governance Code Seeking Sustainable Corporate Growth and Increased Corporate Value over the Mid- to Long-Term' published in June, 2015, Companies should recognize and promote diversity of personnel, including the active participation of women[4]. In 2013, the Tokyo Stock Exchange changed its disclosure rulings—listed companies are to disclose the number/percentage of women board members in their corporate governance reports.

Contd.

4 For details see /http://www.ecgi.org/codes/documents/japan_cg_code_1jun15_en.pdf

Table: 1 Status of Gender Diversity in Advanced and Emerging Economies

SN	Country	Quotas	Current Status**(perc entage of board seats held by women)	Gender Diversity in Action
5.	Norway	40 percent	36.6	In 2005, Norway became the first country to introduce board gender quotas when the Norwegian Public Limited Liability Companies Act was amended to require 40 percent representation of both genders on boards. Disclosure of the state of diversity in the company is also required under the Norwegian Accounting Act. Norway has the highest aggregate percentage of female directors i.e.35.6% (GMI International, 2011)
6.	UK	No quota	15.6	The U.K. Financial Reporting Council revised the U.K. corporate governance code requiring companies to report annually on their boardroom diversity policies and to include gender diversity in the evaluation of board effectiveness with effect from October 1, 2012. In 2011, Lord Davies launched an independent review of women on boards, commissioned by the U.K. government. He recommended that FTSE 100 companies should aim for a minimum of 25 percent female board member representation by 2015.

Contd.

Table: 1 Status of Gender Diversity in Advanced and Emerging Economies

SN	Country	Quotas	Current Status**(percentage of board seats held by women)	Gender Diversity in Action
7.	USA	No Quota	12.2	A 2009 SEC proxy disclosure rule requires that companies to disclose if their nominating committees consider diversity in the director selection process. Though the diversity is not defined by the rule, certain U.S. states have implemented their own measures to increase diversity on boards.
B.				Emerging Economies:
1.	China	No Quota	8.5	-The Code of Corporate Governance for Listed Companies in China does not mention gender diversity as a desirable quality or background for board members. - 35.3% of Chinese construction banks' board position are held by women. This is the highest percentage among the 31 banks listed in the 2010 Fortune Global 200.

Contd.

Table: 1 Status of Gender Diversity in Advanced and Emerging Economies

SN	Country	Quotas	Current Status**(percentage of board seats held by women)	Gender Diversity in Action
2.	India	As per the new Companies Act, 2013 and revised Clause 49 of the Equity Listing agreement, companies are required to have at least one female director on their boards[5].	7.7	The new Companies Act, 2013 and the revised Clause 49 Listing Agreement are significant steps towards gender diversity on statutory front and has been considered as a breakthrough in the history of corporate governance.

Contd.

5 Here companies means the following classes of companies: 1)Every listed company and 2)Every public company having : Paid-up share capital of INR 1 billion or turnover of INR 3 billion or more.

Table: 1 Status of Gender Diversity in Advanced and Emerging Economies

SN	Country	Quotas	Current Status**(percentage of board seats held by women)	Gender Diversity in Action
3.	Malaysia	In June of 2011, in an effort to promote gender equality, the Malaysian Cabinet approved a policy where companies must achieve at least a 30 percent representation of women in decision-making positions in the private sector	10.4	In the Budget of 2015, the government has announced RM2.26 billion to Women, Family and Community Development Ministry to enhance the contribution of women and plans to train 125 potential women directors to fill positions on the boards of government-linked companies and in the private sector (Bernama, Budget 2015: People Economy, October 2014.

Contd.

Table: 1 Status of Gender Diversity in Advanced and Emerging Economies

SN	Country	Quotas	Current Status**(percentage of board seats held by women)	Gender Diversity in Action
4.	South Korea	No quota	1.8	In Korea, a bill is being promoted which would require large companies and public bodies to appoint women to a minimum of 30 percent of senior management (executive) positions[6].
5.	South Africa	No Quota	17.5	Although the South African cabinet approved the Women Empowerment and Gender Equality Bill in August 2012, the bill has not yet been passed. South Africa is the country with the highest percentage of companies that had at least one female director among emerging economies
6.	Thailand		9.7	The Office of Women's Affairs and Family Development and the Ministry of Social Development and Human Security promote and create networks of gender equality in the Thai civil service system.
7.	Turkey	No Quota	10.0	The Capital Markets Board of Turkey (CMBT) in 2014 contained a provision for boards to have at least one woman director on a "comply or explain" basis.

*Source: ** Deloitte Report on Women in the Boardroom: A global Perspectives (2014) Fourth Edition.*

6 Newspim, Congress 'Mandate 30 Percent Female Executives' Bill Promoted, December 17, 2014

three female directors, were Indonesia, Japan, Malaysia and South Korea. After revisiting the each country profile, reports and surveys conducted by recognized and reputed agencies worldwide and reviewing the prior studies, we constructed the following table that provides a bird's eye view of the current status of the female directors' participation of both selected advanced and emerging economies across the globe including India:

An Indian Experience

India, in spite of being the world's largest democracy and one of the fastest growing economies, women faces unequal access in many areas including education, job advance-ment, and political power. The Indian constitution guarantees gender equality and it also guarantees religious freedom. However, gender rights guaranteed by the constitution do not extend over religious personal laws, which often give fewer rights to women (Archana Parashar, 2008). As per revised Clause 49(II) (A) (1), a company board must consist of at least one female director. New Companies Act, 2013 provides that.... companies as may be prescribed, shall have at least one woman director. (Section149, Chapter XI, p.90). Furthermore, the appointment of woman director shall be as per the provisions provided in Clause 49 (II) (A) (1)[7].

Gender diversity has been advocated as a means of improving organizational value and performance by inculcating boards with new insights, new informa-

tion and new perspectives (Miller and Triana, 2009). So, the following table presented below provides information regarding the presence of women directors on board of companies listed in India:

From this table it is clear that presence of female director on Indian boards is very low. In fact, the median values revealing that in 50 percent companies comprise not more than one female director on their boards. Moreover, the average number of female on board is less than one in each year. Minimum value i.e. zeros indicating that there are many companies with only male directors on Indian boards. Here, mean value and standard deviations are nearly same indicating that distribution is not normal. That is why a non- parametric test-Kruskal- Wallis test has been used as an alternative to the one-way analysis of variance to check year-wise variations. It shows that year-wise variation in the average number of female directors on boards of companies listed in India is not statistically significant as p value is less than 0.05. Hence, it can be concluded that women representation in boardrooms remains constant during the study period.

In the above table for the purpose of the comparative study data has been categorized into two sections i.e. companies with at least one female directors and companies with no women director on Indian boards. From the table it is clear that number of companies with at least one female director on board has been increased drastically over the period of time. It indicates that the awareness about gender diversity in boardroom has been augmented. Companies with at least

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7 For details see Revised Clause 49 Circular dated 15th September, 2014 available at: /http://www.sebi.gov.in/ cms/sebi_data/attachdocs/1410777212906.pdf

Table2: Year-wise Distribution of Female Directors on Boardrooms in India

Year	Minimum	Maximum	Median	Mean	SD
2013	0	3	1.00	0.85	0.77
2012	0	4	1.00	0.82	0.84
2011	0	3	1.00	0.70	0.75
2010	0	2	1.00	0.65	0.66
2009	0	2	1.00	0.56	0.61

Kruskal-Wallis H Test(x^2)=8.34, d.f.=4, p>0.05

Source: Authors' Compilation

Table 3: Comparison of Companies with at least one female director (WOB) and Companies with no Female Directors on Board (N_WOB)

Parameters	2013		2012		2011		2010		2009	
	N_WOB	WOB	N_WOB	WOB	N_WOB	WOB	N_WOB	WOB	N_WOB	WOB
No. of Companies	35%	65%	42%	58%	48%	52%	47%	53%	51%	49%
Average Board Size (No. of Directors on board)	9.88	11.32	9.45	12.03	10.48	11.07	10.51	11.39	11.07	10.93
Company Performance (Return on Assets i.e. ROA)	10.31%	7.69%	8.37%	8.69%	10.42%	11.74%	9.77%	10.82%	10.62%	9.58%
Compliance with Corporate governance Codes	97.2%	90.8%	95.3%	98.7%	93.75%	90.4%	91.5%	92.5%	88.2%	85.71%

Source: Authors' Computation

one female director have relatively larger sized board in each year except in 2009. As far as performance is concerned, companies with at least one female director have greater returns on assets (ROA) in most of the years (except in first and last study period may be due to other reasons) as compared with the companies with no women director on their boards. The same result is in case of compliance with the corporate governance codes of Clause 49. Though the compliance rate has been increased over the time, companies with at least one female director have better compliance only in two years. Here, it is notable that the number of companies with at least one female director on board has been increased drastically over the period of time only because of mandatory quota as per Clause 49 of Listing Agreement of Securities Exchange Board of India (SEBI) and the new Companies Act, 2013 or in true spirit.

Cultural, domestic and other Issues and Female workforce Participation: Reconcilable Clashes?

A deeper understanding of the issues and problems limiting the female workforce participation can assist in tackling with those challenges to foster gender diversity in workplace. Too many women still lack basic freedoms and opportunities and face huge inequalities in the workplace. In fact, some work force norms about characteristics of an "ideal worker" can disadvantage women for doing their jobs. Case studies of the ICT industry culture in India, Sri Lanka, and the United Kingdom have found long hours and a "workaholic" ethic disproportionately affect women's retention and promo-

tion (Morgan, S. 2012; Griffiths, Marie, and Karenza Moore. 2010). Similar patterns have been identified in other professions where women are in the minority and less likely to be promoted, including law, investment banking, and consulting in the United States (Martin and Jurik 2007; Bertrand, M., et al. 2009). The presence of women at the board table varies drastically across countries (0.2% in Japan to 22% in Slovenia), reflecting a cultural and value-based approach to the issue (Terjesen and Singh, 2008). All around the world women spend more time on unpaid domestic work-that is, child and elderly care and housework than men (United Nations. The World's Women 2010: Trends and Statistics. New York: United Nations). In nutshell, social biased norms, domestic responsibilities, early marriage and pregnancy, limited mobility and less flexibility towards taking own independent decisions, stereotypes, legal and workforce discrimination, fewer opportunity to access health, education and other basic facilities hinder the female workforce partici-pation.

What can regulators do?

Increasing the involvement of women in different roles and titles on corporate boards inspires intense discussion around the world, with some countries even adopting legislation to enforce their presence. As we have discussed earlier and it is obvious from the table-1 that various legislative measures including the imposition of quota as well as other initiatives have been taken in different parts of the world. In fact, some corporate houses are coming with women friendly policies and softening up of its workforce norms and workplace flexibility that increases the female

workforce representation and provides more scope and opportunities to nurture themselves for in order to fit in the frame of the companies to contribute in the progress and sustainability by taking higher and strategic positions. Women-friendly work policies have been shown to boost firm profitability (OECD. 2012. "The Business Case for Women's Economic Empowerment." Background Paper. Paris: OECD). Manpower Group surveys report that only 2 percent of employers across 42 countries have adopted strategies to recruit more women (Newport and Wilke, 2013).

There is difference of opinion for women quotas worldwide. Supporters of quotas justify them by citing a variety of supposed benefits that greater numbers of women will bring to the boardroom. Some suggest companies are more profitable when they have more women directors, though the evidence for this is questionable given the wide variety of factors, many of which are difficult to quantify, that determine the success or failure of an organization. Others who suggest that quota cannot resolve the issue as despite being the first to implement diversity quotas, Norway has experienced little upwards movement since its initial jump. From 2009 to 2011 the aggregate percentage of female directors has actually dropped slightly from 35.8% to 35.6%. There are some statements and opinions about the women quota:

1) "Being a minority in a position of importance is a privilege, and not a burden[8] "

   Jaspal Bindra, CEO (Asia), Standard

Chartered PLC.

2) There should be no less motivation for diversity in developing countries than in developed countries….. The fact is that, in every country, you need to encourage more diversity, to bring in this difference of perspective as a way to bring fresh air into the board debate."

   Patrick Zurstrassen, Chairs the European Confederation of Directors' Associations (ECoDA). Focus 9, pp: 21)

Quotas would definitely quicken the pace to achieve the desirable results. But, will it be sustainable? Will it be free from questioning? The reality with having a quota is that it can quickly degenerate into tokenism. However, the problem with quotas is that they deal with the symptom, not the underlying cause.
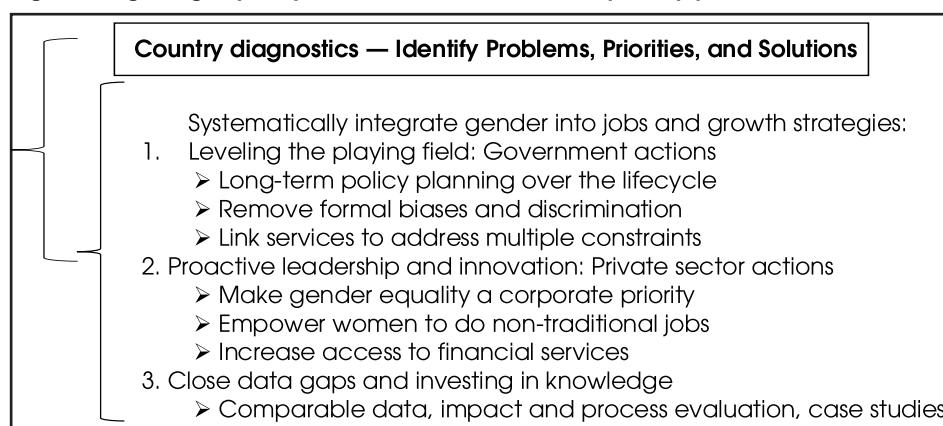
Signpost for the way ahead

It is necessary to take actions at grass root level to achieve real and meaningful results. First, it is required to create an environment that would enable women to break the glass ceiling. Stereotyping, bias, and brutally long working hours are discouraging women executives from reaching for the top. There is need of positive reinforcement so that more women will find it rewarding to make sacrifices for advancement in their careers. These are often tough personal choices, and smart companies would use them as opportunities to attract and retain the right professionals instead of driving them away. According to the World

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8 *Women on Boards: A Conversation with Male Directors, Focus 9, Global Corporate Governance Forum pp: 16*

Bank Report (2014), actions should be considered at three broad levels in order to bring gender equality at work (Figure 1). First, reforms and other actions may be needed by govern ment with participation from the private sector and civil society organizations to level the playing field for equality at work, including addressing constraints across the life cycle and reforming the "rules of the game". Second, proactive private sector leadership and innovation can encourage women's participation and success in the world of work, for example by establishing company policies and practices that relieve constraints on women's time, encourage men's role in caring responsibilities, tackle discrimination in the workplace, and help women gain access to productive inputs. Third, closing data gaps and investing in knowledge will enable more evidence-based policymaking and tracking of results. This is central to achieving and measuring the progress that is needed.

Figure-1: Igniting equality at work: World Bank Group entry points

| Country diagnostics — Identify Problems, Priorities, and Solutions |

Systematically integrate gender into jobs and growth strategies:
1. Leveling the playing field: Government actions
   - Long-term policy planning over the lifecycle
   - Remove formal biases and discrimination
   - Link services to address multiple constraints
2. Proactive leadership and innovation: Private sector actions
   - Make gender equality a corporate priority
   - Empower women to do non-traditional jobs
   - Increase access to financial services
3. Close data gaps and investing in knowledge
   - Comparable data, impact and process evaluation, case studies

Source: World Bank Report 2014 retrieved from https://openknowledge.worldbank .org/handle/10986/17121 License: CC BY-NC-ND 3.0 IGO."

Conclusion and Suggestions

Getting gender diversity and inclusion as a main stream component for the governance of corporations requisite for sustainable development and overall progress and this is more than just a gender issue. Igniting female workforce participation on corporate boards in true spirit involves identifying and understanding real issues and challenges and taking bold, harmo- nized actions and multi-pronged approach to encounter the problems. Majority of listed Indian companies comprise at least one female director on their boards. Women representation in Indian boardrooms remains constant during the study period. It is notable that the number of companies with at least one female director on board has been increased drastically over the period of time whether only because of mandatory quota as per Clause 49 of

Listing Agreement of Securities Exchange Board of India (SEBI) and the new Companies Act, 2013 or in true spirit? Another important aspect that may be addressed in future research work is that inclusion of women directors in boardrooms is in what capacity i.e. executive director or non-executive director? Whether they are inside the glass ceiling just because of quota or really chairing any committee and have say in the boardrooms. Such issues are need to be addressed for assessing their actual participation and involvement in the strategic decision making process in boardrooms. Increasing women workforce participation can yield big development payoffs. It can bring a rich talent pool with different ideologies and experiences for driving firm innovation and productivity. Softening up of workforce norms and workplace flexibility and developing female friendly policies may upsurge the female workforce participation and provide more scope and opportunities to nurture themselves to fit in the frame of the companies to contribute in the progress and sustainability by chairing higher and strategic positions.

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