



**Shobhit
University**

Shobhit Institute of Engineering & Technology, Meerut
A University established u/s 3 of UGC Act 1956

Volume 2, Number 1
January - June, 2007

ARTICLES

- Regime-Switching in Stock Returns and Volatility: Evidence and Implications** : *KN Badhani and LS Bisht*
- Impact of Dividend Announcement on Share Prices** : *Ramesh Chander, Renuka Sharma and Kiran Mehta*
- Factors affecting the Liability Structure: A Study of Selected Commercial Banks** : *Mitali Sen and JK Pattanayak*
- Price Manipulation in Stock Market: An Entropic Analysis** : *YV Reddy and A Sebastin*
- Service Quality in Banks: A Study in Haryana and Chandigarh** : *Sudesh*
- The Organisational Climate in the Banking Industry: A Study in the State of Punjab** : *Ritu Lehal and Sukhdeep Singh*
- Measuring the Cost of Capital through Capital-Asset Pricing Model (CAPM): An Intra-sectoral Trend Analysis of Indian Banking Industry** : *Karam Pal and Puja Goyal*

COMMUNICATION

- E-Tailing in India: Scope and Perspective** : *Nityesh Bhatt and Surender Sangwan*
- TQM Initiatives in an LCV Manufacturing Company: A Case Study** : *Ashwani Kumar*

BOOK REVIEWS

NICE Journal of Business

(Half-yearly Journal of School of Business Studies, Shobhit University, Meerut)

ISSN: 0973-449X

VOLUME 2

NUMBER 1

JANUARY-JUNE, 2007

Chief Patron : Mr. Shobhit Kumar, Chancellor, Shobhit University, Meerut

Patron : Kunwar Shekhar Vijendra, Pro-Chancellor, Shobhit University, Meerut

Prof. R.P. Agarwal, Vice-Chancellor, Shobhit University, Meerut

Editor : Prof. D.P.S. Verma, Director (Planning and Development), Shobhit University, Meerut

EDITORIAL BOARD

Prof. Abhinandan K. Jain

Indian Institute of Management, Ahmedabad

Prof. Alok Saklani

Director

Apeejay Institute of Management, Dwarka, Delhi

Prof. Balram Dogra

Director

Apeejay Institute of Management, Jalandhar (Pb.)

Prof. Daleep Singh

Department of Management

Maharshi Dayanand University, Rohtak

Prof. Debi S. Saini

Management Development Institute, Gurgaon

Prof. Eric Hansen

Oregon State University, Corvallis (USA)

Prof. J.S. Panwar

Dean, Faculty of Management Studies

Sardar Patel University, Vallabh Vidya Nagar (Guj.)

Prof. J.P. Gupta

Vice-Chancellor

Jaypee Institute of Information Technology
(Deemed University), Noida

Prof. H.C. Chaudhary

Dean, Faculty of Management Studies

Banaras Hindu University, Varanasi

Prof. H. Chaturvedi

Director

Birla Institute of Management Technology
Greater Noida (U.P.)

Prof. Mike Berrell

Graduate School of Business

RMIT University, Melbourne (Australia)

Prof. Nicolas Forsans

Leeds University Business School

Leeds (UK)

Prof. Prem Vrat

Vice-Chancellor

UP Technical University, Lucknow

Dr. Pikay Richardson

Manchester Business School, Manchester (UK)

Prof. P.K. Jain

Department of Management Studies

Indian Institute of Technology, Delhi

Prof. R.D. Sharma

Deptt. of Commerce

University of Jammu, Jammu

Prof. Yogendra Verma

Department of Management Studies

Himachal Pradesh University, Shimla

Editorial Assistance: Pratibha Bist, Ravi Prakash Singh, and Upendra Gami

All correspondence pertaining to editorial and circulation matters may be addressed to:

The Editor: NICE Journal of Business

School of Business Studies, Shobhit University, Modipuram, Meerut-250 110

Phone 0121-257 5091/92; Fax 0121-257 5724

(Dialing code: from Delhi 95-121, from outside India: +91-121)

e-mail: editornjb@gmail.com, and editornjb@shobhituniversity.ac.in

The opinions expressed in the articles, published in the *NICE Journal of Business*, do not necessarily represent the views of the Shobhit University/NICE Society, Meerut, or the Editor. Any material published in the Journal should not be reproduced or reprinted in any form, without prior permission from the Editor/Publisher.

CONTENTS

<i>From the Editor's Desk</i>	(iii)
Regime-Switching in Stock Returns and Volatility: Evidence and Implications	1
<i>KN Badhani and LN Bisht</i>	
Impact of Dividend Announcement on Share Prices	15
<i>Ramesh Chander, Renuka Sharma, and Kiran Mehta</i>	
Factors affecting the Liability Structure: A Study of Selected Commercial Banks	31
<i>Mitali Sen and JK Pattanayak</i>	
Price Manipulation in Stock Market: An Entropic Analysis	41
<i>YV Reddy and A Sebastin</i>	
Service Quality in Banks: A Study in Haryana and Chandigarh	55
<i>Sudesh</i>	
The Organisational Climate in the Banking Industry: A Study in the State of Punjab	67
<i>Ritu Lehal and Sukhdeep Singh</i>	
Measuring the Cost of Capital through Capital-Asset Pricing Model (CAPM) An Intra-sectoral Trend Analysis of Indian Banking Industry	77
<i>Karam Pal and Puja Goyal</i>	
COMMUNICATION	
E-Tailing in India: Scope and Perspective	89
<i>Nityesh Bhatt and Surender Sangwan</i>	
TQM Initiatives in an LCV Manufacturing Company: A Case Study	101
<i>Ashwani Kumar</i>	
BOOK REVIEWS	111
<i>Human Resource Management</i> (Scott Snell and George Bohlanders) <i>Brinda Balakrishnan</i>	
<i>Management Information System</i> (James A. O' Brien and George M. Marakas) <i>JP Gupta</i>	
<i>Customer Relationship Management: A Strategic Perspective</i> (G. Shainesh and Jagdish N. Seth) <i>Kasande Shailesh Prabhakar</i>	
<i>International Business: Competing in the Global Market Place</i> (Charles W L Hill and Arun Kumar Jain) <i>Amit Girdharwal</i>	
<i>Effective Technical Communication</i> (M Ashraf Rizvi) <i>Upendra Gami</i>	
<i>Management Information Systems: Managerial Perspective</i> (DP Goyal) <i>N.P. Singh</i>	

SHOBHIT UNIVERSITY, MEERUT

School of Business Studies

SHOBHIT University came into existence with the elevation of the Shobhit Institute of Engineering and Technology, Meerut, to a Deemed University, by the Ministry of Human Resources, Government of India, vide Notification, dated 8th November, 2006, issued under Section 3 of the University Grants Commission Act, 1956. Earlier, Shobhit Institute of Engineering and Technology was set up by the NICE Society, an educational and philanthropic society, envisaged and inspired by Babu Vijendra Kumar ji, who was an eminent agriculturist and social worker from Gangoh (Saharanpur) U.P. The Society was registered in 1989, as a non-profit organisation under the Societies Registration Act, 1860, with its office at Meerut and headquarters at New Delhi, and professional institutes located at Meerut and Gangoh (Saharanpur).

Besides the School of Business Studies, Shobhit University has eight other schools, including School of Agri-and-Bio-informatics, School of Computer Engineering and Information Technology, School of Electronic Engineering, School of Bio-Technology and School of Bio-Medical Engineering, School of Basic and Applied Sciences, School of Journalism and Mass Communication, and School of Pharmaceutical Sciences.

The School of Business Studies provides MBA programme in various streams, like Marketing and International Business, Supply Chain and Retail Management, Finance and Investment Management, Human Resources and Organizational Development, Production and Technology Management, Services Marketing and Customer Relationship Management, Insurance and Risk Management, Agri-Business and Rural Marketing, and IT and Knowledge Management. It also provides M.Phil. and Ph.D. programmes in Business Management.

Shobhit Institute of Engineering and Technology, Gangoh (Saharanpur), imparts education for B.Tech. degree of the Uttar Pradesh Technical University (UPTU), Lucknow, in various branches of engineering and technology. Adarsh Vijendra Institute of Pharmaceutical Sciences, Gangoh, provides education for the B.Pharm. degree. Furthermore, the NICE Society runs Kunwar Shekhar Hospital and Research Centre, at Gangoh.

NICE JOURNAL OF BUSINESS

NICE Journal of Business is a half-yearly journal, earlier published by NICE Management College, Meerut, and now brought out by the School of Business Studies, Shobhit University, Meerut. It seeks to provide a platform to research scholars, practising managers, and academicians in business management, commerce, economics, and allied fields, to present their research findings and share their views and experiences.

The journal aims at disseminating information about recent developments in the relevant field and to publish book reviews, Ph.D. thesis abstracts, case studies, and bibliographies on relevant topics.

Original contributions received for publication in the journal are subjected to a blind review by experts in the relevant field.

From the Editor's Desk

I am pleased to place before the readers the third issue (Vol. 2, No. 1) of *NICE Journal of Business*. The response from the readers and contributors has been overwhelming.

The issue contains research papers, short articles, and book reviews, on the topics of current interest in business and allied areas.

One of the complicated areas of business, where relatively less development has taken place, is stock market. This is mainly due to high uncertainty and volatility in share prices. Using Hamilton's Markov Switching Regime technique, Dr. K.N. Badhani and Dr. L.S. Bisht have examined the behaviour of index returns and volatility in stock market. In their well-researched paper, they conclude that volatility plays a dominant role in the switching behaviour and the switching is significantly synchronised across the indices and governed by macro-economic forces, rather than portfolio-specific forces.

There is another paper on the complicated topic of the prediction of share prices. In their article, Dr. Ramesh Chander, Ms. Renuka Sharma, and Ms. Kiran Mehta have analysed the effect of dividend announcement on share prices by evaluating different parameters. They have found that the cash-outflow on account of tax payments and dividend distribution forms the more logical and valid basis for dividend announcement rather than the informational efficiency of market mechanism.

With emerging competition and changing economic scenario, the liability structure has come to be a significant determinant of the financial position of the commercial banks in India. Dr. Mitali Sen and Dr. J.K. Pattanayak carried out an empirical research to establish the relationship between the liability structure and the selected critical factors, by using a factor-analytic model and the multiple-regression analysis. They have found that market power, profitability, growth, risk factor, ownership and size are the significant determinants of the capital structure of any publicly-traded bank.

Dr. Y.V. Reddy and Mr. A. Sebastin have studied the phenomenon of price manipulation in the shares of a company, through the Entropy analysis. Through their empirical analysis, the authors have concluded that some orders placed by a participant in the stock-market trading system may result in multiple trades, but not in all.

With the onset of globalisation of Indian economy, every industry has geared up for innovation and technology enhancement, and for gaining a competitive edge. The banking industry is one of those industries which have been reformed on an extensive scale. Through her research-based article, Dr. Sudesh has stressed the service quality in the banking industry. She has analysed the SERVQUAL scores to evaluate the performance of selected banks in Haryana and Chandigarh.

In their survey-based article, Dr. Ritu Lehal and Mr. Sukhdeep Singh have sought to evaluate the organisational climate in the banking industry. They have also carried out an inter-bank analysis. The article can be considered as a useful reference for drawing lines of differentiation among the banks on the basis of their organisational climate.

Dr. Karam Pal and Ms. Puja Goyal have sought to measure the cost of capital, one of the most important yardsticks for evaluating investment projects, by using the Capital Asset Pricing Model (CAPM). They have found that the major private-sector banks have low cost of equity, average cost of debt, and low risk level, which pose a threat to challenge competitors in the public sector.

With increasing innovations in technology, enhancement of competition, and introduction of information technology, the economy of the world is changing rapidly. Dr. Nityesh Bhatt and Mr. Surender Sangwan have highlighted the scope and significance of e-Tailing in India. They have proposed a model for the expansion of e-Tailing in India.

The emerging competition and technological advancements have aroused consumers' expectations for quality. Through a case study of an LCV manufacturing company, Dr. Ashwini Kumar has analysed the initiatives taken by the company to enforce total quality management in the supply chain. He has also illustrated how the company has benefited from implementing total quality management in its operations.

Then, we have six book reviews, written by eminent teachers and experts in the relevant fields, including Human Resource Management, Management Information System, Customer Relationship Management, International Business, and Business Communication.

I express my gratitude to the learned authors and book-reviewers, for their valuable contribution.

A number of experts helped us in assessing the articles and making critical comments and valuable suggestions for their improvement. I owe a word of thanks to all of them, for their support and cooperation.

In the new set-up of the Shobhit University, Mr. Shobhit Kumar, Chairman of the NICE Society is the Chancellor of the University. He continues to be the Chief Patron of the *NICE Journal of Business*. Kunwar Shekhar Vijendra, Vice-Chairman of the Society has assumed the position of the Pro-Chancellor and continues to be the Patron of the Journal. Prof. R.P. Agarwal, who has joined as the first Vice-Chancellor of the University, is also the Patron of the Journal. All the three have taken keen interest in this academic endeavour. I am highly grateful to them, for their guidance and support.

Shobhit University
MEERUT

D.P.S. VERMA
Editor

REGIME-SWITCHING IN STOCK RETURNS AND VOLATILITY

Evidence and Implications

K.N. Badhani* and L.N. Bisht**

Abstract

This paper examines the behaviour of index returns and volatility on S&P CNX Nifty and CNX Nifty Junior, using Hamilton's Markov Switching Regime Technique. The study has revealed significant evidence of two regime-switching behaviour. While the first regime is characterised by high volatility and low returns, the second regime has low volatility and high returns. The negative association between volatility and return is inconsistent with the Inter-temporal Capital Asset Pricing Model (ICAPM). The 'leverage-effect' and the 'volatility-feedback hypothesis' also do not fully explain these results. The 'asymmetric-reaction-to-news' provides an alternative explanation. It has also been found that volatility (rather than returns) plays a dominant role in the switching behaviour. Moreover, the switching behaviour in the two indices is significantly synchronised. Thus, the forces governing the switching behaviour are market-wide in nature, rather than portfolio-specific.

Key Words: *Markov switching regime, ICAPM, Leverage effect, Volatility feedback, Over-reaction to bad news*

INTRODUCTION

MODELLING of non-stationary time-series, using Markov Switching Regime Technique, was first proposed by Sclove in 1983. However, the technique gained popularity only after the publication of Hamilton's famous paper (Hamilton, 1989), demonstrating the successful application of the technique for modelling of trade cycles. Hamilton's approach of switching regimes (Hamilton, 1989, 1990) is quite straightforward. In this approach, the mean or the volatility

parameters are viewed as the outcome of a discrete-state Markov process. In the subsequent applications of Markov Switching Regime Technique, it has been used with more complex model specifications, such as ARMA, GARCH, VAR, Co-integration, and other time-series regression models. However, the strength of Hamilton's approach lies in its simple specification and capability to reveal intricate properties of time-series. In this paper, Hamilton's approach of Markov Switching Regimes has been used to study the association between stock market returns and volatility in India.

* Reader, Department of Commerce, Kumaun University, Nainital (Uttarakhand) - 263 002; e-mail: badhanikn@yahoo.co.in

** Reader, Department of Commerce, Kumaun University, Nainital (Uttarakhand) - 263 002

SURVEY OF LITERATURE

The first-differentiated, log-transformed stock prices (stock returns) often tend to be stationary on the basis of standard unit-root tests. However, it is widely believed that stock markets are subject to 'bull' and 'bear' phases (regimes). Using Hamilton's approach, we can describe and analyse the occasional shifts of market from one regime to another. The regimes can be identified on the basis of the mean return, or the volatility of return, or both. Several such attempts have been made in different markets, particularly in the US. Schwert (1989) considered a model in which returns may have either a high or a low variance, and switches between these return distributions as determined by a two-state Markov process. Hamilton and Susmel (1994) proposed the ARCH model with sudden discrete changes in the process that governs volatility. They found that a Markov switching model was a better statistical fit to the data than the ARCH model without switching. Turner, *et al.* (1989) and Schaller and van Norden (1997) considered a Markov switching model in which either the mean or the variance, or both, might differ between the two regimes. One of the interesting findings of their studies is that when both the returns and volatility are allowed to vary between two regimes, they are negatively associated; negative mean return is associated with high volatility and vice versa. More recently, Kim, *et al.*, (2004) found strong support for Markov-switching market volatility in the US monthly stock-return data. They attribute the negative association between mean and variance of returns to 'volatility feedback-effect'.

The relationship between time-varying mean returns and volatility has become one of the popular areas of investigation in empirical finance. Conventional finance theories are based on the notion that risk and returns move together; the higher the risk, the higher the return, and vice versa. The notion that risk and returns are positively associated is so fundamental that Ghysels, Santa-Clara and

Valkanov (2005) call it the 'first fundamental law of finance'. The Capital-Asset Pricing Model-CAPM (Sharpe, 1964; Lintner, 1965; Mossin, 1966) formally presents this relationship in a general cross-sectional static-equilibrium context. The Inter-temporal Capital Asset Pricing Model (ICAPM) proposed by Merton (1973, 1980) extends this notion to a dynamic framework. According to the ICAPM, the time-varying conditional excess return on an asset is a linear positive function of its time-varying variance and available investment opportunities at a particular time. However, subsequent studies reach conflicting conclusions regarding the sign of the relationship between conditional mean and volatility. In general, they found a weak or negative causality of conditional volatility on conditional return (Campbell, 1987; Glosten, Jagannathan and Runkle, 1993; Whitelaw, 1994; Lettau and Ludvigson, 2003; Brandt and Kang, 2004; and Guo and Whitelaw, 2006).

As French, Schwert and Stambaugh (1987) have emphasised, there is stronger evidence that positive innovations to volatility are correlated with negative innovations to returns. The most popular explanation of this negative volatility-return association is the 'leverage-hypothesis' (Black, 1976). According to his hypothesis, when the total value of a leveraged firm falls due to a fall in price, the value of its equity becomes a smaller share of the total. Since equity bears the full risk of the firm, the risk (conditional volatility) rises with a fall in stock-prices. However, the empirical testing of this hypothesis shows that the leverage effect is unable to explain the risk-relationship completely (Christie, 1982; Schwert, 1989). Another explanation that puts the causality in reverse order (i.e. a change in price is caused by a change in volatility) is called the 'time-varying risk premium' or the 'volatility-feedback hypothesis' (Campbell and Hentschal, 1992). According to this hypothesis, if volatility is priced, an anticipated increase in volatility raises the required return on equity,

leading to an immediate stock-price decline. This explanation explicitly assumes the ICAPM, as correct. According to this explanation, the negative relationship between conditional variance and return is a transitory phenomenon and a positive association between them should shortly succeed it.

Various econometric techniques such as the GARCH-M models, asymmetric GARCH models, and the instrumental variable (or GMM) approach, have been used to investigate the relationship between the time-varying mean and variance of returns. Some studies have used the Markov-switching specification for this purpose (Turner, et al., 1989; Kim, et al., 2004). This technique has some obvious advantages over other techniques (see Kim, et al., 2004, p. 341). Particularly, the Markov switching specification captures only large and persistent discrete changes in market volatility and, therefore, gives us more confidence than other specifications. In view of this fact we are using the Markov switching specification in the present study to examine the association between the time-varying mean and the volatility of stock-returns.

OBJECTIVES OF THE STUDY

The present study addresses the following questions:

1. Does the mean and the volatility in India follow the Markov-switching process? Is there an existence of persistent mean and volatility regime changes?
2. How do persistent shifts in the mean and the volatility of returns interact with each other? Are the means and the volatility positively associated with each other in terms of the ICAPM?
3. Are the forces governing the switching behaviour market-wide or portfolio-specific?

HAMILTON'S SWITCHING REGIME MODEL

In a formal sense, regime-switching econometric models refer to a situation in which a variable (say, stock market returns) is assumed to be drawn from two or more different distributions, called 'regimes', with some well-defined stochastic process determining the likelihood that each observation return is drawn from a given distribution. In a Markov-switching model, the changes in regimes are determined by an unobserved state variable, which is typically modelled as a Markov chain with some transitional probability matrix. These transitional probabilities are estimated, using some recursive estimation algorithms, as suggested by Kitagawa (1987). Hamilton's version of Markov switching model uses very simple specifications, where the variable is assumed to be drawn from two or more distributions, with different mean or variance or both.

In this study, we model stock returns, using Hamilton's approach and consider four different specifications. The first specification has no regime switching and serves as a benchmark to evaluate the appropriateness of switching models. In this specification, stock market returns 'R' are assumed to be drawn from a single Gaussian distribution, with mean α_0 and variance σ_0 :

$$R_t = \alpha_0 + \sigma_0 \varepsilon_t \quad \dots (1)$$

Where, ε_t is a strong white noise. This specification represents our null-hypothesis of no-switching.

Now, we consider three alternative hypotheses. In the first, returns are assumed to be drawn from two distributions, with different mean-values (α_0 and α_1):

$$R_t = \alpha_0 (S_t) + \alpha_1 (1 - S_t) + \sigma_0 \varepsilon_t \quad \dots (2)$$

Where, S_t is a binary state variable which follows a first-order Markov chain

with transitional probabilities matrix

$$P = \begin{pmatrix} p & 1-p \\ 1-q & q \end{pmatrix}, \text{ and:}$$

$$\begin{aligned} \Pr(S_t = 1 / S_{t-1} = 1) &= p \\ \Pr(S_t = 2 / S_{t-1} = 1) &= 1-p \\ \Pr(S_t = 1 / S_{t-1} = 2) &= 1-q \\ \Pr(S_t = 2 / S_{t-1} = 2) &= q \end{aligned} \quad \dots (3)$$

S_t (1 and 2) are two regimes. p and q are the probabilities of persistence of regime 1 and 2 respectively, while $(1-p)$ and $(1-q)$ are the probabilities of regime-switching. The specification presented in equation (3) implies that the probability of a given regime occurring during this period depends only on the regime of the last period.

The second alternative hypothesis is that the returns are drawn from two distributions, with same mean but different variances (σ_0 and σ_1):

$$R_t = \alpha_0 + [\sigma_0(S_t) + \sigma_1(1-S_t)]\varepsilon_t \quad \dots (4)$$

The third alternative hypothesis allows for different mean values and variances:

$$R_t = \alpha_0(S_t) + \alpha_1(1-S_t) + [\sigma_0(S_t) + \sigma_1(1-S_t)]\varepsilon_t \quad \dots (5)$$

Under each of the alternative hypothesis, the distribution from which stock market return is drawn is determined by the state variable .

Unfortunately, we do not have any standard test for examining the above hypothesis because the transitional probabilities are not identified under the null hypothesis of no-switching. Under these circumstances, the asymptotic distribution of likelihood ratio, Lagrange multiplier and Wald test are not standard. (Generally, these statistics follow χ^2 distribution asymptotically. Some attempts have been made to compute non-standard asymptotic distribution of these statistics (Hansen, 1992, 1996; Garcia, 1998). Following Schaller and van Norden (1997), Garcia's distribution of likelihood ratio for the hypothesis testing has been used. Following

Psaradakis and Spagnolo (2002), Schwarz Information Criterion (SIC) has also been applied as an additional support for our inferences.

DATA AND METHODOLOGY

This study is based on daily closing values of two leading NSE-based indices, viz. S&P CNX Nifty (hereafter referred to as 'Nifty') and CNX Nifty Junior (hereafter 'Nifty Jr.'). The sample period of the study covers 126 months from January 1996 to June 2006. The daily closing values of the indices were log-transformed and differentiated to obtain 'stock-returns'. All the estimates are made using the Time Series Modelling Software, TMS 4.20 (Davidson, 2006) at Ox Console 4.04 platform (Doornik, 2006). Parameters are estimated using conditional maximum-likelihood (time domain) method with Gaussian likelihood distribution. The likelihood ratios for the alternative hypotheses (presented in equations 2, 4 and 5) are computed in reference to null hypothesis (presented in equation 1).

RESULTS OF ESTIMATION

Benchmark Model

First, we estimate the benchmark model (equation: 1) which represents the null hypothesis of the study (i.e. no-switching). The results are presented in Table 1. The intercept represents the mean return and the error term represents the standard deviation of the return. The mean daily Nifty return is 0.047 per cent, which is statistically not different from zero ($t=1.47$). Standard deviation of Nifty returns is 0.01625 (or 1.63 per cent). Similarly, the mean daily Nifty Jr. return is 0.061 per cent ($t=1.65$) and its standard deviation is 1.89 per cent. The distribution of both the return series is leptokurtic (Kurtosis is more than 7). Jarque-Bera statistic for both the series is quite high which indicates that the returns do not follow the normal distribution.

Switching in Mean

Equation 2 divides the return series into two regimes, with different mean returns but

Table 1
Benchmark Model

Particulars	Parameter	Parameter Estimates			
		Nifty		Nifty Junior	
		Estimate	t	Estimate	t
Mean	Mean (Intercept)	0.00047	1.47	0.00061	1.65
Variance	S.D. (Error- Term)	0.01625	-	0.01894	-
Diagnostic Statistics	Log likelihood	7102.27		6699.56	
	Likelihood Ratio	-		-	
	Schwartz Information Criterion	7094.40		6691.68	
	Skewness	-0.3139		-0.5893	
	Kurtosis	7.6668		7.1160	
	Jerque-Bera Statistic	2429.77***		2008.74***	
	Box-Pierce (Q12): Residuals	55.09 ***		113.62***	
	Squared Residuals	454.41***		1200.90***	

***p<0.01 **p<0.05 *p<0.10

identical variance. The results of the estimation of this equation are shown in Table 2. The mean return on Nifty for Regime 1 is -0.0555, while for Regime 2, it is +0.0012. Both the returns are different from zero (t-values are 4.30 and 3.17,

respectively). Similarly, for Nifty Jr. the mean return in Regime 1 is -0.0537 (t=15.52) and in Regime 2 it is +0.0025 (t=7.50). Therefore, the first regime represents the bear phase while the second, the bull phase. The transitional

Table 2
Regime-Switching in Mean

Particulars	Parameter	Parameter Estimates			
		Nifty		Nifty Junior	
		Estimate	t	Estimate	t
Transitional Probabilities	p	0.2589		0.3755	
	1-p	0.7411		0.6245	
	q	0.9907		0.9786	
	1-q	0.0093		0.0214	
Mean	Regime:1	-0.05549	4.29 ***	-0.05370	15.52 ***
	Regime:2	0.00117	3.17 ***	0.00248	7.50 ***
Variance	S.D.	0.01499		0.01605	
Diagnostic Statistics	Log likelihood	7188.16		6871.76	
	Likelihood Ratio	171.78 ***		344.40***	
	Schwartz Information Criterion	7168.48		6852.07	
	Skewness	0.0192		0.0537	
	Kurtosis	6.4866		5.7837	
	Jerque-Bera Statistic	1332.32***		850.43***	
	Box-Pierce (Q12): Residuals	52.31 ***		88.76 **	
	Squared Residuals	426.52***		1014.53***	

*** p<0.01** p<0.05* p<0.10

probabilities show that Regime 2 is persistent but Regime 1 is transitory because the probabilities of switching from Regime 1 to Regime 2, $(1-p)$, and the persistence of Regime 2, (q) , are high. On the other hand, the probabilities of persistence of Regime 1, (p) , and the probabilities of switching from Regime 2 to Regime 1, $(1-q)$, are low. $p+q-1$ is positive, it shows the overall persistence of the regimes. The time-series plot of smooth probabilities of Regime 1 or the low-return regime (Figures 1-B and 2-B) shows that there are only a few occasions when this probability is high enough. The Kernel density of low-return regime probabilities (Figure: 3-A) shows a concentration around zero. This implies that during the period under study, the market remained generally bullish. A few bearish shocks that the market experienced were short-lived in nature.

The likelihood ratio for mean switching in comparison to no-switching null-hypothesis is 171.78 and 344.40 for Nifty and Nifty Jr. returns, respectively. Garcia (1998) shows that while the

5 per cent critical value for the likelihood ratio statistic is 10.34; the 1 per cent critical value is 13.81 for this case. Our results, therefore, imply very strong rejection of null hypothesis of no-switching. Schwarz Information Criterion (SIC) also shows a significant improvement after switching, which also supports our inference.

Switching in Variance

Equation 4 divides the return series into two regimes with different variance but equal mean. The results of the estimation of this equation are presented in Table 3. While Regime 1 represents the period of high volatility, Regime 2 represents the period of low volatility. The variance in Regime 1 is more than double the variance in Regime 2 in both the return series. Moreover, both the regimes show high levels of persistence as probabilities of persistence of the two regimes (p and q) are quite high and probability of transition from one regime to another ($1-p$ and $1-q$) are quite low. $p+q-1$ is not only positive but also quite close to 1; it shows that the regimes are highly

Table 3
Regime-Switching in Variance

Particulars	Parameter	Parameter Estimates			
		Nifty		Nifty Junior	
		Estimate	t	Estimate	t
Transitional Probabilities	p	0.9202		0.9232	
	1-p	0.0798		0.0768	
	q	0.9776		0.9742	
	1-q	0.0224		0.0258	
Mean	Intercept	0.00086	3.07***	0.00132	4.73***
Variance	Regime:1	0.02687		0.03186	
	Regime:2	0.01172		0.01185	
Diagnostic Statistics	Log likelihood	7351.94		7098.62	
	Likelihood Ratio	499.34***		798.12***	
	Schwartz Information Criterion	7332.25		7078.93	
	Skewness	-0.1762		-0.2259	
	Kurtosis	3.1456		2.9058	
	Jerque-Bera Statistic	15.93***		23.34***	
	Box-Pierce (Q12): Residuals	67.12***		121.78***	
	Squared Residuals	104.77***		198.18***	

*** p<0.01** p<0.05* p<0.10

persistent. This observation is quite consistent with the concept of 'volatility persistence,' a styled fact often revealed by the GARCH family of models (Poterba and Summers, 1986).

Figure 1-C shows the time-series plot of the probabilities of the high-volatility regime (Regime 1) for the Nifty returns. Figure 2-C shows the time-series plot of the corresponding probabilities for the Nifty Jr. returns. Both the figures look quite identical. This suggests that the switching process is almost synchronised in these two indices. The Kernel density plot of the probabilities for the high-volatility regime (Figure 3-B) shows concentration around 'zero' and 'one'. The higher concentration around zero suggests that Regime 2 (i.e., low-volatility regime) occurs more frequent than Regime 1 (i.e., the high-volatility regime).

The likelihood ratios for variance switching in comparison to the no-switching null-hypothesis are 499.34 and 798.12 for Nifty and Nifty Jr., respectively. These results imply very strong rejection of null hypothesis. In fact, the evidence of switching in variance is stronger than that in mean. The comparison of SIC also supports this inference.

Switching in Mean and Variance

Now, Equation 5 which allows simultaneous switching in mean and variance, is estimated. The results are presented in Table 4. Regime 1 is characterized by a variance, which is more than two times the variance in Regime 2. Regime 1 shows a negative mean return, which is not significantly different from zero (indicated by the low *t*-value). On the other hand, the mean return is positive and significantly different from zero

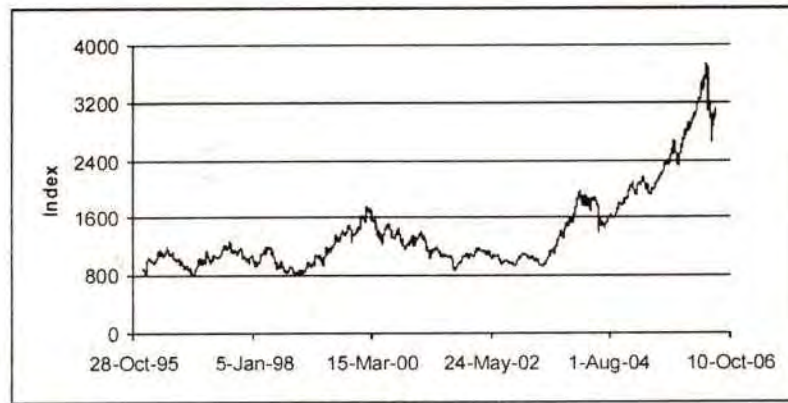
Table 4
Regime-Switching in Mean and Variance

Particulars	Parameter	Parameter Estimates			
		Nifty		Nifty Junior	
		Estimate	<i>t</i>	Estimate	<i>t</i>
Transitional Probabilities	p	0.9186		0.9209	
	1-p	0.0814		0.0791	
	q	0.9754		0.9739	
	1-q	0.0247		0.0261	
Mean	Regime:1	-0.00176	1.34	-0.00243	1.59
	Regime:2	0.00114	2.78***	0.00160	5.18 ***
Variance	Regime:1	0.02630		0.03180	
	Regime:2	0.01157		0.01188	
Differential Effect of Regime 2 in Comparison to Regime:1	Mean	0.00290	2.06**	0.00403	2.47**
	Variance	.01473	5.82***	0.01993	14.55***
Diagnostic Statistics	Log likelihood	7354.58		7102.91	
	Likelihood Ratio	504.62***		806.70***	
	Schwartz Information Criterion	7330.95		7079.29	
	Skewness	-0.0669		-0.0858	
	Kurtosis	3.1745		2.868	
	Jerque-Bera Statistic	5.3*		5.14*	
	Box-Pierce (Q12): Residuals	65.69***		116.61***	
	Squared Residuals	110.10***		188.90***	

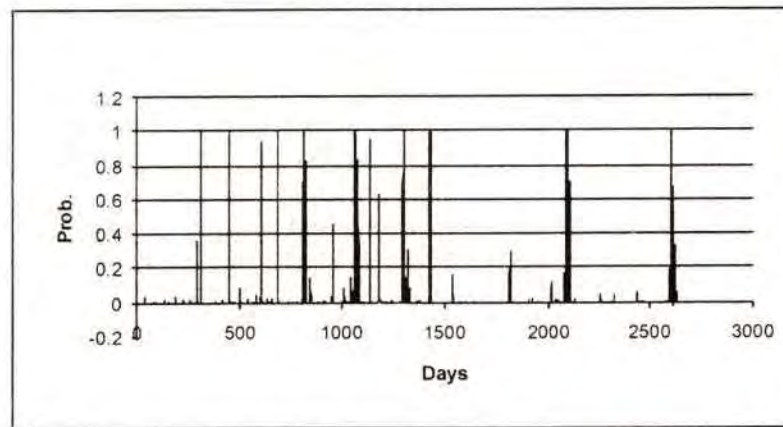
*** p<0.01** p<0.05* p<0.10

Figure 1

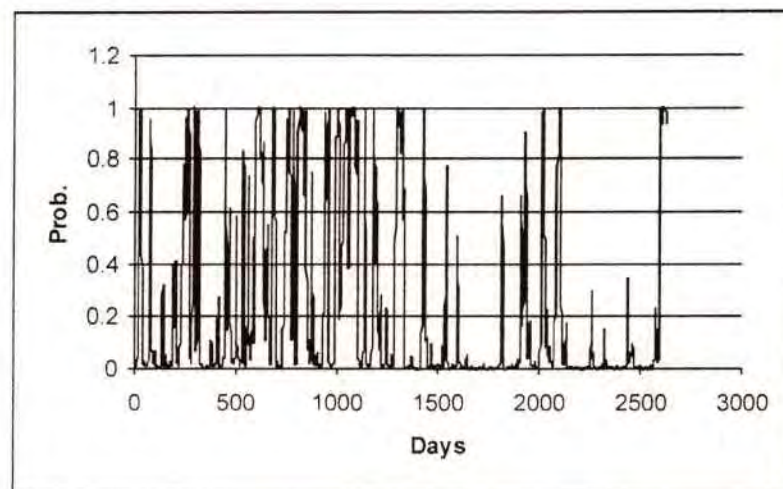
Regime 1: Probabilities for Nifty Returns



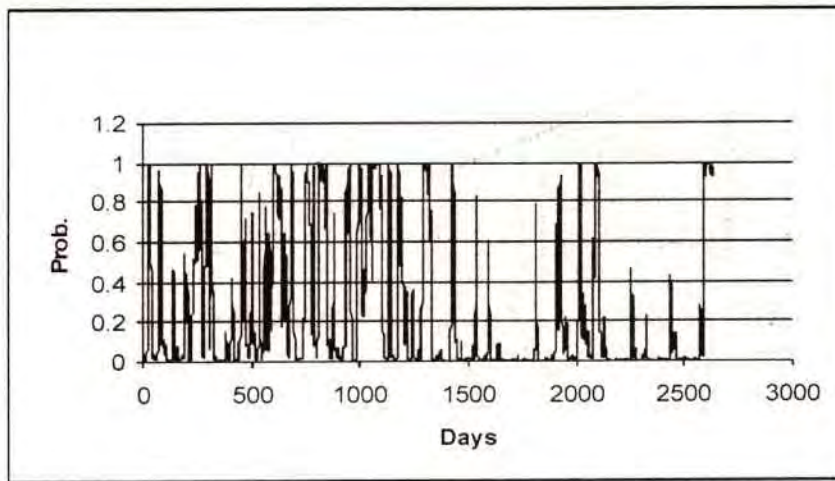
A. S&P CNX Nifty



B. Probabilities of Low Return Regime



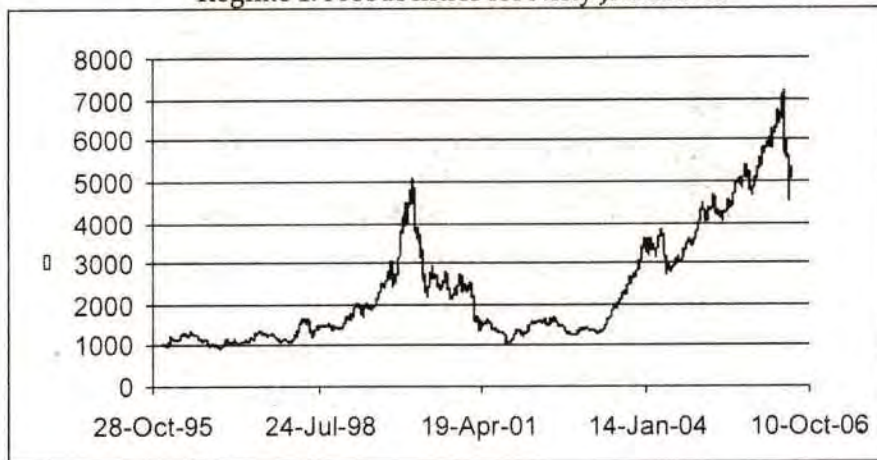
C. Probabilities of High Volatility Regime



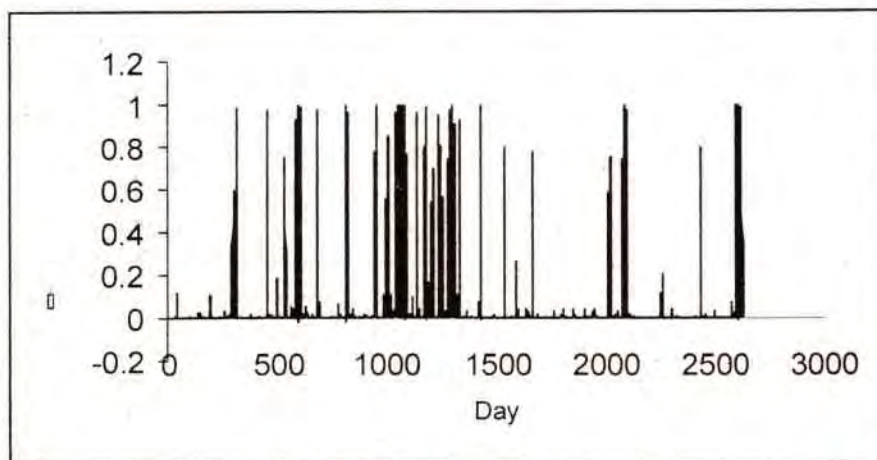
D. Probabilities of High Volatility and Low Return Regime

Figure 2

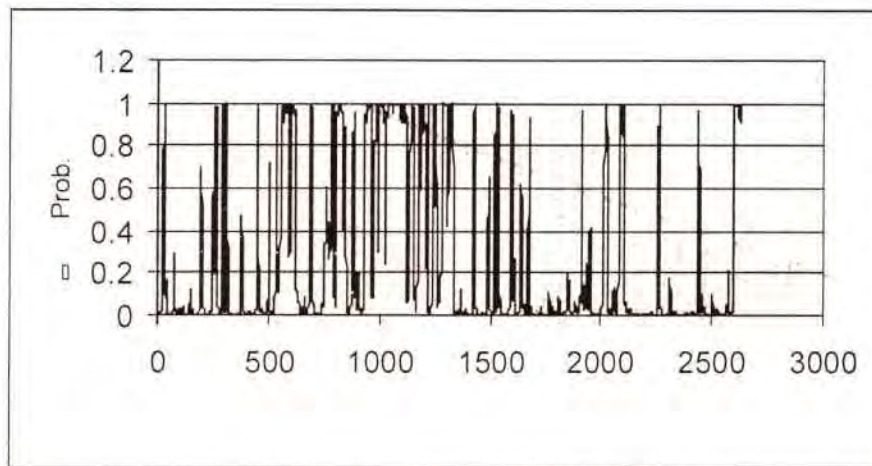
Regime 1: Probabilities for Nifty Jr. Returns



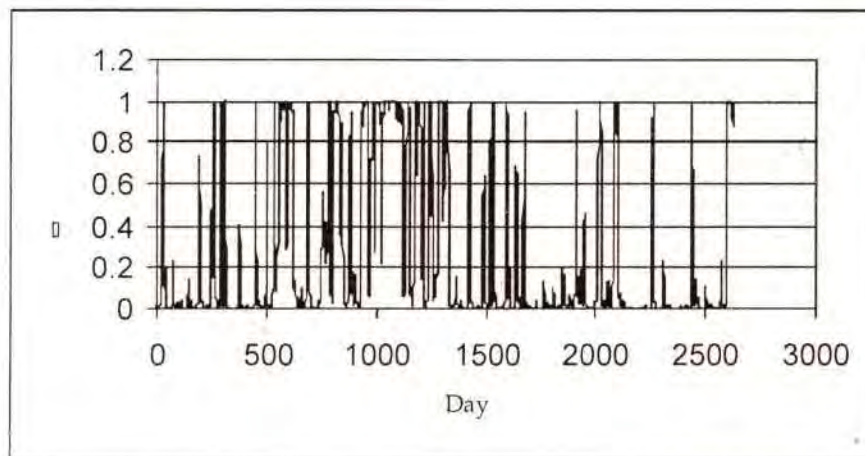
A. CNX Nifty Junior



B. Probabilities of Low Return Regime



C. Probabilities of High Volatility Regime



D. Probabilities of High Volatility and Low Return Regime

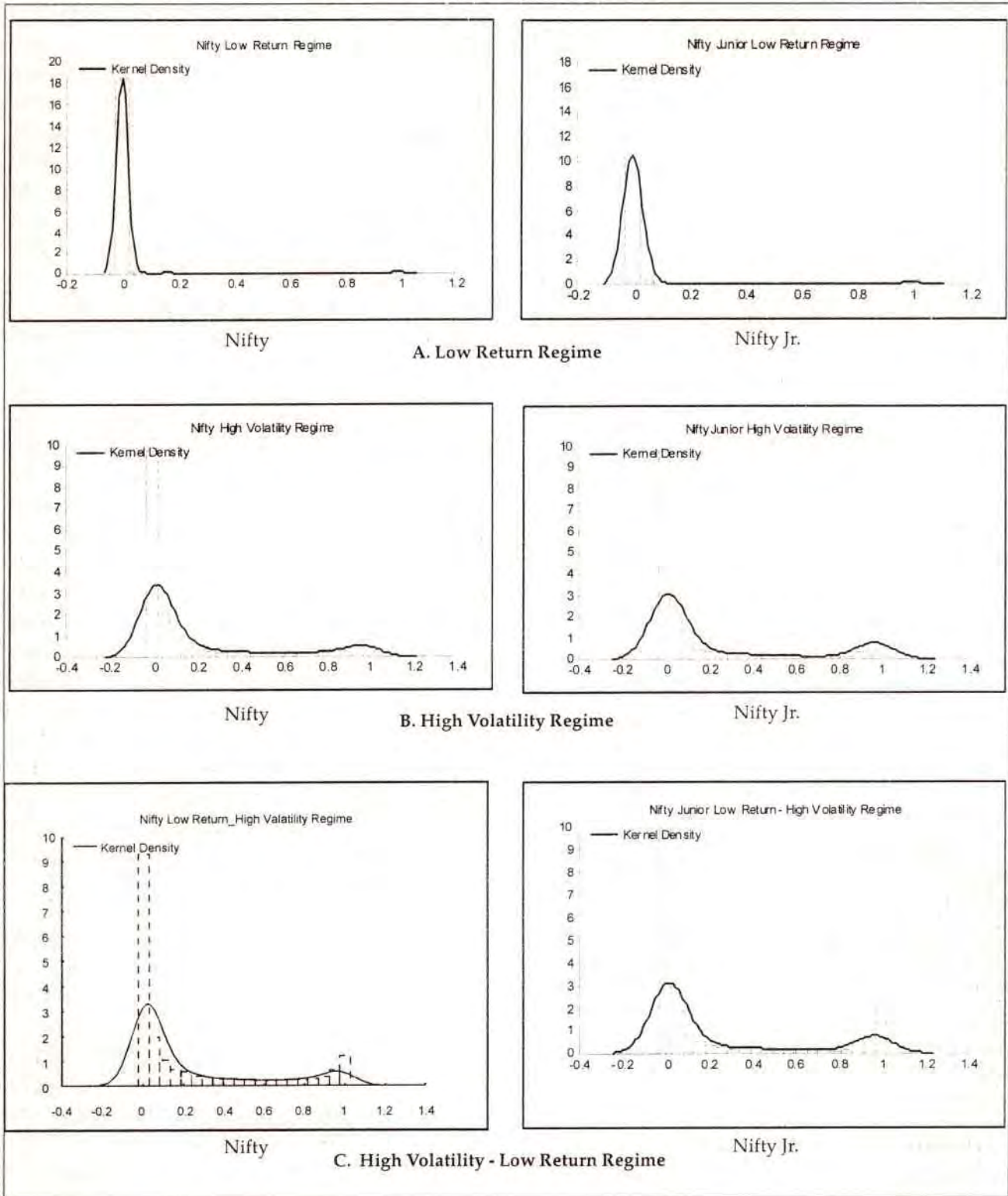
in Regime 2. These results imply that there is a negative association between the returns and the volatility. High volatility is associated with low returns and the low volatility with the high returns. Both the regimes show quite high levels of persistence. The persistence probabilities of regimes (p and q) are quite high and while the transition probabilities from one regime to another regime ($'1-p'$ and $'1-q'$) are quite low, $p+q-1$ is very close to 1.

The time-series plots of Regime 1 probabilities for Nifty (Figure 1.D) and Nifty Jr. (Figure 2-D), reveal many intricacies of the switching behaviour. If we compare these probabilities with the regime probabilities of variance switching

model (Equation 4), we find that these two sets of regime probabilities (Figure 1-C and Figure 2-C) closely resemble each other. The coefficients of correlation between these two probabilities are $+0.9961$ ($p < 0.000$) and $+0.9988$ ($p < 0.000$), respectively for Nifty and Nifty Jr. returns. The Kernel density plot of the probabilities for the high-volatility-low-return regime (Figure 3.D) also indicates similar behaviour as is seen in the high-volatility regime (Figure 3-C). This implies that the forces governing volatility play of more important role in the switching behaviour. This observation may have certain implications for return-variance causality relationship. It appears that a change in volatility brings about a change

Figure 3

Kernel Density of Regime Probabilities



in return but the same is not true vice versa. Another interesting fact is that the regime switching in Nifty and Nifty Jr. is synchronized as Figures 1-D and 2-D resemble. The correlation coefficient between Regime 1 probabilities in these indices is +0.7397 ($p < 0.000$). This suggests that the forces governing switching behaviour are predominantly market-wide in nature rather than portfolio-specific.

The likelihood ratios for the mean-and-variance-switching in comparison to no-switching null-hypothesis are 504.62 and 806.72, respectively, for Nifty and Nifty Jr. returns. This implies a strong rejection of the no-switching null-hypothesis in favour of the mean-and-variance-switching. However, if we compare these results with the results of variance-switching model (Equation 4), no remarkable improvement is found in log-likelihood and SIC. This again reinforces our conclusion that volatility is the governing force in the switching behaviour.

We have also estimated the differential effect of Regime 2 in comparison with Regime 1. These results are presented in Table 4. The differential effect is significant for both the mean and the variance, but for variance-switching, this effect is much stronger (as reflected by high t -value).

Diagnostic statistics also reveal interesting facts. The residual kurtosis significantly drops down to normal when we allow simultaneous switching of the mean and the variance. Jarque-Bera statistic shows that the residuals from mean-variance-switching model do not significantly deviate from the normality. This implies that the mean-variance-switching model brings about significant improvement in the model specification. However, high values of the Box-Pierce statistics (Q-12) for residuals and the squared-residuals show that there is still room for improvement for specifications. For better results, we may include autoregressive (AR) terms and autoregressive conditional heteroskedasticity (ARCH) terms in the switching model.

IMPLICATIONS OF THE RESULTS

The most significant implications of this study are for the on-going debate on the inter-temporal risk-return relationship. Most of the empirical studies on the time-varying volatility-return relationship are based on one of the three techniques: the GARCH-in-mean (GARCH-M) model, Instrumental Variable (or GMM) approach, and the asymmetric GARCH modelling (such as EGARCH, TGARCH, and QGARCH etc.). Instead of modelling one variable as dependent on another variable (as is the case with all the modelling techniques mentioned above), the variance and the return are allowed to vary independently in two regimes. Therefore, the approach can be said to be free from any specification bias. It has been observed that the negative returns are associated with high volatility. These results are consistent with the results of earlier studies based on switching-regime approach (Turner, et al., 1989; Brock, et al., 1992; Schaller and van Norden, 1997; Kim, et al., 2004). However, the results reveal two noteworthy peculiarities. First, the forces governing volatility are playing the dominant role in regime switching. Therefore, it seems logical that the causality runs from volatility to returns, are not the other ways round. This inference appears more consistent with the volatility-feedback story. However, the volatility-feedback hypothesis implies that the negative shocks in returns must be temporary in nature and confined to the beginning of the high-volatility regime. We have observed a negative mean return for a persistent period of high-volatility. Therefore, our results do not fully support the volatility-feedback hypothesis. They look rather consistent with the 'asymmetric-reaction-to-news hypothesis'. According to this hypothesis, market overreacts to bad news (Koutmos, 1999; Karmakar, 2006; Marshall and Walker, 2002). Therefore, bad news brings about high volatility alongwith with low returns. On the other hand, the market generally shows a gradual adjustment to good news, leading to low level of volatility.

Another interesting question that emerges from the results of our study is, "Why do investors hold stocks during the high-variance-low-return regime?" If the stock market is characterised by two regimes - a regime in which the risk is relatively low and investors earn high returns and in another regime, where the risk is substantially higher and investors lose money (and moreover these regimes are persistent in nature); the investors should not rationally hold stocks during the high-volatility-low-return regime. Turner, *et al.*, (1989) explain this, using the idea that investors are unable to observe the current regime and therefore learn about the current regime over time. However, the findings of Brock, *et al.*, (1992) do not appear to support this proposition. They find that when certain trading rules give a 'buy' signal, subsequent returns are positive on an average; but when the trading rules give a 'sell' signal, subsequent returns are negative on average. Negative returns are associated with high variance than positive returns. In other words, the regimes are predictable to some extent.

The inverse relationship between the variance and the return, together with the persistent nature of the regimes has placed a great challenge before the fundamental law of finance - the risk-return trade-off. The existing hypotheses do not fully explain these results. The existence of the high-variance-low-return regime is against the notion of the rationality of investors. Therefore, more research is required to explain this anomaly, particularly in light of the non-rationality-based behavioural theory of finance. The behaviour of the rational and noise-traders during different regimes may perhaps throw some light on this issue.

CONCLUSION

In this paper, the behaviour of index-returns and volatility has been examined by using Hamilton's Markov switching regime technique. Significant evidence of two regime switching behaviour is found. While, in the first regime, the mean return

is negative and the return variance is significantly high, in the second regime, the mean return is substantially higher and the return variance is relatively low. Both of regimes show high persistence. We also find that volatility plays a dominant role in switching behaviour. The switching is significantly synchronized across the indices; and is, therefore, likely to be governed by the macro-economic forces rather than portfolio-specific forces.

The inverse relationship between return and variance is against the notion of the 'risk-return trade-off' - the first fundamental law of finance. The leverage-effect hypothesis and the volatility-feedback hypothesis also do not completely reconcile with these results. Further research, particularly the behavioural research, is required to explain this anomaly.

REFERENCES

- Black, F. (1976), "Studies of Stock Price Volatility Changes", in *Proceedings of 1976 Meetings of Business and Economic Statistics Section, American Statistical Association*, pp. 177-181.
- Brandt, M. W. and Q. Kang (2004), "On the Relationship between the Conditional Mean and Volatility of Stock Returns: A Latent VAR approach", *Journal of Financial Economics*, Vol. 72, No.2, pp. 217-257.
- Brock, W., J. Lakonishok, and B. LeBaron (1992), "Simple Technical Trading Rules and The Stochastic Properties of Stock Returns", *Journal of Finance*, Vol. 47, No.5, pp. 1731-1764.
- Campbell, J. (1987), "Stock Return and the Term Structure", *Journal of Financial Economics*, Vol. 18, No.2, pp. 785-803.
- Christie, A. (1982), "The Stochastic Behaviour of Common Stock Variances: Value, Leverage, and Interest Rate Effect", *Journal of Financial Economics*, Vol. 10, No.4, pp. 407-432.
- Davidson, J. (2006), "Time Series Modeling 4.19", Software downloadable from <http://www.timeseriesmodelling.com> (accessed December, 2006).
- Doornik, J.A. (2006), "OX-Consol Version 4.04", Software downloadable from <http://www.doornik.com> (accessed December, 2006).
- French, K.; G. Schwert, and R. Stambaugh (1987), "Expected Stock Returns and Volatility", *Journal of Financial Economics*, Vol. 19, No. 1, pp. 3-30.
- Garcia, R. (1998), Asymptotic Null Distribution of Likelihood Ratio Test in Markov Switching

- Models", *International Economic Review*, Vol. 39, No. 3, pp.763-788.
- Glosten, L.R.; R. Jagannathan, and D. E. Runkle (1993), "On the Relation between Expected Value and the Variance of the Nominal Excess Return on Stocks", *Journal of Finance*, Vol. 48, No. 5, pp. 1779-1801.
- Guo, H. and R. F. Whitelaw (2006), "Uncovering the Risk-Return Relation in Stock Market", *Journal of Finance*, Vol. 61, No. 3, pp.1433-1463.
- Hamilton, J. D. (1989), "A New Approach to the Economic Analysis of Nonstationary Time-Series and Business Cycle", *Econometrica*, Vol. 57, No.2, pp. 357-384.
- Hamilton, J. D. (1990), "Analysis of Time-Series Subject to Changes in Regime", *Journal of Econometrics*, Vol. 45, No. 1, pp. 39-70.
- Hamilton, J. D. and R. Susmel (1994), "Autoregressive Conditional Heteroskedasticity and Change in Regime", *Journal of Econometrics*, Vol. 64, No. 1, 2, pp.307-333.
- Hansen, B.E. (1992), "The Likelihood Ratio Test under Non-standard Conditions: Testing the Markov-Switching Model of GDP", *Journal of Applied Econometrics*, Vol. 7, Supplement Issue, pp. S61-S82.
- Hansen, B.E. (1996), Inference when Nuisance Parameter is not Identified under the Null-Hypothesis", *Econometrica*, Vol. 64, No. 2, pp. 413-430.
- Karmakar, M. (2006), "Time-Varying Volatility and leverage Effect in Financial Markets of Asia-Pacific Countries", *ICFAI Journal of Applied Finance*, Vol.12, No. 6, pp. 19-29.
- Kim, C.; J. C. Morley, and C. R. Nelson (2004), "Is There a Positive Relationship between Stock Market Volatility and the Equity Premium", *Journal of Money, Credit and Banking*, Vol. 36, No. 3, pp 339-359.
- Kitagawa, G. (1987), "Non-Gaussian State Space Modelling of Nonstationary Time Series", *Journal of American Statistical Association*, Vol. 82, No.400, pp.1032-1063.
- Koutmos, G. (1999), "Asymmetric Price and Volatility Adjustments in Emerging Asian Stock Markets", *Journal of Business Finance and Accounting*, Vol. 26, Nos. 1-2, pp. 83-100.
- Lettau, M. and S. Ludvigson (2003), "Measuring and Modelling Variance in Risk-Return Trade-off", Working paper, New York University. <http://bbs.cenet.org.cn/html/cenetbbs/20033613192947652.pdf> (accessed March, 2007)
- Linter, J. (1965), "Volatility of Risky Assets and the Selection of Risky Investments in Stock Portfolio and Capital Budget", *Review of Economics and Statistics*, Vol. 47, No. 1, pp. 13-37.
- Marshall P. and E. Walker (2002), "Asymmetric Reaction to Information and Serial Dependence of Short-Run Returns", *Journal of Applied Economics*, Vol. 5, No. 2, pp. 273-292
- Merton, R. (1973), "An Inter-temporal Capital Asset Pricing Model", *Econometrica*, Vol.41, No.5, pp. 867-887.
- Merton, R. C. (1980), "On Estimating the Expected Return on the Market: An Exploratory Investigation", *Journal of Financial Economics*, Vol. 8, pp. 323-361.
- Mossin, J. (1966), "Equilibrium in Capital Asset Market", *Econometrica*, Vol. 35, No. 4, pp. 768-783.
- Poterba, J. and L. Summers (1986), "The Persistence of Volatility and Stock Market Fluctuations", *American Economic Review*, Vol. 76, No. 5, pp.1142-1151.
- Psaradakis, Z. and N. Spagnolo (2002), "On the Determination of the Number of Regimes in Markov Switching Autoregressive Models", *Journal of Time-Series Analysis*, Vol. 24, No.2, pp. 237-252.
- Schaller, H., and S. van Norden (1997), "Regime Switching in Stock Market Returns", *Applied Financial Economics*, Vol.7, pp. 177-191.
- Schwert, G. (1989), "Why does Stock Market Volatility Change over Time?" *Journal of Finance*, Vol. 44, No.5, pp. 1115-1153.
- Sclove, S. (1983), "Time-Series Segmentation: A Model and a Method", *Information Science*, Vol. 29, pp.7-25.
- Sharpe, W. (1964), "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk", *Journal of Finance*, Vol. 19, No.3, pp. 425-442.
- Turner, C. M., R. Startz and C. R. Nelson (1989), "A Markov Model of Heteroscedasticity, Risk and Learning in Stock Market", *Journal of Financial Economics*, Vol. 25, No. 1, pp. 3-22.
- Whitelaw, R. F. (1994), "Stock Market Risk and Return: An Equilibrium Approach", *Review of Financial Studies*, Vol. 13, No. 3, pp. 521-547.

IMPACT OF DIVIDEND ANNOUNCEMENT ON SHARE PRICES

Ramesh Chander*, Renuka Sharma** and Kiran Mehta**

Abstract

Studies have been conducted in various countries to assess the impact of dividend announcement on share prices which have always been an area of vital interest for financial economists. If the market responds instantaneously, accurately and in an unbiased manner to dividend announcement, it is assumed to be more efficient. Taking this cue further, the present study seeks to examine the informational efficiency for dividend announcement in the Indian share markets. It involves identification as to how swiftly new information regarding dividend is adjusted in current prices and to note any drift in such an adjustment mechanism in order to formulate profitable investment strategies. Based on event methodology, this study documents evidence for 188 incidents of dividend announcement for Group A listed stocks on the Bombay Stock Exchange during the study period from January 2004 to December 2005. The results reported a consistent incidence of average abnormal returns for Capital Asset Pricing Model (CAPM) around the dividend announcement. However, an average abnormal return in terms of mean-adjusted framework was considered logically more consistent. The pattern of average cumulative abnormal returns in this context indicated over-expectation of investors regarding dividend announcement in the information leakage phase which had subsided considerably, consequent to the dividend announcement. These return drifts were more categorical and visible when depicted through charts. Nevertheless, a broad contour of market efficiency was endorsed and validated across all the measurement criteria to exuberate informational efficiency in the Indian stock markets. It can be inferred that dividend income does not inspire much the over-enthused investors in the rising capital markets. Under these conditions, market participants are more destined to generate abnormal return by devising investment strategies on the fundamentals, rather than on technical analysis.

Key Words: *Informational efficiency, Dividend announcement, Abnormal return, Cumulative abnormal returns, Share prices.*

INTRODUCTION

NUMEROUS studies have been conducted across the globe to frame theoretical base and have generated evidence to discern the impact of dividend

announcement on share prices. Fama compiled a comprehensive appraisal of theoretical and empirical evidence of market efficiency in which an efficient market was defined as "a market in which prices always fully reflect available

* Chairperson, Department of Business Administration, Chaudhary Devi Lal University, Sirsa - 125 055 (Haryana); e-mail: rameshchandra2005@rediffmail.com

** Both lecturers, Department of Business Administration, Chaudhary Devi Lal University, Sirsa - 125 055 (Haryana)

information" (Fama, 1970). Efficiency in a competitive market implies that no investor can earn abnormal returns consistently and, as a result of equilibrium in prices, there are no undervalued or overvalued shares. In an informational efficient market, all investors are expected to react to any particular information rationally and 'early birds' to the information are unable to earn profit from it. This proposition was further modified by Fama (1991) for an adjustment which spawned from the growing body of empirical research on the Efficient Market Hypothesis (EMH) as "the expected value of abnormal returns is zero, but chance generates deviations from zero (anomalies) in both directions."

Informational efficiency of the market has always been an area of vital interest for financial economists. The Efficient Market Hypothesis is based on the preposition that the available information is reflected in stock prices and no investor is able to beat the market to attain abnormal returns. Here, the time consumed by the market to get adjusted to new information is the most crucial factor. If the market responds instantaneously, accurately, and in an unbiased manner, it is assumed to be more efficient. Ball and Brown (1968) and Fama, *et al.* (1969) were first to notice that there was a delay in the stock market's response to the events that contain relevant information. Consequently, Fama (1970) defined sub-efficient markets where prices may fail to fully reflect all relevant information because of the existence of time lag between the announcement of an event and its incorporation into share prices (Fama, 1991).

The most effective information in such cases could be the announcement of earnings, dividends, mergers, and acquisitions which could have a direct impact on the value of a company, and, hence, on its stock price. Sometimes, such information is categorised on the basis of accounting information and non-accounting information. This form of market efficiency reflects all historical and publicly available information, which restrains an investor

to make abnormal returns based on these publicly available information and to predict share returns. The commanding feature of efficient market is to test how rapidly the prices adjust to new information. One of the reliable research tools in this regard is the event study. It is a statistical tool to examine whether the release of information is followed by consistent and approved abnormal returns. An event study measures the average cumulative performance of a stock return, from a specified number of time periods before and after the announcement of the event under study.

REVIEW OF LITERATURE

Fama, *et al.* (1969) conducted the seminal study on the semi-strong form of market efficiency with a view to determining the effect of stock splits on share prices. The study is important in the sense that it was the first study of its kind for developing a research methodology for testing market efficiency under reference.

According to Peterson (1971), an announcement of bonus issue has a momentous impact on stock prices. Scholes (1972) found a significant, but short-term, impact on stock prices by the sudden decision of managers to sell a large number of stocks in the market.

Petit (1972) documented that investors are able to earn significant abnormal returns after cash dividend announcements by the companies. Grossman (1976) has shown that under certain conditions prices can reveal all private information to uninformed traders.

Charest (1978) found that the stock-split information caused insignificant abnormal returns over a period of time and validated efficiency in capital market. However, Grossman and Stiglitz (1980) stipulated that prices incorporate new information immediately only if the cost of transactions is zero.

Grinblatt, Masulis and Titman (1984) provided evidence of significantly positive announcement returns for both stock-splits and

large stock dividend announcements. One potential hypothesis, they provided for this evidence, is the so-called retained earnings hypothesis with stock dividends. If the firm meets constraints that are a function of retained earnings, such as legal restrictions, stock exchange rules, or bond covenants, the bonus shares can inhibit the firm's ability to pay cash dividends. Firms expecting positive future performance will not expect these constraints to be binding, so they do not mind reducing retained earnings. Firms that do not expect to do well would find these constraints binding and, hence, would choose not to issue more shares.

Patell and Wolfson (1984) examined the market reaction around dividend and earning announcements. They documented the evidence that showed abnormal return lasts no longer than 10 minutes following the time of the announcement. Despite this general finding of rapidly adjusting stock prices, some puzzling results remain. Most notable is the fact that stock prices do not adjust instantaneously to profit announcements. Instead, on an average, the firm's share price continues to rise or fall for a substantial period after the announcement of an unexpectedly high or low profit. This anomaly appears to be quite robust to changes in the sample period and research methodology (Ball and Brown, 1968; Chan, Jegadeesh and Lakonishok, 1996; and Fama, 1998).

Agarwal (1991) studied market efficiency to analyse the behaviour of dividends and share prices of selected automobile companies. In this study, it was observed that the current dividend behaviour is explained by current level of net profits and past two years dividends. Three and four years lagged dividends were also tried to explain current stock prices but were found to be statistically insignificant.

Joshi (1991) concluded that in the efficient market conditions, a takeover bid acts as a good disciplinary device to punish the inefficient management. The inefficiency of stock market

distorts the functioning of this device and takeover bids were not observed to be made for rational reasons always.

Dhillon and Johnson (1994) studied 131 announcements, 61 dividend increases, and 70 dividend decreases and concluded that markets were efficient.

Sahadevan and Thiripalraju (1995) studied the price behaviour of shares with the help of monthly observations of money supply and stock price variables. In the study, it was observed that money supply (M) and Sensex did not show any relationship between stock returns and broad money, except for the period from May 1980 to March 1987. It concluded with the absence of any consistent evidence for various sample periods in the direction of causal relationship between money supply and stock prices.

Rao (1999) studied market efficiency to examine the response of stock prices to fiscal and monetary policy pronouncements, changes in industrial policy, changes in administered price policy, and changes in exchange rate policy of a particular industry or a group of firms (e. g., export-oriented firms). Concerned with the fiscal and monetary policy pronouncements, it was found that federal budgets were associated with increase in volatility whereas the half-yearly credit policy announcements had no impact on the market movements. Changes in administered prices seemed to have the maximum impact on the market.

Chaturvedi (2000) worked on the share price behaviour in relation to P/E ratios in the pre-and-post announcement period of 90 stocks listed on the Bombay Stock Exchange. He observed that two-third of the post-announcement cumulative abnormal returns occurred in the control period of 21 days to 40 days, implying that stock prices do not adjust rapidly to the P/E information.

Gupta (2001) studied market efficiency to examine the semi-strong form of efficient market hypothesis with the help of selected accounting variables and macro-economic variables. It has

been found that the dividend per share had significant correlation with the market prices. However, the return on equity did not show a significant influence and the growth in price-earning ratio showed little evidence. Likewise, the growth in earning per share and leverage had negligible influence in explaining the underlying share prices.

Hallock and Mashayekhi (2003) examined the share price reaction to dividend, earnings, and stock-split announcements over a 30-year period. The study found strong support for this idea and noted very little evidence that was consistent with the idea that "news is less newsworthy". Although, they did find that the share price reaction to "good" dividend news has become less positive and to "bad" dividend news has become less negative over time.

Hallock and Farzad (2003) tested the signaling theory of dividends by investigating the stock-price reaction to dividend announcements on the Oslo Stock Exchange, and subsequent changes in the cash flows of the firms involved. The results indicated that significant abnormal stock returns were associated with announcements of dividend changes. The results were robust to alternative models of dividend expectations, after controlling for the impact of earnings announcements.

Sponholtz (2005) analysed the simultaneous announcement of current dividends, current earnings, and the management's forecast of earnings of the next year. He found that stock market reaction to the simultaneous announcement can be explained by the component of surprise contained in the current dividend and the management's forecast of next year's earnings.

OBJECTIVES OF THE STUDY

The present study seeks to examine the impact of dividend announcement on share prices in the Indian stock markets. It involves identification as to how swiftly the new information on dividend announcement is adjusted in current prices and

to locate market inefficiencies for profit opportunities in view of the re-alignment of share prices to the annual dividend announcement. As such, the study intends to investigate the issues outlined below:

- i) Does any new information disclosure on annual dividend cause discernible movement in share prices?
- ii) Can investors devise profitable investment strategies given market adjustment to new information disclosure relating to annual dividend announcement?
- iii) Does the impact of dividend announcement remain stationary across the measurement criteria?

RESEARCH METHODOLOGY

As outlined earlier, the present study was conceptualised primarily to identify informational content of annual dividend announcements for the investors to earn abnormal returns consistently. Based on event-study methodology, it also intends to generate empirical evidence on stock market efficiency in India in its semi-strong variant for dividend announcement. In order to pursue the said objectives, the following were hypothesis formulated :

- H₀₁ That share prices react instantaneously to dividend announcement in an unbiased manner to absorb new information disclosure.
- H₀₂ As a logical corollary to H₀₁, investors are unable to earn any abnormal returns consistently.
- H₀₃ That investment performance enshrined in H₀₂ holds good across the measurement criteria for dividend announcement.

Companies release new information (after conclusion of the Board meetings) on dividend announcement to the press and the same is uploaded on their websites almost

instantaneously. This information is also communicated to the stock exchanges and the Securities and Exchange Board of India (SEBI) for prudent governance and for the benefit of investors. The electronic and print media flash this information for public consumption. Economic data storage and maintenance agencies update their databases to reflect new information disclosure. Thus, there are different modes to make public aware of new information. Since the requisite information in this study is procured from the PROWESS database maintained by the Centre for Monitoring Indian Economy (CMIE) under a licensing agreement, the nod of public availability of information concerning annual dividend announcement is the same as is disclosed in the PROWESS database (as Board meeting disclosure). This is a designated event (dividend announcement) in this research paper for the computation of stock returns to discern its impact on the underlying market prices.

For information disclosure concerning the event (annual dividend announcement), all Group A listed shares on the Bombay Stock Exchange were considered to investigate informational efficiency for a two-year period, January 2004 to December 2005. It comprised 188 events consisting of 104 events for the calendar year 2004 and the remaining 84 for the calendar year 2005. In the present context, "event study" is used to examine the stock price changes surrounding the corporate dividend announcement. If the stock price tenders up relative to the price movements of other stocks during the same period, the market views the event as beneficial; if the price drops, the event is perceived as detrimental.

As noted by Fama (1991), the event study findings are fairly predictable and can produce 'less than controversial' findings for informational efficiency of stock markets. The rationale for event-study examination is to see any abnormal investor behaviour around the event announcement for excess return. In other words, the event study identifies difference between realized stock return (R) and its expected

return, i.e. abnormal return (Fama, 1970). The abnormal return (AR_{jt}) for a stock (j) in given period (t) is obtained by considering the ex-post return (R_{jt}) and subtracting it from the expected return ($E(R_{jt})$) in the same period (t) on the presumption that investors expect equivalent market returns such that:

$$\text{Abnormal return: } AR_{jt} = R_{jt} - E(R_{jt})$$

The expected return is being generated in the investment literature from various pricing models, such as Capital Asset Pricing Model (CAPM), Market Model (MM), Mean-adjusted Return, Market-adjusted Return, and the like. In the present study, the CAPM, Market-adjusted Model, and Mean Adjusted Return Model have been applied to identify and measure information efficiency for dividend announcement across the measurement criteria. Other key inputs in this methodological frame are the length of event window and return measurement horizon. Weekly return measurement is preferred for obvious reasons to provide enough breathing space to the market mechanism to react to the new information disclosure. Further, that the trading volume on the Indian stock exchanges is concentrated in fewer stocks as compared to a larger sample size for the present study. The weekly return measurement horizon is expected to develop a conduit for a level-playing field for most actively traded stocks and not so frequently-traded stocks sampled in the study. As a corollary, 25 weeks comprised the event window, consisting of 12 weeks' horizon of pre-announcement and the same period in the post-dividend announcement horizon. The BSE 100 index was preferred for the benchmarking market portfolio for wider visibility and market breadth. The weekly yield on 91-days Treasury Bills, (Govt. of India) was imputed for risk less return in the study. The results obtained were scanned for .05 and .01 levels for statistical significance.

CAPM Framework

One of the basic models to determine the expected return for stock specific abnormal

returns is the CAPM framework. This model was developed and extensively used by Sharpe (1964), Lintner (1965) and Mossin (1966) to generate expected return in the manner given below:

$$E(R_{jt}) = R_{ft} + [E(R_{mt}) - R_{ft}] \text{cov}(R_{jt}, R_{mt}) / \sigma^2(R_{mt})$$

where,

$E(R_{jt})$ is the expected rate of return on stock (j) in a given period (t).

R_{ft} is the risk less rate of return in a given period (t).

$E(R_{mt})$ is the expected rate of return of market portfolio in a given period (t).

$\text{Cov}(R_{jt}, R_{mt})$ is the co-variance between R_{jt} and R_{mt} .

σ^2 is the variance of rate of return of the market in a given period (t).

Market-adjusted Return Model

The Market-adjusted Return Model is widely used in empirical research on the subject. This model assumes that the expected return is constant across securities, although it is not necessarily constant for a given security. The mathematical expression for this model is:

$$AR_{it} = R_{it} - R_{mt}$$

where,

AR_{it} is the abnormal return on *i*th stock in *t* period.

R_{it} is the ex-post return on *i*th stock in *t* period.

R_{mt} is the ex-post return on market index (*m*) in *t* period

Mean-adjusted Return Framework

The Mean-adjusted Return Model assumes that the expected return for security (j) is equal to a constant K_j which can be different across securities (Brown and Warner, 1980). The abnormal return on a given stock (j) is generated in this framework as given below:

$$AR_{jt} = R_{jt} - K_j$$

where,

R_{jt} is the realised return on a stock (j) in a given period (t).

K_j is the simple stock return average of the estimation period.

The return-measurement framework explained above is used in this study to derive abnormal returns on account of new information disclosure regarding sample stocks. Since an excess return on investment is the difference between actual and expected return on that investment, it is implicit in every test of market efficiency. In some cases, this expected return adjusts for risk using the capital asset pricing model or the arbitrage pricing model, and in others the expected return is based upon returns on similar or equivalent investments. In every case, a test of market efficiency is a joint test of market efficiency and the efficacy of the model used for expected returns. When there is an evidence of excess returns in a test of market efficiency, it can indicate that markets are inefficient or that the model used to compute the expected returns is wrong or both. While this may seem to present an insoluble dilemma, if the conclusions of the study are insensitive to different model specifications, it is much more likely that the results are being driven by true market inefficiencies and not just by model misspecifications.

One of the most significant problems postulated by the event study is that the pattern of the observed stock returns could depict inadequacies of the benchmark model used in measuring extraordinary returns as opposed to market inefficiency. So the model used to calculate expected returns must be assumed as it correctly defines the normal security returns. So, while testing the Efficient Market Hypothesis (EMH) or analysing the results regarding efficiency or inefficiency, it should be considered that the hypothesis could be accepted or rejected on account of use of the incorrect equilibrium model.

When the information regarding any corporate announcement reaches a small group of investors before the official release of information, the abnormal returns computed under the event study may not provide generic results. In this case, the stock prices may not adjust rapidly to the new information before the official announcement of the event. Likewise, any abnormal return on the announcement date is a poor indicator of the total impact of the information release. In these cases, cumulative abnormal returns are used as a competent measure, which is simply the sum of all abnormal returns over the time period of interest. When measuring CARs, the abnormal return for each

day is added from the day before. If abnormal return for the day $t-1$ is -2 per cent, t is 3 per cent, and $t+1$ are 5 per cent the CARs would be -2 per cent, 1 per cent, and 6 per cent, respectively (Ross *et.al.*, 1978).

The analysis of event studies analyses are typically used for two different purposes:

1. As a test of semi-strong form market efficiency; and
2. Assuming that the market efficiency hypothesis holds, as a tool for examining the impact of some event on the wealth of the shareholders.

Table 1
Average Abnormal Returns (AAR) for Sample Shares for Dividend Announcement

Week	CAPM Model		Market-adjusted Return Model		Mean-adjusted Return Model	
	Average Abnormal Returns	z-values	Average Abnormal Returns	z-values	Average Abnormal Returns	z-values
-12	-0.9044	-0.4374	-0.5288	-0.3636	-0.6859	-0.4268
-11	-0.7423	-0.4107	-0.9126	-0.4159	-1.2627	-0.4303
-10	-0.7814	-0.4397	-1.2926	-0.5243	-1.8610	-0.4751
-9	-0.7342	-0.4279	-1.6371	-0.5055	-2.4839	-0.4802
-8	-0.9346	-0.4565	-2.2109	-0.5986	-3.1898	-0.5139
-7	-0.3402	-0.4090	-2.0829	-0.4547	-3.5118	-0.4734
-6	-0.4512	-0.3920	-2.0671	-0.4101	-3.7560	-0.4398
-5	-0.2343	-0.3555	-1.8901	-0.3219	-3.9605	-0.3977
-4	-0.2343	-0.3310	-1.6578	-0.2635	-4.1025	-0.3709
-3	-0.0655	-0.3015	-1.2603	-0.1873	-3.9985	-0.3231
-2	0.0736	-0.2699	-0.7134	-0.1029	-3.8935	-0.2903
-1	0.1361	-0.2398	-0.0721	-0.0104	-3.5462	-0.2418
0	-0.0286	-0.2234	0.3669	0.0539	-3.3435	-0.2099
1	0.0549	-0.2045	0.8749	0.1346	-3.0097	-0.1750
2	0.0806	-0.1881	1.4192	0.2449	-2.6287	-0.142
3	-0.3781	-0.1903	1.5364	0.2748	-2.6469	-0.1352
4	-0.2042	-0.1856	1.8142	0.3471	-2.5461	-0.1223
5	-0.6922	-0.1973	1.5381	0.2948	-2.8808	-0.1310
6	-0.4532	-0.1999	1.5325	0.3057	-3.0172	-0.1298
7	-0.6621	-0.2082	1.2741	0.2532	-3.3117	-0.1354
8	-0.7901	-0.2205	0.9397	0.1899	-3.7143	-0.1458
9	-0.6894	-0.2286	0.6924	0.1407	-4.0584	-0.1527
10	-0.8339	-0.2404	0.2966	0.0613	-4.5084	-0.1634
11	-0.5288	-0.2434	0.2667	0.0609	-4.7717	-0.1664
12	-0.6067	-0.2477	0.1111	0.0260	-5.0335	-0.1685

This paper provides an initial investigation of Indian stock market behaviour in reaction to the announcement of dividend, using the 'event study' methodology.

RESULTS AND DISCUSSION

As pointed out earlier, the results reported in this study were obtained in terms of the 'event study' methodology, wherein average abnormal returns were derived through CAPM, market-adjusted return and mean-adjusted return framework with a view to studying the impact of dividend announcement on stock prices.

Pattern of Average Abnormal Returns (AAR)

The pattern of average abnormal returns (AAR) around dividend announcement is shown in Table 1. In the CAPM framework, a lesser (close to zero) positive incidence of average abnormal return was noticed around (4 weeks pre/post-announcement) the dividend announcement date. The same were noticed gaining momentum and were magnified in a negative direction as the event horizon widened. However, this incidence could not be considered statistically significant to validate market inefficiency for a significant impact on stock prices.

A diametrically opposite behaviour of average abnormal returns was discovered around the dividend announcement when the abnormal returns were measured in the market-adjusted framework. These returns were negative in the estimation window, which turned out positive the after dividend announcement. The incidence of abnormal returns in this regard too was minimal one, which was not statistically significant. Though the positive incidence of average abnormal returns in post-announcement period reflects the investors' confidence in stock performance, yet these results further re-endorse the informational efficiency of the stock markets. On the other hand, a consistent negative behaviour for average abnormal returns was noticed in the mean-adjusted framework for average abnormal returns around dividend

announcement, both for the pre and post event announcement period. Incidence of z-values in this regard has further been inclined to the acceptance of null hypothesis for market efficiency.

Based on the results explained above, three generalisations can be deduced for informational efficiency of stock markets:

1. The incidence of average abnormal returns was consistent for the CAPM, with some insignificant magnitudinal variations around the dividend announcement.
2. For the Market-adjusted Model, diametrically-opposite incidence of average abnormal returns was discovered, with variations in magnitude.
3. Uniform and consistent abnormal return behaviour pattern was found in the Mean-adjusted Return Model.

Therefore, the average abnormal return derived in terms of the mean adjusted return model appears to be logically consistent and sound as compared to the other two measurement criteria. However, a broad contour of market efficiency was endorsed and validated across all the measurement criteria to exuberate parameter stationary behaviour of abnormal returns. On the whole, the results of the study vindicate the informational efficiency of the stock market in spite of statistically-insignificant variations across the measurement criteria for average abnormal returns around dividend announcement.

Pattern of Average Cumulative Abnormal Returns (ACAR)

Leakage of information tends to influence stock return as the information regarding dividend announcement is known to a small group of investors before its official announcement. In such a case, the stock price might start to increase (in case of a "good news" announcement), days

or weeks before the official announcement date. Any abnormal return on the announcement date is then a poor indicator of the total impact of the dividend information release. In these situations, a better indicator would be the cumulative abnormal return, which is simply the sum of all abnormal returns over the given time period. The cumulative abnormal returns thus captures total firm-specific stock movement for the entire period when the market might be responding to dividend announcement. The results pertaining to sample stocks during the study period are reported in Table 2.

The table reveals that the cumulative average abnormal returns have a rising tendency in the

post-event period as compared to the corresponding estimation phase, when the returns were measured with the CAPM framework. A higher negative incidence of cumulative abnormal return in the post-event phase reflects over-expectation and irrational reaction to the new information disclosure concerning the annual dividend. However, the magnitude of over-reaction was not considered significant to invalidate the stock market efficiency. Through the market adjusted model, the behaviour of cumulative average abnormal returns was similar to that of average abnormal returns as the same has been positive around the announcement. The behaviour of cumulative

Table 2
Average Cumulative Abnormal Returns (ACAR) for Sample Stocks for Dividend Announcement

Weeks	CAPM Framework		Market Adjusted Model		Mean Adjusted Returns	
	ACAR	z-test	ACAR	z-values	ACAR	z-values
-12	-0.9044	-0.4374	-0.5288	-0.3636	-0.1009	-0.2466
-11	-1.6468	-0.3209	-0.3837	-0.2581	-0.1161	-0.1317
-10	-2.4281	-0.4005	-0.3800	-0.3389	-0.2294	-0.2158
-9	-3.1624	-0.3421	-0.3445	-0.2592	-0.2756	-0.1893
-8	-4.0970	-0.4885	-0.5737	-0.4761	-0.3023	-0.2023
-7	-4.4372	-0.1498	0.1280	0.0771	-0.2715	-0.1521
-6	-4.8884	-0.207	0.0158	0.0096	-0.1498	-0.0733
-5	-5.1227	-0.087	0.1770	0.0860	-0.0231	-0.0107
-4	-5.3570	-0.0966	0.2323	0.1297	0.1211	0.0518
-3	-5.4225	-0.026	0.3974	0.2094	0.3176	0.1320
-2	-5.3489	0.0296	0.5469	0.3064	0.3820	0.1533
-1	-5.2128	0.0481	0.6413	0.3032	0.5532	0.2008
0	-5.2414	-0.011	0.4390	0.2392	0.5935	0.2251
1	-5.1865	0.0190	0.5080	0.2486	0.6719	0.2570
2	-5.1059	0.0260	0.5444	0.2344	0.6702	0.2577
3	-5.4840	-0.1632	0.1172	0.0713	0.6464	0.2731
4	-5.6883	-0.0796	0.2777	0.1506	0.6119	0.2731
5	-6.3805	-0.3269	-0.2760	-0.2112	0.5643	0.2787
6	-6.8336	-0.2011	-0.0056	-0.0042	0.5148	0.2698
7	-7.4957	-0.3084	-0.2584	-0.2309	0.4889	0.2536
8	-8.2856	-0.4215	-0.3344	-0.3006	0.4972	0.2511
9	-8.9752	-0.3547	-0.2473	-0.267	0.5150	0.2558
10	-9.8092	-0.4619	-0.3959	-0.3892	0.5050	0.2463
11	-10.3380	-0.2576	-0.0299	-0.0216	0.5013	0.2503
12	-10.9447	-0.3129	-0.1555	-0.1671	0.4755	0.2513

returns in this regard revealed initial over-reaction, which may be considered as a case of leakage of information relating to dividend announcement. This tendency had dwarfed around the announcement time and had resurfaced subsequently in the post announcement period in the form of over-expectation regarding the corporate performance. But the magnitude of this kind of reaction was not found statistically significant to refute the informational efficiency of markets.

The behaviour of cumulative abnormal returns in the mean-adjusted framework also indicate the over-expectation of investors regarding dividend announcement in the information-leakage phase. Around the announcement date, a higher magnitude of cumulative abnormal returns was discerned to indicate that the initial over-expectation had subsided considerably for new information disclosure. The positive instances of cumulative returns under reference in the post-announce periods indicate that the under-expectation in the early phase and its persistence in subsequent periods exuberate the build-up of over expectation for prospective dividend announcement. It won't be out of place to mention statistically insignificant behaviour of performance outcome for informational efficiency. These results can be generalized as follows:

1. The CAPM framework-based measurement criteria has reported a fairly consistent behavior of Average Cumulative Abnormal stock returns in pre-and post-dividend announcement period,
2. The alternative bouts of Average Cumulative Abnormal stock returns were experienced in both pre-and post-event periods as a result of under-expectation and over-reaction to dividend announcement under the market-adjusted measurement criterion, and
3. The mean-adjusted return framework has

indicated over-expectation regarding dividend announcement in the initial phase of pre-announcement period.

This is a classic case of under-reaction in the post-announcement phase. However, the performance outcomes across the measurement criteria reveal relatively better consistence performance reporting under the CAPM framework for dividend announcement.

Pattern of Returns Drift across Measurement Criteria

The behaviour of stock return drifts, outlined in the previous discussion, is more categorical and visible once the same is plotted on a plane for pre and post-dividend announcement phases. Though, as noted earlier, the CAPM-based stock returns were more consistent in the pre and post-announcement period, but the drift in the return pattern is more visible under the market-adjusted model around the announcement date. Similar inferences can also be drawn for the mean-adjusted model too, but the results were not vociferous and crystal as obtained under the market model (Figure 1). Regarding the drift in cumulative average abnormal return, the mean-adjusted model is relatively better placed to identify drift around dividend announcement date. The other two measurement criteria have depicted an identical pattern in this regard (Figure 2). On the whole, the mean-adjusted model has revealed identical drift pattern in stock return around dividend announcement both for average annual return and for its cumulative reincarnation.

In order to investigate the said phenomenon further, the year-wise information inputs were obtained both for Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR). Regarding the abnormal returns for 2004, the CAPM framework and the market-adjusted model vividly describe market efficiency around the event announcement. Similar tendency was also noted for mean-adjusted return model with a

Figure 1

Pattern of Average Abnormal Returns (AAR)
around Dividend Announcement

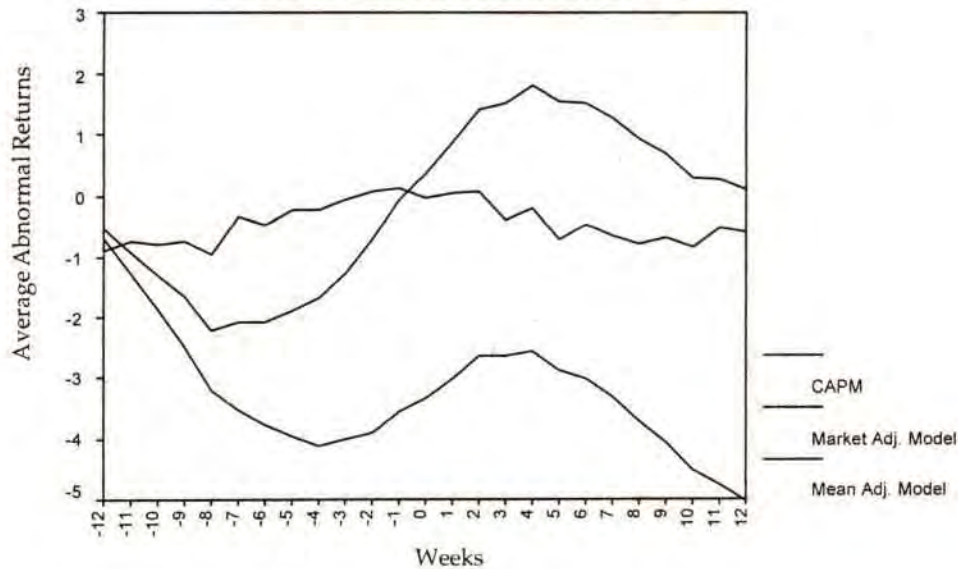
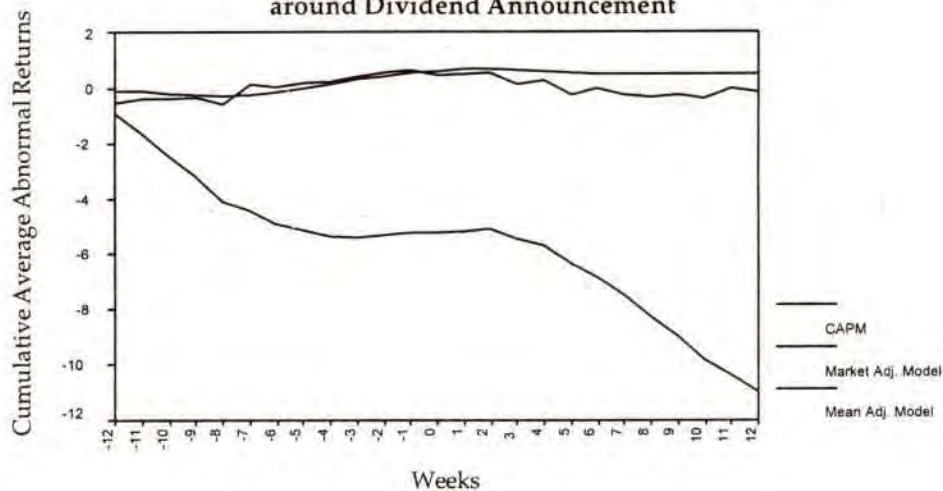


Figure 2

Pattern of Average Cumulative Abnormal Returns (ACAR)
around Dividend Announcement



little (delayed) lag for discounting the impact of dividend announcement (Figure 3). The behaviour of average abnormal return for the year 2005 signifies the absence of return drift under the mean-adjusted return model. Again, the CAPM and market-adjusted model discovers an identical return movements as noted for the year 2005 (Figure 4). It is interesting to note identical abnormal return behaviour for all the

three models for shorter measurement horizon while for a longer measurement horizon contrasting divergent abnormal return behaviour was noted across the measurement criterion. The crux of argument lies in the fact that divergent abnormal return behaviour under CAPM and market-adjusted model in the estimation window and the post-event window had been smoothed

Figure 3

Pattern of Average Abnormal Returns (AAR) around Dividend Announcement for 2004

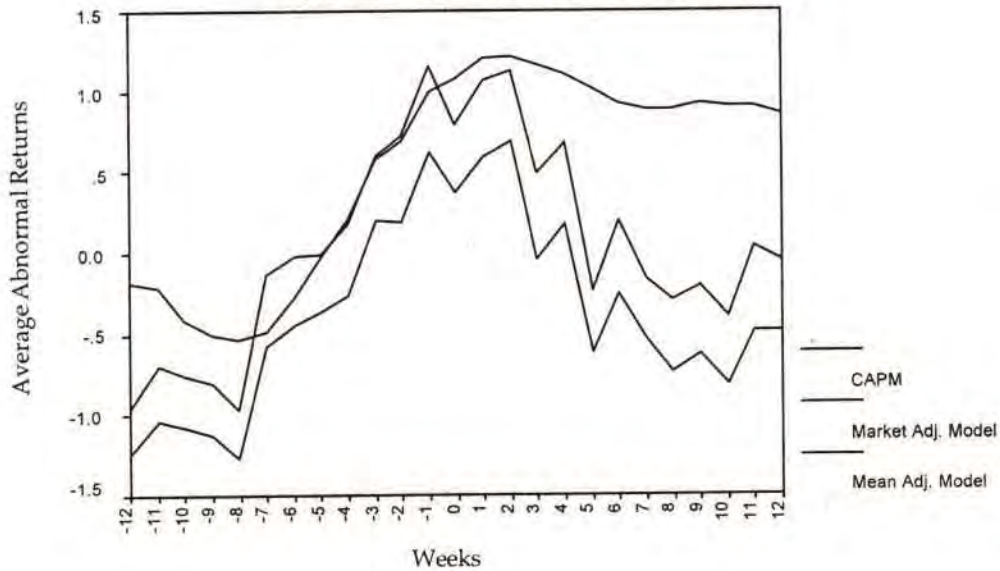
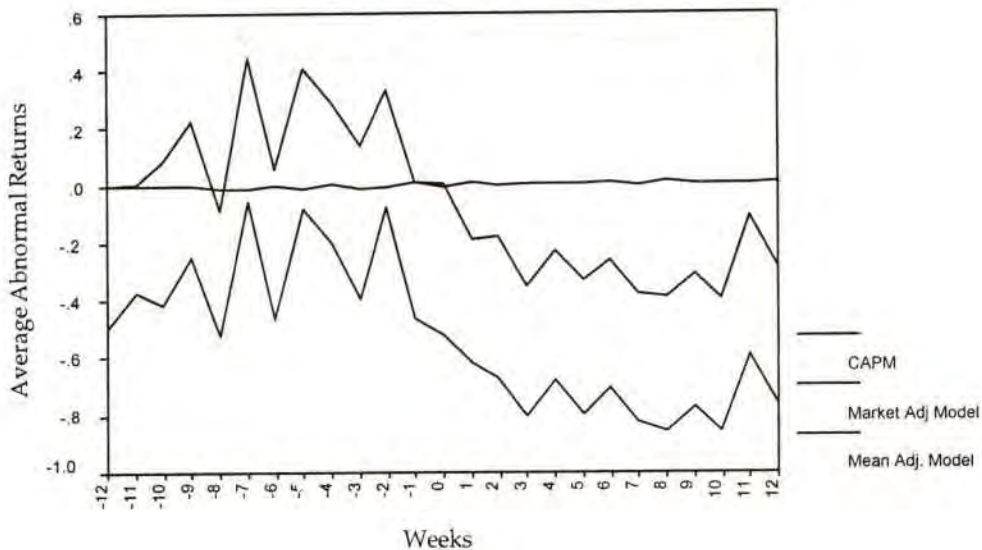


Figure 4

Pattern of Average Abnormal Returns (AAR) around Dividend Announcement for 2005.



out in the mean-adjusted return model simply by operation of averaging, still validating, the informational efficiency. It appears that the market is more efficient in the shorter horizon. Even further, it implies the significance of stock selection activity for an investor in the long run.

The information inputs reported in Figure 5 offers some interesting readings regarding the stock return behaviour for dividend announcement as regards three measurement criteria, for the year 2004. The CAPM and the

market-adjusted return model vividly describe insignificant stock return around the dividend announcement to document classic evidence for the over-expectation in the estimation window and the over-reaction in the post-event announcement window. The counterpart stock return pattern in the market-adjusted model in 2004 indicates the irrational over-expectation in the estimation window and under-reaction in the post-event window. These evidences were not

considered robust to invalidate informational efficiency proposition. This point of view is further endorsed by the return measurement criterion under the mean-adjusted return model in relation to the dividend announcement.

As regards the stock return behaviour pattern around dividend announcement for the year 2005, the average cumulative stock returns were consistently declining in the CAPM framework both in the pre-and post-dividend announcement

Figure 5

Pattern of Average Cumulative Abnormal Returns (ACAR) around Dividend Announcement for 2004.

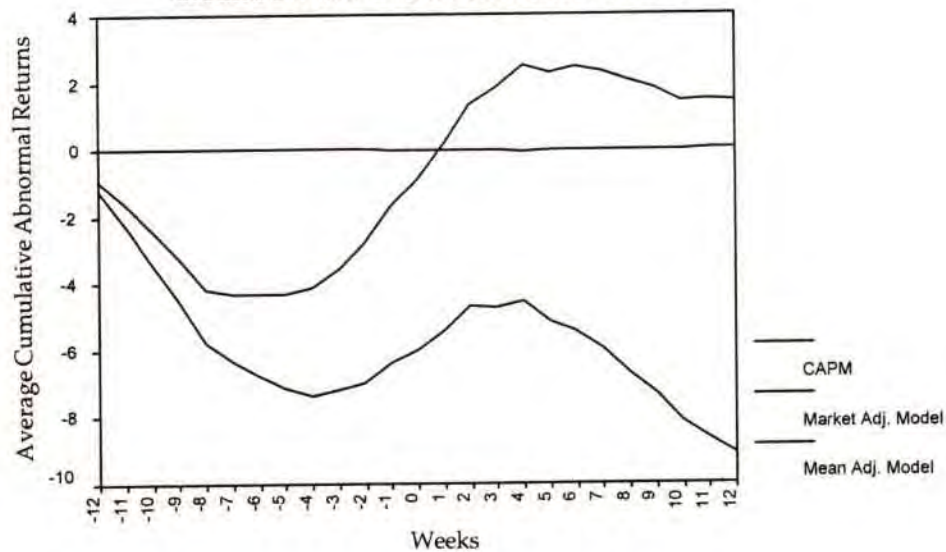
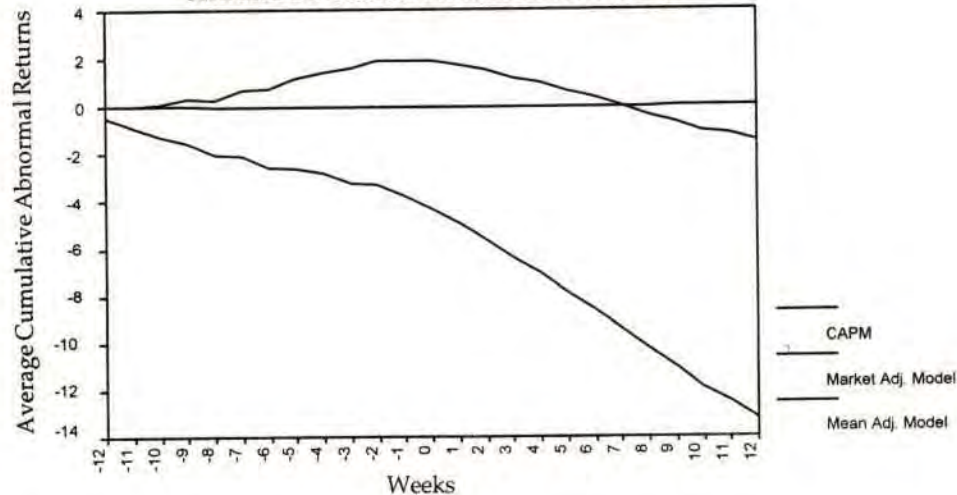


Figure 6

Pattern of Average Cumulative Abnormal Returns (ACAR) Around Dividend Announcement for 2005



window. None-the-less, an identical return pattern was discovered for dividend announcement in the market-adjusted return model with a slight positive bias. In both the cases informational efficiency was exuberant and validated. Consistent and identical results were noted under the mean adjusted return frame for 2005 as for 2004 in the pre-and post-dividend announcement period. It is curious to discover an identical stock return pattern both for CAPM and market adjusted return model since both the measures derived returns based on the benchmarking market index, BSE 100 in the two time periods under reference both for the abnormal returns and cumulative abnormal returns. Another important point of view discerned from the foregoing analysis is that stock return behaviour in 2004 indicated irrational investor-expectation on dividend announcement which were subsequently over-reacted by the market participants in the year 2005. On the whole, it is worth noting that three measurement criteria have depicted divergent return patterns in the two time periods, yet the informational efficiency holds as an evidence in Figure 1 and Figure 2.

CONCLUSION

Based on the results explained above, the incidence of average abnormal returns was found consistent for the CAPM model around dividend announcement. Opposite incidence was noted for the market-adjusted model and a uniform and consistent abnormal return behaviour pattern was discovered for the mean-adjusted return model. Therefore, average abnormal return derived in terms of mean-adjusted return framework appeared logically more consistent around the event announcement. However, broad contours of market efficiency were endorsed and validated across all the measurement criteria to exuberate the informational efficiency of stock markets in India. The behaviour of average cumulative abnormal returns in the mean-adjusted framework

indicated the over-expectation of investors regarding dividend announcement in the information leakage phase, which had subsided considerably after new information disclosure. The mean adjusted return measurement criteria have brought to light a classic dichotomy of over-expectation regarding dividend announcement in the pre-event period and the under-reaction in the post-dividend announcement phase. These stock return drifts were more categorical and visible when depicted through charts. However, on the whole, the results reported in this study have vociferously supported and endorsed informational efficient stock markets for dividend announcement across all measurement criteria.

The findings of this study indicate greater swiftness of market mechanism to react to dividend announcement, such that investors and market participants are unable to devise profitable trading strategies consistently. It can be inferred that corporates are constrained to declare lesser dividend in view of inevitable large cash outflows for taxes. More over, dividend income, being a marginal constituents in investment return, does not inspire much to the over enthused investors in rising capital markets. These factors appear to be more logical and valid for dividend announcement as compared to the informational efficiency of market mechanism under reference. Under these circumstances, market participants are more destined to generate abnormal return, devising investment strategies on fundamentals than on the technical analysis. Further, behaviour of return drift for measurement criteria for dividend announcement could not be construed robust to inspire the investors and the fund managers on performance reporting and the academicians for informational efficiency.

REFERENCES

- Agarwal, R.N. (1991), "Dividends and Stock Prices: A Case Study of Commercial Vehicle Sector in India 1966-67 to 1986-87", *Indian Journal of Finance and Research*, Vol. 1, No. 1, pp. 61-67.
- Ball, R., and P. Brown (1968), "An Empirical Evaluation of

- Accounting Income Numbers", *Journal of Accounting Research*, Vol. 6, No. 3, pp. 159-178.
- Chan, L.N. Jegadeesh, and J. Lakonishok (1996), "Momentum Strategies", *Journal of Finance*, Vol. 51, No. 5, pp. 1681-1713.
- Charest, Guy (1978), "Dividend Information, Stock Return and Market Efficiency II", *Journal of Financial Economics*, Vol. 6, No. 2, pp. 297-330.
- Chaturvedi, Hari Om (2000), "Half Yearly Financial Results and Behavior of Share Prices in India", *Finance India*, Vol. 14, No. 2, pp. 537-545.
- Dhillon, Upinder S., and Johnson Herb (1994), "The Effect of Dividend Changes on Stock and Bond Prices", *Journal of Finance*, Vol. 49, No. 1, pp. 281-292.
- Fama, E. (1970), "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance*, Vol. 25, No.1, pp. 383-417.
- Fama, E. (1991), "Efficient Capital Markets II", *Journal of Finance*, Vol. 46, No. 5, pp. 1575-1617.
- Fama, E., Fisher, M., Jensen, and R. Roll (1969), "The Adjustment of Stock Prices to New Information", *International Economic Review*, Vol. 10, No. 4, pp. 1-21.
- Fama, Eugene F. (1991), "Market Efficiency, Long-Term Returns, and Behavioural Finance", *Journal of Financial Economics*, Vol. 49, No. 3, pp. 283-306.
- Grinblatt, M.S., R. W. Masulis, and S. Titman (1984), "The Valuation Effects of the Stock Splits and Stock Dividends", *Journal of Financial Economics*, Vol. 13, No. 4, pp. 461-490.
- Grossman, S., (1976), "On the Efficiency of Competitive Stock Markets Where Traders have Diverse Information", *The Journal of Finance*, Vol. 31, No. 2, pp. 573-585.
- Grossman, S. and J. Stiglitz (1980), "On the Impossibility of Informationally Efficient Markets", *American Economic Review*, Vol. 70, No. 3, pp. 373-408.
- Gupta, Pardeep (2001), "A Study of Stock Market Efficiency in India", *Finance India*, Vol. 15, No. 2, pp. 665-673.
- Hallock, Kevin F., and Mashayekhi Farzad (2003), "Are Formal Corporate News Announcements Still Newsworthy? Evidence from three decades of US data on Earnings, Splits and Dividends", Paper presented in Seminar jointly hosted by the Federal Reserve Bank of Chicago and the Ohio State University.
- Joshi, K.K. (1991), "Take-over Bid and Stock Market Discipline", *Indian Journal of Finance and Research*, Vol. 1, No. 1, pp. 69-74.
- Lintner, J. (1965), "The Valuation of Risky Assets and the Selection of Risky Investments in Stock Portfolio and Capital Budgets", *Review of Economics and Statistics*, Vol. 18, No.1, pp. 13-37.
- Mossin, J. (1966), "Equilibrium in a Capital Assets Market", *Econometrica*, Vol. 23, No. 2, pp. 768-783.
- Patell, J.M., and M.A. Wolfson (1984), "The Intraday Speed of Adjustment of Stock Prices to Earnings and Dividend Announcements", *Journal of Financial Economics*, Vol. 13, No. 2, pp. 223-252.
- Petit, R. Richardson (1972), "Dividend Announcements, Security Performance and Capital Market Efficiency", *Journal of Finance*, Vol. 27, No. 5, pp. 993-1007.
- Peterson, R. (1971), "Bonus Issues, Shares Issues, Share Splits and Right Issues," *The Chartered Secretary*, July/August, pp. 198-207.
- Rao, E. Nageswara (1999), "Stock Market Reaction to Macroeconomic Events", *Finance India*, Vol. 13, No. 4, pp. 1249-1250.
- Ross, Stephen A. (1978), "The Current Status of the Capital Asset Pricing Model (CAPM)", *The Journal of Finance*, Vol. 23, No. 3, pp. 885-900.
- Sahadevan, K.G., and Thiripalraju M. (1995), "Money and Stock Prices: Some Empirical Evidence on their Lead-Lag Relationship", *Indian Journal of Finance and Research*, Vol. 1, No. 4, pp. 10-29.
- Sponholtz, C. (2005), "Separating the Stock Market's Reaction to Simultaneous Dividend and Earnings Announcements", Centre for Analytical Finance, Working Papers Series No. 212, pp. 1-32.
- Sharpe, William (1964), "Capital Asset Prices: A Theory of Market Equilibrium under Condition of Risk", *Journal of Finance*, Vol. 19, No. 3, pp. 425-442.
- Scholes, Myron S. (1972), "The Market for Securities: Substitution Versus Price Pressure and the Effects of Information on Share Prices", *Journal of Business*, Vol. 16, No. 3, pp. 179-211.

OUR REFEREES

The following experts have helped us in evaluating the articles, received for publication in this issue of *NICE Journal of Business*. We owe a word of thanks to each one of them.

Prof. Alok Saklani, Director, Apeejay Institute of Management, New Delhi

Prof. C.P. Gupta, Management Development Institute, Gurgaon

Prof. Furqan Qamar, Director, Centre for Management Studies, Jamia Millia Islamia, New Delhi

Prof. G.S. Batra, Department of Management Studies, Punjabi Univeristy, Patiala

Prof. J.D. Singh, Director, Jaipuria Institute of Management, Noida

Prof. K.C. Arora, Birla Institute of Management Technology, Greater Noida

Prof. Mukesh Chaturvedi, Birla Institute of Management Technology, Greater Noida

Prof. Mukesh Dhunna, FMS, Maharishi Dayanand University, Rohtak

Prof. Pikay Richardson, Manchester Business School, Manchester, UK

Prof. PK Jain, Department of Management Studies, IIT Delhi, New Delhi

Prof. Prem Vrat, Vice-Chancellor, UP Technical University, Lucknow

Prof. R.J. Masilamani, Birla Institute of Management Technology, Greater Noida

Prof. R.K. Mittal, Commerce Department, Kurukshetra University

Prof. R.S. Dwivedi, Formerly, Management Dept., Kurukshetra University

Prof. S. K. Bedi, FMS, Maharshi Dayanand University, Rohtak

Prof. S.A. Ansari, MONIRBA, Allahabad University

Prof. V.M. Baijal, MONIRBA, Allahabad University

Dr. Gaytri Varma, Reader Laxmibai College, Delhi University

Dr. Gunjeet Kaur, Associate Professor, Birla Institute of Management Technology, Greater Noida

Dr. Kamlesh Jain, Reader, Mata Sundari College, Delhi University

Dr. Nidhi Jain, Reader, Department of Financial Studies, Delhi Univerity

Dr. Rajat Panwar, Asstt. Professor, Oregon State University, USA

Dr. Sunil Sharma, Reader, Faculty of Management Studies, Delhi University

Mrs. Brinda Balakrishnan, Birla Institute of Management Technology, Greater Noida

Prof. Alok Saklani, Prof. J.D. Singh, Prof. Mukesh Dhunna, and Prof. R.S. Dwivedi, deserve a special mention, for a very meticulous critique of the articles referred to them

FACTORS AFFECTING THE LIABILITY STRUCTURE

A Study of Selected Commercial Banks

Mitali Sen* and J.K. Pattanayak**

Abstract

The changing economic scenario has encouraged more meaningful research on the liability structure of Indian commercial banks. This paper offers an empirical evidence of the relationship between a set of bank-specific variables and the liability structure of the banks. Those listed in Bombay Stock Exchange (BSE) have been taken up for the study. Thus, the study makes an attempt to determine the critical factors of the liability structure by using an exploratory factor analysis on a sample of 39 banks, for a period of seven years, from 1996 to 2002. However, there is no clear-cut definition of leverage in the academic literature. An alternative definition of leverage reflects different aspects of the determinants of the liability structure of commercial banks and, hence, the debt element has been further divided into long-term and short-term in order to assess the variation. A multiple-regression analysis of each of the leverage measures is conducted on the critical factors that are identified through factor analysis in order to observe the direction of relationship between these factors and the liability structure. The findings are consistent with the Trade-off theory, Pecking Order theory, and other mainstream capital-structure theories. The study has suggested that market power, profitability and growth factor, risk factor and ownership and size are the significant determinants of the capital structure of publicly-traded banks.

Key Words: *Liability structure, Indian commercial banks, Market power, Profitability growth.*

INTRODUCTION

HOW do firms choose their capital structure? What are the main driving factors behind such decisions? What are the consequences of the performance of the firm? Even though these and other questions have challenged researchers for long, the picture is far from being complete.

Following the famous irrelevance proposition

of Modigliani and Miller (1958), most of the theories have sought to explain the capital structure by introducing imperfections in the seminal Modigliani and Miller framework. In the Static Trade-off Theory (Myers, 1977), the optimal leverage ratio of the firm is determined by the trade-off between the current tax-shield benefits of debt against the potential bankruptcy costs. The Information Asymmetry Hypothesis (Myers and Majluf, 1984) emphasises frictions due to

* Faculty Member (Finance), Department of Management Studies, Indian School of Mines University, Dhanbad - 826004; e-mail: mitalisen@rediffmail.com.

** Associate Professor (Accounting & Finance), Department of Management Studies, Indian School of Mines University, Dhanbad-826004; e-mail: jkpattanayak@yahoo.co.in.

asymmetric information between managers and outside investors. In the Pecking Order model, a financial hierarchy descends from internal funds to debt and to external equity. The Free Cash flow hypothesis of Jensen (1986) asserts that firms prefer to issue new debt, rather than new equity, because of the "bonding" effects of the required interest payments on debt. Many of these theories have been empirically tested, yet there is little consensus on how firms choose their capital structure.

However, most of the empirical work on capital structure has been largely confined to the United States and a few other advanced countries. Scanty literature is available on the study of the capital structure in the Indian context. Moreover, most empirical research on the issue of the capital structure choice in the Indian context has been devoted to manufacturing firms. Less attention has been paid to understand the critical factors that determine the capital structure of financial sector firms, particularly the banking sector. We seek to shed light on several capital structure issues focusing on the liability side from the perspective of Indian commercial banks. In this paper, 'capital structure' and 'liability structure' have been used interchangeably.

REVIEW OF LITERATURE

Some recent studies have attempted to throw light on the capital structure issue within the institutional specifics of developing countries using firm-specific information (Cobham and Subramaniam, 1995; Singh, 1995; Cherian, 1996; Booth *et. al.*, 2000). An exploratory study of capital structure of Indian firms showed that agency cost was a significant determinant of the debt-equity choice (Deb, 1995). Further, the existence of inter-industry differences in the capital structure of Indian manufacturing firms was examined and the possible sources of such variations in capital structure was identified (Das & Roy, 1998). The influence of three factors, viz., taxes, contracting costs, and information costs were observed on the capital structure of Indian firms covering eight

different industries (Bhattacharya and Banerjee, 2001). Vilasuso and Minkler (2001) interpreted the trade-off theory, on the balancing of the costs and benefits of debt, in terms of the literature on asset structure and agency theory, where claims that equity financing is preferred when assets are intangible or highly specialised. They argue that a project that requires highly specific assets will initially be financed by equity. However, as the debt to equity ratio decreases, in line with the agency theory, the cost of debt falls while the cost of equity rises. These agency cost effects become increasingly more important, until debt finance becomes the preferred form.

An empirical study revealed that the optimal capital structure choice in a manufacturing firm is positively influenced by factors such as growth, size, product and industry characteristics, whereas cash flow affects the choice negatively (Bhaduri, 2002). In another study, it was found that the conflict of interest between shareholders and managers influence the firm's capital structure decision (Narasimhan and Vijayalakshmi, 2002). An attempt was made to study the effect of non-traditional debt (NTD) on the financial risk of a firm with the determinants of the capital structure as control variables, using a sample of 276 Indian manufacturing firms (Sarma, *et. al.*, 2004). It was observed that firms with NTD relatively had low volatility of earnings, non-debt tax shield, profitability, market to book ratio and cash constraint, and high volatility of collateral assets, firm size and bankruptcy cost in comparison to firms without NTD.

As per the literature review, barring a few research works, a meticulous study to examine the capital structure is conspicuously absent in India. All the financial theories that have been developed to explain capital structure have empirical evidence based upon large manufacturing firms. However, the question as to whether these arguments are valid for other non-financial firms, particularly banking firms, has received little attention. There is relatively less evidence on the issue of the capital structure

concerning the Indian banking sector. Some of the research study relating to banks in the USA and other developed countries are reviewed below.

Chen and Mazumdar (1994) identified that the debate on bank capital structure remained unresolved. However, as conceived by Orgler and Taggart (1983) the general capital structure theory could provide a useful framework in analysing the bank capital structure. Merton Miller's (1995) question if M&M propositions apply to banks is also consistent with the view that banks' debt equity choice still remains an empirical question. The most significant question to interested researchers and practitioners is - 'Does the Banks' Capital Structure matter, and if so, how should it be set?' (Diamond and Rajan, 2001). Will the existing theory of the capital structure still be relevant? And if not, in what way would the determinants of capital structure in the Indian banking sector differ?

Dietrich and Vollmer (2003) offered an alternative explanation as to why banks do not completely finance their assets by demand deposits but by a mixed capital structure. This explanation was different from the one given by Diamond and Rajan (2000). They derived a condition for the banks' optimal capital structure by a trade-off between a risk sharing and a hold-up effect on the bank's bargaining position vis-à-vis her borrowers and her financiers. Alfon et al. (2004) carried out a quantitative and qualitative study of the factors determining the excess capital reserves in selected banks in the UK. Marques and Santos (2004) empirically explored the problem of the banking firm's voluntary capital structure decisions using a unique data set gathered through a survey conducted with a sample of 89.5 percent of the Chief Executive Officers (CEOs) of Portuguese banks in office during the 1989-1998 period. The results of the study proved that Portuguese banks' debt equity choice did matter and the surveyed CEOs showed a relative preference for the trade off capital structure policy model. In yet another study, the determinants of capital were examined for

German banks (Kleff and Weber, 2004). The German banking sector was classified into three characteristic banking groups including savings banks, cooperative banks and other banks, which differed with respect to their ownership and their access to the capital market.

Against this backdrop, the capital structure decisions of banks appear to be a promising topic for empirical research. In the Indian banking sector, an attempt was made to identify the critical factors influencing the capital structure choice of Indian commercial banks by conducting an exploratory factor analysis on a sample of 82 Indian commercial banks for a period of seven years from 1996 to 2002. (Sen & Pattanayak, 2004). Also the variations in the determinants of capital structure of Indian commercial banks have been empirically analysed by decomposing its total liability structure into various debt elements (Sen, 2004). It was observed that the results of this analysis differed significantly with the variation in the different debt elements. The present study to identify the critical determinants of liability structure of listed Indian banks is an attempt to bridge the existing gap.

OBJECTIVES OF THE STUDY

The study seeks to go beyond the previous studies by analysing the determinants of the liability structure of the publicly listed Indian commercial banks. The specific objectives of the study are:

- To identify the critical factors influencing the liability structure of listed Indian commercial banks, using a factor-analytic model.
- To examine the relationship between the liability structure of the banks and the identified factors, by using a multiple-regression analysis.

However, a significant question relating to the liability structure of the banks is whether the debt should be long-term or short-term. This aspect needs to be taken into account while testing the

critical determinants of the capital structure of the concerned bank. Hence our focus is on the variation in the relationship of the factors relating to various debt components.

METHODOLOGY AND SAMPLE

The method applied in this study to identify the critical factors affecting the capital structure is based on a factor-analytic model. Firstly, the proxy variables, which are thought to influence the capital structure of banking firms, were identified. The variables used in the study and their measurement are largely adopted from the existing literature. A total of 12 explanatory

variables were identified. Their definitions are listed in Exhibit 1.

A factor analysis has been done on these 12 variables to identify a set of critical factors. After that linear multiple regression relying on the method of ordinary least square is carried out to examine the correlation between the identified determinants of the capital structure and the leverage. However, there is no clear-cut definition of leverage in the literature. The specific choice depends on the objective of the analysis. The paper analyse various measures of debt, depending on the maturity structure, because many of the capital structure theories have different implications for different types of debt

Exhibit 1
Explanatory Variables and Their Brief Description

<i>Sl.no.</i>	<i>Proxy Variables</i>	<i>Description</i>
1.	Cash and bank balance to total assets ratio (CBT)	Indicator of bank liquidity. In general, banks with a larger volume of liquid assets are perceived to be safer, since these assets would allow banks to meet unexpected withdrawals.
2.	Advances to total assets ratio (AT)	Defined as the total loan portfolio of a bank indicating its asset structure.
3.	Investments in government securities to total assets ratio(INGT)	Represents the treasury operations in government securities indicating its asset structure.
4.	Natural logarithm of total assets (LNT)	Signifies the size of banks.
5.	Net NPA to net advances ratio (NPADV)	Measure the quality of a bank's asset and the risk associated with it. It is indicative of the quality of credit decisions made by bankers.
6.	Net interest margin (NIM)	Defined as the difference between interest earned and interest expended as a proportion of average total assets, representing the efficiency of portfolio management of banks.
7.	Return on assets (ROA)	Referred to as the operating profit divided by the average total assets (EBIT/Total Assets) indicating the profitability of the banks.
8.	Ratio of fee based income to total income (FEETI)	Represents earnings from fee-based products, i.e. non-banking activities. It is a measure of bank's diversification from the conventional loan based earnings in an effort to mitigate its risk and generate more returns,
9.	Natural logarithm of number of outstanding shares(LNSH)	Indicates the ownership of banks. It is assumed that larger number of shares imply diffused ownership.
10.	Tobin's Q ratio (TQ)	Calculated as the sum of market value of equity and book value of debt as a proportion of book value of total assets. It is an indicator of a bank's market power.
11.	One plus annual change in banks' assets (GRTH)	Represents the growth opportunities of the banks.
12.	Capital adequacy ratio (CAR)	Measured by the ratio of capital to risk weighted assets, thereby indicating the risk adjusted capital base of the banks.

instruments. Four measures of debt structure used in this study are total liability (TL), deposit (DEP), long term borrowing (LTB) and current liability (CL). All decomposed debt elements are normalised by the book value of total assets and their precise definitions are presented in Exhibit 2. All the variables are measured in book values and not in market values because of data limitation.

Exhibit 2

Definitions of Various Measures of Debt (Dependent Variables)

1. *Total Liabilities (TL)*: The sum of total long-term debt and total current liabilities.
2. *Deposit (DEP)*: An account with a bank that earns interest normally proportional to and below current base rates. The notice period for withdrawal will influence the interest rate. It can be a Demand Deposit that can be drawn on demand without prior notice, or a Term Deposit that is maintained for a fixed term, or else a Savings Deposit, which pays interest on balances held, usually once or twice per year.
3. *Long Term Borrowings (LTB)*: The amount of debt repayable in more than one year, consisting of long-term bank borrowings and long-term securitized debt.
4. *Current Liabilities (CL)*: Represents the debt owned by banks that are due for settlement within one year that includes creditors, accrued interest etc.

Note: All debt elements are normalised by the book value of total assets.

Sample

The data used for the empirical analysis was obtained from the corporate database (*Prowess*) of the Centre for Monitoring Indian Economy (CMIE). The sample contains 39 commercial banks that are listed in BSE over the period of seven years (1995-96 to 2001-02). The choice of the period of study can be justified on the ground that it is the period for which the data on the relevant variable are available on a consistent basis.

ANALYSIS AND RESULTS

Factor Analysis

An exploratory factor analysis was used to address the issue of determinants of capital structure of the banks. The factor analysis is a statistical tool to determine a minimum number of unobservable common factors by studying the co-variance among a set of observed variables. The factor analysis was carried out with a set of 12 explanatory variables as listed in Exhibit 1. The first step involved the extraction of initial factors. The method of principal component analysis (PCA) was used to identify the critical factors. The minimum number of factors was extracted by using the Kaiser rule of thumb; i.e. the initial eigen value should be greater than or equal to one.

Thus we obtain a factor-structure co-efficient matrix where the co-efficients refer to the correlation between factors and variables, known as factor loading. The varimax rotation method was applied to enhance the interpretability of the factors by minimising the number of variables that have high loadings on a factor. The varimax-rotated factor-loading matrix is presented in Table 1.

Four factors are extracted using the eigen value criteria. Those variables which have a loading of more than 0.55, i.e., 30 per cent overlap in variance between the variable and the factor, are included in a particular factor. The results so obtained are fairly robust to the choice of cut-off. After extraction of the common factors, we estimate the factor scores for each factor. The common factors themselves can be expressed as linear combinations of the observed variables.

$$F_i = W_{i1} X_1 + W_{i2} X_2 + \dots + W_{ik} X_k$$

where,

F_i = estimate of the i th factor

W_i = weight or factor loading

k = number of variables.

Table 1
Varimax Rotated Factor Loading Matrix

	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>
AT	0.827	0.090	-0.216	0.039
INVGT	0.771	0.182	0.086	-0.081
TQ	-0.893	0.116	0.162	0.189
CBT	0.541	-0.626	0.298	-0.005
NIM	-0.534	0.586	0.051	0.111
ROA	0.189	0.808	0.068	0.179
GRTH	-0.103	-0.772	0.074	0.032
NPADV	0.243	0.172	-0.836	0.186
CAR	0.012	0.088	0.917	0.046
LNT	0.275	-0.076	0.366	-0.638
FEETI	-0.298	-0.115	0.341	0.610
LNSH	-0.148	-0.196	0.098	-0.893
Eigen value	2.945	2.133	1.982	1.703
%variance explained	24.545	17.776	16.513	14.191
Cumulative percent	24.545	42.321	58.834	73.025

Interpretation of the Extracted Factors

Factor 1: The factor consists of advances to total assets ratio (AT), investments in government securities to total assets ratio (INGT) and Tobin's Q ratio. As we have already mentioned that Tobin's Q (TQ) ratio is used as a proxy for market power of the banks and AT and ING T used as a proxy for the asset structure of banks. This factor can be identified as the market power factor.

Factor 2: It can be identified as the profitability and growth factor, which comprises cash and bank balance to total assets ratio (CBT), net interest margin, return on assets and growth opportunities. The factor is negatively loaded to cash and bank balance to total assets ratio and growth opportunities but has a positive loading with NIM and ROA. This shows that profitable banks will have a high interest spread, hence relying less on cash and bank balance and other growth opportunities.

Factor 3: From the loading pattern, we can identify it to be the risk factor, which consists of capital adequacy ratio (CAR) and net NPA to net advances ratio (NPADV). The factor is positively

loaded to CAR but negatively loaded to NPADV, thereby suggesting that banks with a bigger capital base will have less NPA resulting in improved asset quality bearing low risk.

Factor 4: The factor is a bit ambiguous. It is positively loaded in favour of fee-based income to total income ratio but negatively loaded to the natural log of total assets and the natural log of the number of outstanding shares. As the natural log of the total assets is a proxy for size and the natural log of the number of outstanding shares is a proxy for ownership, the loadings indicate that large banks have more diffused ownership and less service diversification, thereby generating less quantum of fee-based earnings. Thus we identify this factor as ownership and size factor.

Regression Analysis

In the second step, the relationship between various measures of leverage and the factors obtained from the first step is estimated using a regression analysis.

Table 2
Multiple Regression Analysis of the Various Debt Elements
(N=39 listed Indian commercial banks)

Dependent Variable	Constant	Market Power Factor	Profitability & Growth Factor	Risk Factor	Ownership & Size Factor	Adj R2	F
TL Long-term Debt	0.866*** (19.614)	0.022*** (2.905)	0.001*** (2.994)	-0.003** (2.204)	0.031** (2.363)	0.574	4.181***
DEP	0.697*** (6.815)	0.003 (0.150)	0.036** (2.050)	-0.003 (-0.053)	0.012* (1.766)	0.476	2.489*
LTB Short-term Debt	0.108*** (2.827)	0.006 (0.900)	0.018** (2.689)	-0.002* (-1.938)	-0.005* (-1.842)	0.569	4.343***
CL	0.027** (2.418)	-0.029** (-2.588)	-0.011*** (-2.959)	0.005** (2.775)	0.004 (0.931)	0.442	2.864**

*, **, ***, significant at the 10, 5, 1 percent level, respectively. TL refers to total liabilities; DEP refers to total deposits; LTB refers to long-term borrowings; CL refers to current liabilities. All dependent variables are normalised by total assets.

Values in parenthesis represent its ratio.

The regression model used in the second step is specified as:

$$\text{Regression Model: Lev} = \alpha + \sum_{j=1}^n \beta_j F_{jk} + \epsilon_k$$

where, F_{jk} represents the factor score related to the j th factor.

α is the intercept, β_j is the regression coefficient,

ϵ_k is the error term n is the number of factors and Lev is the Leverage

A regression of the various measures of debt ratio (as shown in Exhibit 2) on the factor scores of the four factor model was used to test the statistical significance of the extracted factors in order to explain the variation in debt structure across the 39 banks. The factor analysis undertaken in the first step of the study eliminates any potential multi-co-linearity problems among the factor scores during the regression. The results are presented in Table 2.

From the F value, it is observed that the regression analysis of the debt components on the extracted four factors has a relatively high explanatory power and it produces significant co-efficients.

The analysis has revealed that all the forms of debt, except current liability, are positively associated with the market power factor. This is because with an increase in the market power the banks' bankruptcy cost reduces and hence the banks rely more on external debt. That is, as banks' market power increases, they employ more debt to pursue their output maximisation strategy. However, the negative and significant correlation of current liability with market power can be attributed to the fact that banks with more market power do not rely on short-term debt.

The positive relationship between total debt and profitability and growth factor supports Jensen's Free Cash Flow Model, which states that firms with high profitability will consider debt as a disciplining mechanism to ensure that managers pay out profits rather than building their personal empires. Also more profitable banks go for more debt in order to take advantage of the tax shield available on debt financing, which is consistent with the Static Trade-off Theory. Deposit also has a significant positive correlation with the profitability and growth factor which indicates that the banks with high earnings and growth opportunities are perceived to be safer by customers and, hence, there is high quantum of deposits. However, the factor has a

negative correlation with current liability. This suggests that more profitable banks will rely on internal funds rather than outside short term debt, which is consistent with the pecking order proposition.

Total debt, deposits and long-term borrowings are all negatively correlated to the risk factor which indicates that banks with higher risk will have smaller capacity to face fixed interest commitments and, hence, less dependency on external debt. However, current liabilities have a significant positive correlation with the risk factor. This result confirms the observation made by Diamond (1991) that banks need to borrow short-term debt since no one will lend them for a long-term because of the associated default risk.

We find that all forms of debt, with the exception of long-term borrowings, have a significant positive correlation with the ownership and size factor. This shows that large size banks with diffused ownership will rely more on external debt as the agency cost of debt is lower for manager-controlled firms (Myers, 1977). In addition, they have high deposits and current liabilities to generate more investment opportunities, and so they do not require long-term borrowings.

Thus, the determinants of the capital structure of Indian commercial banks show significant variations across the different measures of debt used in the regression analysis.

CONCLUSION

The study presents an exploratory factor analytic model to explain the observed variation in the capital structure by identifying four factors, viz. market power factor, profitability and growth factor, risk factor and ownership and size factor. Our results indicate a wider set of determinants of the optimal financing choice as it includes many bank specific variables. This study has empirically examined the relationship between the liability structure and the set of four extracted

factors using the data for 39 listed Indian commercial banks for the period 1996 - 2002, by employing a multiple regression analysis. As many of the capital structure theories have different implications for different types of debt instruments, this paper makes an attempt to study the variations in the determinants of capital structure by dividing the liability categories of banks into deposit, long term borrowings and current liabilities. To conclude it can be argued that many of the mainstream capital structure theories do conform to the realities of the Indian banking sector despite their differences in institutional characteristics and regulatory framework.

This paper has laid the groundwork to explore the determinants of the liability structure of listed banks upon which a more detailed evaluation can be based. Further work is required to develop new hypotheses for the capital choice decisions of Indian commercial banks and to design new variables to reflect the bank-specific influence.

REFERENCES

- Alfon, Isaac, Isabel Argimon, and Patricia Bascunana (2004), "What determines how much capital is held by UK banks and building societies?" *Occasional Paper Series 22*, Financial Services Authority, July.
- Barclay, Michael, and Clifford Smith (1995), "The maturity structure of corporate debt", *Journal of Finance*, Vol. 50, No. 2, pp. 609-632.
- Bhaduri, Saumitra N. (2002), "Determinants of Corporate Borrowing: Some Evidence from the Indian Corporate Structure", *Journal of Economics and Finance*, Vol. 26, No.2, www.jeandf.bizland.com/summer02/summer02.htm (accessed September, 2003).
- Bhattacharya, Malay, and Ashok Banerjee (2001), "Determinants of Capital Structure: Revisited Empirically", *ICFAI Journal of Applied Finance*, Vol. 7, No. 2, pp. 38-53.
- Booth, L., V. Aivazian, A. Kunt-Demirguc, and V. Maksimovic (2001), "Capital Structure in Developing Countries", *Journal of Finance*, Vol. 56, No. 1 pp. 87-130.
- Chen, Andrew, and Sumon Mazumdar (1994), "Impact of Regulatory Interactions on Bank Capital Structure", *Journal of Financial Services Research*, Vol. 8, No. 4, pp. 283-300.
- Cherian, S. (1996), "The Stock Market as a Source of Finance: A Comparison of U.S. and Indian Firms", *The World Bank Policy Research Working Paper*, No. 1592.

- Cobham, D., and R. Subramaniam (1995), "Corporate Finance in Developing Countries: New Evidence for India", *Discussion Paper* No. 9512, U.K.: University of St. Andrews.
- Das, Sumitra, and Malabika Roy (1998), "Inter industry differences in Capital Structure Evidence from India", www.igidr.ac.in/~money/malabika.pdf (accessed August, 2003).
- Deb, Sandip (1995), "Determinants of Capital Structure Decisions in Large Mature Corporations: An Empirical Analysis", www.iimahd.ernet.in/impandey/sandip.htm (accessed September, 2003).
- Diamond, D.W. (1991), 'Debt Maturity Structure and Liquidity Risk', *Quarterly Journal of Economics*, Vol. 106, No. 3, pp. 709-737.
- Diamond, Douglas W., and Raghuram G. Rajan (2001) "Liquidity Risk, Liquidity Creation and Financial Fragility: A Theory of Banking", *Journal of Political Economy*, Vol. 109, pp. 287-327.
- Dietrich, Diemo, and Uwe Vollmer (2003), "Determinants of a Bank's Capital Structure", www.iwh-halle.de/d/start/News/pdf/Session5-2%20Dietrich.pdf, (accessed January, 2005).
- Harris, M., and A. Raviv (1991), "The Theory of Capital Structure", *Journal of Finance*, Vol. 46, No. 1, pp. 297-355.
- Jensen, M.C. (1986), "Agency Costs of Free Cash Flow, Corporate Finance and Take-overs", *American Economic Review*, Vol. 76, No. 2, pp. 323- 339.
- Kleff, Volker, and Martin Weber (2004), "How do Banks Determine Capital? Evidence from Germany", <http://opus.zbw-kiel.de/volltexte/2004/1677/pdf/dp0366.pdf> (accessed January, 2005).
- Marques, Manuel O., and M. J. Coutinho dos Santos (2004), "Capital Structure Policy and Determinants: Theory and Managerial Evidence", EFMA 2004 Basel Meetings Paper, www.207.36.165.114/NewOrleans/Papers/1301754.pdf. (accessed January 14, 2004).
- Miller, M.H. (1977), "Debt and Taxes", *Journal of Finance*, Vol. 32, No. 2, pp. 261-275.
- Miller, Merton (1995), "Do the M&M Propositions Apply to Banks?", *Journal of Banking and Finance*, Vol. 19, Nos. 3 & 4, pp. 483-489.
- Modigliani, F., and M.H. Miller (1958), 'The Cost of Capital, Corporate Finance, and the Theory of Investment', *American Economic Review*, Vol. 48, June, pp. 261-297.
- Modigliani, F., and M.H. Miller (1963), "Corporate Income Taxes and the Cost of Capital: A Correction", *American Economic Review*, Vol. 53, No. 3, pp. 433-443.
- Myers, S. C., and N. S. Majluf (1984), "Corporate Financing and Investment Decisions When Firms have Information That Investors Do Not Have", *Journal of Financial Economics*, Vol. 13, pp. 187-221.
- Myers, S. C. (1977), "The Capital Structure Puzzle", *Journal of Finance*, Vol. 34, No. 3, pp. 575-592.
- Myers, Stewart (1984), "The Capital Structure Puzzle", *Journal of Finance*, Vol. 39, pp. 575-592.
- Narasimhan, M S., and S. Vijayalakshmi (2002), 'Impact of Agency Cost on Leverage and Dividend Policies', *ICFAI Journal of Applied Finance*, Vol. 8, No. 2, pp. 16-25.
- Orgler, Yair, and Robert Taggart (1983), "Implications of Corporate Capital Structure Theory for Banking Institutions", *Journal of Money, Credit, and Banking*, Vol. 15, No. 2, pp. 212-221.
- Rajan, R.G., and L. Zingales (1995), "What Do We Know about Capital Structure? Some evidence from International Data", *Journal of Finance*, Vol. 50, No. 5, pp. 1421-1460.
- Sarma, L.V.L.N., M. Thenmozhi, and S.K. Preeti (2004), "Effect of Non-Traditional Debt on Financial Risk: Evidence from Indian Manufacturing Firms", *ICFAI Journal of Applied Finance*, Vol. 10, No. 7, October, pp. 5-9.
- Sen, Mitali (2004), "A Decompositional Analysis of the Liability Structure of Indian Commercial Banks", *Management Review*, Vol. 16, No. 4, pp. 25-33.
- Sen, Mitali, and J. K. Pattanayak (2005), "An Empirical Study of the factors influencing the Capital Structure of Indian Commercial Banks", *ICFAI Journal of Applied Finance*, Vol. 11, No. 3, pp. 53-67.
- Shyam Sunder, Lakshmi, and Stewart Myers (1999), "Testing Static Trade off Against Pecking Order Models of Capital Structure", *Journal of Financial Economics*, Vol. 51, No. 2, pp. 219-244.
- Singh, A., (1995), "Corporate Financing Patterns in Industrializing Economics: A Comparative International Study", *International Finance Corporation Technical Paper*, No. 2. Washington, DC, World Bank, Cited in Bhaduri, Saumitra N., (2002).
- Titman, S., and R. Wessels (1988), "The Determinants of Capital Structure Choice", *Journal of Finance*, Vol. 43, No. 1, pp. 1-19.
- Vilasuso, J., and A. Minkler, (2001), "Agency Costs, Assets Specificity, and the Capital Structure of the Firm", *Journal of Economic Behaviour and Organisation*, Vol. 44, No. 1, pp. 55-69.

Business Perspectives

RESEARCH PAPERS

An Empirical Analysis of Day of The Week Effect In Indian Stock Market
Hareesh Kumar, P. R. Madhusoodanan and Malabika Deo

Indo-Thai FTA: Sensitivity Analysis of Textiles and Clothing Industry
Paramananda Nayak and Avijit Maudal

The Efficiency of LICI during the Post - Liberalization and Globalization Period - A Case Study of the State of West Bengal
Amit Kumar Chakrabarty

Quantification of Non -Cognitive Intelligence in the Current Health Care Environment: A Case Study
Ranajit Chakrabarty and Zeenat Sayeed

Managing Quality Risk in Automotive Sector in India: An Analysis of Six Sigma Practices
V. K. Khanna and Alok Pandey

Administrative Management - A Perspective from Indian Religious Scriptures
Shivendra Kumar Pandey and Sanjay Kumar Srivastava

Modeling of Access to Finance and Decision to Purchase Consumer Durables in NCR Region
Shri Prakash, Shalini Sharma and Arvind Bagati

NOTES, MEMORANDA AND COMMUNICATIONS

Imperatives of Knowledge Management
Sabita Mahapatra and G. C. Mahapatra

Managing Credit Risk through Assets Reconstruction Companies - Emerging Issues
Pradeep Singh

BOOK REVIEW

Emotional Intelligence at work-A Professional Guide
Anita Saxena

Forex Management and Business Strategy
Brinda Balakrishnan

Subscriber/Year	One Year	Two Years	Three Years
Individual	Rs. 300	Rs. 575	Rs. 700
Institutional	Rs. 400	Rs. 750	Rs. 1000
Students	Rs. 200	Rs. 375	Rs. 500
Foreign (Air mail)	\$ 75	\$ 125	\$ 200
Foreign (Surface mail)	\$ 60	\$ 100	\$ 140

Mr. Rishi Tiwari
Business Manager

Birla Institute of Management Technology

Plot No. 5, Knowledge Park-II, Greater Noida (NCR), U.P. -201306 (INDIA)

Phone: +91-120-2323001-10 Ext. 323 Telefax: +91-120-2323022/025

E-mail : library@bimtech.ac.in Web : www.bimtech.ac.in

PRICE MANIPULATION IN STOCK MARKET

An Entropic Analysis

Y.V. Reddy* and A. Sebastin**

Abstract

This paper seeks to apply information-theoretic concept of entropy to study suspected manipulation of share prices in the context of the Indian stock market. With the sample entropy (SampEn) methodology, the authors analysed the trade data of the share reported to have been manipulated in a certain period of time. The values so computed revealed potential evidence of manipulation. Through the case study of the share of Lupin Laboratories Ltd., which has been reported to be subject to price-manipulation, during the period October 1999 to January 2000, it has been noted that entropic analysis of the order-related data would ensure more efficiency in the study of any price-manipulation attempt in the share market

Key Words: *Stock price manipulation, Variation, Irregularity, Approximate entropy, Sample entropy*

INTRODUCTION

STOCK price manipulation has been studied by various authors in different situations, such as continuous auction, insider trading, asymmetric information, corners, short squeezes, imperfect competition, financial signaling, equity offerings, takeover bids, 'talking down' the firm, no information, nested information, bluffing, and front running. Though there is plenty of literature on market microstructure in general and market manipulation in particular, there is still a scope for an in-depth study of manipulation of stock market prices, using the concepts of stochastic calculus, game theory, and information theory among others.

Mathematical modelling and statistical analysis of stock price movements has become a

field of its own, beginning with Louis Bachelier's Brownian Motion Model of 1900, for pricing warrants traded on the Paris bourse (Stock Exchange), to the recent dynamic systems theory and neural networks. Though, pollutants, such as fraud and market manipulation appear nearly impossible to be modelled, they are real and significantly alter price movements without any seeming economic reasons. Simply incorporating fraud into a random effects component of a model fails, as the extent of fraud is rarely chronic but is so frequent as not to be ignored. Hence, a model independent analytic tool (i.e., a tool providing qualitative inferences across diverse model configurations) tracking stock price movements will be of immense use in order to study price manipulation.

* Reader, Department of Commerce, Goa University, Goa - 403 206; e-mail: yvreddy@unigoa.ac.in

** Assistant Vice-President, National Stock Exchange of India Limited, Mumbai - 400 051; e-mail: masebastin@yahoo.com

The inspiration for the present study comes from two sources, one, Vila Jean Luc (1989) which presents two examples of market manipulation as games with asymmetric information and derives the conditions for equilibrium, treating the gains and losses as payoffs associated with the various strategies of the players, two, Gilad Bavly and Abraham Neyman (2003) which presents the feasibility of online correlation in the strategies adopted by a group of players in a repeated game with perfect monitoring, which is concealed from a boundedly rational player and discusses the conditions for the existence of a concealed strategy in terms of entropy, in a theoretical game environment. Entropy is defined for the probability mass or density function of a random variable and a mixed strategy in a game is a probability distribution on the set of all pure strategies available to a player. Hence, entropy of the mixed strategies of the players in a game is defined naturally.

ENTROPY - CONCEPT AND HISTORY

The concept of entropy arose in physical sciences in the 19th century. Clausius, building on the previous intuition of Carnot, introduced for the first time in 1867 a mathematical quantity S , which he called entropy. It describes heat exchanges occurring in thermal processes via the relation $dS = dQ / T$ where Q denotes the amount of heat and T is the absolute temperature at which the exchange takes place. Ludwig Boltzmann derived that the Clausius entropy S associated with a system in equilibrium is proportional to the logarithm of the number W of microstates which forms the macrostate of this equilibrium, i.e., $S = k^* \ln (W)$. Since then, the concept of entropy has been extended to study microscopically unpredictable processes in fields, such as stochastic processes and random fields, information and coding, data analysis and statistical inference, partial differential equations and rational mechanics. This has led to the employment of diverse mathematical tools in dealing with the concept of entropy.

The theoretical foundation of entropic methods used in modern finance was formalised by two mathematicians, Jacob Bernoulli and Abraham de Moivre. The concept of entropic analysis of equity prices was first proposed by Louis Bachelier in 1900. It anticipated many of the mathematical discoveries made later by Norbert Wiener and A.A. Markov in the early nineties. *J.L.Kelly, Jr.* established the relationship between the information rate in a binary symmetric channel and speculation under uncertainty and made the large mathematical infrastructure of information theory, which was further developed by Claude Shannon in the mid forties.

The introduction of metric entropy and the extension of the classification theory of measure-preserving transformations, by Kolmogorov in the fifties, led to significant advances. The uncertainty about the actual state of a system or a process is measured by Shannon is entropy. If the uncertainty is about predictions of a process, it may be decreased by gaining information from the passage of time itself. However, the dynamics of the process may produce new information at each successive stage making forecasting unreliable despite knowledge of the past. This kind of uncertainty about the future is measured by Kolmogorov-Sinai (KS) entropy.

SELECTED STUDIES OF ENTROPIC ANALYSIS IN STOCK MARKET

Nawrocki (1984) used an application of entropy theory for the first time to describe financial market disequilibrium. Ten years later, John Conover (1994) applied entropy theory in devising a methodology for programmed trading of equities. Then, the analysis of entropy tops and bottoms was found by Marantette (1998) as an addition to the buy and sell points of cyclic analysis. In this regard, Pincus and Singer (1998) suggested techniques to produce irregular finite series and normal infinite series, based on constructions and properties derived from approximate entropy (ApEn), a computable formulation of irregularity for a sequence of arbitrary length. Working in the same

direction, Maasoumi and Racine (2000) examined the predictability of stock market returns by employing a new metric entropy measure capable of detecting non-linear dependence within the returns series. In addition, Richman and Moorman (2000) introduced a new statistic tool called sample entropy to quantify irregularity in short and noisy time series. The utility of approximate entropy to assess subtle and potentially exploitable changes in serial structure of a financial variable was determined by Pincus and Kalman (2004). Chen (2005) showed that most empirical evidences about market behaviour may be explained by a new information theory generalised from Shannon's entropy theory of information. Finally, Kispert used the prices of stock options to find a probability measure for the underlying stock and has derived that the probability vector with maximal entropy seems to be theoretically more justified than others.

BASIC CONCEPTS OF ENTROPY

First of all, it is imperative to take a glance at a few basic concepts of entropy as per Shannon's approach, which are widely used in information theory.

Entropy of a Random Variable

Let X be a random variable with $p(x)$ as the probability mass function. Then the entropy of X is defined as

$$H(X) = H(p) = - \sum_x P(x) \log p(x) = E [\log\{1/p(x)\}]$$

where, the base of the logarithm is 2, and $0 \log 0$ is taken as 0.

Entropy is measured in bits and $0 \leq H(X) < \infty$. If logarithm is taken to the base e , then entropy is measured in nats. $H_a(X)$ denotes the entropy of X when logarithm is to some base a .

Joint Entropy

The joint entropy of a pair of random variables X and Y with a joint probability mass function $p(x,y)$

is defined as

$$H(X,Y) = - \sum_x \sum_y p(x,y) \log p(x,y) = - E[\log p(x,y)]$$

Conditional Entropy

The conditional entropy of a random variable Y given another variable X is defined as

$$H(Y/X) = \sum_x p(x) H(Y/X = x) = - E[\log p(Y / X)].$$

Then we have the chain rule:

$$H(X,Y) = H(X) + H(Y / X) = H(Y) + H(X / Y)$$

and more generally,

$$H(X_1, X_2, \dots, X_n) = \sum_{i=1}^n H(X_i / (X_1, X_2, \dots, X_{i-1}))$$

It follows that $H(X_1, X_2, \dots, X_n) \leq \sum_{i=1}^n H(X_i)$ with equality iff X_i are independent.

Conditioning reduces entropy, i.e., $H(X / Y) \leq H(X)$, with equality iff X and Y are independent.

$$\text{Also, } H((X,Y) / Z) = H(X / Z) + H(Y / (X,Z)).$$

Relative Entropy

The relative entropy or cross entropy or the Kullback - Leibler (KL) distance between two probability functions $p(x)$ and $q(x)$ is $D(p \parallel q) = \sum_x p(x) \log \{p(x) / q(x)\} = E[\log \{p(x) / q(x)\}]$.

It may be noted that $D(p \parallel q) \geq 0$ and $= 0$ if $p = q$.

However, $D(p \parallel q)$ is not equal to $D(q \parallel p)$ in general.

Since, relative entropy is not symmetric and does not satisfy the triangle property, it is not a true distance between distributions.

Mutual Information

Consider two random variables X and Y with a joint probability mass function $p(x,y)$ and marginal mass functions $p(x)$ and $p(y)$. Then, the

mutual information $I(X;Y)$ is the relative entropy between the joint distribution $p(x,y)$ and the product distribution $p(x)p(y)$.

$$\text{i.e., } I(X;Y) = \sum_x \sum_y p(x,y) \log \{p(x,y) / p(x)p(y)\} \\ = D(p(x,y) \text{ P } p(x) p(y))$$

where, it may be noted that $I(X;Y) \geq 0$
 $= 0$ iff X and Y are independent.

$$\text{Also, } I(X;Y) = H(X) - H(X/Y) = H(Y) - H(Y/X)$$

That is to say, mutual information is the reduction in the uncertainty of X due to the knowledge of Y and vice versa.

Due to symmetry, X says as much about Y as Y says about X .

$$\text{Also, } I(X;Y) = H(X) + H(Y) - H(X,Y) \text{ and} \\ I(X;X) = H(X).$$

Thus, the mutual information of a random variable with itself is the entropy of the random variable. That is why entropy is referred to as self-information.

ENTROPY AND STOCK PRICE MANIPULATION

In the electronic stock trading system, as participants place orders for buying or selling the shares of a scrip at different prices and for various quantities, trades are effected by matching these orders according to price - time priority. Prices vary from time to time, based on the fundamental factors of the scrip, its past history and the demand for the scrip. The prices at which, the times at which and the quantities for which, orders are placed by a participant, are expected to be in accordance with the prevalent market conditions and towards investment or speculative purpose. As the information related to and the perception on the price of a scrip change with time, a participant assigns values to these variables - price, time and quantity - with certain probabilities, while placing orders. Hence, price, time and quantity of the order in respect of a scrip may be considered as random variables with probability distributions.

Since, Shannon's entropy is defined for a random variable with probability mass function $p(x)$ as $H(p) = -\sum_x p(x) \log p(x)$, we may

compute the entropy for the random variables of order price, order time and order quantity in respect of a scrip for every participant, only if a probability distribution can be fitted for each of these variables. As long as a participant places orders in the normal course of business, the entropy values of these variables will be in some range. Just as volatility of price differs from scrip to scrip, and from time to time, the entropy will also vary from scrip to scrip, depending on trading activity.

However, when a participant repeatedly places orders for buying/selling according to some pattern in the price or time or quantity, to manipulate the price of a scrip, the probability distributions of these variables undergo changes which are reflected in the corresponding entropy values. Such orders placed for manipulating the stock market will induce more regularity or persistence in the distributions and consequently, entropy is likely to decrease. Large decrease in the entropy value from normal ranges for the respective variables may lead to potential evidence of price manipulation by a participant. Though regularity of such nature happens by chance rarely, repeated drops in the entropy values of the order-related variables of scrip, within a span of a few trading-days point to likely manipulation in the price of that scrip.

ENTROPY VERSUS VARIANCE

Stock market analysts usually study shifts in mean levels as also variations (in various notations) to understand the state of the market. However, the persistence of certain patterns or shifts may provide critical information. So far, formulae to directly quantify randomness have not been used in market analysis, possibly due to lack of a quantification technology. So, excluding sequential patterns or features which presented themselves, subtler changes in serial

structure would remain undetected largely. Volatility is generally equated to the variation of scrip's price, with large swings normally denoted as highly volatile or unpredictable. However, there are two fundamentally distinct means by which data deviate from central tendency - (i) they have high variation (as may be measured by standard deviation or variance) and (ii) they appear highly irregular or unpredictable (as may be measured by entropy). These two non-redundant means have important consequences. The point is that the extent of variation in scrip prices is generally not feared but what concerns is the unpredictability in time and quantity of the variation. If a market participant is assured of a typical model, with large amplitude for future changes in the price of scrip, it will not be frightening because future prices and resultant strategies may be planned. Thus, a quantification technology to separate the concepts of classical variation and irregularity is of paramount importance.

Entropy is a measure of disparity of the probability mass function of a distribution from the uniform distribution whereas variance measures the average distance of the various realizations from the mean of a distribution. According to Ebrahimi, Maasoumi and Soofi (1999), both these measures reflect concentration, however, unlike variance which measures concentration only around the mean, entropy measures diffuseness of the density irrespective of the location of concentration. They also show, using a Legendre series expansion, that entropy depends on many parameters of a distribution and may be related to high order moments of a distribution. Therefore, entropy could offer a closer characterization of the probability mass function since it uses more information about the distribution than that used by variance and hence is more general than the traditional methods based on variance. McCauley J. (2003) propounds that entropy represents the disorder and uncertainty of a stock market or a particular stock since entropy has the ability to capture the

complexity of the systems, without requiring rigid assumptions which could bias the results. While volatility is an estimate of the variation of scrip's price, entropy is concerned with the irregularity or randomness of the price fluctuations. Hence entropy is more suited than any measure of variation, to study manipulation of the stock market.

APPROXIMATE ENTROPY AND SAMPLE ENTROPY

In the absence of publicly available, participant-wise order data for buying or selling a stock, fitting probability distributions for order price, order time and order quantity are not possible and hence, there is no way of computing Shannon entropy values. For any scrip, the only publicly available information is on trade price, trade time and trade quantity, not the identity of the participants who are parties to the trades. Thus, one can construct a time series of each scrip based on price, time and quantity, on a daily basis and under such circumstances, tools for computing the entropy of short and noisy time series are required. Approximate entropy and sample entropy are advances made in this direction.

Traditional methods for estimating the entropy of a system represented by a time series are not suited to the analysis of short and noisy data sets. The calculation of Shannon's entropy requires the probability density (mass) function of the random variable which denotes the time series. However, Kolmogorov - Sinai's (KS) entropy may be a useful parameter to characterise system dynamics. Though KS entropy measures the mean rate of creation of information, it cannot be estimated with reasonable precision for real world time series of finite length. Hence approximate entropy (ApEn), a set of measures of serial irregularity, has been introduced for typically short noisy time series. ApEn, a family of statistics closely related to the entropy measure, provides an appropriate tool to grade the extent of irregularity. ApEn grades a continuum that ranges from totally ordered to maximally

irregular (completely random). ApEn attempts to distinguish data sets on the basis of regularity and not to construct an accurate model of the data.

Approximate Entropy Estimation

ApEn measures the logarithmic likelihood of runs of patterns that are close continue to remain close on next incremental comparisons. The intuition motivating ApEn is that if joint probability measures that describe sets of two systems are different, then their marginal distributions on a fixed partition are likely to be different. ApEn assigns a non-negative number to a sequence or time series, with larger value corresponding to greater apparent serial randomness or irregularity, and smaller value corresponding to more instances of recognizable features in the data. Two input parameters - a block or run length m and a tolerance window r , are required to be specified to compute ApEn. To be very precise, ApEn computes the logarithmic frequency of runs of patterns that run within $r\%$ of the SD (standard deviation) of a time series for m contiguous observations continuing to remain within the same tolerance width r for $m+1$ contiguous observations. Normalising r to the SD of the time series makes ApEn translation and scale invariant, in that ApEn remains unchanged under uniform process magnification.

Let the given time series be u_1, u_2, \dots, u_N .

For any m , s.t. $1 \leq m < N$, define in \mathfrak{R} , the following m -tuples:

$$x_{m,1} = (u_1, u_2, \dots, u_m)$$

$$x_{m,2} = (u_2, u_3, \dots, u_{m+1})$$

$$x_{m,i} = (u_i, u_{i+1}, \dots, u_{i+m-1})$$

$$x_{m,N-m+1} = (u_{N-m+1}, u_{1+N-m+1}, \dots, u_N)$$

Define $d(x_{m,i}, x_{m,j}) = \max |u_{i+k} - u_{j+k}|$ where $k = 0, 1, \dots, m-1$

This gives the distance between any two m -tuples.

For $r > 0$, the r -neighbourhood of $x_{m,i}$ is defined as $\{x_{m,j} \in \mathfrak{R}^m / d(x_{m,i}, x_{m,j}) \leq r\}$

i.e. the neighbourhood of a particular m -tuple $x_{m,i}$ consists of all m -tuples, which are within a distance of r units from $x_{m,i}$.

Since, $d(x_{m,i}, x_{m,i}) = 0 \forall i$, the r -neighbourhood of any $x_{m,i}$ is never empty for any r , which is chosen generally as a % of the standard deviation of the data series $\{u_i\}$.

$$\text{Let } C_{m,i}(r) = \frac{\text{Number of } j \text{ s.t. } d(x_{m,i}, x_{m,j}) \leq r}{N - m - 1} = \text{ratio}$$

of $x_{m,j}$'s in the r -neighbourhood of $x_{m,i}$

$$\text{and } \Phi_m(r) = \frac{1}{N - m - 1} \sum_{i=1}^{N-m-1} \log C_{m,i}(r)$$

= average of the log of the ratios of $x_{m,j}$'s in the r -neighbourhood of any $x_{m,i}$

$$\text{Then, } \Phi_{m+1}(r) - \Phi_m(r) = \log \frac{[\prod_{i=1}^{N-m} C_{m+1,i}(r)]^{\frac{1}{N-m}}}{[\prod_{i=1}^{N-m-1} C_{m,i}(r)]^{\frac{1}{N-m-1}}} \dots (1)$$

average of the log of the ratios of $(m+1)$ tuples in the r -neighbourhood of any $x_{m+1,i}$
 = $\frac{\text{average of the log of the ratios of } (m+1) \text{ tuples in the } r\text{-neighbourhood of any } x_{m+1,i}}{\text{average of the log of the ratios of } m \text{ - tuples in the } r\text{-neighbourhood of any } x_{m,i}}$

The ratio in (1) is always ≤ 1 so that $-\infty < \Phi_{m+1}(r) - \Phi_m(r) \leq 0 \forall r \geq 0$ and $m = 1, 2, \dots, N$.

Fixing m and r , $\text{ApEn} = \text{Lt}_{N \rightarrow \infty} \{\Phi_m(r) - \Phi_{m+1}(r)\}$

Given N data points, this formula is implemented by defining

$$\text{ApEn}(m,r,N) = \Phi_m(r) - \Phi_{m+1}(r)$$

$\Phi_m(r) \geq \Phi_{m+1}(r)$ it is clear that $0 \leq \text{ApEn} < \infty$ with $\text{ApEn} = 0$ implies perfect regularity.

Small values of ApEn imply strong regularity or persistence in a sequence and large values of ApEn imply substantial fluctuation or irregularity.

For finite N , the largest possible value of ApEn is $-\Phi_{m+1}(r) \leq -\log(N-m)^{-1}$

$$0 \leq \text{ApEn}(m,r,N) \leq \log(N-m)$$

Demerits of ApEn

It may be noted that ApEn algorithm counts each sequence as matching itself in order to avoid the occurrence of $\log 0$ in the calculations. This leads to a bias which causes ApEn to lack two important properties

- ApEn is heavily dependent on the record length and is uniformly lower than expected for short records
- ApEn lacks relative consistency ie. if ApEn of a data set is higher than that of another, it should, but does not, remain higher for all conditions.

Let $A_{m,i}(r) = \text{Number of } j \neq i, \text{ s. t. } d(x_{m,i}, x_{m,j}) \leq r$

The ApEn algorithm, then assigns to each template $x_{m,i}$, a biased conditional probability of $\frac{A_{m+1,i}(r)+1}{A_{m,i}(r)+1}$ which will be always $>$ the unbiased

probability of $\frac{A_{m+1,i}(r)}{A_{m,i}(r)}$. The largest deviation

occurs when a large number of templates $x_{m,i}$ have $A_{m,i}(r) = A_{m+1,i}(r) = 0$, since a conditional probability of 1 is assigned to these templates (corresponding to perfect order). The difference between the biased and the unbiased conditional probabilities assigned to individual templates makes the calculations sensitive to record length in a way that depends on the conditional probability. As $N \rightarrow \infty$, $A_{m,i}(r)$ and $A_{m+1,i}(r)$ will be generally large, this makes the biased and the unbiased probabilities asymptotically equivalent. Hence, the bias is evident only for finite data sets and the expected value of $\text{ApEn}(m,r,N)$ is less than the parameter $\text{ApEn}(m,r)$. This bias cannot be eliminated by simply removing self-matches, unless $C_{m,i}(r) > 0 \forall i$. One way of reducing the bias

is to redefine $A_{m+1,i}(r) = \epsilon_1$ when $A_{m+1,i}(r) = 0$ and $A_{m,i}(r) = \epsilon_2$ when $A_{m,i}(r) = 0$ where ϵ_1 and ϵ_2 are infinitesimal. However this is arbitrary and hence another family of statistics called Sample entropy (SampEn) has been introduced.

Sample Entropy Estimation

SampEn is a new family of statistics which is free of the bias caused by self-matching. SampEn is largely independent of record length and displays relative consistency under circumstances where ApEn does not. The name refers to the applicability to time series data sampled from a continuous process.

Since $x_{m+1,i}$ is not defined for $i = N - m + 1$, only the first $(N - m)$ vectors of length m and all the $(N - m)$ vectors of length $m+1$ are considered without self-matches in the calculation of SampEn.

$$\text{Let } B_{m,i}(r) = \frac{\text{Number of } j \neq i \text{ s.t. } d(x_{m,i}, x_{m,j}) \leq r}{N-m+1},$$

where $j = 1, 2, \dots, N - m$

and

$$B_{m+1,i}(r) = \frac{1}{N-m} \sum_{i=1}^{N-m} B_{m,i}(r).$$

Similarly,

$$\text{let } B_{m+1,j}(r) = \frac{\text{Number of } i \neq j \text{ s.t. } d(x_{m+1,i}, x_{m+1,j}) \leq r}{N-m+1},$$

where $j = 1, 2, \dots, N - m$

and

$$B_{m+1}(r) = \frac{1}{N-m} \sum_{i=1}^{N-m} B_{m+1,i}(r)$$

$$\text{Then, } \text{SampEn}(m,r) = \text{Lt}_{N \rightarrow \infty} \log \left[\frac{B_{m+1}(r)}{B_m(r)} \right],$$

which is estimated by the statistic

$$\text{SampEn}(m,r,N) = -\log \left[\frac{B_{m+1}(r)}{B_m(r)} \right].$$

When two $(m+1)$ -tuples are within a distance

of r , the corresponding m -tuples are also within the same distance. Hence $B_m(r) \geq B_{m+1}(r)$ always implying that $\text{SampEn} \geq 0$.

ApEn Versus SampEn

There are two major differences between SampEn and ApEn statistics:

1. SampEn does not count self-matches, which is justified on the ground that entropy being a measure of the rate of information production, self-comparison of data with themselves is meaningless.
2. SampEn does not use a template-wise approach while estimating conditional probabilities.

If $B(m,r) = \frac{(N-m)(N-m+1)}{2} B_m(r)$ is the total number of template matches of length m and $B(m+1,r) = \frac{(N-m)(N-m+1)}{2} B_{m+1}(r)$ is the total number of forward matches of length $m+1$, the conditional probability that two sequences within a tolerance of r for m points remain within r at the next point is given by

$$\frac{B(m+1,r)}{B(m,r)} = \frac{B_{m+1}(r)}{B_m(r)} \quad \text{and} \quad \text{hence}$$

$$\text{SampEn}(m,r,N) = -\log \left[\frac{B(m+1,r)}{B(m,r)} \right]$$

In contrast to $\text{ApEn}(m,r,N)$ which calculates probabilities in a template-wise fashion, $\text{SampEn}(m,r,N)$ calculates the negative logarithm of a probability associated with the time series as a whole. $\text{SampEn}(m,r,N)$ is defined except when $B(m,r) = 0$ which implies that no regularity has been detected or when $B(m+1,r) = 0$ which corresponds to a conditional probability of 0 and an infinite value of $\text{SampEn}(m,r,N)$. The lowest non-zero conditional probability as per this

algorithm is $\frac{2}{(N-m)(N-m+1)}$ and, therefore,

the upper bound of $\text{SampEn}(m,r,N)$ is given by

$$-\log \left[\frac{2}{(N-m)(N-m+1)} \right] = \log \left[\frac{(N-m)(N-m+1)}{2} \right]$$

which is almost double the upper bound of $\text{ApEn}(m,r,N)$ viz. $\log(N-m)$.

Since sample entropy addresses the drawbacks of approximate entropy, sample entropy of the time series of trade price, trade time and trade quantity of a scrip over a period may be used to discern serial irregularity and to study manipulation in the price of the scrip.

A CASE STUDY

The scrip of Lupin Laboratories Ltd., which has been reported to be the subject to price manipulation on various days during the period from October 1999 to January 2000 (www.sebi.com) was chosen for the study. The prices of all the trades executed in the scrip on the National Stock Exchange were taken for the various trading days during this period. The differences in the prices of successive trades were taken as time series. By taking such first differences, stationary character of the time series may be assumed safely so that meaningful analysis may be made. Further, a manipulator is always interested in price differences in order to gain as much as possible and hence places successive orders with artificial prices carrying a manipulative intent. The computation of SampEn for each time series requires two input parameters, viz., the template size m and the tolerance window r . For time series with a few thousand data points, a value between 2 and 5 for m and a value between 0.1 and 0.25 for r are used generally for computing SampEn . In this analysis, it was observed empirically that the results were not too dependent on specific values of m and r within these ranges respectively.

SampEn of the time series consisting of the differences in successive trade prices of the scrip of Lupin Laboratories Ltd., was computed for $m = 2, 3, 4, 5$ and $r = 0.15, 0.16, 0.17, 0.18, 0.19,$ and 0.20 . These SampEn values for the trading days in October, November, December, 1999 and

January 2000 are given in Tables 1, 2, 3 and 4, respectively. It may be observed that SampEn is very low on days 4, 5, 6, 7, 8, 9, 10 and 13 in October, on days 5, 17 and 19 in November, on days 15, 16 and 18 in December 1999 and on days 1 and 7 in January 2000, for all values of m and r . Specifically, SampEn for all these 16 days is utmost 0.20 for $m = 5$ and $r = 0.20 \cdot SD$. Also, SampEn was 0 on days 6, 7 and 13 in October and on day 17 in November 1999 implying maximum regularity in the data pertaining to these days. The fact that the trades on each of these days were executed at the same price lends credence to the maximum possible regularity in the time series and hence the least possible value of SampEn for each of these days.

The above mentioned 16 days in October 1999 - January 2000, when the SampEn is very low, are days of potential manipulation in the price of the Lupin Laboratories Ltd. scrip. The order related data for the scrip, pertaining to these 16 days may be analysed further to observe the trading patterns of the participants and discern price manipulation attempt by any participant.

CONCLUSION

Entropic analysis is a novel area for the Indian stock market and with a near vacuum in research efforts. This paper applies entropic analysis to study price manipulation. Due to non-availability of participant-wise, order-related data, sample entropy was found suitable for this study. SampEn values for the trade price data related to the scrip of Lupin Laboratories Ltd., on various trading days in the period during which it was reported to be subject to price manipulation, supported such suspicion. This empirical analysis should be done for many other scrips to reach the conclusion that entropic analysis is an effective tool to study stock market manipulation. Further, since all orders placed by a participant may not

result in trades due to non-availability of matching counter-orders and some orders may result in multiple trades, trade related data may not reveal the entire information contained in all the orders. Hence, entropic analysis of order related data (if available) will ensure more efficiency in the study of price manipulation attempts in the stock market.

REFERENCES

- Bavly, Gilad, and Abraham Neyman (2003), "Online Concealed Correlation by Boundedly Rational Players", Discussion Paper No. 336, www.ratio.huji.ac.il/neyman/publications (accessed on 22.04.2005 and 08.03.2007)
- Chen, Jing (2005), "Information Theory and Market Behaviour", University of Northern British Columbia, Working Paper
- Cover, Thomas M., and Joy A. Thomas (1991), *Elements of Information Theory* (New York: John Wiley and Sons)
- Greven, Andreas, Gerhard Keller, and Gerald Warnecke (2003), *Entropy* (Princeton: Princeton University Press)
- John Conover (1994), "NtropsiX", www.johncon.com (accessed on 31.05.2006, 31.01.2007)
- Luc, Vila Jean (1989), "Simple Games of Market Manipulation", *Economic Letters*, Vol. 29, Issue 1, pp. 21-26
- Maasoumi, Esfandiar, and Je Racine (2000), "Entropy and Predictability of Stock Market Returns", University of California San Diego, Working Paper
- Marantette, David T. (1998), *The Entropy Danger*, www.goldstock.com (accessed on 21.03.2006)
- Nawrocki, David (1984), "Entropy, Bifurcation and Dynamic Market Disequilibrium", *Journal of Economic Dynamics and Control*, Vol. 19, Issue 2, May 1984, pp. 266 - 284.
- Pincus, Steve, and Burton H. Singer (1998), "A Recipe for Randomness", *Proceedings of the National Academy of Sciences of USA*, Vol. 95, No. 4, pp. 1363-1368.
- Pincus, Steve, and Rudolf E. Kalman (2004) "Irregularity, Volatility, Risk and Financial Market Time Series", *Proceedings of the National Academy of Sciences of USA*, Vol. 101, No. 38, pp. 13709 - 13714
- Richman, Joshua S., and J. Randall Moorman (2000), "Physiological Time-Series Analysis using Approximate Entropy and Sample Entropy", *American Journal of Physiology*, Vol. 278, No. 6, pp. 2039 - 2049 www.sebi.gov.in (accessed on 30.11.2005 and 30.12.2006)

Table 1
Sample Entropy Values for Lupin Laboratories Ltd.

(for the month of October 1999)

<i>m, r</i>	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10	Day11	Day12	Day13	Day14	Day15	Day16	Day17	Day18	Day19	Day20
2, 0.15	1.031	1.184	0.961	0.132	0.05	0	0	0.391	0.22	0.239	0.644	0.905	0	0.482	0.551	0.672	0.957	1.007	0.935	0.958
2, 0.16	1.031	1.025	0.961	0.132	0.05	0	0	0.391	0.22	0.241	0.644	0.905	0	0.482	0.551	0.672	0.957	1.007	0.835	0.958
2, 0.17	0.94	1.025	0.961	0.132	0.05	0	0	0.391	0.22	0.241	0.644	0.838	0	0.482	0.551	0.672	0.957	1.007	0.835	0.958
2, 0.18	0.94	1.025	0.961	0.132	0.05	0	0	0.371	0.221	0.241	0.63	0.838	0	0.482	0.551	0.672	0.957	1.007	0.835	0.918
2, 0.19	0.94	1.025	0.961	0.132	0.05	0	0	0.371	0.221	0.241	0.63	0.838	0	0.492	0.551	0.672	0.957	1.007	0.835	0.918
2, 0.20	0.94	1.025	0.961	0.132	0.05	0	0	0.371	0.222	0.24	0.63	0.838	0	0.492	0.517	0.627	0.906	0.937	0.835	0.918
3, 0.15	0.993	1.006	0.887	0.098	0.051	0	0	0.276	0.15	0.176	0.541	0.843	0	0.352	0.431	0.61	0.977	0.947	0.752	0.903
3, 0.16	0.993	0.9	0.887	0.098	0.051	0	0	0.276	0.15	0.179	0.541	0.843	0	0.352	0.431	0.61	0.977	0.947	0.663	0.903
3, 0.17	0.855	0.9	0.887	0.098	0.051	0	0	0.276	0.15	0.179	0.541	0.775	0	0.352	0.431	0.61	0.977	0.947	0.663	0.903
3, 0.18	0.855	0.9	0.887	0.098	0.051	0	0	0.273	0.15	0.179	0.534	0.775	0	0.362	0.431	0.61	0.977	0.947	0.663	0.842
3, 0.19	0.855	0.9	0.887	0.098	0.051	0	0	0.273	0.15	0.179	0.534	0.775	0	0.362	0.431	0.61	0.977	0.947	0.663	0.842
3, 0.20	0.855	0.9	0.887	0.099	0.051	0	0	0.273	0.15	0.184	0.534	0.775	0	0.362	0.406	0.57	0.912	0.888	0.663	0.842
4, 0.15	0.828	0.719	0.871	0.077	0.053	0	0	0.236	0.063	0.16	0.462	0.673	0	0.288	0.298	0.602	0.984	0.9	0.679	0.696
4, 0.16	0.828	0.738	0.871	0.077	0.053	0	0	0.236	0.063	0.159	0.462	0.673	0	0.288	0.298	0.602	0.984	0.9	0.589	0.696
4, 0.17	0.746	0.738	0.871	0.077	0.053	0	0	0.236	0.063	0.159	0.462	0.632	0	0.288	0.298	0.602	0.984	0.9	0.589	0.696
4, 0.18	0.746	0.738	0.871	0.077	0.053	0	0	0.245	0.063	0.159	0.449	0.632	0	0.288	0.298	0.602	0.984	0.9	0.589	0.652
4, 0.19	0.746	0.738	0.871	0.077	0.053	0	0	0.245	0.063	0.159	0.449	0.632	0	0.295	0.298	0.602	0.984	0.9	0.589	0.652
4, 0.20	0.746	0.738	0.871	0.078	0.053	0	0	0.245	0.063	0.164	0.449	0.632	0	0.295	0.299	0.562	0.904	0.895	0.589	0.652
5, 0.15	0.668	0.633	0.874	0.062	0.054	0	0	0.178	0.048	0.124	0.419	0.587	0	0.236	0.235	0.506	0.914	0.935	0.609	0.495
5, 0.16	0.668	0.745	0.874	0.062	0.054	0	0	0.178	0.048	0.123	0.419	0.587	0	0.236	0.235	0.506	0.914	0.935	0.461	0.495
5, 0.17	0.617	0.745	0.874	0.062	0.054	0	0	0.178	0.048	0.123	0.419	0.567	0	0.236	0.235	0.506	0.914	0.935	0.461	0.495
5, 0.18	0.617	0.745	0.874	0.062	0.054	0	0	0.192	0.048	0.123	0.404	0.567	0	0.236	0.235	0.506	0.914	0.935	0.461	0.482
5, 0.19	0.617	0.745	0.874	0.062	0.054	0	0	0.192	0.048	0.123	0.404	0.567	0	0.245	0.235	0.506	0.914	0.935	0.461	0.482
5, 0.20	0.617	0.745	0.874	0.063	0.054	0	0	0.192	0.048	0.123	0.404	0.567	0	0.245	0.229	0.461	0.837	0.866	0.461	0.482

Table 2
Sample Entropy Values for Lupin Laboratories Ltd.

(for the month of November 1999)

m, r	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10	Day11	Day12	Day13	Day14	Day15	Day16	Day17	Day18	Day19	Day20
2, 0.15	0.785	0.677	0.95	1.021	0.368	1.089	0.957	0.863	0.744	1.055	0.893	0.901	0.574	1.235	1.139	0.662	0	0.824	0.371	0.723
2, 0.16	0.785	0.677	0.95	1.021	0.368	1.089	0.957	0.863	0.744	1.055	0.893	0.901	0.574	1.235	1.139	0.662	0	0.824	0.371	0.723
2, 0.17	0.785	0.677	0.95	0.913	0.368	1.089	0.957	0.863	0.744	1	0.849	0.901	0.574	1.045	0.968	0.662	0	0.824	0.371	0.723
2, 0.18	0.786	0.677	0.95	0.913	0.368	1.089	0.957	0.863	0.744	1	0.849	0.901	0.574	1.045	0.968	0.662	0	0.824	0.371	0.723
2, 0.19	0.786	0.658	0.901	0.913	0.367	1.089	0.893	0.863	0.744	1	0.849	0.901	0.546	1.045	0.968	0.662	0	0.824	0.371	0.676
2, 0.20	0.786	0.658	0.901	0.913	0.367	1.019	0.893	0.863	0.744	1	0.849	0.901	0.546	1.045	0.968	0.662	0	0.824	0.371	0.676
3, 0.15	0.639	0.544	0.817	1.009	0.257	1.026	0.938	0.731	0.665	1.064	0.755	0.821	0.433	1.224	1.043	0.612	0	0.75	0.326	0.704
3, 0.16	0.639	0.544	0.817	1.009	0.257	1.026	0.938	0.731	0.665	1.064	0.755	0.821	0.433	1.224	1.043	0.612	0	0.75	0.326	0.704
3, 0.17	0.639	0.544	0.817	0.857	0.257	1.026	0.938	0.731	0.665	1.024	0.739	0.821	0.433	1.044	0.927	0.612	0	0.75	0.326	0.664
3, 0.18	0.639	0.544	0.817	0.857	0.257	1.026	0.938	0.731	0.665	1.024	0.739	0.821	0.463	1.044	0.927	0.612	0	0.75	0.326	0.664
3, 0.19	0.639	0.538	0.757	0.857	0.26	1.026	0.873	0.731	0.665	1.024	0.739	0.821	0.463	1.044	0.927	0.589	0	0.75	0.326	0.664
3, 0.20	0.639	0.538	0.757	0.857	0.26	0.976	0.873	0.731	0.665	1.024	0.739	0.821	0.835	0.971	0.889	0.549	0	0.643	0.255	0.665
4, 0.15	0.54	0.42	0.669	1.005	0.194	0.909	0.812	0.61	0.552	1.031	0.612	0.835	0.338	0.971	0.889	0.549	0	0.643	0.255	0.665
4, 0.16	0.54	0.42	0.669	1.005	0.194	0.909	0.812	0.61	0.552	1.031	0.612	0.835	0.338	0.971	0.889	0.549	0	0.643	0.255	0.665
4, 0.17	0.54	0.42	0.669	0.817	0.194	0.909	0.812	0.61	0.552	1.012	0.592	0.835	0.338	0.908	0.852	0.549	0	0.643	0.255	0.665
4, 0.18	0.528	0.42	0.669	0.817	0.194	0.909	0.812	0.61	0.552	1.012	0.592	0.835	0.338	0.908	0.852	0.549	0	0.643	0.255	0.665
4, 0.19	0.528	0.425	0.64	0.817	0.189	0.909	0.776	0.61	0.552	1.012	0.592	0.835	0.388	0.908	0.852	0.549	0	0.643	0.255	0.62
4, 0.20	0.528	0.425	0.64	0.817	0.189	0.868	0.776	0.61	0.552	1.012	0.592	0.835	0.388	0.908	0.852	0.537	0	0.643	0.255	0.62
5, 0.15	0.436	0.347	0.686	1.094	0.177	0.92	0.757	0.555	0.495	1.025	0.493	0.726	0.266	0.794	0.892	0.506	0	0.622	0.201	0.636
5, 0.16	0.436	0.347	0.686	1.094	0.177	0.92	0.757	0.555	0.495	1.025	0.493	0.726	0.266	0.794	0.892	0.506	0	0.622	0.201	0.636
5, 0.17	0.436	0.347	0.686	0.833	0.177	0.92	0.757	0.555	0.495	1.061	0.506	0.726	0.266	0.864	0.833	0.506	0	0.622	0.201	0.636
5, 0.18	0.461	0.347	0.686	0.833	0.177	0.92	0.757	0.555	0.495	1.061	0.506	0.726	0.266	0.864	0.833	0.506	0	0.622	0.201	0.636
5, 0.19	0.461	0.366	0.623	0.833	0.172	0.92	0.741	0.555	0.495	1.061	0.506	0.726	0.31	0.864	0.833	0.506	0	0.622	0.201	0.606
5, 0.20	0.461	0.366	0.623	0.833	0.172	0.899	0.741	0.555	0.495	1.061	0.506	0.726	0.31	0.864	0.833	0.487	0	0.622	0.201	0.606

Table 3
Sample Entropy Values for Lupin Laboratories Ltd.

(for the month of December 1999)

<i>m, r</i>	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10	Day11	Day12	Day13	Day14	Day15	Day16	Day17	Day18	Day19	Day20	Day21
2, 0.15	0.87	0.992	0.763	0.576	0.962	0.864	0.857	0.91	0.815	0.775	1.085	0.641	0.805	0.821	0.183	0.038	0.508	0.457	0.872	0.651	0.671
2, 0.16	0.87	0.992	0.763	0.576	0.962	0.864	0.855	0.91	0.766	0.775	1.049	0.641	0.805	0.804	0.175	0.038	0.508	0.457	0.872	0.645	0.671
2, 0.17	0.87	0.992	0.763	0.526	0.962	0.864	0.855	0.834	0.766	0.735	1.049	0.641	0.805	0.804	0.175	0.038	0.508	0.452	0.817	0.645	0.671
2, 0.18	0.87	0.992	0.763	0.526	0.962	0.864	0.855	0.834	0.766	0.735	1.049	0.641	0.806	0.804	0.175	0.038	0.508	0.452	0.817	0.645	0.653
2, 0.19	0.814	0.915	0.763	0.526	0.909	0.852	0.855	0.834	0.766	0.735	1.042	0.641	0.806	0.804	0.175	0.038	0.508	0.452	0.817	0.645	0.653
2, 0.20	0.814	0.915	0.763	0.526	0.909	0.852	0.855	0.834	0.716	0.735	1.042	0.624	0.806	0.787	0.175	0.038	0.508	0.453	0.805	0.622	0.653
3, 0.15	0.816	0.994	0.715	0.477	0.904	0.76	0.79	0.655	0.835	0.691	1.096	0.534	0.718	0.749	0.123	0.039	0.39	0.334	0.952	0.558	0.628
3, 0.16	0.816	0.994	0.715	0.477	0.904	0.76	0.8	0.655	0.774	0.691	1.077	0.534	0.718	0.736	0.118	0.039	0.39	0.334	0.952	0.555	0.628
3, 0.17	0.816	0.994	0.715	0.453	0.904	0.76	0.8	0.616	0.774	0.652	1.077	0.534	0.718	0.736	0.118	0.039	0.39	0.329	0.886	0.555	0.628
3, 0.18	0.816	0.994	0.715	0.453	0.904	0.76	0.8	0.616	0.774	0.652	1.077	0.534	0.716	0.736	0.118	0.039	0.39	0.329	0.886	0.555	0.632
3, 0.19	0.748	0.889	0.715	0.453	0.844	0.755	0.8	0.616	0.774	0.652	1.067	0.534	0.716	0.736	0.118	0.039	0.39	0.329	0.886	0.555	0.632
3, 0.20	0.748	0.889	0.715	0.453	0.844	0.755	0.8	0.616	0.718	0.652	1.067	0.513	0.716	0.726	0.118	0.039	0.39	0.33	0.875	0.541	0.632
4, 0.15	0.793	1.002	0.665	0.393	0.772	0.704	0.696	0.67	0.725	0.604	0.998	0.503	0.692	0.679	0.109	0.04	0.352	0.192	0.922	0.517	0.516
4, 0.16	0.793	1.002	0.665	0.393	0.772	0.704	0.722	0.67	0.686	0.604	0.956	0.503	0.692	0.665	0.106	0.04	0.352	0.192	0.922	0.497	0.516
4, 0.17	0.793	1.002	0.665	0.392	0.772	0.704	0.722	0.598	0.686	0.556	0.956	0.503	0.692	0.665	0.106	0.04	0.352	0.189	0.872	0.497	0.516
4, 0.18	0.793	1.002	0.665	0.392	0.772	0.704	0.722	0.598	0.686	0.556	0.956	0.503	0.69	0.665	0.106	0.04	0.353	0.189	0.872	0.497	0.537
4, 0.19	0.746	0.905	0.665	0.392	0.764	0.689	0.722	0.598	0.686	0.556	0.946	0.503	0.69	0.665	0.106	0.04	0.353	0.189	0.872	0.497	0.537
4, 0.20	0.746	0.905	0.665	0.392	0.764	0.689	0.722	0.598	0.667	0.556	0.946	0.485	0.69	0.659	0.106	0.04	0.353	0.191	0.861	0.488	0.537
5, 0.15	0.749	1.129	0.611	0.358	0.716	0.628	0.674	0.632	0.776	0.658	0.82	0.462	0.644	0.634	0.098	0.02	0.271	0.141	0.81	0.434	0.486
5, 0.16	0.749	1.129	0.611	0.358	0.716	0.628	0.692	0.632	0.768	0.658	0.775	0.462	0.644	0.611	0.096	0.02	0.271	0.141	0.81	0.419	0.486
5, 0.17	0.749	1.129	0.611	0.355	0.716	0.628	0.692	0.581	0.768	0.611	0.775	0.462	0.644	0.611	0.096	0.02	0.271	0.138	0.802	0.419	0.486
5, 0.18	0.749	1.129	0.611	0.355	0.716	0.628	0.692	0.581	0.768	0.611	0.775	0.462	0.633	0.611	0.096	0.02	0.272	0.138	0.802	0.419	0.499
5, 0.19	0.696	1.033	0.611	0.355	0.746	0.601	0.692	0.581	0.768	0.611	0.768	0.462	0.633	0.611	0.096	0.02	0.272	0.138	0.802	0.419	0.499
5, 0.20	0.696	1.033	0.611	0.355	0.746	0.601	0.692	0.581	0.757	0.611	0.768	0.477	0.633	0.615	0.096	0.02	0.272	0.14	0.79	0.419	0.499

Table 4

Sample Entropy Values for Lupin Laboratories Ltd.

(for the month of January 2000)

m, r	Day1	Day2	Day3	Day4	Day5	Day6	Day7
2, 0.15	0.339	0.835	0.787	1.031	0.733	1.065	0.376
2, 0.16	0.339	0.835	0.787	1.031	0.733	1.065	0.376
2, 0.17	0.316	0.779	0.781	0.979	0.733	0.99	0.376
2, 0.18	0.316	0.779	0.781	0.979	0.721	0.99	0.374
2, 0.19	0.316	0.779	0.781	0.979	0.721	0.981	0.374
2, 0.20	0.315	0.77	0.773	0.963	0.721	0.965	0.374
3, 0.15	0.267	0.839	0.705	1.166	0.646	0.972	0.31
3, 0.16	0.267	0.839	0.705	1.166	0.646	0.972	0.31
3, 0.17	0.256	0.793	0.698	1.096	0.646	0.903	0.31
3, 0.18	0.256	0.793	0.698	1.096	0.637	0.903	0.316
3, 0.19	0.256	0.793	0.698	1.096	0.637	0.893	0.316
3, 0.20	0.255	0.778	0.69	1.072	0.637	0.889	0.316
4, 0.15	0.228	0.733	0.656	1.182	0.575	0.992	0.272
4, 0.16	0.228	0.733	0.656	1.182	0.575	0.992	0.272
4, 0.17	0.218	0.713	0.647	1.111	0.575	0.935	0.272
4, 0.18	0.218	0.713	0.647	1.111	0.566	0.935	0.272
4, 0.19	0.218	0.713	0.647	1.111	0.566	0.93	0.272
4, 0.20	0.218	0.694	0.636	1.108	0.566	0.926	0.272
5, 0.15	0.206	0.736	0.688	1.027	0.423	1.085	0.203
5, 0.16	0.206	0.736	0.688	1.027	0.423	1.085	0.203
5, 0.17	0.187	0.683	0.675	0.91	0.423	0.98	0.203
5, 0.18	0.187	0.683	0.675	0.91	0.43	0.98	0.205
5, 0.19	0.187	0.683	0.675	0.91	0.43	0.964	0.205
5, 0.20	0.187	0.698	0.66	0.922	0.43	0.951	0.205

THE INDIAN JOURNAL OF INDUSTRIAL RELATIONS
A Review of Economic and Social Development

CONTENTS

- | | |
|--|---|
| • Trade Union Research in Support of a Role in Development | Bo Jonsson |
| • Voice for the Voice Workers: Addressing the IR Concerns in the Call Center/BPO Industry of Asia | Rene E. Ofreno,
Christopher Ng and
Leian Marasigan-
Pasumbal |
| • Migrant Labour and Trade Union's Response and Strategy in China | Fang Lee Cooke |
| • Partnership as Union Strategy –Does it Work in Asia? Case Studies in Indonesia and Malaysia | Aryan Satrya and
Balakrishnan
Parasuraman |
| • Trade Unions and Wider Society | C.S Venkata
Ratnam |
| • Declining Labour Power and Challenges before Trade Unions: Some Lessons from a Case Study on Private Sector Unionism | Debi S. Saini |
| • The Rise Fall of Indian Trade Unions: A Legislative and Judicial Perspective | E.M. Rao |
| • Choosing Collective Bargaining Agent: The Andhra Pradesh Experience in India | P.D. Raju |
| • Trade Unions and Civil Society: Issues and Strategies | K.R. Shyam Sundar |
| • Book Reviews | |

SUBSCRIPTION RATES

Period	India	Foreign	
		Air Mail	Sea Mail
	INR	\$	\$
One Year	600	100	65
Three Years	1500	275	175
Five Years	2400	375	175
Single Copy	160	30	18

SHRI RAM CENTRE
 FOR INDUSTRIAL RELATIONS AND HUMAN RESOURCES
 4, SAFDAR HASHMI MARG, NEW DELHI-110001
 Phone: 23352410/12/14/15 Fax: 23351953
 E-mail : sricir@indiatimes.com, sricir_25@yahoo.com
 Website : www.sricirhr.com

SERVICE QUALITY IN BANKS

A Study in Haryana and Chandigarh

Sudesh*

Abstract

Apart from attracting new customers, business organisations, these days, realise the importance of retaining the existing customers. Developing long-term relationship with the latter, requires the firm to ensure customer satisfaction through quality service. Hence, to have a competitive edge, companies are focusing on service quality. Measuring the quantity of service is, thus, an important function of service organisation. In the present study, an attempt has been made to measure the service quality in banks, with variations across demographic variables. The study also offers suggestions for improving the service quality in banks.

Key Words: *Service quality, Banks, Customer Satisfaction*

INTRODUCTION

FINANCIAL sector reforms have resulted in increased competition among the Indian banks. Simultaneously, customer awareness and expectations have grown due to openness of economy, advent of information technology and revolution of media, etc. Banks are compelled to take care of their customers as a means of achieving competitive advantage. The customers' choice of banks is determined by quality service in addition to their financial strengths and operational efficiency. Lack of interest in services can partly be attributed to the fact that there was little understanding of the differences between the management of services and the manufacturing of an organisation (Bitran and Lojo, 1993). Though the basic management

principles are the same for both the types of organisations, yet service organisations have some unique features that require a different emphasis from management perspective. Features which differentiate services from manufacturing have been described by many writers (Parasuraman, *et al.*, 1993 and Zeithaml, *et al.*, 1996). Services have been described in terms of their main attributes which include the followings:

1. **Nature of product:** Services are basically intangible. Therefore, customer satisfaction in services is not only influenced by objective measures of performance but is also influenced by intangible aspects during the service performance.
2. **Heterogeneity:** This creates another challenge for quality management as

* Reader, Department of Management, Kurukshetra University, Kurukshetra; E-mail: sudesh_kuk@rediffmail.com

quality in service is not just about conforming to standards, but also customizing the service, the behaviour and expectations of the customer being served.

3. **Inseparability:** This refers to the fact that most services are produced and consumed at the same time. Hence, quality management of services becomes difficult, as it is not often possible to actively monitor all service deliveries taking place and the service cannot be inspected before its consumption.
4. **Perishability:** This refers to the fact that services cannot be saved, stored, resold, or returned. A seat on an airplane or in a restaurant, an hour of a lawyer's time, a medical/academic advice or telephone line capacity cannot be reclaimed and used or resold at a later time which is quite in contrast to goods.

Due to their intangibility, heterogeneity, inseparability, and perishability, service quality has become difficult to conceptualise and measure. Hence, it is important for business managers to understand the provisions, symbols and tangible clues used by the customers in evaluating the service offered by business organisations. Quality is thus relative and subjective and depends on the perceptions and expectations of the customer with respect to the service offered.

For service-sector companies such as banking, insurance, and tourism, the issues and challenges of service quality are of the utmost significance. Poor service quality places such organisations at a competitive disadvantage. If customers perceive that service quality is unsatisfactory, they will not hesitate to switch over their business elsewhere. In recent years, it has been witnessed that there is discontentment with regard to service quality, even when the quality of many manufactured goods appear to have improved significantly. The recent trend in many service organisations is to consider service

quality as a critical factor enabling them to achieve a differential advantage over their competitors (Kotler, 2006). Increasingly, quality is becoming a key variable in strategic planning. Organisations which are becoming leaders in service quality are characterised by the commitment of the top management and a corporate culture that encourages a focus on consumer and quality throughout the company (Albrecht and Zemke, 1985).

In India, public sector banks meet nearly 90 per cent banking needs of the country and retail banking constitutes 80 per cent of this total banking business (Ram Mohan, 2002). Many academicians and practitioners have highlighted the need for better service quality in banks. Several researches have suggested the adoption of modern banking technology as a means to improve customer services (Sundaram, 1984; Nageswar, 1987; Nageswar and Pramod, 1990; Brahmanandan and Narayana, 1990; Seshasai, 1999; Gani and Bhat, 2003). These studies have made public sector banks aware that if the present trend of customer dissatisfaction continues, they would lose their valuable clients to their competitors especially to private and foreign banks. In fact, this was realised much earlier when the Rangarajan Committee Report (1989) stressed the need for mechanisation of the Indian banks. Many other researchers have suggested the adoption of modern banking technology as a means to improve customer services (Ammayya, 1996). Therefore, the banks have to provide quality service to their customers for survival, as well as to have competitive advantage.

LITERATURE REVIEW

There are a number of studies that refer to the importance of clients/ customers' perceptions of quality (Takeuchi and Quelch, 1983). These result from comparisons by expectations of service with actual performance (Gronroos, 1982 and Berry, et al., 1985). Berry (1980) along with Booms and Bitner (1981) argued that due to intangible nature of services, customers use elements associated

with the physical environment when evaluating service quality. Managing the evidence and using the environmental psychology are often seen as important marketing tools. Levitt (1981) proposed that customers use appearances to make judgments about realities. The less tangible a product is the more powerful shall be the effect of packaging while judging that product. Gronroos (1982) had identified two service quality dimensions, viz., functional quality and technical quality. Functional quality represents the perception of the manner in which the services are delivered. Technical quality or outcome quality on the other hand, represents the outcome of the service act or what the customer receives in the end (Brady and Cronin, 2001).

Parasuraman, et al. (1985) suggested that the criteria used by consumers mould their expectations and perceptions of delivered service quality fit into ten dimensions: tangibility, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding/knowing the customer and access. Subsequent researches, by Parasuraman, et al. (1988) have condensed these into five dimensions of service quality. The Pentadimensional model has now become the standard way of measuring service quality in banking sector.

1. Tangibility : includes physical facilities, equipment, appearance of personnel
2. Reliability : includes ability to perform the promised service accurately and with reliability.
3. Responsiveness : includes willingness to help customers and provide prompt service
4. Assurance : includes knowledge and courtesy of employees and their ability to convey trust and confidence.

5. Empathy : includes caring and individualised attention the company provides to its customers.

Parasuraman, et al. (1988) developed a 22-item scale, referred to as SERVQUAL Scale, which is widely used as a generic instrument for measuring service quality. The basis for identifying the five components was factor analysis of the 22-item scale developed from focus groups and from the specific industry applications undertaken by the authors (Parasuraman, et al., 1985, 1988; and Zeithaml, et al., 1990). Though, the veracity of conceptualising the SERVQUAL scale has been questioned by Carman (1990), the validity of the 22 individual performance scale items that make up the SERVQUAL scale appears to be well supported both by the procedures used to develop the items and by their subsequent use as reported in the literature (Brown and Swartz, 1989; Zeithaml, et al., 1990; Lewis, 1991; Young, et al., 1994; Berry and Parasuraman, 1997).

There are some limitations with SERVQUAL, which have been highlighted by the authors themselves (Parasuraman, et al., 1991) and also by other researchers (Babakhus and Boller, 1992; Lewis and Mitchell, 1990; Lewis, 1993; and Smith, 1992). These relate to respondents' difficulties with negatively-worded statements using two lists of statements for the same items. There is also a disagreement among various researchers regarding the number of dimensions of service to be assessed. Another problem relates to the time factor at which the service quality has to be measured, i.e., before, during or after a service encounter, while there is a healthy and productive debate regarding the dimensionality of SERVQUAL items to be included to service quality scale across different industries. Researchers, however, generally agree that the scale items are good predictors of overall service quality (Bolton and Drew, 1991; and Cronin and Taylor, 1992).

A number of other empirical studies have been conducted using the SERVQUAL scale

which include car retailing (Carrnan, 1990), travel and tourism (Fick and Ritchie, 1991), and hospitality (Saleh and Ryan, 1991), banks (Lewis, 1991), and medical services (Brown and Swartz, 1989). There have been a number of such studies that deal with service quality in banking industry in general and in particular the application of SERVQUAL instrument in commercial banks (Blanchard and Gallway, 1994; Angur, et al., 1999; Bahia and Nantel, 1998; Lassar, et al., 2000, Sureshchander and Rajendran, 2003; Kang and James, 2004; Jain, 2005; and Dogra, 2006).

OBJECTIVES OF THE STUDY

In view of the tremendous importance of service quality in banks, the present study attempts to achieve the following objectives:

1. To examine service quality in banks in three districts of Haryana and the Union Territory of Chandigarh through Service Quality Scale (SERVQUAL).
2. To ascertain service quality variation in banks across selected demographic variables, and
3. To suggest, on the basis of study results, ways and means of improving service quality in banks to make it more effective and efficient.

RESEARCH METHODOLOGY

The present study has been conducted in the northern districts of Haryana, which includes Kurukshetra, Karnal, Ambala and the Union Territory of Chandigarh. The study is restricted to five banks with two each from the public sector and the private sector and one foreign bank. The public sector banks taken for the study are State Bank of India (SBI), which is the largest bank in India and Punjab National Bank (PNB), which has the distinction of being one of the oldest banks. The private banks are ICICI and HDFC, and the foreign bank is Citi Bank (CB). ICICI is one of the leading banks among the private sector banks. It has been rated the best bank in terms of service

quality by a recent survey of Money Outlook. These banks were purposely selected for the present study keeping in view their economic and social contribution, specifically in terms of advancing credit, mobilising deposits, employee strength and branch network. The study is limited to retail banking, as it constitutes a major portion of banking business. The sample for the study comprises three hundred bank customers. The number of respondents was 75 from SBI, 75 from PNB, 52 from ICICI, 53 from HDFC and 45 from CB. This represents 50 per cent of bank customers from nationalised banks, 35 per cent from private sector banks, while the remaining 15 per cent from the foreign bank. While choosing the bank customers, non-probabilistic judgment-cum-convenience sampling technique is used. All important demographic characteristics like age, education, income and profession of the respondents are taken into consideration.

The data for the present study has been collected mainly from the primary sources using SERVQUAL. This 22-item instrument is widely used for measuring service quality. The data is collected through a questionnaire, and the five components of service quality are factor-analysed. The study is also supplemented by informal discussions with the customers and observation of the researcher.

ANALYSIS AND RESULTS

In the present study, the main focus of analysis is on customer expectations and perceptions in relation to the pure components of service quality: tangibility, reliability, responsiveness, assurance and empathy. Expectations and perceptions were measured on a seven-point scale. The mean of difference between customer expectations and customer perceptions were calculated separately for all the banks under study. To measure the service quality of the banks, the mean of SERVQUAL scores on all dimensions was computed separately for each bank and is presented in Table 1. It is evident from the data that the service quality of the foreign bank (CB)

Table 1
Service Quality of Banks Averaged on all Dimensions

Banks	Dimensions of Service Quality					Overall Service Quality
	Tangibility	Reliability	Responsiveness	Assurance	Empathy	
SBI	-2.42 (5)	-1.03 (5)	-1.82 (5)	-1.33 (4)	-1.82 (4)	-8.42 (5)
PNB	-2.10 (4)	-0.96 (3)	-1.75 (4)	-1.34 (5)	-1.84 (5)	-7.99 (4)
ICICI	-0.75 (3)	-1.00 (4)	-0.75 (2)	-1.02 (2)	-1.10 (2)	-4.62 (2)
HDFC	-0.65 (2)	-0.75 (2)	-0.96 (3)	-1.04 (3)	-1.60 (3)	-5.00 (3)
CB	-.35 (1)	-0.20 (1)	-0.35 (1)	-0.33 (1)	-0.63 (1)	-1.86 (1)

Note: Figures within parenthesis are ranks for each dimension.

is high whereas the service quality of public sector banks (SBI followed by the PNB) is comparatively low. Private sector banks (ICICI and HDFC) service quality is between the two extremes. The results also make it explicit that all banks fall below the expectations of their respective customers because their scores are in the negative.

However, foreign banks are relatively close to the expectations of their customers in comparison with public-sector banks since their overall service quality score is -1.86. Dimension-wise analysis reveals that service quality of State Bank of India (SBI) is comparatively poor on tangibility and responsiveness (ranked 5th), followed by other dimensions of service quality (ranked 4th). The position of PNB is slightly better. Its score is lowest on assurance and empathy followed by tangibility and responsiveness whereas it is ranked 3rd on reliability. ICICI Bank is ranked second overall, followed by HDFC in a close third position.

Service Quality Variation across Demographic Variables

Today, banking organisations need to provide consistent service quality to maintain and increase their market share and profitability. In the present study, an attempt has also been made to study whether banks provide the same quality to all their customers, across different

demographic variables like income, age, level of education, and profession. Mean expectations and mean perceptions were calculated for different variables for each bank separately. SERVQUAL scores, accordingly, were computed for different groups and for each bank.

Service Quality Variation and Income

To measure the service quality of different income groups of customers of the sample banks, respondents were grouped into four income groups, viz., Group 1 (income up to Rs. 15,000 per month), Group 2 (income between Rs. 15,001 – Rs. 25,000 per month), Group 3 (income between Rs. 25,001 – Rs. 35,000 per month) and Group 4 (income exceeding Rs. 35,001 per month). As shown in Table 2, the SERVQUAL scores of Citi Bank are comparatively high in the three income groups. However, there was no respondent in Citi Bank Group 1. The scores of the private banks, varied marginally on all the dimensions. Both private sector banks have very close scores but ICICI has better overall ranking, except in Group 2. Whereas the score of SBI and PNB are comparatively low in all the income groups, PNB's overall rank was better in Group 4.

The Table 2 also shows that service quality of Indian banks, as perceived by customers, increases as the income level goes up. However, it is not necessary that there will be a

Table 2
Comparative SERVQUAL Scores of Different Income Groups

Service Quality Dimensions	Upto Rs. 15000 (per month)					Rs. 15,001-Rs. 25,000 (per month)					Rs. 25,001 -35,000 (per month)					Above Rs. 35,001 as (per month)				
	SBI N=18	PNB N=22	ICICI N=7	HDFC N=6	CB N=0	SBI N=32	PNB N=29	ICICI N=10	HDFC N=9	CB N=5	SBI N=17	PNB N=18	ICICI N=16	HDFC N=17	CB N=15	SBI N=8	PNB N=6	ICICI N=19	HDFC N=21	CB N=25
Tangibility	-2.39 (4)	-2.27 (3)	-0.96 (1)	-1.00 (2)	0	-2.36 (5)	-2.32 (4)	-0.95 (2)	-1.00 (3)	-0.42 (1)	-2.36 (5)	-2.00 (4)	-0.84 (2)	-0.88 (3)	-0.42 (1)	-2.42 (5)	-1.92 (4)	-0.82 (2)	-0.84 (3)	-0.41 (1)
Reliability	-1.48 (4)	-1.35 (3)	-1.02 (2)	-0.98 (1)	0	-1.31 (4)	-1.65 (5)	-1.03 (2)	-1.15 (3)	-0.21 (1)	-1.71 (4)	-1.85 (5)	-0.75 (2)	-0.78 (3)	-0.33 (1)	-0.32 (4)	-0.55 (5)	-0.42 (2)	-0.48 (3)	-0.32 (1)
Responsiveness	-2.62 (4)	-2.34 (3)	-0.85 (1)	-0.97 (2)	0	-2.35 (5)	-1.92 (4)	-0.88 (2)	-0.96 (3)	-0.20 (1)	-1.31 (5)	-1.03 (4)	-0.72 (2)	-0.76 (3)	-0.25 (1)	-0.59 (4)	-0.98 (5)	-0.46 (2)	-0.48 (3)	-0.27 (1)
Assurance	-1.62 (3)	-1.69 (4)	-0.97 (1)	-1.03 (2)	0	-1.66 (5)	-1.34 (4)	-1.30 (3)	-0.98 (2)	-0.38 (1)	-0.93 (4)	-1.36 (5)	-0.62 (2)	-0.74 (3)	-0.29 (1)	-0.49 (4)	-0.51 (5)	-0.40 (3)	-0.38 (2)	-0.32 (1)
Empathy	-2.27 (3)	-2.31 (4)	-0.52 (1)	-0.62 (2)	0	-2.25 (5)	-1.56 (4)	-0.70 (1)	-0.75 (3)	-0.73 (2)	-1.49 (5)	-1.47 (4)	-0.54 (2)	-0.64 (3)	-0.21 (1)	-0.32 (4)	-0.38 (5)	-0.36 (2)	-0.42 (3)	-0.22 (1)
Total	-10.38	-9.96	-4.32	-4.60	0	-9.93	-8.79	-5.13	-4.79	-1.73	-8.00	-7.98	-3.47	-3.80	-1.50	-4.14	-4.34	-2.46	-2.60	-1.54
Overall Rank	4	3	1	2	0	5	4	3	2	1	5	4	2	3	1	4	5	2	3	1

Note: Figure in parenthesis represents ranks to the respective service quality dimensions.

proportionate increase in the quality of service delivered by Indian banks in relation to their customers' levels of income. This is so because higher income groups usually belong to higher strata of society and are aware about their rights as bank customers. Lower income groups usually comprise small businessmen, farmers, pensioners and less-qualified employees who are not so aware of their rights. Also, the score of low/medium income groups is considerably high in comparison to higher income groups. The service quality of foreign banks as perceived by the respective respondents shows a minor variation with regard to income groups as these banks are very selective in choosing a customer and operate in selective markets only. Besides this, these banks operate mostly through ATMs, which do not recognise levels of income.

Service Quality Variation and Age

With a view to measuring service quality variation, if any, of different age groups of customers of the sampled banks, respondents were categorised into three age groups viz., 20-35 years; 36-50 years and above 51 years. As shown in Table 3, CB has high SERVQUAL scores across all dimensions, whereas SBI and PNB have

low scores for all the three age groups. The analysis clearly reveals that the service quality of Indian banks is high for upper age groups, whereas the reverse is the case for lower age groups.

Service Quality Variation and Profession

To study service quality variations across various professions, respondents were categorised into two categories, i.e., business and service. It was found that all banks provide better service quality to business groups in comparison with service groups. This is because the business class gives more business to the banks. The table reveals that CB is high on SERVQUAL score for both groups, while SBI followed by PNB have low score for both groups, whereas ICICI and HDFC banks follow similar pattern on other dimensions. The dimension-wise analysis reveals serious shortfall for tangibility followed by empathy for all public sector banks as reported by business groups. The scores on reliability are comparatively better. Service quality of Citi Bank as reported by business and service groups is exceptionally high on all dimensions except empathy which has been rated relatively low. This could be because of the fact that Citi Bank is still not able to give

Table 3

Comparative SERVQUAL Scores of Different Age Groups

Service Quality Dimensions	Age 30-35 (Years)					Age 36-50 (Years)					Age above 51 (Years)				
	SBI N=22	PNB N=21	ICICI N=20	HDFC N=19	CB N=5	SBI N=28	PNB N=27	ICICI N=20	HDFC N=21	CB N=28	SBI N=25	PNB N=27	ICICI N=12	HDFC N=13	CB N=12
Tangibility	-2.57 (5)	-2.38 (4)	-0.42 (2)	-0.44 (3)	-0.28 (1)	-2.30 (4)	-2.49 (5)	-0.88 (2)	-0.90 (3)	-0.27 (1)	-2.42 (5)	-1.88 (4)	-.98 (2)	-1.02 (3)	-0.65 (1)
Reliability	-1.51 (5)	-1.21 (4)	-0.57 (3)	-0.52 (2)	-0.27 (1)	-1.15 (5)	-1.00 (4)	-0.68 (2)	-0.72 (3)	-0.15 (1)	-1.25 (5)	-1.22 (4)	-0.65 (2)	-0.78 (3)	-0.19 (1)
Responsiveness	-2.19 (5)	-1.92 (4)	-0.46 (2)	-0.48 (3)	-0.25 (1)	-1.92 (5)	-1.76 (4)	-0.98 (3)	-0.92 (2)	-0.30 (1)	-1.24 (4)	-1.32 (5)	-0.82 (2)	-0.86 (3)	-0.46 (1)
Assurance	-1.53 (4)	-1.71 (5)	-0.36 (2)	-0.38 (3)	-0.23 (1)	-1.36 (5)	-1.26 (4)	-1.01 (2)	-1.04 (3)	-0.27 (1)	-1.12 (5)	-1.09 (4)	-0.98 (3)	-.95 (2)	-0.44 (1)
Empathy	-2.06 (4)	-2.33 (5)	-0.56 (2)	-0.62 (3)	-0.47 (1)	-1.83 (5)	-1.81 (4)	-0.85 (3)	-0.82 (2)	-0.56 (1)	-1.66 (5)	-1.65 (4)	-0.98 (3)	0.95 (2)	-0.82 (1)
Total	-9.86	-9.55	-2.37	-2.44	-1.50	-8.56	-8.32	-3.55	-4.40	-1.55	-6.44	-7.16	-4.41	-4.56	-2.56
Overall Rank	5	4	2	3	1	5	4	2	3	1	4	5	2	3	1

Note: Figure in parenthesis represents ranks to the respective service quality dimensions.

Table 4
Comparative SERVQUAL Scores of Business and Service Groups

Service Quality Dimensions	Business "Group I"					Service "Group - II"				
	SBI N=38	PNB N=37	ICICI N=32	HDFC N=32	CB N=37	SBI N=37	PNB N=38	ICICI N=22	HDFC N=21	CB N=8
Tangibility	-2.42 (5)	-2.05 (4)	-0.98 (2)	-1.00 (3)	-.27 (1)	-2.40 (5)	-2.22 (4)	-0.76 (3)	-0.68 (2)	-0.43 (1)
Reliability	-0.83 (4)	-0.72 (3)	-0.87 (5)	-0.67 (2)	-0.25 (1)	-1.22 (4)	-1.26 (5)	-0.98 (3)	-0.88 (2)	-0.58 (1)
Responsiveness	-1.44 (5)	-1.38 (4)	-0.68 (3)	-0.48 (2)	-0.28 (1)	-2.29 (4)	-2.34 (5)	-0.76 (2)	-0.84 (3)	-0.37 (1)
Assurance	-1.02 (4)	-1.12 (5)	-0.48 (3)	-0.42 (2)	-0.24 (1)	-1.57 (4)	-1.64 (5)	-0.56 (2)	-0.58 (3)	-0.44 (1)
Empathy	-1.29 (4)	-1.53 (5)	-0.67 (3)	-0.72 (2)	-0.55 (1)	-2.51 (5)	-2.27 (4)	-0.98 (3)	-0.90 (2)	-0.63 (1)
Total	-7.00	-6.80	-3.68	-3.29	-1.59	-9.99	-9.73	-4.04	-3.88	-2.45
Overall Rank	5	4	3	2	1	5	4	3	2	1

Note: Figure in parenthesis represents ranks to the respective service quality dimensions.

individual care to the customers. The analysis of Table 4 suggests that all banks provide relatively better service quality to business groups as compared to service groups. The major reason for better service quality to business groups is that their levels of income are relatively higher in comparison to that of service groups and they give more business to banks. They also have frequent interaction with bank employees and as a result, banks establish personal relations with

them. This finding supports the earlier research findings.

Service Quality Variation and Level of Education

To study the service quality variation, if any, at different levels of education, respondents were grouped into three education levels viz., level 1: Graduation; level 2: post-graduation; level 3: higher education (e.g., M.Phil., Ph.D., etc.). As

Table 5
Comparative SERVQUAL Score of Educational Group

Service Quality Dimensions	Level - 1					Level - 2					Level - 3				
	SBI N=30	PNB N=32	ICICI N=18	HDFC N=19	CB N=10	SBI N=30	PNB N=32	ICICI N=22	HDFC N=23	CB N=22	SBI N=15	PNB N=11	ICICI N=12	HDFC N=11	CB N=13
Tangibility	-2.40 (5)	-2.20 (4)	-0.15 (2)	-0.17 (3)	-2.8 (1)	-2.38 (5)	-2.01 (4)	-0.17 (2)	-0.34 (3)	-0.44 (1)	-2.50 (5)	-2.20 (4)	-0.16 (2)	-0.18 (3)	-0.12 (1)
Reliability	-0.98 (4.5)	-0.98 (4.5)	-0.39 (2)	-0.42 (3)	-0.20 (1)	-1.13 (5)	-0.94 (4)	-0.32 (2)	-0.48 (3)	-0.20 (1)	-0.97 (5)	-0.78 (4)	-0.30 (2)	-0.32 (3)	-0.13
Responsive ness	-1.79 (4)	-1.81 (5)	-0.71 (2)	-0.87 (3)	-0.23 (1)	-2.11 (5)	-1.76 (4)	-0.59 (2)	-0.69 (3)	-0.42 (1)	-1.88 (5)	-1.40 (4)	-0.56 (2)	-0.12 (3)	-0.09 (1)
Assurance	-1.26 (4)	-1.35 (5)	-0.95 (2)	-0.97 (3)	-0.22 (1)	-1.39 (5)	-1.38 (4)	-0.78 (2)	-0.88 (3)	-0.39 (1)	-1.43 (5)	-1.02 (4)	-0.64 (2)	-0.68 (3)	-0.34 (1)
Empathy	-1.71 (4)	-1.84 (5)	-1.17 (2)	-1.19 (3)	-0.40 (1)	-1.90 (4.5)	-1.90 (4.5)	-0.94 (2)	-0.98 (3)	-0.68 (1)	-1.89 (5)	-1.34 (4)	-0.89 (3)	-0.88 (2)	-0.45 (1)
Total	-8.14	-8.18	-3.37	-3.62	-1.33	-8.45	-7.99	-2.80	-3.37	-2.13	-8.67	-6.74	-2.55	-2.78	-1.13
Overall Rank	4	5	2	3	1	5	4	2	3	1	5	4	2	3	1

Note: Figure in parenthesis represents ranks to the respective service quality dimensions.

shown in Table 5, Citi Bank figures high on scores among all educational groups. However, there are significant variations of service quality among public sector banks as reported by respective bank customers. The low score of PNB (-8.18) followed by SBI (-8.15) indicates poor quality services in comparison to Citi Bank. The dimension-wise analysis shows serious shortfall for tangibility followed by responsiveness among PNB and SBI.

The table reveals that these are minor service quality variations in banks among different educational groups. The findings of this study lead us to conclude that banks do not recognize different levels of education as a major factor in differentiating customers in terms of services, as is the case of income and profession. This study however needs further investigation.

CONCLUSION AND SUGGESTIONS

The nature and frequency of studies in India concerning service quality or customer service in banks is limited. The studies which have been undertaken found that service quality in public sector banks in India is poor (Nageswar, 1987, Brahmanandam and Narayana, 1990; Elias, 1982; Nageshwar and Promod, 1990; and Seshasai, 1999). The present study found that poor service quality in public sector banks is mainly because of deficiency in tangibility, lack of responsiveness and empathy. But on these five dimensions, private sector banks reformed better than the public sector banks. As expectations of customers have not been fully met, there is a lot of scope for improvement on service quality. However, foreign banks are relatively close to the expectations of their customers with regard to the five dimensions of service quality.

The analysis across income groups, shows that service quality of SBI and PNB as perceived by their respective customers varies with their levels of income, though not proportionately. In Citi Bank, there is a minor variation in service quality across different income groups. The bank operates mostly through ATMs, which cannot

recognize any difference in levels of income. The analysis of service quality in sampled banks as perceived by different age groups reveals that the service quality in all banks is comparatively better among higher age groups whereas reverse is the case among lower age groups.

The study reveals that banks provide comparatively better service quality to business class customers in comparison to service class customers as they are comparatively small in number but their contribution in banking business is higher. Moreover, business class customers are more liberal in giving gifts on festivals, which helps in inculcating personal relations. Different education levels, however, do not exhibit greater variation in service quality. The service quality management with respect to these three bank groups offers interesting information on the level of service delivered by these banks in India.

Delivering high service quality is one of the best ways for banks to respond to competition. Reliable and valid measures of customer service quality are essential to achieve, and as a result service quality programmes should become high priority of the banks. Expenditure on such programmes should be viewed as long-term investment for future growth and profitability. It is, therefore, suggested that banks should make investment in research in order to understand customer needs and expectations at all stages in the service delivery process so as to determine the key components of service quality. They should also conduct frequent training programmes in areas, like prompt cash payments and receipts at the counter, efficient pass book and statement service, prompt collections and remittance services, early decisions on credit applications and quick attention to complaints. All these activities also have direct impact on customers' perception towards service quality. Banks should also offer such products or services which would fully meet customers' needs and develop systems and procedures which are user-friendly. They should make best use of technology in products

or services, systems and environment so as to ensure speed, accuracy and efficiency. Although, these banks have invested in technology heavily, there are still many bottlenecks which need to be addressed. It is also evident from the investigation that findings have some important managerial implications. The management of the banks should pay attention to potential failure points and be responsive to customer problems. Last but not the least, the management of the banks should put its sincere efforts to match the expected service quality to the offered service quality so that commitment and loyalty of the customers can be achieved.

REFERENCES

- Albrecht, K., and R. Zemke (1985), "Service America: Doing Business in the New York in Lewis, Barbara (1991) Service Quality: An International Comparison of Bank Customers Expectations and Perceptions", *Journal of Marketing Management*, Vol. 7, pp. 47-62.
- Ammayya, T. (1996), 'Developing Competitive Advantage through Absorption of Technology in Knowledge, Skills and Attitudes of People', *IBA Bulletin*, Vol. 18, No. 12, pp. 38-42.
- Angur, M.G., R. Natarajan Jr. and J.S. Jahera (1999), "Service Quality in the Banking Industry: An Assessment in a Developing Economy", *International Journal of Bank Marketing*, Vol. 17, No. 3, pp. 16-123.
- Babakus, E., and G.W. Boller (1992), "An Empirical Assessment of the SERVQUAL Scale", *Journal of Business Research*, Vol. 24, pp. 253-268.
- Bahia, K., and Nantel, J. (1998), "A Reliable and Valid Measurement Scale for the Perceived Service Quality of Banks", *International Journal of Bank Management*, Vol. 18, No. 2, pp. 84-91.
- Berry, L.L., V.A. Zeithaml, and A. Parasuraman (1985), "Quality Counts in Services Too", *Business Horizons*, May-June, pp. 44-52.
- Berry, L.L. (1980), "Services Marketing is Different", *Business*, May-June, pp. 8-30.
- Berry, L.L., and A. Parasuraman, (1997) "Listening To the Customer -The Concept of A Service-Quality Information System", *Sloan Management Review*, Spring, pp. 65-76.
- Bitran, G., and H. Lojo (1993), 'A Framework for Analysing Service Operations', *European Management Journal*, No. 2, Vol. 3, pp. 271-282.
- Blanchard, R.F., and R.L. Galloway (1994), "Quality in Retail Banking", *International Journal of Service Industry Management*, Vol. 5, pp. 5-23.
- Bolton, R.N., and J.H. Drew (1991), "A Multistage Model of Customer's Assessment of, Service Quality and Value", *Journal of Consumer Research*, Vol. 17, No. 4, pp. 375-384.
- Booms, B.H., and M.J. Bitner (1981), "Marketing Strategies and Organisation Structures for Services Firms", in Zeithaml V.A., A. Parasuraman, and L.L. Berry (1985) "Problems and Strategies in Service Marketing", *Journal of Marketing*, Vol. 49, No. 2, pp. 33-46.
- Brady, M.K., and J.J. Cronin, (2001), "Some New Thoughts on Conceptualising Perceived Service Quality: A Hierarchical Approach", *Journal of Marketing*, July, pp. 65-77.
- Brahmanandam, G.N., and M.S. Narayana, (1990), "A Study on Customer Service in Commercial Banks", *Indian Journal of Marketing*, Vol. 20, No. 5, pp. 7-8 and 16.
- Brown, S. W., and T.A. Swartz (1989), "A Gap Analysis of Professional Service Quality" *Journal of Marketing*, Vol. 57, April, pp. 92-100.
- Carman, J.M. (1990), "Consumer Perceptions of Service Quality: An Assessment of the SERVQUAL Dimensions", *Journal of Retailing*, Vol. 66, Spring, pp. 33-56.
- Cronin, J.J., and S.A. Taylor (1992), "Measuring Service Quality: A Re-examination and Extension", *Journal of Marketing*, Vol. 60, July, pp. 55-68.
- Dogra, B., and Awasthi A. K. (2005), "Measuring Service Quality in Banks: An Assessment of Service Quality Dimensions", in Conference Proceeding on 'Global Competitiveness' at the Indian Institute of Management Kozhikode, October.
- Elias, A. H. (1982), "Indian Banking Service", *Journal of Indian Institute of Bankers*, Vol. 35, No.3, pp. 119-124
- Fick, G.R., and J.R.B. Ritchie (1991), "Measuring Service Quality in the Travel and Tourism Industry", *Journal of Travel Research*, Vol. 30, No.3, pp. 2-9
- Gani, A., and Mushtaq A Bhat (2003), "Service Quality in Commercial Banks: A Comparative Study", *Paradigm*, Vol.7, No.1, pp. 24-36.
- Gronroos, C. (1982), "Strategies Management and Marketing in the Services Sector" in Parasuraman A., V.A. Zeithaml, and L.L. Berry (1985) "A Conceptual Model of Service Quality and its Implications for Future Research", *Journal of Marketing*, Vol. 50, No.4, pp. 41-50.
- Jain, S.K. (2005), "Searching for Critical Success Factors: A Dimension-Specific Assessment of Service quality and its relationship with Customer Satisfaction and Behavioural Intentions in Fast Food Restaurants", *Paper from the International Conference on Service Management* (pp. 111-125), Institute for International Management and Technology, Gurgaon, India.
- Kang, G.D. and J. James (2004), "Service Quality Dimensions: An Examination of Gronroos' Service Quality Model", *Managing Service Quality*, Vol. 14, No. 4, pp. 267-277.

- Kotler, Philip (2006), *Marketing Management*, 12th ed. (Delhi: Pearson Education (Singapore) pvt. Ltd.)
- Kwan, W., and T. J. Lee (1994), "Measuring Service Quality in Singapore Retail Banking", *Singapore Management Review*, Vol. 6, No. 4, pp. 7-11.
- Lassar, W.M.; C. Manolis; and R. D. Winsor (2000), "Service Quality Perspectives and Satisfaction in Private Banking", *Journal of Services Marketing*, Vol. 14, Nos. 2 and 3, pp. 244-272.
- Levitt, T. (1981), "Marketing Intangible Products and Product Intangibles", *Harvard Business Review*, May-June, pp. 94-102.
- Lewis, B.R. (1991), "Service Quality: An International Comparison of Bank Customers Expectations and Perceptions", *Journal of Marketing Management*, Vol. 7, pp. 47-62.
- Lewis, B.R. (1993), "Service Quality Measurement", *Marketing Intelligence and Planning*, Vol. 11, No. 4, pp. 4-12.
- Lewis, B.R., and V.W. Mitchell (1990), "Defining and Measuring the Quality of Customer Service", *Marketing Intelligence and Planning*, Vol. 8, No. 6, pp. 11-18.
- Nageswar, R. (1987), "Customer Service in Banks Must Improve", *Yojana*, Vol. 31, No. 13, pp. 20-31.
- Nageswar, R., and P. Pramod (1990) "Customer Services and Banks", *Yojana*, Vol. 34, No. 13, pp. 15- 22.
- Panasuraman, A., V.A. Zeithaml, and L. L. Berry (1988), "SERVQUAL: A Multiple Scale for Measuring Consumer Perceptions of Service Quality", *Journal of Retailing*, Vol. 64, No. 1, pp.12-40.
- Parasuraman, A., L. L. Berry, and V. A. Zeithaml (1985), "A Conceptual Model of SQ and its Implications for Future Research", *Journal of Marketing*, Vol. 49, Fall, pp. 41-50.
- Parasuraman, A., L. Berry, and V. Zeithaml (1993), "Research Note: More on Improving SQ Measurement", *Journal of Retailing*, Vol. 69, No. 3, pp. 140-147.
- Parasuraman, A., L.L. Berry, and V.A. Zeithaml (1991), "Undertaking Customer Expectations of Service", *Sloan Management Review*, Vol. 32, No. 3, pp. 44.
- Ram Mohan (2002), "Deregulation and Performance of Public Sector Banks", *Economic and Political Weekly*, Vol. 7, No. 5.
- Rangarajan, C. (1982), "Innovation in Banking; Impact on Deposits and Credit", *Indian Express*, October, p. 12.
- Saleh, F., and C. Ryan (1991), "Analysing Service Quality in the Hospitality Industry Using the SERVQUAL Model", *Service Industries Journal*, Vol. 11, No. 3, pp. 324-343.
- Seshasai, P.V. (1999), "Customer Service - Some HRD Interventions", *IBA Bulletin*, Vol. 21, No. 2, pp. 11-16.
- Smith, A.M. (1992), "The Consumer's Evaluation of Service Quality: Some Methodological Issues" in Glynn, W.J., and J.G. Barnes (1995) *Understanding Services Management*, New York, John Willey & Sons, pp. 57-88.
- Sundararn, S. (1984), 'Customer Service in Banks at Crossroads', *The Journal of the Indian Institute of Bankers*, Vol. 55, No. 4, pp. 217-223.
- Sureshchandar, G.S., and Rajendran C. (2003), 'Customer Perceptions of Service Quality in Banking Sector of a Developing Economy: A Critical Analysis', *International Journal of Bank Marketing*, Vol. 21, No. 5, pp. 233-242.
- Takeuchi, H., and J.A. Quelch (1983), "Quality is more than Making a Good Product", *Harvard Business Review*, July-Aug, pp.139-145.
- Young, C., L. Cunningham, and M. Lee (1994), "Assessing Service Quality as an Effective Management Tool: The Case of Airline Industry", *Journal of Marketing*, Vol. 63, Spring, pp. 76-95.
- Zeithaml, V.A., A. Parasuraman, and L.L. Berry (1990), *Delivering Quality Service: Balancing Customer Perceptions and Expectations* (New York: Free Press), pp. 28.
- Zeithaml, V.A., A. Parasuraman, and L.L. Berry (1996), "The Behavioural Consequences of Service Quality", *Journal of Marketing*, Vol. 60, April, pp. 31-46.

Guidelines for Writing Book Review

We invite academicians and others to write reviews of books on management and allied subjects.

The book reviewers are requested to follow the guidelines given below:

1. The reviewer should begin with a listing of the bibliographical details of the book, comprising the names of the authors, full title and sub-title as they appear on the cover, details of the place and name of the publisher, year of publication, the number of pages in the book, and the price, if mentioned.
2. The review can range from 1000-3000 words, depending upon the topic and the importance of the book.
3. Reviews should engage with the issues, problems, and themes articulated in the book and make a rigorous attempt to identify and assess the main set of arguments that have been put forth by the author. It should, in other words, have a strong engagement with the conceptual structure of the book and should bring out its strengths and weaknesses.
4. The book under review should have been published recently, preferably in the current or the previous year.
5. The reviewer may also include comments on the stylistic aspects and literary presentation of the book.
6. References should be avoided altogether. If references are considered essential, the citation style, adopted by *NICE Journal of Business*, should be used.

The review should be an objective assessment of the book, indicating its specific strengths and weaknesses, and overall assessment.

THE ORGANISATIONAL CLIMATE IN THE BANKING INDUSTRY A Study in the State of Punjab

Ritu Lehal* and Sukhdeep Singh**

Abstract

The organisational climate is a set of properties of the work environment, perceived by employees and assumed to be a major factor in influencing their behaviour. This paper attempts to study the impact of organisational climate on bank executives of the public and the private sector, in State of Punjab. The study has revealed that executives in the banking sector perceive the organisational climate moderately. The executives of private-sector banks perceive the organisational climate more favourably as compared to the executives of the public sector. An inter-bank comparison has shown that the executives in HDFC Bank perceive the organisational climate more favourable as compared to the remaining three banks, namely, Bank of Punjab, State Bank of Patiala, and Punjab National Bank selected for the study. The analysis of the dimensions chosen to ascertain the organisational climate, highlights that the training and development dimension has contributed more towards making the organisational climate better in both public and private-sector banks. Concern for welfare, scope for advancement, safety and security, objectivity and rationality, and interpersonal relationship are the other dimensions which have improved the organisational climate in public sector banks. Similarly, in the private-sector banks, formalisation and standardisation, scope for advancement, objectivity and rationality, supervision, and monetary benefits are the other dimensions that have improved the organisational climate. Dimension-wise analysis reveals that training and development, scope for advancement and objectivity and rationality, are the most important dimensions to improve the organisational climate in both the public and private-sector banks.

Key Words: *Organisational climate, Bank executives, Perception, Training and development, Rationality.*

INTRODUCTION

AN increasing number of companies are realising their social responsibility, which is reflected in their policies of commitment to employees' welfare and betterment of the organisational climate. The organisational climate is the human environment

within which employees do their work. It may refer to the environment prevailing within a department or a unit, such as a branch, a plant, or an entire organisation. The organisational climate is just like an asset, comprising of the attitude of the people towards the organisation as a whole. The organisational climate is a set of

* Reader (Correspondence Courses), Department of Commerce, Punjabi University, Patiala – 147 002; e-mail: gsllehal@yahoo.com

** Research Scholar, Department of Commerce, Punjabi University, Patiala – 147 002; e-mail: sukhdeep_pawar@yahoo.co.in

properties of the work environment, perceived by employees and assumed to be a major factor in influencing their behaviour. The climate of a particular organisation may be observed from the environment and feelings held in common. The organisational climate can neither be seen nor touched, but it exists like air in the room, it surrounds and affects everything that happens in the organisation. The organisational climate is also affected by almost everything that occurs in the organisation. The organisational climate has a major influence on human performance through its impact on individual motivation and job satisfaction, and the job satisfaction significantly influences how people approach their level of efforts and commitment and their contribution to organisational effectiveness (Sharma and Sharma, 1989).

REVIEW OF LITERATURE

Pestonjee and Desai (1999) sought to establish the relationship between the factors of learned helplessness and organisational role stress to motivational climate in the organisation. The sample comprised 220 respondents belonging to the middle management of five units of engineering industry located in western India. The study revealed that the climate of the organisation that is related to trust among the members affects the learned helplessness and pressurise the executive management of reward. It was the other dimension of the organisational climate, which had a significant bearing on the dependent variable of learned helplessness and organisational role stress.

The study conducted by Gani and Shah (2001) in the banking industry in Kashmir, provides an adequate description of the concepts, constructs, determinants and correlates of the organisational climate. The study suggests that the banking industry, as a whole, has a poorly-perceived the organisational climate and that the situation in the private-sector banks is worse than that in the public-sector ones. Further, as compared to workers, officers find their organisational climate

to be better. Certain measures aimed at improving the organisational climate and the overall effectiveness of the organisation were suggested in this paper.

Mela (2002) examined the job satisfaction levels among women higher-education administrators and the relationship between their job satisfaction and the perception of satisfaction with the organisational climate. The sample 186 consisted of respondent women administrators, employed at five colleges and universities in the south-east and north-east US. The study revealed a number of significant associations between job satisfaction and the organisational climate.

Tripathi and Tripathi (2002) sought to investigate the relationship between organisational climate and organisational success, which include effectiveness, job satisfaction, organisational commitment, and intention to quit. The study, based on a sample of 200 middle-level executives of public and private-sector organisations, revealed that a combination of reward, participation, proficiency, and responsibility, was likely to increase the job satisfaction, effectiveness, and organisational commitment.

Helena, *et al.* (2003) sought to determine how the perceived organisational climate of a workplace was related with work-related symptoms and sickness absence, and how these factors varied according to socio-demographic and work-related characteristics. It was found that part of the impact of the organisational climate on sickness absence was not caused by an increase in work-related symptoms.

Thus, the organisational climate seems to correspond not only with the organisational practices and leadership but also with the occupational health. The organisational climate could be used as a research tool and it attempts to reduce the work-related ill-health and sickness absenteeism.

The study by Malcolm, *et al.* (2005) predicted that the association between the company climate and the productivity would be mediated by an

average level of job satisfaction. In a study of 42 manufacturing companies, subsequent productivity was significantly correlated in controlled analyses with eight aspects of the organisational climate (e.g., skill development and concern for employee welfare) and with average job satisfaction. In addition, an overall analysis showed that company productivity was more strongly correlated with those aspects of climate that had stronger satisfaction loadings. A second prediction, that managers' perceptions of the climate would be more closely linked to the company productivity than those of non-managers, was not supported.

The study by Purang (2006) compared the HRD climate perceptions of public, private and multinational organisations. The study compares the perceptions of middle-level managers from five organisations (two private sector, two public sector and one multinational organisation), on ten dimensions of HRD climate. The study concluded that the climate at the individual level was a summary perception of the organisation's work environment that is descriptive rather than evaluative in nature. Another approach to organisation climate is the cultural approach, which proposes that the climate arises from inter-subjectivity of members as they interact within a context established by an organisation's culture. In the Indian context, the type of organisation influences the culture prevalent in the organization, since climate is an outcome of culture.

The review of literature reveals that many studies have been conducted on organisational climate or its relationship with other factors, like job satisfaction, productivity, organisational role stress, etc. A few studies also compare public and private-sector organizations on the above counts. But no research work has been carried out to study the organizational climate of public and private-sector banks. The present study is an endeavour to examine the organisational climate in the banking sector in the State of Punjab.

RATIONALE OF THE STUDY

The business environment is becoming increasingly complex, especially in the service sector, where the organisations demand high quality performance from their employees. Considering the substantial portion of one's lifetime that is spent on job, the organisations have a primary responsibility towards their employees to improve their working conditions, to find ways to cope with workers burnout programmes and to assist employees in their career development. Absence of a favourable climate limits the ability of an organisation, which can otherwise attract huge capital and increase effective utilisation of resources. In the early nineties, the banks from private sector spread their wings in Indian economy. Now, it is an appropriate time to study whether the executives in banks perceive the climate favourably or not. Keeping in view the banking-sector reforms, it is also the need of the hour, to compare the public and private-sector banks on the basis of the organisational climate.

OBJECTIVES AND SCOPE

The study has the following objectives:

1. To evaluate the overall organisational climate in the banking industry in Punjab.
2. To examine the organisational climate in public and private-sector banks.
3. To make an inter-bank analysis on the basis of the organisational climate.
4. To assess the various dimensions of organisational climate in public and private-sector banks.

Banks constitute an important part of the total infrastructure of the national economy. The economic development of a nation is greatly influenced by the functioning of its banking industry. The study is related to a few branches of public and private sector banks in Punjab. These branches are situated at Patiala, Ludhiana, Jalandhar and Amritsar districts of Punjab. The

districts were selected on the basis of three regions of Punjab. The banks taken up for the purpose of study are: State Bank of Patiala (SBP), Punjab National Bank (PNB), Housing Development and Financing Corporation (HDFC) Bank, and Bank of Punjab (BOP). Out of the public-sector banks, State Bank of Patiala and Punjab National Bank were selected because these banks are the leading banks in north India. Moreover, they seem to exhibit similar working conditions and environment. Similarly, out of the private-sector banks, Bank of Punjab and HDFC Bank were chosen since these banks are also the leading banks among private-sector banks, and have comparable organisational structure, functioning, and system of operations.

RESEARCH METHODOLOGY

Sample

In order to assess the present state of the organisational climate in the banking industry in Punjab, first of all, the researchers visited the zonal offices of all the four banks from both public and private sectors, selected for the study, and collected information about the total strength of the executives working in these banks. Then, proportionately 300 executives were selected. However, only 276 of them responded to the questionnaire. Out of these 276 executives, 68 belonged to State Bank of Patiala, 56 to Punjab National Bank, 80 to Bank of Punjab, and 72 to HDFC bank. So, convenient sampling was used, keeping in view the availability and accessibility of the bank executives. Proper care was taken while selecting the executives to ensure that they are the representative of the universe.

Data Collection

The study is based on the primary data. The branches of all the four banks selected for study are situated in four districts of Punjab, namely, Patiala, Ludhiana, Jalandhar and Amritsar. It was necessary for the researchers to visit personally

all the bank branches to gather first-hand information as well as to get the questionnaire filled.

Questionnaire-cum-Scale

A questionnaire-cum-scale developed by Gani and Shah (2001) to measure organisational climate, was used for data collection. This questionnaire-cum-scale has been used for many research studies, including a study conducted by the authors in the banking industry in Kashmir. It provides an adequate description of the concepts, constructs, determinants and correlates of the organisational climate. The validity of the tool has already been tested and used by numerous researchers. Ten specific dimensions of organisational climate with the help of four statements each have been individually assessed. All the statements in this questionnaire-cum-scale are positive. The statements in the questionnaire are qualitative; and they are quantified on a five-point scale, using Likert's technique. Ten dimensions of the organisational climate are as follows: inter-personal relationship, participative management, formalisation and standardisation, training and development, monetary benefits, objectives and rationality, scope for advancement, supervision, concern for welfare, safety, and security.

The interpersonal relationship dimension relates to the atmosphere in which the employees of an organisation work. Participative management relates to the joint decision-making in the organisation. Formalisation and standardisation pertains to the rules and regulations, norms and policies, and goals of the organisation. The training and development dimension includes training, the courses and conferences sponsored for the employees, constant acquaintance with the changing procedures and regulations, through refresher courses, and the development of employees through training. The monetary benefits form the other dimension which includes short-run as well as long-run financial support to the employees.

Objectives and rationality are concerned with the methods of redressing the grievances and complaints of the employees by the management. The scope for advancement dimension deals with logical and fair promotion policy in the organisation. Supervision includes the relationship between a supervisor and his subordinates to develop their individual worth and interest in the work. Concern for welfare is related to short-term as well as long-term facilities and amenities being provided by the organisation to its employees and their families. Safety and security dimension of the organisational climate includes attractive retirement benefits provided by an organisation to its employees, adequate job security, safety of employees in risky situations and healthy working conditions provided by the organisation to its employees.

As pointed out earlier, four statements each pertained to one dimension of the organisational climate. So, the average score was obtained for one factor by dividing it by four. For taking definite decisions, a grand mean and standard

Category	Score
Highly satisfied (with the organisational climate)	: More than 162
Moderately satisfied	: From 120 to 162
Less Satisfied	: Less than 120

deviation were calculated for organisational climate, which are 141 and 21, respectively. All the executives were divided into three categories on the basis of mean and standard deviation:

The higher score implies that the perceived climate is favourable to that particular executive and the lower score implies that the respondent does not perceive the climate to be favourable. It explains that he is unable to adapt and cope with various methods and procedures followed in the organisation.

Statistical Tools Employed

Non-parametric tests were used for the study. These tests are easy to compute and simple to apply. The mean was calculated for finding the difference between public and private-sector banks. The standard deviation was calculated for judging the representativeness of the mean score among public and private-sector banks. A 't' test was used for finding significance of mean difference between public and private-sector banks and the chi-square test was used to describe the magnitude of the discrepancy between the distribution of public and private sector bank executives across the three categories, namely, highly satisfied, moderately satisfied, and less satisfied, with the organisational climate.

Data Analysis

This study deals with the analysis of the overall organisational climate in the banking industry and makes a comparison between public and private-sector banks in terms of their organisational climate. It also presents an inter-bank comparison and dimension-wise analysis of the organisational climate, in the two categories of banks.

THE ORGANISATIONAL CLIMATE IN BANKING INDUSTRY

On the basis of the questionnaire-cum-scale, the overall mean score of the organisational climate for the total sample (N=276) turned out to be 141.21. As revealed by Table 1, bank executives perceive the climate moderately.

In order to study the distribution pattern of public and private-sector bank executives across levels of the perceived organisational climate, the respondents were classified into three categories on the basis of their organisational climate score and were compared in terms of their number and percentage in public and private-sector banks.

As shown in Table 1, the responses of the executives regarding the organisational climate in both the public and private-sector banks, fall under three categories, i.e., highly satisfied,

Table 1
Satisfaction Levels of Organisational Climate in Public and Private Sector

Category of Banks	No. of Executives	Highly satisfied with OC	Moderately satisfied with OC	Less satisfied with OC
Public-sector banks	124	17 (14)	61 (49)	46 (37)
Private-sector banks	152	26 (17)	114 (75)	12 (8)

$\chi^2=55.70$, $df=2$, $P < .01$

Note: The figures given in parentheses denote percentages.

moderately satisfied, and less satisfied, with their number and percentage. The table reveals that 14 per cent executives from the public-sector banks and 17 per cent from the private-sector banks are highly satisfied with the organisational climate. 49 per cent and 75 per cent of the executives from the public and private-sector banks, respectively, fall under the category of 'moderately satisfied' with the organisational climate. But, as far as the position of the less satisfied executives with the organisational climate is concerned, 37 per cent executives from the public-sector banks and only 8 per cent from the private sector banks fall under this category. The table shows that there is a wide difference between the two categories of bank executives as far as the organisational climate is concerned. However, in the case of the private-sector banks, the number and percentage is higher as compared to the public-sector banks, which means that in the private sector, bank executives perceive the climate more favourably than their counterparts in the public sector. But, on the whole, the majority of executives are moderately satisfied with the organisational climate in both the categories of banks.

This has been testified by the chi-square value (55.70), which is significant at 0.01 level. Thus, the

two categories of executives differ significantly with regard to their perception of the organisational climate.

Public-sector and Private-sector Banks Compared

The second objective of the study was to compare the public and private-sector bank executives on the basis of organisational climate. While Table 1 shows only the three levels of satisfaction with regard to organisational climate found in public and private-sector bank executives with their number and percentage, Table 2 provides whether the difference of satisfaction with the organisational climate, among the executives, is significant or non-significant, which was calculated on the basis of mean, standard deviation, and critical ratio. The mean was calculated to find the difference between the perception of public and private-sector banks' executives in term of the organisational climate. The standard deviation was calculated for ascertaining the representativeness of the mean among public and private-sector bank executives, whereas the 't' test was applied to see the significance of the mean differences.

As shown in Table 2, there is a significant mean difference between the two categories of

Table 2
Organisational Climate of Public and Private-Sector Bank Executives

Category of Banks	No. of Executives	Mean	S.D.	Critical Ratio
Public-sector banks	124	134.63	23.33	
				4.933**
Private-sector banks	152	146.58	16.97	

** $P < .01$

bank executives with regard to the organisational climate, as critical ratio turned out to be significant at 0.01 level. Thus, the mean score is higher in the case of private-sector banks (146.58) than that in the case of their counterpart in the public sector (134.63).

This suggests that in the private sector, bank executives perceive the climate more favourably than that in the case of public-sector banks. The possible reasons may be that the training courses and conferences, conducted for the executives, are better in private-sector banks. Constant acquaintance with the changing procedures and regulations through refresher courses, and rules and regulations may be the possible reason of the success in private-sector banks.

Inter-Bank Comparison

All the four banks, taken up for study were compared on the basis of the organisational climate. The relevant data is shown in Table 3.

Table 3
An Inter-bank Comparison of the Organisational Climate in Banks

Name of the Bank	Mean Score of the Organisational Climate
State Bank of Patiala	41.37
Punjab National Bank	126.45
Bank of Punjab	144.98
HDFC Bank	148.35

The table shows that HDFC Bank has the highest mean score (148.35), followed by the Bank of Punjab (144.98), State Bank of Patiala (141.37), and the Punjab National Bank (126.45). It can be concluded that the executives in HDFC Bank perceive the climate more favourable as compared to those in the remaining three banks. It also suggests that in the private sector, bank executives' perception of the climate is more favourable than that in the public-sector banks. The possible reasons may be: (a) Decisions are taken collectively in their banks; (b) Bank policy suits their interests; (c) Rules and regulations provide satisfaction to them; (d) Goals may be achievable; and (e) There are adequate arrangements for training and development programmes in the private-sector banks.

Dimensions-wise Analysis of Organisational Climate

The questionnaire included ten dimensions of the organisational climate, on which means and standard deviations were calculated for comparing public and private-sector bank executives. Dimension-wise mean scores of the organisational climate in public and private-sector banks are shown in Table 4.

As revealed by the table, in the case of public-sector banks, training and development dimension has the highest mean score (14.18), followed by concern for welfare (14.01), scope for

Table 4
Dimension-wise Analysis of the Organisational Climate in Banks

Variables	Public Sector Banks		Private Sector Banks		t-Values
	Mean	S.D.	Mean	S.D.	
Interpersonal Relationship	13.51	3.12	13.99	2.45	1.45 NS
Participative Mgt.	12.02	3.17	13.94	2.52	5.60**
Formalisation and Standardisation	13.23	3.34	15.26	2.58	5.69**
Training and Development	14.18	3.31	15.53	2.35	3.97**
Monetary Benefits	13.39	2.88	14.29	2.97	2.52**
Objectivity and Rationality	13.58	3.15	15.07	2.30	4.54**
Scope for Advancement	13.95	2.89	15.12	2.48	3.63**
Supervision	13.14	3.57	15.03	2.31	5.28**
Concern for Welfare	14.01	2.43	13.87	2.52	0.44 NS

NS: $P > 0.05$, ** $P < 0.01$

advancement (13.95), safety and security (13.60), objectivity and rationality (13.58), inter-personal relationship (13.51), monetary benefits (13.39), formalisation and standardisation (13.23), supervision (13.14), and participative management (12.02). Similarly, in the case of private sector banks, training and development dimension has the highest mean score (15.53), followed by formalisation and standardisation (15.26), scope for advancement (15.12), objectivity and rationality (15.07), supervision (15.03), monetary benefits (14.29), safety and security (14.17), interpersonal relationship (13.99), participative management (13.94), and concern for welfare (13.87).

The results indicate that training and development contribute to the maximum extent towards improvement of the organisational climate in both public and private-sector banks. It has been possible through better arrangements of training programmees and refresher courses for the executives and sponsoring them to attend conferences. Hence, the executives perceive favourable climate in both the categories of banks. Concern for welfare, scope for advancement, safety and security, objectivity and rationality, and interpersonal relationship are the other dimensions responsible for improving the organisational climate in public-sector banks. Similarly, in the case of private-sector banks, formalisation and standardisation, scope for advancement, objectivity and rationality, supervision and monetary benefits are the other dimensions for improving the organisational climate.

A comparison between public and private-sector banks reveal that training and development, scope for advancement, objectivity and rationality and monetary benefits contributed maximum towards improving the organisational climate in both the categories of banks. It also reveals that only one dimension of the organisational climate, concern for welfare is showing higher mean score in public-sector banks as compared to private-sector banks. But

the mean score difference is non-significant. It suggests the short-term as well as long-term facilities, working conditions, and other welfare facilities extended to the executives, are almost same in both the categories of banks. The table also reveals that out of the ten dimensions of the organisational climate, three dimensions, namely, interpersonal relationship, safety and security, and concern for welfare show non-significant differences between both the categories of banks. It suggests that the atmosphere for work, informal social relationship among the executives, concern for one another, rendering spontaneous help to one another, and job security extended to the executives, are almost the same in public and private-sector banks. The remaining seven dimensions of the organisational climate, namely participative management, formalisation and standardisation, training and development, monetary benefits, objectivity and rationality, scope for advancement and supervision, show higher mean score in private-sector banks as compared to public-sector banks, which suggests that the overall dimensions-wise organisational climate is more favourably perceived by the executives in private-sector banks, as compared to the executives in public-sector banks.

CONCLUSION AND POLICY-IMPLICATIONS

The study has revealed that the organisational climate in the banking sector in Punjab is moderate. The distribution pattern of executives at the three levels of satisfaction has revealed that the majority of executives in public and private-sector banks fall under the 'moderately satisfied' category. A comparison between public and private-sector banks, on the basis of the organisational climate, has shown that in private-sector banks, the executives perceive the climate as more favourable than those in the public-sector banks. An inter-bank analysis reveals that the perceived climate is better in HDFC Bank than that in Bank of Punjab. In case of the public-sector banks, the executives in State Bank of Patiala perceive the climate more favourable than those

in the Punjab National Bank. The dimension-wise analysis of the organisational climate reveals that 'training and development', 'scope for advancement', and 'objectivity and rationality' are the important dimensions to improve the organisational climate in the banks.

Thus, there is a need to improve the climate in the bank in Punjab, since the majority of banks' executives fall in 'moderately satisfied' category. For taking crucial decisions by the management and in order to improve the organisational climate, certain significant factors, like training and development, scope for advancement, objectivity and rationality, and monetary benefits can be taken into account. Some focused steps have to be taken to enhance the safety and security of executives in the banking sector. There is a need for improving short-term as well as long-term facilities, working conditions, and other welfare facilities, especially in the private-sector banks. Some measures are also required to improve interpersonal relations and mutual co-operation among the employees. To ensure this, suitable organisational development interventions in the form of training and development, ought to be introduced. Employees have to be encouraged to form cross-functional teams and work on common goals. The level of organisational climate should be checked at regular intervals, with the help of experts so that future development policies can be formulated. The results of the study can be implemented for the betterment of the organisations.

REFERENCES

- Bose, Sudeepa, and Manisha Aggarwal (2003), "Work Environment and Perceived Fulfilment of Psychological Contract: A Study of Private and Public Sector Organisations", *Indian Journal of Industrial Relations*, Vol. 38, No.4 (April), pp. 460-479.
- Elankumaran, S. (2004), "Personality, Organisational Climate and Job Involvement: An Empirical Study", *Journal of Human Values*, Vol. 10, No. 2, pp. 117-130.
- Gani, A., and Farooq A. Shah (2001), "Correlates of Organisational Climate in Banking Industry", *Indian Journal of Industrial Relations*, Vol. 36, No. 3 (January), pp. 301-321.
- Helena, Rasanen, Kimmo Kivimaki, and Mika (2003), "Organisational Climate, Perceived Work-Related Symptoms and Sickness Absence: A Population-based Survey", *Journal of Occupational & Environmental Medicine*, Vol. 45, No. 2, pp. 175-184.
- Lewlyn, L.R. Rodrigues (2005), "Industry-institute Correlates of HRD Climate: Empirical Study Based Implications", *Indian Journal of Industrial Relations*, Vol. 41, No. 2 (October), pp. 167-187.
- Malcolm, Patterson, Peter Warr, and Michael West (2005), "Organisational Climate and Company Productivity: The Role of Employee Affect and Employee Level", *CEP Discussion Paper No. 626*.
- Mela, A. Dutka (2002), "The Relationship between Job Satisfaction and the Organisational Climate for Women Higher Education Administrators at Five Institutions"; <http://escholarship.bc.edu>. (accessed in October 2002)
- Pestonjee, D.M., and Tripti P. Desai (1999), "A Study of Organisational Climate in Relation to Organisational Role Stress and Learned Helplessness", *Working Paper Series, IIM Ahmedabad*.
- Purang, Pooja (2006), "HRD Climate: A Comparative Analysis of Public, Private, and Multinational Organisations", *Indian Journal of Industrial Relations*, Vol. 41, No. 3 (January), pp. 407-419.
- Sharma, Sagar, and Devender Sharma (1989), "Organisational Climate, Job Satisfaction and Job Anxiety", *Psychological Studies*, Vol. 34, pp. 21-27.
- Tripathi, Sangeeta, and Nachiketa Tripathi (2002), "The Effect of Organisational Climate on Organisational Success", *Indian Journal of Industrial Relations*, Vol. 38, No. 2 (October), pp. 161-171.

A good plan violently executed now is better than a perfect plan next week.
George S. Patton, War As I Know It

★ ★ ★ ★ ★

The end cannot justify the means, for the simple and obvious reason that the means employed determine the nature of the ends produced.
Aldous Huxley, Ends and Means

★ ★ ★ ★ ★

*One impulse from a vernal wood
May teach you more of man,
Of moral evil and of good,
Than all the sages can.*
William Wordsworth, The Table Tuned

★ ★ ★ ★ ★

*Some praise at morning what they blame at night;
But always think the last opinion right.*
Alexander Pope, Sceptical Essays

★ ★ ★ ★ ★

We must beat the iron while it is hot, but we may polish it at leisure.
John Dryden, Aeneis

★ ★ ★ ★ ★

MEASURING THE COST OF CAPITAL THROUGH CAPITAL-ASSET PRICING MODEL

An Intra-sectoral Trend Analysis of Indian Banking Industry

Karam Pal* and Puja Goyal**

Abstract

The cost of capital is vital to modern finance, touching on investment and disinvestment decisions, measures of economic profit, performance appraisal, and incentive systems. The paper introduces the main concepts related to the calculation of the cost of debt, cost of equity, and the overall cost of capital. The study includes estimation of the cost of equity using CAPM and the cost of debt and the weighted average cost of capital of Indian banks. It has been found that the major private-sector banks have low cost of equity and overall capital cost than public-sector banks. They have increased debt content in their total capital as the cost of debt decreased. Risk level, i.e., beta, is also low in private sector banks. The intra-sectoral analysis presents the case of emerging big private-sector in Indian banking industry. The study may show a way to the Indian banking industry to trace the causes of the high cost of capital.

Key Words: *Capital Asset Pricing Model, Cost of capital, Market premium, Public and private sectors, Indian banking industry.*

INTRODUCTION

A bank raises funds by attracting deposits, borrowing money in the inter-bank market, or by issuing financial instruments in the money market. The bank then lends most of these funds to borrowers. Thus, banks play a facilitating role in the economy. Therefore, the potential benefits of improved performance in the banking industry can be substantial, giving the impact of their services on

resource allocation and competitiveness in the broader economy. The banking industry in India has undergone major changes in recent years. Advancement in communication and information technology has facilitated growth in the Internet banking, ATM network, electronic transfer of funds, and quick dissemination of information. Structural reforms in the banking sector have improved its health. One major factor that plays an important role in the success of the

* Associate Professor, Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar (Haryana); e-mail: karampalsingh@yahoo.com

** Junior Research Fellow (UGC-JRF), Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar (Haryana).

banking industry is the cost of their funds. Banks need to estimate their cost of capital with a fair degree of accuracy.

The cost of capital is the most important yardstick to evaluate investment proposals. Not only the hurdle rate for investment projects but also the composition of the firm's capital structure is determined by this variable. Given the huge annual expenditure on capital projects and corporate acquisitions, the wise selection of discount rates is of great importance to corporate executives. The cost of capital is central to modern finance, touching on investment and divestment decisions, measures of economic profit, performance appraisal, and incentive systems. Managers, investors, and regulators have a compelling interest in identifying the factors that influence the cost of raising funds from the market. Managers require a precise estimate of their firm's cost of equity capital for capital budgeting. Investors require the same for equity valuation; regulators need to understand the impact of new accounting standards on the cost of raising funds from the market.

The cost of capital for a firm is a weighted sum of the cost of equity and the cost of debt. Firms finance their operations in three ways: issuing shares, borrowings, and reinvesting prior earnings (internal financing). The rate of return that is necessary to maintain market value (or stock price) of a firm, is also called a hurdle rate, cut-off rate, or minimum required rate of return. The firm's cost of capital is calculated as a weighted average of the costs of debt and equity funds. The equity funds include both the share capital (equity share and preference share) and retained earnings.

The cost of debt is relatively simple to calculate, as it is composed of the interest paid (interest rate), including the cost of risk (the risk of default on the debt). In practice, the interest paid by the company will include the risk-free rate plus a risk component, which itself incorporates a probable rate of default. For companies with similar risk or credit ratings, the interest rate is largely exogenous.

The cost of equity capital plays an important role in various managerial decisions, and investors' equity valuation decisions. However, no universally-accepted approach for estimating it is available. The Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) is the cornerstone of modern finance and has been widely accepted as the most appropriate technique for the estimation of the cost of equity. Its decision-theoretic foundation, mean-variance analysis, has become a major guidance to asset allocation. Its equilibrium restriction provides the most important risk correction in the evaluation of portfolio performance. It is widely applied to determine appropriate discount rates in capital budgeting. Asset-pricing models with even greater generality are based on CAPM's key arguments of optimal portfolio demands and market equilibration, and share its main prediction, namely, that expected returns increase with the co-variation with aggregate risk. Most of the prior empirical work on asset-pricing relies on the average realised returns as a proxy for the expected returns.

Despite the fact that the tests of asset-pricing theory call for measures of the expected returns, the widespread use of realised returns is necessitated, in part, by the fact that expected returns are not observable. Furthermore, the use of realised return is defended on the ground that in an efficient market where risk is appropriately priced, the average ex-post realised returns should be an unbiased estimator of the unobservable *ex ante* expected returns (Gebhardt, *et al.*, 2001, p. 136).

Over the period of four decades, this model has been extensively tested in its various forms in the developed capital markets of the world, with the results ranging from favourable to non-favourable. In developing countries, no serious effort has been made to test the application of this model. In India, there have been major changes in economic and financial policies since 1991. The corporations are now-a-days taking their financing and investment decisions in a different

environment. Hence, there is a need to test the CAPM in the Indian context.

The present paper seeks to bring out the real face of the cost-of-capital decisions of banking industry in a competitive global economy. The study includes estimation of the cost of equity, using CAPM and the cost of debt, and the weighted average cost of capital of Indian banks. It explores the risk and return relationship in Indian banking industry. The results may help investors in taking decisions regarding investment in Indian banks. Furthermore, it may prove useful for policy-makers in establishing relationship between their performance and risk.

REVIEW OF LITERATURE

It is imperative for corporate sector to create adequate wealth continuously and this is possible only if the investment is made in projects where the return is more than the expected cost of capital. As the pressure for better financial performance has been increasing mainly because of increasing competition in the present globally competitive era, the researchers have explored some factors and techniques that help in estimation of the cost of capital.

Bruner, Eades and Higgins (1998) presented the results of a cost-of-capital survey of 27 highly reputed corporations, ten leading financial advisers, and seven best-selling textbooks and trade books. The results show close alignment among all these groups on the use of common theoretical frameworks and on many aspects of estimation.

Later on, Koedijk, *et al.*, (1999) investigated as to what extent three competing asset-pricing models price an individual firm's stock differently in an internationally integrated world. The cost of capital should be determined using the international capital asset pricing model (ICAPM) rather than the domestic capital asset pricing model (CAPM).

According to the estimation of Botosan and Plumlee (2001), the expected cost of equity capital

using the unrestricted form of the classic dividend discount formula and examined the extent to which these estimates ($rDIV$) reliably proxy for expected cost of equity capital. It was located that the $rDIV$ estimates are associated with six risk proxies. The $rGORDON$ estimates have the highest correlation with $rDIV$ and behave in a manner consistent with expectations regarding their relationships with the risk proxies.

In the year 2001, Gebhardt, Lee and Swaminathan proposed an alternative technique for estimating the cost of equity capital. A discounted residual income model has been used to generate a market-implied cost of capital. The study shows that a firm's implied cost-of-capital is a function of its industry membership, B/M ratio, forecasted long-term growth rate, and the dispersion in analyst earnings forecasts. In the same year, Cooper and Davydenko developed a practical way of estimating the cost of risky debt for use in the cost of capital. The cost of debt is different from both the promised yield and the risk-free rate, which are sometimes used for this purpose, because of the expected probability of default. The parameters of the Merton model implied by these inputs are used to compute the expected return on debt. Working in the same direction.

Easton (2003) developed a model of earnings and earnings growth and demonstrated how this model may be used to obtain estimates of the expected rate of return on equity capital. Francis, Per Olsson, and Schipper (2003) examined the cost of capital effects of earnings attributes for all firms with at least 24 monthly returns over the years 1975-2001 and the attributes were: quality, persistence, predictability, smoothness, value relevance, timeliness and conservatism. The results show that firms with the most favourable values of each attribute, viewed individually, enjoy significantly lower costs of capital than firms with the least favourable values.

In addition, Lee, Ng and Swaminathan (2003) gathered data from the G-7 countries to: (a) devise

a practical approach to estimating the cost of equity capital to aid in international investments and (b) to conduct tests of international asset pricing model (IAPM) using forward-looking cost of equity capital measure.

Recently, Christoffersen, Jacobs and Vainberg (2006) affirmed that few issues are more important for finance practice than the computation of market beta's. The study used information embedded in the prices of individual stock options and index options to compute a forward-looking market beta at the daily frequency. He found that these forward-looking betas contain information relevant for forecasting future betas that is not contained in historical betas.

There has been very little work on this issue in developing countries, in general, and India in particular. In India, CAPM was first tested by J.N. Dhankar (1988), who used it to compute the risk-adjusted cost of capital of 38 public-sector undertakings for a period from 1973 to 1983. Srinivasan (1988) found that CAPM did not exactly hold in Indian environment but its spirit holds well. He used a quarterly data of 85 firms over a period of three years, i.e., 1983 to 1985. A study by R.S. Dhankar (1995) revealed that investors could apply CAPM in Indian capital markets but if there are companies which resort to falsification of information and manipulation of variables, like transfer pricing, forex and other unethical practices, then one has to be very careful in using a tool, like CAPM, which basically requires a reasonably efficient stock market.

Thus, it appears that no specific study has been conducted on the measurement of cost of capital through CAPM. The present study seeks to bridge the gap in this important area of business.

OBJECTIVES OF THE STUDY

As the most vital objective of the corporate sector is to maximise the shareholders' value, establishing a relationship between the financial

variables and the corporate objective is imperative. The main objective of the paper is to ascertain the cost of capital and establish the risk and return level in the Indian banking industry. More specifically, the research objectives are:

- To compute and analyse the cost of the equity capital of the sample banking companies;
- To analyse the cost of debt of these companies;
- To compute and analyse the weighted-average cost of capital of these companies; and
- To compare the weighted-average cost of capital of the public and private-sector banks.

RESEARCH METHODOLOGY

The Data

The study makes use of secondary data. The relevant secondary data was collected from *nse-india.com*, *rbi.org.in*, and CMIE database 'PROWESS'. Journals and periodicals, like *Indian Journal of Commerce*, *Management Accountant*, *Business Today*, *Business India*, and *Finance India* were also consulted to obtain the relevant information.

The Sample

The cost of equity capital has been studied from the Indian banking industry for the period 1996-97 to 2005-06. The sample companies have been listed on the National Stock Exchange (NSE).

The Model

In the present study, the cost of debt, the cost of equity, and the weighted-average cost of capital of Indian banks, have been estimated through CAPM.

- **Cost of Debt (Kd):** The cost of debt is computed by taking the rate on a non-

defaulting bond whose duration matches the term structure of the corporate debt adding a default premium. This default premium will rise as the amount of debt increases. Since in most cases the debt expense is a deductible expense, the cost of debt is computed as an after tax cost to make it comparable with the cost of equity. Thus, for profitable firms, the debt is discounted by the tax rate. It has been estimated by using the following formula:

$$K_d = \text{Total interest expenses} \times (1 - \text{Effective tax rate}) / \text{Total borrowings}$$

- Cost of Equity (Ke):** The cost of equity is calculated as the "expected" return on equity during a past or future period based on interest rate levels and historical average equity market return. CAPM has been the widely accepted technique used for estimation of cost of equity capital of financial assets. The general idea behind the CAPM is that investors need to be compensated in two ways: time value of money and risk. The time value of money is represented by the risk-free (rf) rate in the formula and compensates the investors for placing money in any investment over a period of time. The other half of the formula represents risk and calculates the amount of compensation the investor needs for taking an additional risk. This is calculated by taking a risk measure (beta) that compares the returns of the asset to the market over a period of time and to the market premium (R_m-r_f). If this expected return does not meet or beat the required return, the investment should not be undertaken.

Capital-Asset Pricing Model: The Capital Asset Pricing Model (CAPM) is used to determine a theoretically appropriate required rate of return. It was the work of financial economist (Nobel laureate in economics) William Sharpe, set out in his book *Portfolio Theory and*

Capital Markets. His model starts with the idea that individual investment contains two types of risk: systematic and unsystematic risks. Systematic risk is the market risk that cannot be diversified away. Interest rates, recessions and wars are examples of systematic risk. Unsystematic risk, also known as "specific risk", is specific to individual stocks and can be diversified away as the investor increases the number of stocks in his or her portfolio. In technical terms, it represents the components of a stock's return that is not correlated with general market moves. The Capital-Asset Pricing Model can be explained as follows:

$$E(R_i) = R_f + \beta_{im} (E(R_m) - R_f)$$

where,

- $E(R_i)$ is the expected return on the capital asset.
- R_f is the risk-free rate of interest. The weighted average of yield rate on 364 days Government Treasury Bills have been taken as proxy for risk-free rate.
- β_{im} (the beta coefficient) is the sensitivity of the asset returns to market returns, it may be calculated as $\beta_{im} = \text{Slope}(R_i, R_m)$. Beta (β) measures the sensitivity of dependent variable to per unit change in the independent variable(s). It, compared with the equity risk premium, shows the amount of compensation equity investors need for taking on additional risk. Betas exceeding one signify more than average "riskiness"; betas below one indicate lower than average.
- $E(R_m) - R_f$ is sometimes known as the market premium or risk premium. It is the difference between the expected market rate of return and the risk-free rate of return. Given that no Banking Index is available for the period starting 1996-97, an Index has been prepared. It includes banking stocks listed on National Stock Exchange since 1996-97. It is a market

capitalisation weighted index, with base date of April 1, 1996, indexed to a base value of 1000. The yearly return of the index has been computed by adding daily returns. In the year 1998-99, market return came out to be negative, but the investors do not expect negative return on their investment. Therefore, index has been interpolated using Binomial Expansion Method to get positive return.

- **Weighted Average Cost of Capital (Ko):** In the calculation of a firm's cost of capital, each category of capital is proportionately weighted. WACC is calculated by multiplying the cost of each capital component by its proportional weight and then summing: The total capital for a firm is the sum of the value of its equity and the cost of its debt. A firm's WACC is the overall required return of the firm as a whole and, as such, it is often used internally by company directors to determine the economic feasibility of expansionary opportunities and mergers. It is the appropriate discount rate to use for cash flows with risk that is similar to that of the overall firm. The cost of capital is calculated as follows:

$$K_o = (1-\delta)K_e + \delta K_d$$

where,

K_o is the weighted average cost of capital for the firm; δ is the debt-to-capital ratio; K_e is the cost of equity, and K_d is the after-tax cost of the debt.

RESULTS AND DISCUSSION

The estimation and analysis of the cost of capital of Indian banking industry has emerged with various concrete results. Table 1 presents the cost of equity of Indian banks for the period 1996-97 to 2005-06. The Capital Asset Pricing Model has been used to calculate the cost of equity. According to this model, the cost of equity depends upon three factors: risk-free rate, market

premium and beta. In this study, the weighted average yield rate on 364 days Government Treasury Bills has been taken as proxy for risk-free rate. For calculation of market premium, a Bank Index has been created, using banking stocks listed on NSE. For the estimation of beta, the individual security returns on daily basis have been taken as the dependent variable and the return on the market.

The risk-free rate has decreased to 5.718 per cent in 2005-06 from 11.67 per cent in 1996-97. Market premium has also shown wide variation. It was at its peak in 1999-2000, with 41.01 per cent return. Another important factor, i.e., beta is also exhibiting extensive deviation if the whole banking industry is considered together. Between 1996-97 and 2000-01, a few banks have shown above one beta value. Particularly, SBI, Federal Bank Ltd, and Bank of Baroda were the banks that were demonstrating above market level risk. But during 2001-02 to 2005-06 the number of banks showing above market level risk has increased significantly. SBI, Federal Bank Ltd, Bank of India, Punjab National Bank, Bank of Baroda, Canara Bank, IDBI Bank and Syndicate Bank are the banks with the highest cost of equity. HDFC Bank, ICICI Bank, ING Vysya Bank, Karur Vysya Bank, City Union Bank, Kotak Mahindra Bank, Lakshmi Vilas Bank, State Bank of Travancore, United Western Bank Ltd, and State Bank of Bikaner and Jaipur are the banks with the lowest cost of equity. Finally, it is observed that public-sector banks are showing the higher cost of equity than private-sector banks.

The average cost of debt decreased to 2.87 per cent in 2005-06 from 5.54 per cent in 1996-97. The analysis of cost of debt exhibits some peculiar results. Few banks have shown above-average cost of debt throughout the period under study and another few below-average cost. Banks showing above-average cost of debt include IDBI, ING Vysya Bank, Federal Bank, City Union Bank and Centurion Bank of Punjab. HDFC Bank, ICICI Bank, Bank of Rajasthan, Syndicate Bank and State Bank of Travancore have given

Table 1
Cost of Equity (ke)

Bank Name	Years									
	1996-97	1997-8	1998-99	1999-0	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Allahabad Bank	NA	NA	NA	NA	NA	NA	19.25	22.97	27.64	29.23
Andhra Bank	NA	NA	NA	NA	NA	9.83	20.72	25.49	28.97	34.61
Bank of Baroda	49.41	5.41	30.77	36.57	10.58	14.11	19.67	31.87	34.38	43.27
Bank of India	NA	5.31	28.02	31.21	11.68	13.71	15.79	28.31	29.19	51.26
Bank of Maharashtra	NA	NA	NA	NA	NA	NA	NA	NA	26.18	24.46
Bank of Rajasthan Ltd.	30.89	5.54	24.26	21.17	11.06	13.48	16.50	21.64	27.15	32.47
Canara Bank	NA	NA	NA	NA	NA	NA	26.07	31.48	24.41	36.82
Cent. Bank of Punjab Ltd.	NA	NA	NA	37.75	11.03	14.84	15.64	19.93	23.28	19.06
City Union Bank Ltd.	NA	NA	20.19	12.17	9.61	11.12	10.46	16.45	18.34	24.82
Corporation Bank	NA	5.44	29.12	35.53	9.95	12.09	13.15	19.70	19.88	31.27
Dena Bank	26.46	6.27	22.25	24.87	10.11	11.82	17.76	21.48	27.72	29.58
Dhanalakshmi Bank Ltd.	NA	NA	NA	NA	NA	NA	NA	NA	18.89	19.36
Federal Bank Ltd.	28.36	5.23	29.16	33.63	9.61	15.38	17.39	23.04	25.46	32.68
H D F C Bank Ltd.	26.56	5.80	26.05	31.49	11.59	12.20	10.60	14.03	21.15	28.56
I C I C I Bank Ltd.	NA	5.48	24.98	29.29	9.15	14.34	11.82	13.85	16.97	29.79
I N G Vysya Bank Ltd.	26.07	5.75	18.77	23.59	11.54	11.96	11.74	10.50	20.33	24.61
Indian Overseas Bank	NA	NA	NA	NA	25.43	10.72	15.21	21.74	27.76	33.97
Indusind Bank Ltd.	NA	5.70	24.43	32.36	8.55	14.55	14.07	17.70	22.11	35.35
I D B I Ltd.	24.60	5.64	24.58	35.93	11.11	12.85	14.35	23.24	30.27	38.33
J & K Bank Ltd.	NA	NA	19.70	25.51	10.31	12.31	15.94	18.02	20.01	21.09
Karnataka Bank Ltd.	NA	NA	NA	NA	27.76	14.09	14.10	22.00	19.87	42.42
Karur Vysya Bank Ltd.	27.77	5.68	24.35	30.05	10.21	13.96	13.16	17.29	14.89	21.75
Kotak Mahindra Bank Ltd.	29.81	5.62	23.71	31.74	8.36	15.24	15.58	15.30	17.40	28.65
Lakshmi Vilas Bank Ltd.	29.53	5.79	19.69	25.89	10.63	10.52	11.29	15.75	23.49	26.98
OBC	32.02	5.93	25.05	34.60	10.60	12.04	15.40	32.66	31.73	29.48
Punjab National Bank	NA	NA	NA	NA	NA	NA	18.59	31.39	26.19	33.72
South Indian Bank Ltd.	NA		22.72	32.05	5.07	13.51	14.38	18.87	25.14	29.88
SBBJ	NA	6.14	15.74	26.10	11.01	8.71	NA	NA	NA	NA
SBI	33.59	5.22	30.31	45.87	10.36	18.51	16.15	24.10	25.94	37.94
SBT	NA	5.93	16.63	19.16	10.48	9.39	NA	NA	NA	NA
Syndicate Bank	NA	NA	NA	29.66	10.63	10.07	16.83	27.23	31.16	36.51
U T I Bank Ltd.	NA	NA	21.30	31.57	11.32	13.02	12.98	18.54	22.41	26.69
Uco Bank	NA	NA	NA	NA	NA	NA	NA	23.17	27.34	25.10
Union Bank Of India	NA	NA	NA	NA	NA	NA	18.20	25.29	26.55	37.34
United Western Bank Ltd.	27.33	5.98	19.19	26.58	10.79	11.03	10.85	17.55	21.35	19.49
Vijaya Bank	NA	NA	NA	NA	31.88	9.07	14.53	22.31	29.16	28.09
Yes Bank Ltd.	NA	NA	NA	NA	NA	NA	NA	NA	NA	14.14

Source: Calculated through CAPM Model by creating Bank Index for last ten years. The raw data was taken from Prowess Database.

Table 2
Cost of Debt (Kd)

Bank Name	Year									
	1996-97	1997-8	1998-99	1999-00	2000-01	2001-2	2002-03	2003-04	2004-05	2005-06
Allahabad Bank	4.92	4.73	4.68	4.72	4.49	4.42	4.23	3.24	2.90	2.91
Andhra Bank	4.94	4.92	4.46	4.60	4.86	5.05	4.23	3.59	2.75	2.81
Bank of Baroda	5.10	4.67	4.75	4.39	4.49	4.22	3.86	3.13	2.70	2.54
Bank of India	4.69	4.28	4.46	4.47	4.43	3.87	3.68	3.05	2.87	2.66
Bank of Maharashtra	4.72	4.40	4.38	4.73	4.31	4.69	4.05	3.46	3.25	3.50
Bank of Rajasthan Ltd.	5.92	6.20	6.26	6.18	5.74	5.32	3.61	2.64	2.42	2.31
Canara Bank	4.71	4.71	4.77	4.57	4.07	4.58	3.95	3.20	2.93	2.81
Centurion Bank of Punjab	4.10	6.49	7.09	4.98	5.41	6.67	5.94	4.24	2.96	2.76
City Union Bank Ltd.	5.84	6.15	6.45	6.19	5.29	5.24	4.74	4.13	3.81	3.43
Corporation Bank	4.86	4.48	5.04	5.19	4.71	4.28	3.84	3.39	2.59	2.65
Dena Bank	5.19	4.91	5.61	5.31	5.43	5.20	4.60	3.93	3.12	2.83
Dhanalakshmi Bank Ltd.	5.64	6.22	5.85	5.57	5.85	5.37	4.71	3.63	3.25	3.22
Federal Bank Ltd.	6.37	5.59	7.01	6.62	5.52	5.39	4.50	3.64	2.91	2.94
H D F C Bank Ltd.	3.89	3.87	4.32	2.47	3.80	3.60	3.19	2.40	2.09	2.11
I C I C I Bank Ltd.	5.37	4.34	4.36	4.18	3.15	1.13	5.64	4.27	3.05	2.96
I N G Vysya Bank Ltd.	6.52	6.12	6.07	5.73	5.23	5.19	4.42	3.81	3.04	3.28
Indian Overseas Bank	5.80	5.00	5.18	4.90	4.58	4.55	3.96	3.31	3.01	2.89
Indusind Bank Ltd.	6.47	5.91	5.44	4.63	4.88	3.85	4.11	3.22	3.34	3.56
IDBI Ltd.	7.24	6.86	7.13	7.35	7.72	7.66	7.42	0.00	2.60	4.61
J & K Bank Ltd.	4.53	4.43	4.28	4.18	4.16	4.58	3.97	3.12	2.85	2.89
Karnataka Bank Ltd.	5.50	5.50	5.50	5.77	5.34	5.61	5.13	4.37	3.12	3.21
Karur Vysya Bank Ltd.	5.57	5.47	5.88	5.60	5.36	4.68	4.24	3.85	3.26	3.13
Kotak Mahindra Bank Ltd.	11.40	12.98	10.24	8.84	8.36	4.65	4.10	1.56	2.43	2.66
Lakshmi Vilas Bank Ltd.	5.82	5.10	5.70	5.15	5.15	5.43	4.65	3.91	3.44	3.22
OBC	5.20	4.81	5.03	5.10	5.22	4.66	4.45	3.31	2.75	3.21
Punjab National Bank	5.10	4.97	4.50	4.77	4.38	4.37	3.69	3.00	2.72	2.53
South Indian Bank Ltd.	6.54	6.13	6.37	5.82	5.38	5.01	4.48	3.72	3.45	3.05
SBBJ	5.60	5.25	5.33	5.28	5.09	4.88	4.31	3.31	2.90	2.74
State Bank Of India	5.34	4.93	4.81	4.85	4.54	4.83	4.51	3.79	3.13	3.20
State Bank Of Travancore	6.52	6.09	5.82	5.65	5.08	4.90	4.29	3.49	2.96	3.17
Syndicate Bank	4.58	4.45	4.70	4.42	4.38	4.06	3.55	2.52	2.88	2.57
U T I Bank Ltd.	5.50	5.08	5.57	4.15	5.08	4.78	4.15	3.05	2.30	2.68
Uco Bank	5.12	4.90	4.96	4.96	4.85	4.34	3.92	3.11	2.78	3.19
Union Bank Of India	5.05	4.81	4.77	4.87	4.64	4.34	3.99	3.46	2.91	2.85
United Western Bank Ltd.	5.29	4.59	4.57	4.49	4.43	5.40	4.25	3.38	3.39	0.00
Vijaya Bank	4.75	4.34	4.53	4.51	4.55	4.65	3.84	3.35	2.74	3.08
Yes Bank Ltd.	NA	NA	NA	NA	NA	NA	NA	NA	0.76	1.99

Source: Calculated through CAPM Model by creating Bank Index for last ten years. The raw data was taken from Prowess Database

Table 3
Weighted Average Cost of Capital (Ko)

Bank Name	Year									
	1996-97	1997-98	1998-99	1999-0	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Allahabad Bank	NA	NA	NA	NA	NA	NA	13.98	15.42	20.08	21.98
Andhra Bank	NA	NA	NA	NA	NA	NA	11.22	15.12	16.70	24.30
Bank of Baroda	36.31	5.21	26.99	26.58	7.93	10.52	14.77	22.55	23.01	23.98
Bank of India	NA	4.87	15.17	16.68	7.39	7.07	7.95	12.44	11.86	19.42
Bank of Maharashtra	NA	NA	NA	NA	NA	NA	NA	NA	15.58	14.19
Bank of Rajasthan Ltd.	NA	5.73	15.54	17.71	10.29	11.95	14.92	14.30	15.37	22.42
Canara Bank	NA	NA	NA	NA	NA	NA	19.10	21.56	17.75	25.49
Centurion Bank of Punjab ltd.	NA	NA	NA	10.98	6.29	8.37	7.02	8.94	16.78	15.39
City Union Bank Ltd.	NA	NA	16.26	10.59	8.80	10.74	10.08	14.85	17.14	20.41
Corporation Bank	NA	5.37	25.11	29.27	8.35	8.87	10.79	15.56	14.68	20.76
Dena Bank	NA	5.59	13.65	12.04	5.57	6.39	8.82	11.49	15.12	19.87
Dhanalakshmi Bank Ltd.	NA	NA	NA	NA	NA	NA	NA	NA	12.29	13.18
Federal Bank Ltd.	NA	5.37	15.83	17.60	7.39	9.99	11.95	14.54	16.66	20.33
H DFC Bank Ltd.	NA	5.12	12.31	11.95	6.86	7.82	6.88	7.99	10.87	16.33
ICICI Bank Ltd.	NA	5.00	13.78	20.07	6.27	2.46	6.52	5.91	6.31	11.43
ING Vysya Bank Ltd.	21.56	5.81	13.09	14.75	7.57	7.07	6.97	5.86	8.64	11.04
Indian Overseas Bank	NA	NA	NA	NA	22.10	9.87	9.70	13.38	17.40	19.08
Indusind Bank Ltd.	NA	5.72	16.17	17.65	6.77	7.77	10.25	6.72	11.47	17.03
IDBI Ltd.	10.22	6.66	9.68	11.33	8.20	8.25	8.30	2.45	5.33	8.31
Jammu & Kashmir Bank Ltd.	NA	NA	14.63	24.69	8.62	10.58	13.62	15.14	16.58	18.06
Karnataka Bank Ltd.	NA	NA	NA	NA	21.70	12.56	12.13	18.36	16.52	37.01
Karur Vysya Bank Ltd.	16.50	5.61	14.24	18.74	8.71	10.11	10.27	15.64	13.64	18.39
Kotak Mahindra Bank Ltd.	15.28	10.78	15.15	18.93	8.36	9.58	7.79	9.03	8.94	10.94
Lakshmi Vilas Bank Ltd.	19.68	5.55	13.98	15.62	8.53	8.94	8.94	11.65	14.71	20.69
Oriental Bank Of Commerce	29.37	5.84	23.40	26.79	9.90	9.52	11.47	24.13	23.30	23.73
Punjab National Bank	NA	NA	NA	NA	NA	1.69	12.66	18.77	17.03	18.53
South Indian Bank Ltd.	NA	NA	16.22	23.19	5.18	10.64	10.55	13.19	19.40	23.53
SBBJ	NA	5.78	13.73	20.04	9.44	8.40	1.14	NA	NA	NA
State Bank of India	19.46	5.08	17.75	26.22	7.02	12.03	11.09	14.77	14.89	18.37
State Bank of Travancore	NA	6.00	12.88	17.50	8.20	7.56	1.54	NA	NA	NA
Syndicate Bank	NA	NA	NA	21.59	8.63	8.87	13.39	19.22	21.13	21.64
U T I Bank Ltd.	NA	NA	10.03	12.67	6.35	7.50	7.97	10.72	12.06	12.09
Uco Bank	NA	NA	NA	NA	NA	NA	NA	13.84	16.74	11.58
Union Bank of India	NA	NA	NA	NA	NA	NA	11.43	14.43	13.28	15.86
United Western Bank Ltd.	27.33	5.98	19.19	26.58	10.79	11.03	10.85	17.55	21.35	19.49
Vijaya Bank	NA	NA	NA	NA	17.26	7.34	9.49	15.74	18.10	18.62
Yes Bank Ltd.	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.09

Source: Calculated through CAPM Model by creating Bank Index for last ten years. The raw data was taken from Prowess Database

below-average cost of debt. One major conclusion of this analysis is that banks are showing disparity in their cost of debt even in the period of a year. For example, the cost of debt for HDFC is 2.11 per cent in 2005-06 but the same is 3.20 per cent for SBI, thereby demonstrating a difference of more than 100 points basis.

The three factors that affect the overall cost of capital of a company are: the cost of equity, the cost of debt and the proportion of debt and equity in the capital structure. Debt-equity proportion plays a crucial role in deciding the overall cost of a firm. If the cost of debt is less and the firm has employed a major portion of its capital from debt, it may reduce its overall cost. In another case, if the cost of equity is high, firms having more equity capital than debt may have to bear a high overall cost of capital. It may be seen from Table 2 that the cost of debt has reduced during 1996-97 and 2005-06. Therefore, the banks that have increased debt content in their capital were able to maintain overall cost of capital low. The list of this type of banks includes ICICI Bank, Syndicate Bank, UTI Bank, Union Bank of India, Indusind Bank, Bank of Rajasthan and ING Vysya Bank. It may be explored from Table 3 that the overall cost of the above-mentioned banks has not increased in spite of tremendous increase in cost of equity capital during this period. At the other front, there are banks that have not increased their debt content but have increased equity capital. These banks have to bear massive increase in the overall cost of capital. These banks are Centurion, Bank of Punjab Ltd, City Union Bank Ltd, Dhanalakshmi Bank Ltd, Federal Bank Ltd, Karnataka Bank, Karur Vysya Bank and Lakshmi Vilas Bank. There are banks that have maintained

almost the same level of debt-equity proportion during the period of study, their overall cost of capital has increased due to an increase in the cost of equity. These banks are Corporation Bank, Dena Bank, HDFC Bank, Punjab National Bank and State Bank of India.

Table 4 shows that the WACC of public-sector banks is higher than the industry average. The difference is highest in 1996-97 and has decreased gradually over the period under study. Private-sector banks have been able to maintain low WACC. It has shown above-industry WACC in two years only. Therefore, it may be concluded that, in this parameter also, private-sector banks have outperformed by maintaining lower WACC.

It is evident from Figure 1 that WACC of Indian banking industry is following the market premium trend during 1996-2006. It was at its peak in 1996-97 but in the next year when the market premium went down, it also decreased to reach its lowest point. The market premium hit the highest point in 1999-00, but WACC increased less than proportionately. The reason may be more employment of debt by Indian banks in their capital structure. Next year again it fell down and then increased gradually throughout 2001-06.

CONCLUSION

In order to assess the cost of capital of the listed banks in India, an attempt has been made in this paper to bring out a relationship between the cost of debt, the cost of equity, the debt-equity proportion and the risk level. The findings are summarised below:

Table 4

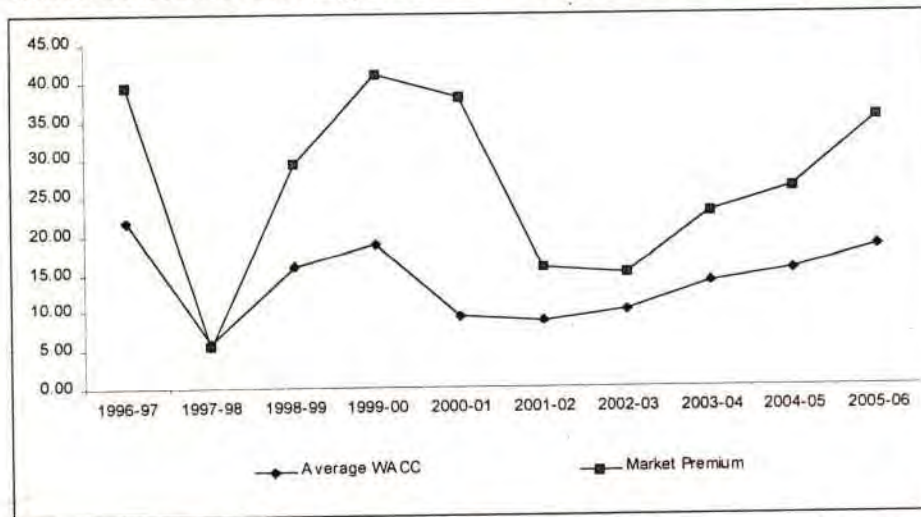
Comparison of Weighted Average Cost of Capital

Year	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Public Sector Banks	28.38	5.47	18.58	20.77	9.84	8.19	10.33	16.08	17.26	19.58
Private Sector Banks	18.43	6.12	14.41	17.47	8.77	9.19	9.88	11.49	13.37	17.15
All Banks	21.75	5.85	15.86	18.79	9.23	8.74	10.11	13.79	15.31	18.33

Source: Calculated through CAPM Model by creating Bank Index for last ten years. The raw data was taken from Prowess Database

Figure 1

Market Premium of Banking Stocks and WACC of Indian Banking Industry



Source: Calculated through CAPM Model by creating Bank Index for last ten years. The raw data was taken from Prowess Database

- The risk-free rate has decreased to 5.97 per cent in 2005-2006 from 11.67 per cent in 1996-1997.
- The market premium has also shown wide variation during the period of the study. It was at its peak in 1999-2000 with 41.01 per cent return.
- SBI, Federal Bank Ltd, Bank of India, Punjab National Bank, Bank of Baroda, Canara Bank, IDBI Bank and Syndicate Bank had the highest cost of equity. HDFC Bank, ICICI Bank, ING Vysya Bank, Karur Vysya Bank, City Union Bank, Kotak Mahindra Bank, Lakshmi Vilas Bank, State Bank of Travancore, United Western Bank Ltd and State Bank of Bikaner and Jaipur are the banks with the lowest cost of equity. Finally, it is found that public-sector banks had a higher cost of equity than private-sector banks.
- While the average cost of debt decreased to 2.87 per cent in 2005-06 from 5.54 per cent in 1996-97, HDFC Bank, ICICI Bank, Bank of Rajasthan, Syndicate Bank and State Bank of Travancore had a below-average cost of debt.
- The cost of debt has reduced during 1996-97 and 2005-06. Therefore, the banks that increased debt content in their capital were able to maintain the overall cost of capital low. The list of this type of banks includes ICICI Bank, Syndicate Bank, UTI Bank, Union Bank of India, Indusind Bank, Bank of Rajasthan, and ING Vysya Bank. Several banks that have maintained almost the same level of debt-equity proportion during the period of study, their overall cost of capital has increased due to an increase in the cost of equity. These banks are: Corporation Bank, Dena Bank, HDFC Bank, Punjab National Bank, and State Bank of India. Some banks which have increased their equity content had to bear an increase in their overall cost. These banks are Centurion Bank of Punjab Ltd., City Union Bank Ltd., Dhanalakshmi Bank Ltd., Federal Bank Ltd., Karnataka Bank, Karur Vysya Bank, and Lakshmi Vilas Bank.

The paper introduced the main concepts related to the calculation of the cost of debt, cost of equity, and the overall cost of capital. It has been

found that the major private-sector banks have low cost of equity and overall capital than public-sector banks. They have increased the debt content in their total capital as the cost of debt decreased. The risk level, *i.e.*, beta, is also low in private-sector banks. Furthermore, they have been intelligent to maintain their cost of debt below the average cost of debt of the banking industry. Public-sector banks have not tried to increase the debt content to benefit from reduce debt cost. The findings can surely facilitate public-sector banks to their cost of capital. It may be added that the analysis and discussion on the issue would prompt the policymakers and other stakeholders in the banking industry in India to make the sector globally competitive and cost-effective.

REFERENCES

- Botosan, Christine A., and Marlene A. Plumlee (2001), "Estimating Expected Cost of Equity Capital: A Theory-based Approach", *papers.ssrn.com/sol3/papers.cfm?abstract_id=279309* (accessed on Feb 22, 2007)
- Bruner, Robert F., Kenneth M. Robert, and Robert C. Higgins, (1998), "Best Practices in Estimating the Cost of Capital: Survey and Synthesis", *Financial Practice and Education* (Spring), pp. 13-28.
- Christoffersen, Peter, Kris Jacobs, and Vainberg, Gregory (2006), "Forward-Looking Betas", *papers.ssrn.com/sol3/papers.cfm?abstract_id=891467* (accessed on Feb 22, 2007)
- Cooper, Ian, and Sergei Davydenko (2001), "The Cost of Debt", *papers.ssrn.com/sol3/papers.cfm?abstract_id=254974* (accessed on Feb 24, 2007)
- Dhankar, J.N. (1988), "A Treatise on Merchant Banking: Project Approval and Financing (New Delhi: Skylark Publications)
- Dhankar, R.S. (1995), "Arbitrage Pricing Theory and the Capital Asset Pricing Model: Evidence from the Indian Stock Market", *Journal of Financial Management and Analysis*, Vol. 18, No. 1, pp. 14-27
- Easton, Peter, (2003), "PE Ratios, PEG Ratios, and Estimating the Implied Expected Rate of Return on Equity Capital", *papers.ssrn.com/sol3/papers.cfm?abstract_id=423601* (accessed on March 5, 2007)
- Fama, E., and K. French (1992), "The Cross-section of Expected Stock Returns", *Journal of Finance* Vol. 47, pp. 427-465.
- Francis, Jennifer, Per Olsson, Ryan LaFond and Katherine Schipper, (2003), "Cost of Capital and Earnings Attributes", Duke University, Massachusetts Institute of Technology (MIT) - Sloan School of Management, Duke University and Duke University, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=414125 (accessed on March, 2007).
- Gebhardt, W.R., Lee C.M.C., and B. Swaminathan (2001), "Toward an Implied Cost of Capital," *Journal of Accounting Research*, Vol. 39, pp. 135-176.
- Koedijk, Kees G., Clemens J.M Kool, Peter C. Schotman, Mathijs A. Van Dijk, and Francois G.J.A. Nissen (1999), "The Cost of Capital in International Financial Markets: Local versus Global Beta", *papers.ssrn.com/sol3/papers.cfm?abstract_id=166848* (accessed on March 6, 2007)
- Lee, C., D. Ng, and B. Swaminathan, (2003), "The Cross-section of International Cost of Capital", *Working paper*, Cornell University (accessed on March, 2007).
- Lintner, J. (1965): "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets," *Review of Economics and Statistics* Vol. 47, pp. 13-37.
- Sharpe, W. (1964): "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance* Vol. 19, pp. 425-442.
- Srinivasan S. (1988), "Testing of Capital Assets, pricing Model in Indian Environment", *Decision*, Vol. 15, (Jan-Mar) pp. 51-62.

E-TAILING IN INDIA Scope and Significance

Nityesh Bhatt* and Surender Sangwan**

Abstract

Indian economy has undergone a sea-change since the onset of economic liberalisation in 1991. During this period, Indian economic sector hitherto-shackled were opened up. Among others, retail sector has become a major driver for the current economic growth. Telecom, IT, and media industries have truly united India as it has resulted in raising of aspirations and available choices beyond the barriers of geography, religion, and economic capacity. All this has led to the rise of e-Tailing, an offshoot of organised retailing. This paper gives an overview of the present retailing scenario and the status of e-Tailing in India. It highlights the category of products which are generally sold on-line and addresses the enablers of e-Tailing in India. It also identifies the major problems faced by e-Tailers and suggests appropriate strategy for managing e-Tailing.

Key Words : e-Tailing, e-Commerce, On-line Shopping, e-Governance, Shopping

INTRODUCTION

INDIAN economy is today at the centre-stage of interest and investment, with GDP growth rate of over 8 per cent per annum, high proportion of productive population below 40 years of age, a vast pool of knowledge workers, high aspiration of the general populace, and environment conducive to the infrastructure development. These developments have resulted in coming up of various sectors labelled as sunrise sectors including retail, telecom, insurance, and infrastructure.

Retailing is the new sunrise sector of the Indian economy. As per Tata Strategic Management Group (TSMG), the total retail

market in India is likely to grow at Compounded Annual Growth Rate (CAGR) of 5.5 per cent at constant prices to USD 374 billion (Rs 16,77,000 crore) by 2015. The organised retail market is expected to grow much faster, at a CAGR of 21.8 per cent to USD 55 billion (Rs 246,000 crore) from the current organised trade of USD 8 billion (Rs 35,000 crore).¹ This is indicative of the huge untapped potential for organised retailing in the country. India's population having access to the internet currently stands at 34 million and is predicted to grow four-fold to over-100 million by 2007. As per the estimates, given in Table 1, e-commerce transactions will cross the Rs 2,300-crore mark (2006-2007) which translates into an increase of over 300 per cent from the financial year 2004-05.²

* Assistant Professor - IT Area, Institute of Management, Nirma University of Science and Technology, Ahmedabad - 382 481, e-mail: nityeshb@gmail.com

** General Manager, Academia-Industry Interface, Rai Business School, Faridabad, Haryana, e-mail: sangwan.surender@gmail.com

Table 1
B2C Commerce in India

Year	2002-03	2003-04	2004-05	2005-06	2006-07
B2C - Rs Crore	130	255	Rs 570	1080 crore	Rs 2300
% Growth		96%	124%	107%	95%

Year	2003-04	2004-05	2005-06
Average No. of Transactions per month	207,000	440000	795000
% Growth	--	112%	80%
Average Transaction Value	--	Rs 1080	Rs 1100*

Source : IOAI e-Commerce Report, 2005

CONCEPT OF E-TAILING

The concept of e-Tailing is to effectively e-enable the phenomenon of purchasing that is part and parcel of our everyday life. e-Commerce can be classified into three forms:

- **Business to Consumer (B2C):** On-line selling by a business unit to an individual consumer.
- **Business to Business (B2B):** On-line selling by business to business.
- **Consumer to Consumer (C2C):** On-line selling by a consumer to another consumer.

This paper is confined to the B2C format of e-Commerce, referred to as e-Tailing. e-Tailing can be divided into following categories:

- **Pure-Play e-Tailer:** A pure-play e-Tailer uses the internet as its primary means of retailing. Examples of pure-play e-Tailers are *amazon.com*, *hungama.com* & *ebay.com*.
- **Brick and Click e-Tailer:** A brick-and-click e-Tailer uses the Internet to push its goods or services but also has the traditional physical storefront available to customers. A popular example of a brick and click e-tailer in India is Big Bazaar's *futurebazaar.com* and LG's *LGBuy.com*.

e-Tailing is a very powerful medium of customer empowerment and customer convenience. In modern ICT era, the importance

of conducting business electronically cannot be undermined. Most businesses are gradually moving towards the digital marketplace as it offers infinite choices. This has led to the emergence of virtual marketplaces, which are nothing but the blossoming of real world commercial and consumer transactions into the cyber world. This transition has changed the role of technology from being a mere enabler to being the backbone of business.

ADVANTAGES OF E-TAILING

e-Tailing offers enormous advantages to both the seller and the buyer, as given below:

Advantages for Sellers

Sellers gain from e-Tailing in the form of reduced real estate costs, mass customisation, reduced inventory costs, and global reach.

Negligible real-estate costs: E-Tailers do not have to buy or rent and maintain expensive showrooms or warehouses in prime locations as they operate through their web sites and thus save huge amount on the real estate costs. As compared to the exorbitant real estate costs in tier I and tier II metropolitan cities, the maintenance cost of a virtual store is very less. Accenture research estimates that a web-based transaction costs \$0.05 on an average, as compared to \$5 for a telephone-based transactions, saving a staggering \$4.95 per transaction or a factor of 100.³

Real time Info and Mass Customisation:

Retailing on the Internet empowers companies to track and capture a customer's interactions on their website and other networked websites and enable them to model the expectation and demand of the customers. Using data mining tools, e-Tailing also enables the companies to leverage interactive information flow for customer-led customisation. Dell computers used this model to gain an edge on the hardware grants of the world including IBM and COMPAQ.

Reduced Inventory Costs: The most critical job of a traditional retailer is to maintain an adequate level of inventory. The cost of maintaining inventory is a major constituent in the final cost of product. An e-Tailer with robust back-end supply chain management and vendors relation systems has to incur fewer inventory costs in comparison to the traditional retailer.

Global Reach: A supermarket has limited geographical area of operation as it caters to the customers of a city or a particular geographical area. However, for the e-Tailer, the whole world is a marketplace due to accessibility of websites from any part of the world.

Advantages for Customers

Customers also stand to gain from e-tailing in the form of time saving and faster decision-making.

Time Saving: Shopping online saves a lot of time to the time-constrained customers. They can book different products and services online without going through the rigor of travelling and queuing. e-Tailing is going to be a boon to time starved people.

Effective and Faster Decision-making: The Internet is the information warehouse where customers can glean information about products and services, make comparison of price, product, features, and brand, read expert reviews, and make informed decisions. Besides, the whole family can participate in the purchase decision-making process at ease.

ENABLERS OF E-TAILING

Indian economy has been transformed by the telecom sector and the consequent 'Internet revolution'. ICT revolution is reshaping business models and redefining strategies in the country. Indian retail market, the second largest untapped market after China in Asia is ranked 1st in the Global Retail Development Index, by Kearney.⁴ A large number of structural, social, demographic and economic factors are the key drivers of India's retail industry and e-Tailing. Customer service and consumer landscape has drastically changed and can be seen along generational lines, geographical lines and Indian economic-scape as presented below:

Demographic Factors

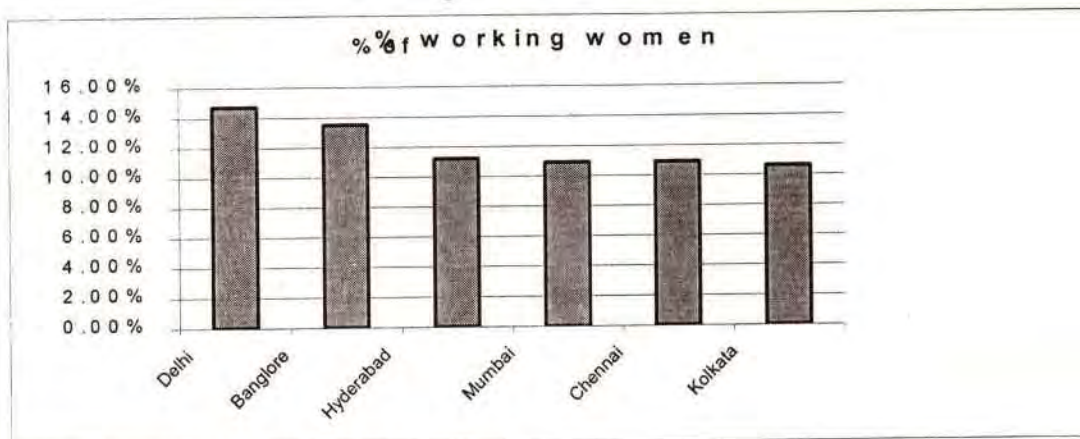
India can be nicknamed as the country of youth as 50 per cent of its population is in the age group 20-25 years.⁵ The generation Y, born after year 1981 and the generation X born between 1965 and 1975, are and will be the real driver of e-tailing in India. These youths have adopted the Internet as a part of their lifestyle.

Another factor, which is a big catalyst for the need of e-Tailing, is the increasing proportion of women at the workplace presented in Figure 1. These women love to spend time with their loved ones at home after office hours rather than wasting it on shopping. The credence to the woman push for e-Tailing is the increasing women proportion at the work place over the years. The figure increased from 13.9 per cent in the year 1999-2000 to a decent 16.6 per cent in the year 2004-05.⁶ This proportion of woman workers in urban India is going to rise further in coming years.

The IOAI e-Commerce Report 2005 also lends credence to the demographic push for e-Tailing as illustrated in figure 2.

As per IOAI findings⁷ of Indians' online shopping behaviour, the reasons are highly encouraging for the e-Tailers to look into.

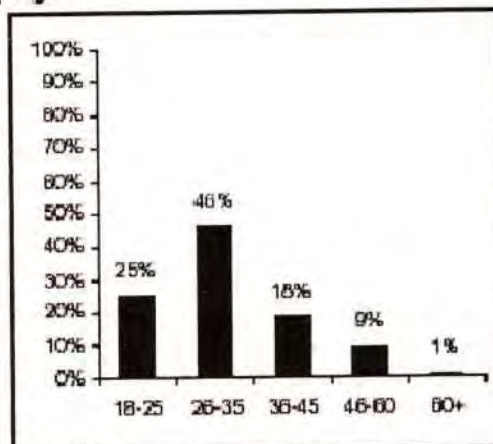
Figure 1
Working Women in Metro Cities



Source : NSSO; AC Nielsen; IRS-2002; KPMG in India Analysis 2005

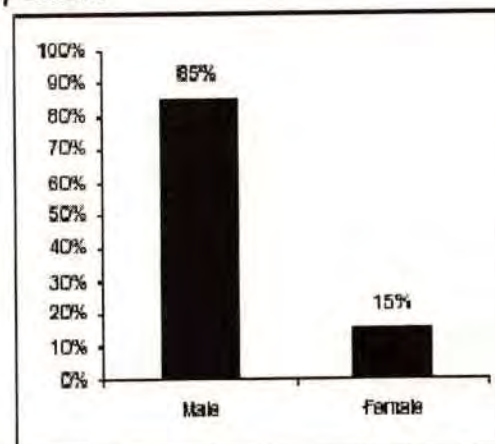
Figure 2
Regular On-line Shopper: A Demographic Profile

By Age



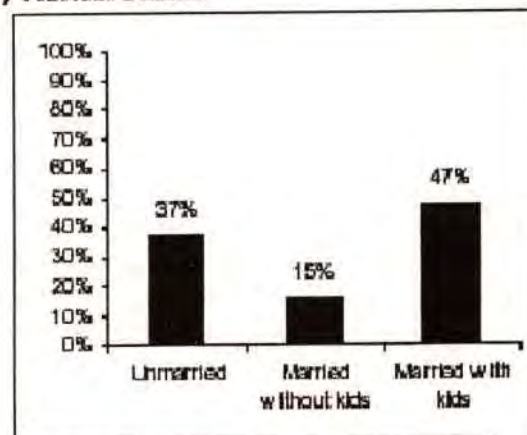
Base: 1493

By Gender



Base: 1493

By Marital Status



Base: 1493

Source : IOAI e-Commerce Report 2005

- 70 per cent of on-line shoppers like 'Home delivery' about on-line shopping.
- 62 per cent of on-line shoppers like 'Time saving' about on-line shopping.
- 60 per cent of on-line shoppers like the '24x7' about on-line shopping.
- 45 per cent of on-line shoppers like the 'Ease of use' of on-line shopping. 39 per cent on-line shoppers prefer it due to easy product comparisons.

Other reasons include the anonymity, cashless transaction, avoiding the crowd, off-station delivery, and the provision of gifts.

INCREASING INCOME LEVEL

India is one of the fastest-growing economies in the world. As per the estimation of Ernst & Young (2006),⁸ out of 183 million households, 40 million households earn USD 4,000-10,000 per year. This comprises salaried employees and self-employed professionals and is expected to grow to 65 million households by 2010. These households are the potential market for the e-Tailing companies as they have shortage of time but not money.

TELECOM AND INTERNET REVOLUTION

India, after all the growth of the last few years, has a teledensity of about 17.16.⁹ According to the Telecom Regulatory Authority of India (TRAI), the country has 189.92 million phones ringing and this is going to increase manifold to 500 million in 2010. Mobile commerce known as m-Commerce has also fuelled the growth of e-Tailing in India. m-Commerce is, the ability to buy and sell goods and services through handheld telecom devices such as mobile phones, PDAs and landline phones and also includes across multiple domains such as Short or Multimedia Message Services (S/MMS) and, Integrated Voice Response (IVR). WAY and Brew, the platforms acting as a virtual games console inside the modern handsets which are the rough

equivalent to the Play Station and Xbox, are also expected to become the next big thing.

There are two types of transactions that take place in m-Commerce—low-value and high-value. Low-value transactions usually include downloads of music, logos, pictures, and ring tones while high-value transactions involve credit and debit card transactions, point-of-sale terminals, going to the merchant location and paying through the handset. Presently in India, only low-value m-Commerce transactions are happening; the concept of m-coupons and wallets has not yet picked up. m-Wallets, or mobile wallets, are software applications that hold a user's sensitive personal and financial information, such as credit card numbers, expiration dates, bank account information, passwords and Personal Identification Numbers (PIN). Most m-Wallets are server-based, therefore, theoretically, are more secure. They avoid placing data onto mobile devices, often constrained by the processor and memory. The m-Coupons, are essentially the system by which the customer does away with the discount books and avail the discount directly through the server right on to his mobile phone. He gets it redeemed at the selected retailers after providing his eight digit pin and getting authenticity from the provider's website.

Further tillip to e-Tailing world would be the increase in the PC penetration of 65 per 1,000 by the year 2008 from the existing 14 per 1,000 and in the Internet penetration of 40 per 1,000 from the existing 5 per 1,000 (number of subscribers).¹⁰

Furthermore, as per I-Cube survey of 2006; the number of computer literates has grown by 270 per cent over the years from 16 million in 2000 to 59mn in 2006. Besides, ever users¹¹ as proportion of computer literate has grown to 54 per cent, i.e., 34 million and active users¹² have leapfrogged to 66 per cent of ever user to 21.¹³ This clearly demonstrates that Internet has catapulted itself from the stage of luxury to the necessity in rapidly networking India and, hence, is a boon for e-Tailing.

CATEGORIES OF ON-LINE SHOPPING PRODUCTS

Consumer goods sold on the Internet can be divided into three categories: physical goods, digital goods, and services. Irrespective of the product type, the on-line shopping experience is new and different from shopping in the physical world. Some of the differences with which consumers must become comfortable are: basic understanding of computer, navigating the Internet, browsing web pages versus retail shelves, security issues, comfortable to divulge personal information and interacting in a mediated environment versus direct interaction with the retailer. Brief descriptions of these three categories are given below:

Physical goods refer to tangible products, such as flowers, books, electronic gadgets, consumer durables, cars, home furnishings, sporting goods, apparels, perfumes and eatables. The growing e-Customer demand in India has forced the marketers and retailers to review their multi-channel sales strategy. Although it is difficult to sell physical goods on-line but with real time database and multimedia processing, the touch and feel can be partially simulated on the computer screen. Companies, like Myshape, Infelicity, and My Virtual Model have tried to replicate the real world in the virtual retail space successfully. With the data of complete body measurements of their virtual customers, they provide onscreen representations of near match of a customer look in various branded clothes. This solution of innovative companies has transformed post purchase dissatisfaction. Though consumers return 30 per cent of the clothes they buy on-line but Myshape by incorporating this virtual tailor has reduced it by 50 per cent.¹⁴

The digital goods include software, information goods, graphical images, and streaming audio and video that are consumed through experience. Listening to music, watching a video clip, or reading an e-book or e-newspaper also come under this category. Due to the bandwidth constraints, sampling too many

digital goods on the Internet is a problem. But innovations in both hardware and software field will solve this problem to a great extent.

Services include products such as consulting, travel bookings, playing sports and games and taking a vacation. In India, *hungama.com*, *irctc.com*, and *Naukri.com* have been successful in developing direct consumer relationships and hence are able to manage the consumers' experience through their online presence.

It has been documented across the world that customers are more receptive to the idea of purchasing digital goods and services online as compared to the physical goods. People love shopping and like to feel, see and experience the physical products. Table 2 (IOAI e-Commerce Report 2005) presents the details of products & services, which the online shoppers purchase.

As shown in the table, out of the total product categories purchased on-line, generally

Table 2

On-line Shopping Categories

Product and services bought online	Percentage
Books	41
Electronic Gadgets	40
Railway Tickets	39
Apparel Accessories	36
Apparel	36
Gifts	35
Computers & Peripherals	33
Airline Tickets	29
Music	24
Movies	21
Hotel Booking	20
Magazines	19
Home Tools & Products	16
Home Appliances	16
Toys	16
Jewellery	15
Movie Tickets	15
Beauty Products	12
Health and Fitness Products	12
Apparel Gift Certificates	10
Sport Goods	7

Source: IOAI e-Commerce Report 2005

TQM INITIATIVES IN AN LCV MANUFACTURING COMPANY

A Case Study

Ashwani Kumar*

Abstract

There has been a paradigm shift in the concept of quality management in recent times. Organisations have come out with meaningful application of quality management throughout the supply chain to sustain competition. Quality management refers to that stage where an entire organisational culture focusses on quality and customer satisfaction through an integrated system of processes, tools, and techniques. Fine-tuning the various business processes within an organisation to the needs of the customer is a challenging task for the management. Any slip in quality, at any stage, may have serious repercussions on the supply chain. The present paper reviews some of the quality management initiatives of an LCV manufacturing company in its supply chain. It shows how the firm has benefited from instilling total quality in its operations.

Key Words: Total quality management, Supply chain management, Six sigma, Swaraj Mazda Limited

INTRODUCTION

QUALITY is an important dimension of production and operations management, in addition to quantity and time factors. Simply stated, quality is conformance to specifications. Customer service is the heart of quality in supply-chain management. According to ISO 8402, quality is "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs". The main objective of quality management is to eliminate defects in every input, process, and output. Quality management, which includes ensuring proper

quality for a company's output, is important not only for its survival in the market, but also to expand its market or when it wants to enter into a new product-line and various other marketing ventures (Chary, 2005). Quality management is, thus, an important long-term marketing strategy. Non-conformance of quality requirements in any segment of supply chain creates a cascading effect.

Genesis of Quality Management

After the Second World War, the war-shattered industries started realising the significance of quality as a successful business driver. Pioneering quality leaders, like W. Edward Deming, Armand

* Senior Lecturer, Government Bikram College of Commerce, Patiala - 147 001 (Punjab); e-mail: marshallgoldsmith@rediffmail.com

Feigenbaum, Philip Crosby, and Joseph M. Juran, led this new quality movement across Japan and the USA for evolving a comprehensive approach to quality management. Based on their recommendations, and observations quality standards came to be known as Total Quality Management (TQM). TQM embraced deep understanding of customer needs, strategic planning process, leadership and other management roles for continuous improvement. With the passage of time, some other quality concepts, such as Concurrent Engineering (CE), Quality Improvement Projects (QIP), Kaizen, Poka-Yoke, Zero Defect, Just-in-time (JIT), Benchmarking, Six sigma and Business Process Re-engineering (BPR) also joined the quality band. In the new business environment, it is not enough if only one department attempts quality management; it is a company-wide activity and various functional departments contribute to its success.

Total Quality Management

Total Quality Management (TQM) is a multi-dimensional concept. According to Johnson (1997), it is "a disciplined management process under the leadership of the top executive involving everyone in the organisation in a cooperative effort to achieve a quality product or service through continuous process of improvement, combined with continuous life-cycle cost reduction to satisfy customer needs and to maximise corporate capability". It aims at galvanising the entire work force to pursue the specific corporate goal of achieving customer satisfaction with regard to quality, price, and delivery by using various techniques, such as statistical process control, design of experiments, employee empowerment, and team structures and processes.

On the suppliers' side, TQM requires the supplier to initiate statistical process control, design of experiments, process capability studies, and quality audit to focus on the elimination of process variability, improve immediate problem

identification, and demonstrate corrective action capability. It also requires that suppliers develop a philosophy of zero defects while endorsing continuous improvements. These elements form the major pillars of the TQM structure in the organisation (Suri, 2005). The quality management methods comprise: determination of acceptable quality levels (AQL), benchmarking, consensus reaching, contingency planning, cost-benefit analysis (CBA), error proofing, objective ranking, potential problem analysis, problem prevention planning, process evaluation and review technique (PERT), quality circles (QCs), quality function deployment (QFD), and team building exercises. The analytical methods may include: cause and effect analysis, critical path analysis (CPA), domain mapping, failure mode and effect analysis, reliability indices, solution effect analysis, stratification, system design, and tolerance design (Kanji and Asher, 1966).

SELECT LITERATURE REVIEW

Several research studies have been carried out in different parts of the world to investigate the status of quality management efforts and utilization of analytical tools to ascertain quality standards and meeting customer satisfaction. Some of the companies world wide which have amply demonstrated introduction of quality management in their corporate functions are Unilever, Du Pont, Xerox, AT & T, Shell ICI, ESSO, Rolls Royce, BP, and Sony (Sharma, 1998). Babu (2007) has analysed various strategies and tools required to adopt TQM in industrial organisations. QFD and systematic view of quality are the pre-requisites for successful implementation of TQM.

Antony (2002) emphasised that quality management is an integrated management philosophy aimed at continuously improving the performance to achieve and exceed customer satisfaction. Metri and Banerjee (2002) have also favored TQM as a way of managing to improve the effectiveness, efficiency, flexibility, and

competitiveness of a business as a whole. Hellesten and Klefsjv (2000) find TQM as a continuously-evolved management system consisting of values, tools and techniques, the aim of which is to increase the external and internal customers' satisfaction with a reduced amount of resources. According to Black and Revere (2006), six-sigma is a powerful experiment of TQM because it repackages some of the stronger TQM principles while adding its own distinct concepts of methodologies. Gilbert (1993) has developed a contingency model based on the four components of quality management implementation, namely, quality control, quality assurance, continuous improvement, and total customer satisfaction. Sarda (2007) has developed a case study of linking QFD and six-sigma for a two-wheeler automobile with four-stroke engine, for defining and prioritising the customer's desires, and translating them into engineering requirements. He found that by using QFD methodology, 'driver gear pinion' noise was reduced and short term sigma level increased from 3.134 to 3.944 points.

Khanna, Prem Vrat, and Sahay (2002) have found that industrial automobile sector is still not

responding fast to the changing needs of the market and that the implementation of quality management philosophy is a must for survival and growth of a firm. Rehman and Siddiqui (2004) have argued that a synergy between quality management and information system can be quite useful in improving the quality of products and services offered to the customers.

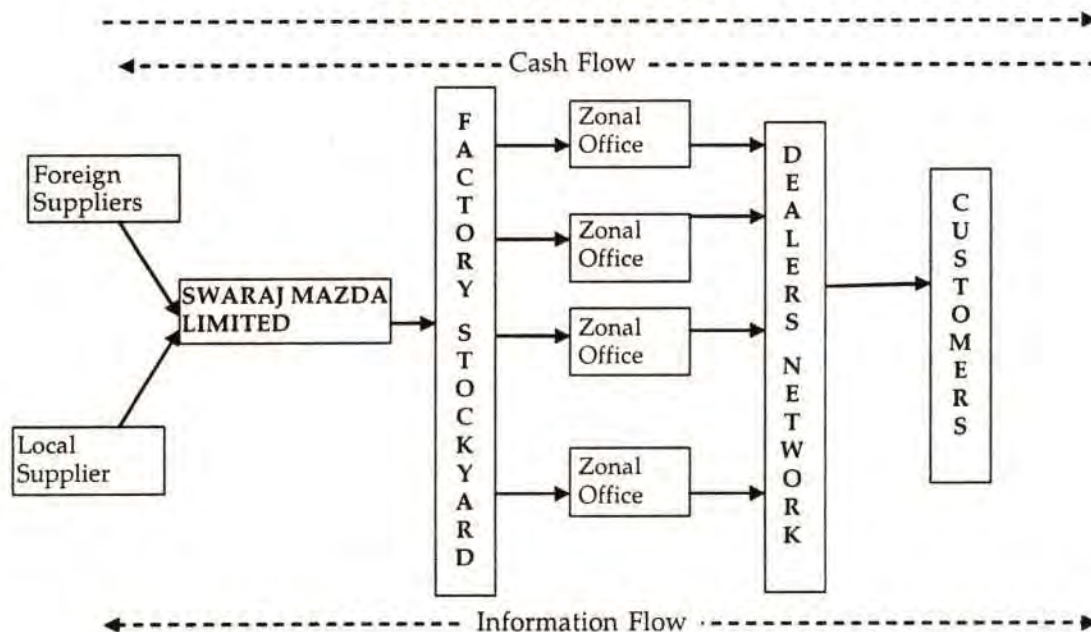
QUALITY MANAGEMENT IN SWARAJ MAZDA LIMITED

The TQM model discussed here is representative of Swaraj Mazda Limited (SML) while produces light commercial vehicles (LCVs). It sells LCVs to consumers through its 10 zonal offices and 130 dealers. It offers 79 variants of LCVs and has a total capacity of 40 vehicles a day. The average transportation lead-time is three to five days.

The factory at the first level supplies LCVs to zonal offices that meet the demand of dealers, who sell them to the ultimate buyers (See Figure 1). The total customer demand at each dealer is normally-distributed. If the dealer is unable to meet the customer order, back-ordering is allowed. In order to prevent stock-out as the

Figure 1

Supply Chain Model of SML



demand fluctuates; each dealer maintains some buffer stock. The dealer, in turn, places order with the zonal office and the zonal office replenishes from the factory stock-yard (FSY), depending on the orders received, back-orders pending, required buffer stock, and the stock available. This information regarding demand and supply is processed at the factory and the allocated vehicles are dispatched to the zonal offices.

The company strives to improve all production and distribution processes. The company claims to be guided by its quality policy –“Dedicated to total quality and continuous improvement”. SML seeks to follow the Japanese philosophy (Collaboration with Sumitomo Corporation and Mazda Corporation, Japan) that “to have a future we must perform today, but to build a better future, we must plan for it today”. The senior personnel are involved in a two-phase strategic planning process that sets the company’s five-year strategic business goals, along with its annual business and performance objectives. Expectations for the coming year are set that result in measurable performance objectives, detailed plan for resource allocation and capital investment, customer-focus strategies and other key elements. As a result of this systematic process, detailed 12-month plans, along with long-range performance goals and resource needs, are developed. The firm’s TQM control plan is its chief vehicle for aligning key business drivers, long-term strategies, annual plans, and specific performance objectives. This plan has several TQM indicators that provide a common focus on quality and convey the relationship between today’s performance and the company’s targets for improvements.

Members of the steering committee work with functional and cross-functional teams to translate the goals into improvement projects with measurable objectives. In addition to these techniques such as SPC, benchmarking, quality function deployment, ISO 9000, and designed experiments are used for problem-solving. The company endeavours to provide a quality product to customers.

Aided by IT system that supports real-time communication and data exchange with customers, a team of sales, engineering, quality and warranty personnel are assigned to each customer. These teams are charged with building and maintaining long-term relationships. They are responsible for capturing current customer requirements, anticipating new ones, and meeting with customer personnel to ensure quick and effective access to key points of contact in the company, and tracking complaints and concerns. Manufacturing teams are authorised to schedule work, manage inventory, and design the layout of their work areas.

SML has developed strategic partnership with their suppliers, who are taking on increased product development responsibilities. It is following ISO 9000(ISO/TS 16949) as mandated by the major automotive assembly firms. Specifically, first tier and tier subsequent to the OEMs maintain supply-chain development through three key factors: Zero defects, 100% on-time delivery, and a process for continuous improvement. Such efforts have improved quality, reduced costs and have increased market share of the company, which company wants to achieve TQM with various quality improvement projects, such as financial performance, on-time delivery, order fill rate, billing error rate, customer satisfaction rating, cycle time, supplier management and operational performance

Organisation for Quality Control

A separate department has been created, which is known as Quality Control Department/ Quality Engineering Department, and is headed by the Chief Manager of quality control assisted by the manager and a team of ten quality control inspectors. The quality control department is composed of a quality engineering function, an inspection function and a laboratory function. The company claims that quality is not confined to the personnel in the quality department and it is equally spread to each employee in the organisation to ensure quality of the end-product.

Figure 2
Quality Control through Assembly Operations

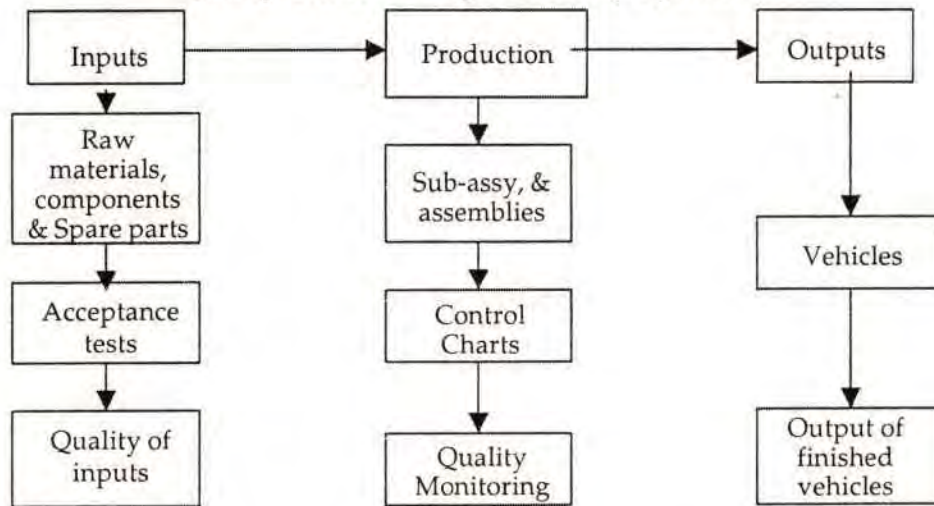


Figure 2 outlines the scope of quality control in the entire supply chain of the organisation.

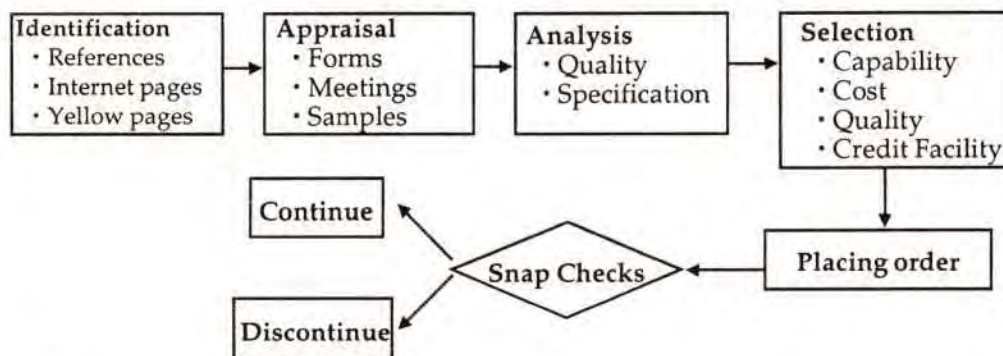
Quality does not begin during production, but long before a vehicle and its spare parts are delivered to the customer. The company has spread its TQM programme to its dealers and suppliers. This quality in SML involves action on four fronts:

1. Control of engineering quality
2. Control of purchased material quality
3. Control of manufacturing quality, and
4. Activities supporting the LCVs after delivery

The roots of quality in SML are embedded right from the sourcing of suppliers and the selection of suppliers. In order to have quality raw material and to maintain relations with the vendor, the company has to perform a tough task. The company also seeks to provide superior after-sales service to ensure customer satisfaction.

The process of quality control in SML begins with the review of design documentation for conformance to design standards and validating the accuracy and completeness of design proof tests and qualification tests. The R&D department of the company works in co-ordination with the Automobile Engineering Quality Control Department, which finalises the design and specifications of the vehicle.

Figure 3
Existing Vendor Selection Procedure of SML



The control of purchased material quality begins with the vendor selection. The procedure of vendor selection is shown in Figure 3.

Source Appraisal and Supplier Certification

Supplier certification program verifies that potential suppliers have the capability to provide the materials SML requires. Certification involves the site visit by a cross-functional team, which carry out an in-depth evaluation of the supplier's capability to meet cost, quality, delivery and flexibility targets from the process, and information system perspective. The SML team consists of members from operations, purchasing, engineering, information systems and accounting departments. Every aspect of producing the materials is explored through observation of the process in action and review of documentation for accuracy and completeness. After a certain period of time, if the performance declines, the supplier may be required to be re-certified. SML follows double sourcing in almost all the supplies. It makes long-term commitment with the selected suppliers and requires continuous programmes to get price reductions and quality improvements.

E- Procurement Initiatives

One of the major e-procurement initiatives taken at SML is scheduling through the web. Earlier, printed schedules were sent through mail. Now-a-days, they are made available on the website

of the company, and the Internet is used extensively. On the basis of schedules, vendors create advance shipment notification, which helps SML to know well in advance about the supplies to be made by the vendor. The information is received through the Internet about the timing of the supplies. This is done to get the overall synergy for the volume and quality. Vendors are also notified of their delivery performance as soon as the material received note (MRN) is prepared. The quality control and engineering (QC & E) department makes an inspection of the goods at the time of unloading. If any defect regarding the quality of goods is located, it is immediately reported back to the vendor or sent back through the transporter. A formula-based quality rating system is followed, which involves the details regarding the stage at which the defect occurred. If any material is rejected during processing on the shop floor, the vendor is penalised for the same. The rating of the vendor on delivery and quality is very crucial. The parameters relating to that are available on the website.

Vendor Evaluation

Vendor evaluation is an important parameter of measuring the quality and delivery performance of vendors. Each vendor passes through this rating scale. The rating criterion is shown in Table 4.

The vendor evaluation report, which is prepared periodically, has the following details:

Table 4

Vendor Evaluation Report

(1)	(2)	(3)	Quality-50				Delivery-50				Rating		
			(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Name of the Vendor	Total	Timely Rec.	Rej. -100	Rebate (-) 10	NC (-) 100	Prdn. (-50)	Delay by 2 days (-) 10	Delay > 2 days (-) 50	W/o. Sched. (-) 50	Not delid (-) 100	% Jul'06	% Aug'06	% Sep'06
Vendor X													
Vendor Y													
Vendor Z													

The first column mentions the particulars of the vendor. In the second column, total deliveries made by the vendor are indicated. The next column provides the timely deliveries to the firm. The next two broad columns give equal weightage to quality and delivery (i.e. 50-50), and the quality column curtails 100 points on account of rejection of material. If the standard material supplied by the vendor is within the range (i.e., 99 per cent conformance), 10 per cent rebate is made from the total points. The non-conformance material is rejected out-rightly and a deduction of 100 points is made. If the material is rejected during production, a similar deduction is made because most of the packed material is received and inspected through sample checks from the lot. If the supply of the material is delayed by two days, 10 points are deducted and the delay of more than the two days from the stipulated time makes a deduction of fifty points. Similarly the material supplied without schedule also debits fifty points. The non-delivery of material results in deduction of 100 points. This evaluation of vendors is made monthly and the total points of rating score are monitored continually for three months. The supplier is given a warning for the low score, and if the same continues for three months, the supplier is rejected and an other source is explored.

Control of Purchased Material Quality

After the evaluation and selection of potential suppliers and sub-contractors, the purchase orders are reviewed for correctness and completeness of quality requirements to ensure that the material purchased conforms to the requirements of purchase orders and specifications. Corrective action is initiated against the supplier and sub-contractor when the purchased material, components and spare parts are not of an acceptable quality. Once the material flows into the firm, it passes through the stringent quality inspection. The incoming material is not allowed to enter the stores unless the quality control team is satisfied about the quality. If the material is not found upto the specifications, it is returned to the supplier.

Quality Assurance during Assembly Operations

During production, the sub-assemblies and the assembly of components pass through strict quality control. Workers are made responsible to produce parts of a specified quality, before they are passed on to the next operation, the concept of quality at the source emerges the workers are put in the quality seat in controlling product quality. Each assembly and sub-assembly operation becomes a quality control station. The workers are also responsible for inspecting their own work, identifying any defects and reworking them into non-defectives, and correcting any cause of defect. Appropriate statistical techniques are used to monitor the quality of the parts produced at each sub-assembly. Workers are

Figure 5

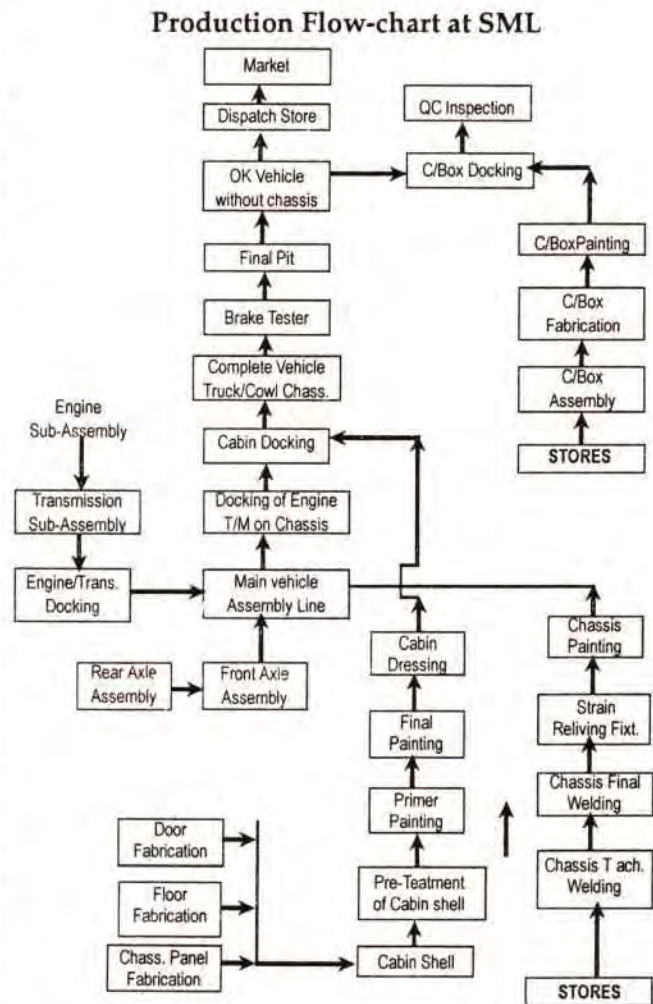


Table 5

Number of Defectives after Visual Inspection of 'C' Class Items

Part No.	Item	No. of Defectives	Part No.	Item	No. Of Defectives
LP02-10-002	Washer	5	SL01-10-264	Spacer	5
LP02-10-010	Bolt Adj.	4	SL01-10-436	Stiffner	7
LP02-10-082	Circlip	3	SL01-10-316	Union Joint	4
SE01-10-161	Seal Valve	7	SE01-12-118	Cap Valve	5
SE08-10-227	Plate Baffle	3	SE01-13-349	Insulator	7
SL01-10-233	Rubber Seal	6	SLA1-13-431	Hose, Fuel	2
SL01-10-235	Gasket	4	LP08-13-105	Stud	3
SL01-11-213	Bush	5	LP08-13-014	Connector	1
SE01-12-123	Sleeve	8	LP03-13-029	Clamp	4
SL01-12-133	Screw Tappet	2	0636-12-412	Key Woodruff	5
SL01-11-201	Pin, Piston	3	S508-13-336	Clamp, Hose	6
0636-10-303	Plugcamshaft	5	SL01-15-111	Impeller	4
SL01-10-385	Plate Seal	6	SL02-13-145	T-Connector	7
SL70-10-33	Pipe Seal	2	SE03-12-345	Plunger	2
SL01-10-260	Bracket	3	SR01-12-678	Spring, Main	2

authorised to stop the assembly line to avoid producing any defective part.

Finally, the finished vehicle goes for complete checking and QC inspection. Figure 5 shows the production flow-chart, with complete assembly and sub-assemblies of components.

After complete assembly of the vehicle, the act of determining conformance and non-conformance of the expected performance is the function of inspection. Through inspection, the QC department seeks to determine the acceptability and non-acceptability of the components and the vehicle. Inspection is carried out in order to know that after correct components have been assembled and the vehicle is right when it is shipped.

Construction of 'np' Chart (number of defective chart) for Constant Sample Size 'n'

Table 5 shows that part number, items and number of defectives as a result of visual inspection carried out to find defects in 'C' class items of components.

Since sample size (n) for all the 30 items is constant, i.e.500, we may construct the np chart

and establish the central line, upper control limit and lower control limit values for the number of defectives (c) as per group.

Central line $\bar{np} = n\bar{p}$ where \bar{p} is the average fraction defective

$$\bar{p} = \frac{\text{sum of all defectives}}{\text{Number of items} \times \text{sample size (n)}}$$

$$= \frac{\sum np}{K \times n}$$

In this sample, $K = 30, n = 500$

Fraction defective $p = c / n$
where 'c' is the number of defectives

$$\text{Therefore, } \bar{p} = \frac{\sum np}{K \times n} = \frac{\sum c}{K \times n} = 0.0086$$

$$\text{Central line CL} = n\bar{p} = 500 \times 0.0086 = 4.33$$

$$\begin{aligned} \text{Upper control limit UCL} &= n\bar{p} + 3\sqrt{n}\bar{p}(1-p) \\ &= 4.33 + 3\sqrt{4} \cdot .33 \times (1-0.0086) \\ &= 10.54 \end{aligned}$$

Table 7
Five-Year Summarised Results of SML (Balance Sheet and Profit and Loss a/c)

Particulars	As on				
	(In Lacs)				
	31.3.2001	31.3.2002	31.3.2003	31.3.2004	31.3.2005
Net Fixed Assets	139	150	179	178	179
Capital Work-in-Progress	11	19	7	3	18
Current Assets:					
Inventories	443	465	596	603	885
Receivables	596	639	637	1041	1641
Cash & Bank	51	92	60	91	160
Others	140	148	157	178	204
Total Current Assets	1230	1344	1450	1913	2890
Total Assets	1380	1513	1636	2094	3087
Capital & Liabilities:					
Equity Capital	105	105	105	105	105
Reserves	69	83	176	303	456
Shareholders' Net-worth	174	188	281	408	561
Borrowings	310	386	38	72	236
Deferred Tax Liabilities		28	22	18	11
Total Current Liabilities	896	911	1295	1596	2279
Total Capital & Liabilities	1380	1513	1636	2094	3087
Revenue:	2360	2978	3723	4777	5899
Expenditure:					
Material Consumption	1843	2297	2802	3694	4763
Personnel Cost	108	135	171	180	191
Mfg. R&D & Administration	73	92	110	139	140
Marketing	199	276	363	403	362
Total expenditure	2223	2800	3446	4416	5456
Profit	137	178	277	361	443
Net Interest	57	58	31	16	40
Depreciation	15	16	21	21	25
Pre-tax Profits	65	104	225	324	378
Margin	2.8%	3.6%	6.0%	6.8%	6.4%
Corporate Tax- Current	25	36	85	118	143
-Deferred	---	---	---	---	---
Profit After Tax	40	68	146	210	242
Retained Earnings	23	41	93	127	153
Per Ten Rs. Share (Rs.) :					
- Operating Revenue	225	284	355	456	563
- Earnings (EPS)	3.8	6.5	13.9	20.0	23.1
- Book Value	16.6	18.0	26.8	38.9	53.5

Table 8
Some Important Ratios

Ratios	2001	2002	2003	2004	2005
Current ratio	1.37	1.47	1.12	1.20	1.25
ITR	5.33	5.61	6.20	6.42	6.67
Margin ratio	2.8%	3.6%	6.0%	6.8%	6.4%
Proprietary ratio	.13	.12	.17	.19	.18
Net Worth ratio	23%	36%	52%	51%	43%
Return on total assets	2.9%	4.94%	8.92%	10.03%	7.84%
EPS	3.8	6.5	13.9	20.0	23.1

$$\begin{aligned} \text{Lower control limit LCL} &= nc - 3\sqrt{np}(1-\bar{p}) \\ &= 4.33 - 6.21 \\ &= -1.88 = 0 \text{ (if negative)} \end{aligned}$$

Since the components belong to 'C' class, any component lying between the upper control limit and the lower control limit will be accepted and the number of defectives after visual inspection is below the UCL, thus the whole process is under statistical control.

PERFORMANCE MEASUREMENT AFTER IMPLEMENTING TQM

The implementation of TQM in SML has led to an overall improvement in the organization. This is evident from the results shown in Table 7.

Table 8 indicates consistently high performance and employee morale. Pre-tax profits increased from 65 to 378 lacs, and profit after tax increased from Rs. 40 lacs to Rs. 242 lacs. The table also shows that almost all the ratios have improved over the years. The slight fall in results in 2005 was mainly due to the overall depression in the LCV industry. This has been possible due to the quality measures adopted in the organisation. The main attraction is the EPS rising from Rs 3.8 to Rs 23.1. In addition to these performance measures, the employee turnover rate is around 1 per cent, which is better than the industry rate; and the attendance rate has topped 98 per cent for the last five years. The internal defect rates have decreased over 50 per cent from 2000 to 2005 and are approaching best-in-class levels, while defect rates for key suppliers have decreased to less than one fifth the level for the best-known competitor. From 2000 to 2005, overall customer satisfaction, as measured, has averaged 97 per cent or higher and customer complaints have dropped steadily. Between 2000 and 2005 production volumes have doubled. Assembly lead times have been trimmed. Since 2000, labour productivity (measured in terms of sales per hour of labour) has improved considerably.

CONCLUSION

SML, in collaboration with Sumitomo Corporation of Japan, has followed strict quality standards. Since there is strong competition in the LCV industry; the company requires a comprehensive plan for TQM to gain a sustainable competitive advantage. TQM and Six-sigma have proved to be the comprehensive methods for quality and customer satisfaction.

REFERENCES

- Antony, J. (2002), "TQM Implementation in Hong Kong Industries", *International Journal of Quality and Reliability Management*, Vol. 19, No. 5, pp. 551-566.
- Babu, Ramesh Y. (2007), "Rethinking TQM for Successful Implementation", *Industrial Engineering Journal*, Vol. 36, No. 2, pp. 33-35.
- Black, B., and L. Revere (2006), "Six Sigma arises from the Ashes of TQM with a Twist", *International journal of Healthcare Quality assurance*, Vol. 19, No. 3, pp. 259-266.
- Chary, S. N. (2004), *Production and Operations Management* (New Delhi: Tata McGraw- Hill Publishing Company), pp.23-24.
- Gilbert, J. (1993), *How to Eat an Elephant: A slice by slice Guide to Total Quality Management*, (New Delhi: Affiliated East-West Press Pvt. Ltd), pp. 56-57.
- Helleston, U., and B. Klefsjv (2002), "TQM as a management System consisting of Values, Techniques and tools", *The TQM Magazine*, Vol. 12, No. 4, pp. 238-249.
- Johnson, R. S. (1997), *Management Process for Quality Operations* (Malaysia: Business Information Press), pp.39-40.
- Kanji, Gopal K., and Mike Asher (1996), *100 Methods for TQM* (New Delhi: Response Books-Sage Publications), pp. 104-105.
- Khanna, V.K., Prem Vrat, and B. S. Sahay (2002), "TQM Practices in the Indian Automobile Sector", *Productivity*, Vol. 47, No. 1-2, pp. 53-58.
- Metri, Bhimarya A., and N. Banerjee (2002), "TQM in Health Care Industries", *Productivity*, Vol. 46, No. 4, pp. 339-343.
- Rehman, Z., and J. Siddiqui (2004), "Realization of Pragmatic Goals with TQM in Indian Organizations", *Productivity*, Vol. 45, No. 3, pp. 444-452.
- Sarda, S. (2007), "QFD and Six-Sigma", *Industrial Engineering Journal*, Vol. 36, No. 2, pp. 33-35.
- Sharma, Sunil (1998), "Corporate Success through TQM Innovations", *Productivity*, Vol. 39, No. 2, pp. 226-231.
- Suri, Kulneet (2005), *Total Quality Management- Principles and Practices, Tools and Techniques* (New Delhi: S. K. Kataria & Sons), pp. 68-69.

products that have high intangible characteristics and low involvement, have high percentage of online purchases, as these products do not require 'touch and feel'. Customers also prefer to buy branded electronic goods and apparels online due to their trust in the brands. However, this phenomenon is present to some extent only in the tier I and tier II cities while the customers of small cities and villages prefer shopping in physical settings only.

PROBLEMS OF E-TAILING IN INDIA

The on-line purchase of digital goods and services offers huge economic benefits vis-à-vis purchasing them in the brick-and-mortar format, as the cost of distribution in on-line mode is almost negligible. The speed of distribution increases manifold as the Internet facilitates the information flows in real time despite differences of time and distance. On-line shopping experiences are purely a convenient ploy and it empowers the family to shop from the comfort of the house. Though new age consumers are adopting the Internet as a shopping medium, gaps remain between the shopping experience in the physical world and the shopping experience online. The gaps can be experienced in various ways

Shopping as a Touch-feel-hear Experience

In India, shopping is still considered to be a family outing and recreation activity. Customers have a tendency to touch, feel and smell the product before the purchase. This type of environment creates a problem of both customer acquisition and retention. Retaining customers is a huge task for the e-Tailer as the market space provides enough opportunities to e-Customers to browse the e-Competitors' offerings leading to rational purchase behaviour.

Lack of Holistic Information

Most customers are comfortable buying books and music on the Internet because the

information required in making a purchase decision is simple. But the same does not hold true when the customer has to purchase merchandise like clothes, cosmetics, consumer durables, which involve higher customer involvement. In cyber space, the buyer is normally starved of crucial information while the seller has complete authority on the type of information, which should be available to the customer. This creates "information asymmetry" wherein the customer feels helpless & confused. In cyber space, the buyer is normally starved of crucial information while the seller has complete information. This is a clear case of "information asymmetry".¹⁵

Massive Presence of Brick and Mortar Outlets

Despite higher Internet penetration, cities like Mumbai or New Delhi might not be a heaven for an e-Tailer. It is due to the fact that grocery shops are available at every nook and corner. Further, on a single phone call, goods are delivered at customers' door step. Thrown in along with free home delivery is a month credit.

Unproven Payments System

Despite the enactment of cyber laws in India, payment system in e-Tailing is a major bone of contention. Consumers are unwilling to pay before delivery, and handling payment against delivery increases the complexity of and load on logistics. Moreover, exorbitant service charges (2 – 3 per cent) are applicable on the credit cards payments. Similarly, the concern about the theft of the credit card information is a big dampener in the e-Tailing push.

Inefficient Logistics

Taking orders on the website is quite simple but delivering it as per the customer's specified delivery time and place is a complex process. Order fulfilment is the key issue that distinguishes survivors from losers in e-Business. Due to infrastructure bottlenecks, delivering

goods in India at minimal delivery charges and time is still a big issue. Other factors, which are a hindrance to the rapid growth of e-Tailing in India prove to be security and privacy concerns, speed of access, mass penetration and lack of navigation standards, legal issues, cyber laws, and uneven taxation system.

STRATEGIES TO GO ON-LINE

For an e-Tailing model to be successful, various issues need to be understood and factored in. The Dot Com burst of the late nineties and early twenties has thrown some hard and bitter questions about the e-Tailing model. Making an e-Tailing presence on the market-space is the easiest step but attracting customers to the website, sustaining the customer's visits and making them purchase, and, furthermore, delivering the goods or services as per the time and place requirements of the customer determine the success of e-Tailing. Various issues an e-Tailer should consider before going online are discussed hereafter:

Know thy Customer Base

Business firms owe their sustainable growth to firms customer loyalty. An e-Tailer's job is all the more difficult, as it is very difficult to identify and value the customer online. An e-Tailer must know, who the customers are, how they want to be served, what they can pay, what segment of the customer-base values the most, and whether the current customer value metrics¹⁶ surpass the customer expectations of e-Purchasing benefits.

Develop a Satisfaction Index

Shopping is all about a satisfying and rewarding experience. Assessing the customer satisfaction level of online shopping is essential in gauging the success and failure of e-Commerce. Conduct of periodic consumer satisfaction study may help in developing a true measure of e-Tailer equity – independent of sales channels. It provides retailers with insights on 'why behind the buy'.

It also helps in evaluating strengths and weaknesses of the existing system.

Develop Real-time Interactive Supply-Chain System

E-Customers happen to be very smart who know where they can get goods cheaper. In e-Business, it is almost impossible to get a customer for life because another e-Tailing site emerges soon. One of the ways the customer can be attracted is to look at the customer's purchasing power. Only retailers who offer overwhelming value can successfully retail on the Internet. This requires the Internet store to constantly innovate and offer new values to the consumer. This also results in dilemma for the companies. For example, companies, such as Sony, have spent considerable fortune in building up their distribution networks but found that someone buys on the Net at 30 per cent cheaper, which upsets the whole value chain they have created. IBM also faced this dilemma and could not see beyond its feet while DELL, the Goliath, emerged on the basis of its real time customer interactive supply chain management (SCM) model. Subhiksha manages to enthrall its customers by delivering groceries and sundry items at the customer's doorstep from the neighbourhood Subhiksha brick and mortar store with payment against delivery model in Chennai. Similar model has also been followed at many places in north India. This is possible only if the SCM is robust and innovative.

Collaborative Commerce

An e-Customer is truly a global customer and hence the e-Tailer has to be a global player. To have the global reach it has to collaborate with manufacturers and suppliers having global presence. For example, *easybuymusic.com* has hooked up with warehouses of music companies and their distributors. So every time an order is placed with *easybuymusic.com*, it scans the warehouse closest to the customer and the order is delivered, creating another satisfied customer. In most cases, the cost of distribution is

substantially lower since fulfilment is done locally.

Building Traffic on the Interconnectivity of the Web

Contextual selling - Placing the product next to closely-related Internet content has emerged as one of the keys to generating internet traffic and stimulating sales. Contextual marketing is cited as one of the most important advantages that online retailers have over their offline counterparts. Contextual selling exploits the connectivity of the Web, or the underlying links among sites. Retailers need to build extensive links and affiliate programs, as well as leverage consumer advocates, to drive traffic at a low cost. Amazon.com, the largest online retailers of books, video and music have an affiliate deal with On-Radio, a network of Internet radio stations. Research suggests that consumers develop an impulse to buy CDs when listening to the radio.

SUGGESTIONS

Successful e-Tailing requires an effective strategy for both B2C and B2B operations and seamless integration of existing channels with new complementary e-Channels. The potential of e-Tailing is indisputable but major stumbling blocks in the way of the online shopping popularity are issues of security, transaction fulfilment and genuineness. Based on the existing infrastructural bottlenecks and psychographic status of the majority of Indian customers, the following measures are suggested for the spread of the e-Tailing in India.

Leveraging e-Governance Foundation for the Rural e-Tailing

With the government thrust for transparency and better governance, e-Governance initiatives have been launched across various states of the country. Government to Citizens (G2C) projects, like Gyan Doot in Madhya Pradesh, e-SEWA in Andhra Pradesh, e-Mitra in Rajasthan and

FRIENDS in Kerala have already started showing signs of success. These e-Initiatives are implemented at thousands of places till taluka and block level and offer a large number of services including different utility payments and railway reservations. Despite this, usage of these facilities by the masses is limited due to illiteracy, lack of awareness and availability of few services at these places. Government through private-public partnership can transform this e-Governance mechanism for mutual advantage. Private players and specially the e-Tailers, can leverage this wide network to advertise and market their merchandise and services besides educating the masses about its usage and benefits.

Replicating Atmospheric Variables of Physical Stores

Eroglu, Machleit and Davis (2001) assumed that many atmospheric variables studied in physical stores (e.g., scent, textures, temperatures) are irrelevant to e-Tailing. This assumption is problematic as online shoppers operate simultaneously in two distinct environments, i.e., the physical environment in which human-computer interaction occurs and e-Tail store environment, which is experienced virtually. With developments in latest technology and software, e-Tail stores can simulate the ambience and 'touch-n-feel' experience of the physical stores to some extent. Similarly, the sale of apparels and electronic items can also be increased using this simulation software.

Financial Institutions as e-Tailing Catalyst

Indian e-Tailing is bogged down by the payment security, lack of trust and doubt about the surety of the transaction fulfilment. These issues are further compounded by the low penetration of credit cards and the Internet. Problems can be tackled if the existing banking delivery mechanism could be utilised for e-Tailing with certain modification. With 70 million debit cards and more than 13,000 ATMs, ATM outlets can be

transformed as e-Tailing shopping marts. Therefore, ATMs can be used for both financial as well as other transactions related to purchase of goods and services. The billing amount for the selected brands can be debited directly from the bank account through the ATM. This option is all the more convenient, as customers are familiar with the ATM operations. The model further allays the payment security, lack of trust, concern of the e-Customers because they perceive banking institutions as highly reliable.

Based on the current e-Tailing scenario and suggestions, we propose the following model for proliferation of e-Tailing in the Indian context.

This model has a different premise from the existing website transaction model. In the existing process of performing sales transaction, a customer logs into a website, browses, selects and collects the goods and services in a shopping cart. Thereafter, the customer is asked to confirm the order and to select the mode of payment; after filling the particulars of the cards, he is asked to confirm the payment followed by delivery of goods at the customer specified address. If the mode of payment is 'Cash on Delivery', then the customer makes payment at the time of delivery.

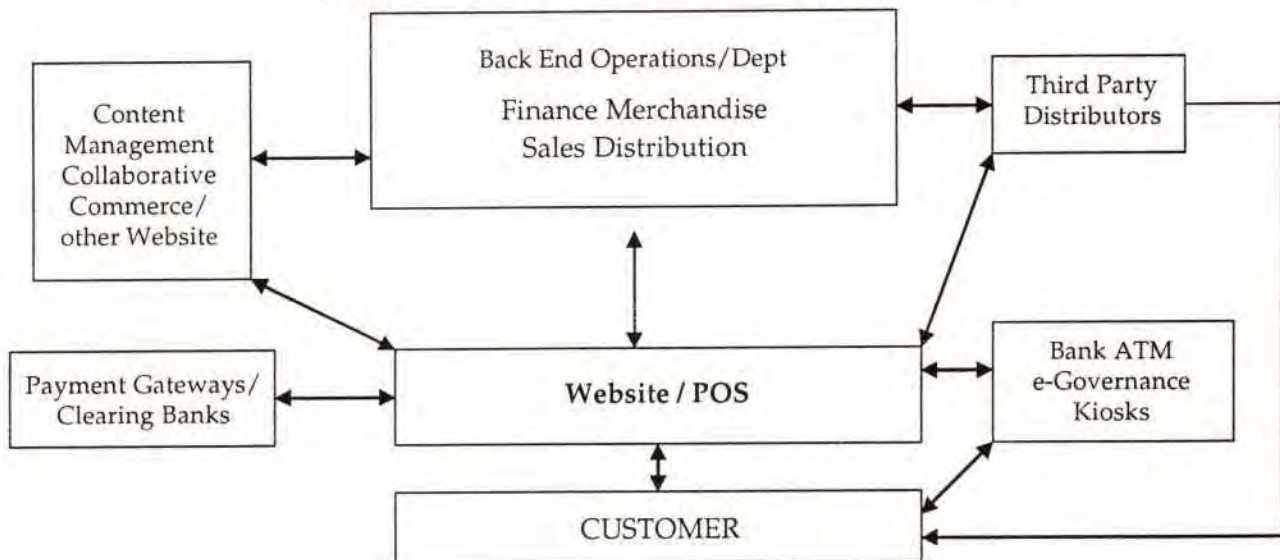
e-Tailers normally prefer payment modes in the form of Debit/Credit cards.

In the above model, we propose the banks' ATM network or e-Governance kiosks as an alternate channel for both purchase and payment. This electronic interface between the e-Tailers and e-Customers serves twin purpose of facilitating the showcasing and selling the goods and services as well as the payment for this transaction. Here, the financing organisation debits the customer for the product or service, thus there is no direct financial transaction between the customer and the commercial website. The advantage of this model is that these institutions have credibility and vast presence, which can be mutually beneficial to both e-Tailers and e-Customers. This model addresses the customer concern for e-Tailing, such as, lack of trust, and security of online transactions, because the reliability of banks is very high.

CONCLUSIONS

The population of India with an access to the internet currently stands at 34 million and is predicted to grow four-fold to a 100 million by

Figure 4
Proposed Model for Proliferation of e-Tailing in India



2007 (Source: IOAI). The Internet user represents every facet of society and transcends any bias. 'Business' and 'Enterprise' have been equally keen on embracing this medium. An email address and a website have become a necessity and not a mere accessory or a luxury. Internet coupled with other media has transformed the psychographic profile of Indian consumers across all age and gender groups. Indian youths find this interactive medium as the style statement of shopping. Changing lifestyles and shopping habits coupled with superior options and selections make this interactive medium most attractive to this e-Generation.

e-Tailing in India can be successful if the firms change their business models and understand their customers more. The retailers who achieve scale in their customer bases sooner rather than later will be able to reap the rewards of early investment. These rewards include the ability to develop supplemental revenue streams and higher sustainable margins more easily.

REFERENCES AND NOTES

- Gupta, P. (2006), *Retail Revolution*, Tata Strategic Management Group (TSMG), <http://www.tata.com> (accessed on March 03, 2007)
- A Huge Population Heading Online, <http://www.iamai.in/news.html> (accessed on Feb 20, 2007)
- Sharma, Shilpi Gautam (2006), *Brick and Mortar to Mouse and Keyboard*, <http://www.diamondworld.net> (accessed on April 03, 2007)
- Kearney, AT, and GRDI (2006), "Emerging Market Priorities for Global Retailers", pp. 2-17.
- Mitra, Amit, and Sanwalka Deepankar (2006), "Indian Retail on the Fast Track", Federation of Indian Chambers of Commerce & Industry, pp. 6-7.
- Chandrasekhar, CP, and Jayati Ghosh (2006), *Women Workers in Urban India*, *Business Line*.
- IOAI Ecommerce Report (2005), "The Power Shopper", pp. 16-56.
- Ernst & Young (2006), "The Great Indian Retail Story".
- TRAI Press Release No. 35/2007, <http://www.trai.gov.in/trai/upload/PressReleases/449/pr17apr07no35.pdf> (accessed on April 21, 2007).
- Jain, Rajesh (2005), "India-targets-pc-penetration-of-65-by-2008", <http://mungee.org/archives/2005/05/19/india-targets-pc-penetration-of-65-by-2008.html> (accessed on April 21, 2007).
- An 'ever user' of the Internet is someone who has used the Internet at any point of time.
- An 'active user' of the Internet is someone who has used the Internet at least once in a month.
- "Internet in India - 2006", <http://www.iamai.in/book.pdf> (accessed on July 07, 2007)
- The Virtual Tailors, <http://www.emarketer.com/the-virtual-tailors.html> (accessed on April 19, 2007).
- Reichheld, Frederick F. (2001), *Loyalty Rules* (USA: Harvard Business School Press), pp.1-19.
- Raab, M David (2005), "Marketing Systems: Marketing Performance Metrics"; http://www.dmreview.com/article_sub.cfm?articleId=1040160, (accessed on April, 20 2007).

BEST ARTICLE AWARD

Shobhit University, School of Business Studies, shall be giving an award to the contributor of the article, adjudged to be the best research article, published in each of the forthcoming issues of the *NICE Journal of Business*.

The article must be original and an exclusive contribution to *NICE Journal of Business*.

The selection shall be made by a jury of five members of the Editorial Board of the Journal.

The award shall consist of a certificate and a cash prize of Rs. 5,000/-.

Editor

BOOK REVIEWS

Scott Snell and George Bohlander, *Human Resource Management*, Thompson South-Western, New Delhi, 2007 Pages: 624; Price: not mentioned

Human Resource Management, by Snell and Bohlander, is an Indian adaptation of the 12th edition of the renowned book, *Managing Human Resources* by Bohlander, Snell and Sherman, with certain modifications and additions. In this textbook, the authors offer tips and suggestions for dealing with the problems pertaining to hiring, training, leadership, discipline, performance appraisal and compensation management. The Indian edition retains most of the contents and flavour of the original book by the same authors, adding certain new dimensions, issues and challenges faced by HR managers in the modern times. By using simple language, engaging writing style, user-friendly design and layout, abundant examples, suggestive Internet sites and hands-on activities, the book provides meaningful insights into the human resource functions and activities. Visuals are throughout used extensively in the book and icons summarising and recapitulating the key terms facilitate the learning and absorption of the concepts. While learning objectives are set out at the beginning of each chapter, discussion questions seek to provide a review with a practical orientation. Support is available for instructors through the support website <http://aise.swlearning.com>, which includes Instructor's Resource Guide, Test Bank, and power-point presentations. An abundance of graphic material-flow charts and summary of research data provide a visual and dynamic presentation of HR concepts and activities.

The book focusses on a wider perspective of creating and gaining sustainable competitive advantage through people. It covers almost all the

aspects of human resource management and its impact on individuals, groups/teams and organisations. It takes the HR function away from the routine staff activities to the one associated with strategic planning and decision-making in organisations. The book emphasises the role of an HR manager as the one involved in and developing, co-ordinating policies and procedures that impact employee well-being, organisational effectiveness and also impacts society at large. The discussion on different organisations from a variety of settings used as examples to illustrate the key points, provide the connection between theory and practice in a simulative learning mode. Important issues and critical trends are spotlighted in each chapter. Summary notes at the chapter-end seek to recapitulate the key concepts. This is followed up with some hands-on activities, under the title 'HRM Experience', that provide the skill orientation. The discussion questions, after each chapter prompt, the students to apply the basic concepts in a real-world situation and thereby enhance their competence to understand and help the organisations they work for, with a view to creating a sustainable competitive advantage through people.

The book is divided into five parts. Part I provides an overview of HRM in today's global environment, outlining the challenges, responsibilities and competence of an HR manager. The Corporate Social Responsibility dimension of globalisation and strategic HRM viewpoint has also been incorporated in this part, which are new additions in this textbook. Parts II to IV bring out the basic HR functions of staffing, developing and maintaining, under the titles: 'Meeting Human Resources Requirements', 'Developing Effectiveness of Human Resources' and 'Implementing Compensation and Security'. The last part, titled "Expanding Human Resources

Management Horizons" takes a futuristic and transformational view, by introducing 'International Human Resources Management' and 'Creating High Performance Work Teams'. In fact, the last chapter challenges the students' comprehension of the HRM function by explaining the dynamics of designing, implementing, and managing HR practices. It introduces the principles of Shared Information, Knowledge Development, Performance Reward Linkage, and Egalitarianism, and fitting them all together as one system. The use of HR Scorecard, which is not found in most other textbooks on Human Resource Management, has been explained in detail. However, this Indian edition, in comparison to the textbook mentioned above by the same authors, does not cover the part on Enhancing Employee Relations separately. The reason could be in terms of its applicability and specific local issues and dynamics in labour relations of the Asian countries, viz. India, Pakistan, Bangladesh, Nepal, and Sri Lanka, for which this edition is meant.

New chapters introduced in this (Indian) edition are: 'Strategy and Human Resources Planning', in Part II, and 'Expanding the Talent pool: Recruitment and Careers', in Part III. Modifications have been made in the chapter 'Organisation Design and Job Requirement' for providing a focus on job analysis, employee involvement and flexible work schedules. The Indian edition, however, does not provide many case studies for discussion and it would certainly be useful to incorporate cases of multinationals and some public and private-sector Asian companies in this edition. However, new features and contents that reflect the way HRM functions today have been incorporated. For instance, skill-building experiential exercises for students, under the title, 'HRM Experience' has been included that provides conceptual clarity for balancing employee management concerns. To absorb the changing profile of an HR manager through the use of information technology, the use of Human Resource Information System (HRIS) has been highlighted, especially in areas, like compensation, recruitment and selection, training, job analysis, and safety. The issues pertaining to workforce diversity have been incorporated in most chapters, since it is an integral

part of any HR activity. Though strategic issues and concerns of HRM are discussed in Chapter 2, the current HR practices and involvement of human capital, like Six Sigma, bench-marking, balance scorecard, competency assessment and strategic alignment, are interspersed in other chapters too, according to their relevance. Contemporary employment issues, like outsourcing, global sourcing, off-shoring, alternative work arrangements, flexi-working, and contractual employment have been discussed in the chapter on Expanding the Talent Pool. Similarly, new consumer-driven health plans, medical savings account, and flexible spending accounts have also been spelt out. International HRM issues that have opened up with the 'India Shining' image are given in a separate chapter, outlining the HR issues, as a consequence of seeking competitive advantage through partnership. The flow of the book takes off from a strategic macro perspective, detailing the strategic role of HR, and moves to the micro-objectives of recruitment, selection, training, compensation and benefits, performance management, and appraising performance. The macro and micro objectives are dovetailed in the last chapter that ties up the various components of a system, including workflow design, HR practices, management processes, and supporting technologies.

The five parts have been organised into 14 chapters. Chapter 1 focuses on the current challenges for HR managers, like going global, embracing new technology, managing change, managing talent or human capital, and responding to markets, besides outlining the new roles and responsibilities of HR managers. The shift from routine staff functions is clearly evident. The new issues of employee diversity, changing demographics, privacy issues, and changing attitudes of work, have been discussed in sufficient details. The change in the concept, from human resource to human capital, is also taken into consideration with a great deal of clarity. Chapter 2 underlines the importance of 'integrating Strategic Planning' and 'Human Resources Planning', using the current business scenario of mergers, acquisitions and downsizing, that leads to dramatic shifts in the composition of the labour force. Chapter 3 incorporates legislative guidelines

for employment of people. Concerns relating to 'Equal Employment Opportunity' Legislation, sexual harassment at workplace and its significance in defining employee rights and duties have been discussed. Chapter 4 focuses on job analysis and job descriptions and methods of motivating employees on the job. Some attention to explain the flow of a job design, emanating from characteristics of work design and organisation design, would have provided more clarity in distinguishing the different roles and responsibilities, at different levels of hierarchy within a function or work design. Interesting issues of flexible work schedules and telecommuting have been addressed. While detailing internal and external sources of recruitment in Chapter 5, the use of new techniques, like Human Resources Information System, job postings and bidding, inventory management, talent and use of assessment centres have also been explained. Challenging issues like the employment of the disabled, older people and dual career couples, hitherto not dealt with in any HRM book, have been taken up in this chapter. The subject of career management has been analysed with an objective of developing talent over a period of time. Chapters 6 and 7 deal with recruitment, selection, training, and development. Chapter 8, while discussing the methods and techniques of performance appraisal, could have also incorporated the methods of potential assessment and the utility of assessment centres and competency mapping. New issues and concerns in compensation management, like equal pay for comparable work, wage rate compression, low salary budgets, have been blended with the traditional concepts of performance based or competence-based pay structures, in Chapter 9. Incentive rewards and employee benefits have been described in Chapters 10 and 11, with adequate coverage of profit sharing, stock options, and ESOP's (employee stock options). Chapter 12 discusses the safety and health concerns in the usual traditional format of a legislative and preventive approach. International issues relating to HRM in organisations with multinational, transnational, international and global operations have been covered briefly, but encompassing all issues relating to recruitment, cross-cultural training, international compensation plans and performance appraisal. The last chapter summarises a plan for strategic and

HR alignment for creation of High-Performance Work Systems (HPWS).

What makes this textbook different from others is that it effectively addresses the challenges of human resource management and, therefore, contains nothing that is outdated or obsolete. There is an increased emphasis on every manager's role in HRM, small-business applications, and HR information systems. Introduction of new topics, like compensation, broad-banding, team rewards, HRIS, domestic partnership benefits, workplace violence, electronic surveillance, HR scorecard, and competency assessment, add to its novelty. The Internet references and addresses appearing throughout the book, as well as end-of-chapter hands-on activities, titled 'HRM Experience', reflect current workplace issues and concerns. There is no doubt that the contents of the book have been drawn out from an exhaustive review of literature and incorporate current practices of organisations.

Case studies appended to each chapter that one finds in other textbooks by these authors are lacking in this (Indian) edition. Some theoretical questions that address the conceptual clarity would have also been useful. A chapter on employee relations and the paradigm shift, from industrial relations to employee relations, needs to be included. Performance Management Systems and new formats of Performance and Potential Assessment, Competency Mapping, Retention Management to address attrition concerns, have not been addressed in detail. It is surprising that retention management has not been given adequate treatment, even though managing talent or human capital has been highlighted as one of the major concerns of an HR manager. Similarly, structuring organisations, using alternative design options, and preparation of job descriptions as activities, would have enhanced the content-value of the book.

This book is more than a textbook since it provides a functional and practical understanding of human resources and the structural, policy, and system initiatives that need to be taken to enhance human capital competence. It enables the readers to see how the management of human resources affects employees and the quality of their work life, and through them impacts the community and society at large. This book has a unique orientation

to real-world application. Practical tips and suggestions provide effective ways of dealing with the problems in communication, leadership, discipline, performance appraisal, and compensation administration. It is a must-read for all HR students and professionals who believe in developing competitive advantage through people.

Brinda Balakrishnan

Research Scholar

Birla Institute of Management & Technology
Greater Noida (NCR)

James A. O' Brien and George M. Marakas,
Management Information System New Delhi;
Tata McGraw-Hill, 2007, Pages 617, Rs. 375,
Paperback.

The book, *Management Information System*, is designed for those students who are aspiring to enter the world of business. The book is also useful for working business professionals. It seeks to equip the students to cope up with the fast-changing business scenario, by providing knowledge of the Information Technology (IT) which has become an important platform for business, commerce, and collaboration processes among all business stakeholders in today's networked enterprises and global market.

In the book, the text has been loaded with real world cases, examples, and exercises about real people and companies in the business world. The book is divided into five modules. Module I starts with the foundation concepts of IT and module II, III, IV, and V deal with the major concepts of developments and managerial issues, application of IT, implementation of IT systems, and challenges to information Technology, respectively.

In Module I, Chapter 1, titled "Foundations of Information Systems in Business", deals with foundation concepts pertaining to information system in business. It covers the fundamental roles of information system in business, types of information system and managerial challenges of information technology, components of information system, information system resources, and information system activities. This chapter seeks to create awareness among the readers.

Chapter 2, titled "Competing with Information Technology" focuses on the fundamentals of strategic advantages and using information technology for it. The chapter basically deals with the synchronization of technology with real business world. The chapter fails to provide any information regarding the competitive advantages of the IT over different domains of business.

Module II comprises Chapters 3, 4, 5, and 6. Chapter 3 discusses the types of computer systems, input, output, and storage technologies. While some of the picture supports have been given in the book, some more diagrams and pictures of input, output and storage devices are lacking. Chapter 4 introduces application software and system software. This Chapter describes application software for end-user reasonably well. Chapter 5 deals with data resource management and technical foundation of database management. It seeks to explore the types of database, data warehouse and data mining, database structure and database development. The analysis and the interpretation are given though appropriate tables and diagrams. Chapter 6 describes the network enterprise and telecommunication network alternatives. It covers business application trends. The roles of the Internet, intranet, extranet and network topologies are considered significant from business point of view.

In Module III, Chapter 7 focuses on enterprise business system and functional business system, which are helpful for the students to understand different types of business systems. Chapter 8 highlights customer relationship management, enterprise resource planning, and supply chain management. Although the description is given through appropriate diagrams and illustrations, it lacks in establishing the competitive advantage of IT system. Chapter 9 deals with the fundamentals of electronic commerce and its applications. The chapter is well-written and clearly carry out the main functioning of e-commerce. The decision support systems and artificial intelligence system have been discussed in Chapter 10. The chapter succeeds in creating diversity and reflects the in-depth knowledge of the author who made every effort to touch the new and emerging concepts of technology.

In Chapter 11 of Module IV, the author discusses the developing business and IT strategies. The Chapter deals with the managerial aspect of decision making and strategic approach of using IT for the purpose. Chapter 12 focuses on the requirement of developing an IT system and systematic approach of its implementation.

The final Module of the book is divided into two chapters. Chapter 13 explicates the security and ethical challenges of IT. The chapter offers a new concept to make the reader aware of the social threat of misuse of technology. Through Chapter 14, the author seeks to explain the enterprise and global management requirement of Information Technology.

At the end, the book provides additional cases, review quiz answers, selected references, glossary for business professionals and subject index. On the whole, the book is a useful work on a subject of great importance. It meets the requirement of management students and business executives.

J.P. Gupta

Vice-Chancellor

Jaypee Institute of Information Technology

Deemed University,

NOIDA - 201 307

G. Shainesh and Jagdish N. Seth, *Customer Relationship Management: A Strategic Perspective*, Macmillan India Ltd., New Delhi, 2006, Pages; 198, Paperback, Rs. 190

The book under review, titled *Customer Relationship Management: A Strategic Perspective*, recently authored by G. Shainesh and Jagdish N. Seth is a good addition to the rapidly growing literature on a subject of topical importance. It explores the foundations of relationship orientation by drawing upon economics as well as behavioural science concepts. The treatment of the subject is concise, yet comprehensive, so as to include all the elements. It is a must read for everyone interested in the fascinating topic of CRM.

Seth, an acknowledged authority on the subject of CRM, has teamed up with Shainesh of IIM Bangalore to write the book. The authors have adopted a strategic perspective and a managerial

orientation. Divided into four sections, consisting of eleven chapters, the book provides a roadmap for organisations planning to initiate the CRM journey.

Section I, comprising the first four chapters, dwells upon the conceptual underpinnings of CRM. Chapter I starts by highlighting the popularity and emergence of CRM. The conceptual foundations of CRM are comprehensively discussed in Chapter 2. The chapter compares and contrasts the transactional and relational orientation to marketing and takes the reader through the nature of relationships during the pre-industrial, industrial and informational era. Scholars have continuously advocated the process approach to CRM. Chapter 3 highlights the issues of customer bonding and strength and durability of relationships while reaffirming the importance of process approach to relationship building. It further enriches the discussion about relationship building and strengthening through a CRM framework that interlinks the constructs of switching, satisfaction, trust, commitment and loyalty. The first section culminates with Chapter 4, which focuses on the economics of customer retention and customer lifetime value metrics. It compares and contrasts the concepts of market share versus share of customer.

The concept of CRM evolved in the domain of services marketing and industrial marketing, which has recently extended to all the domains of marketing, including the consumer markets. The second section of the book, comprising two chapters, dwells upon these aspects. A critique of the existing literature and experiences of CRM implementation helps readers appreciate the application of CRM in several industries. Chapter 5 is devoted to CRM in various service domains such as hospitality, banking, telecom, airlines etc. The focus is clearly on the central notions of service quality, service recovery and role of service guarantees in managing the customer relationship. The authors have also included case studies to further enhance the reader's understanding of the deeper issues involved. Chapter 6 looks at the other track of CRM, viz., CRM in B2B markets and espouses a process-oriented view of Key Account Management (KAM) and touches upon the concept of customer-value management.

The terms CRM and RM are often used synonymously. The concept of Relationship Marketing is believed to provide the conceptual and philosophical foundations of CRM. Thus, technology is an enabler of CRM. The third section of the book caters to this aspect of CRM. The technological aspects of CRM are highlighted through an overview of data mining, the role of contact centers, comparison of some popular CRM products and methodology for selecting a technology-oriented CRM solution. Starting with an overview of the components of e-CRM solutions and technologies supporting front-end sales and back-end processes as well, the authors insist, in Chapter 7, that a balanced approach of CRM must incorporate both operational and analytical technologies. They further cover various aspects of Campaign Management, Sales Force Automation, and Customer Service and Support issues of the technology-based CRM. The authors have not forgot to provide a succinct summary of emerging interactive technologies.

Chapter 8 looks at the product offerings in the CRM market space, viz., Siebel, Onyx, SAP, Oracle, Microsoft, etc. Importantly, the authors have provided a multi-faceted checklist to evaluate CRM software. This checklist does add value to the chapter, considering that it is not an easy task to shortlist and select a CRM vendor and many CRM applications have failed due to the over-enthusiasm of CRM vendors. The chapter looks at CRM solutions for large enterprises, small enterprises and medium enterprises as well.

A topic that hardly finds mention in most books on CRM – Contact Centers for CRM – is the subject matter of a full Chapter 9. The authors have squeezed in eleven pages, devoted to this aspect of managing customer touch-points, through technology-mediated service environment. Customer Contact Centers, also known as Call Centers, have become an integral element of most CRM initiatives and therefore deserve detailed discussion. The authors focus on the role of Contact Centers in building relationships, the components of a Contact Centre and the economics of a Contact Centre.

The process aspect of CRM reaches its logical conclusion with the implementation issues of

CRM, which form the fourth section of the book, consisting of two chapters. Chapter 10 provides a CRM Road Map through the nine-step process of adopting CRM. The authors rightly emphasize the enterprise-wide aspect of CRM and the issues pertaining to organisational culture, change management and the role of internal marketing in successful CRM implementation. The importance of an organisation-wide initiative for the successful implementation of CRM is well illustrated through case studies.

Chapter 11 reiterates the importance of process view of CRM and addresses several important operational issues in CRM implementation by providing a four-step process framework of relationship formation, relationship management and governance, relational performance evaluation process and CRM evolution and enhancement process.

The authors have been largely successful in bringing together the diverse conceptual, philosophical, technological, organizational, cultural, implementation and control issues through the eleven chapters. The book does present a coherent picture of the vast array of CRM dimensions in a lucid and succinct manner that will help the reader to master the CRM basics quickly.

Considering the growing importance of CRM in academic circles and its inclusion as a special subject for students having a marketing major the book will prove to be of immense use to the students of the discipline of marketing management and the faculty of marketing management area. The references at the end of every chapter point out further interesting readings in the subject matter to the faculty desiring to pursue research in the area. More case studies and discussion questions at the end of the chapter would have further enhanced the value of the book. The book will also be a good reference book for practicing managers as well.

Kasande Shailesh Prabhakar

Professor and Deputy Director

Vishwakarma Institute of Management,
Kondhwa, Pune-411 048

Charles W.L. Hill and Arun Kumar Jain, *International Business: Competing in the Global Market Place*, Tata McGraw-Hill Publishing Co. Ltd. 5th ed. (2006), New Delhi, Pages: xxi + 624, Paperback, Price: not mentioned

In modern days, business is not confined to the national boundary, but extends well beyond it. Many business firms have extended their operations to foreign lands and they are increasingly going international. This helps them maximise not only their sales but also profits. The world is virtually becoming a village, thanks to the expansion and speeding up of the transport and communication system and the advent of the internet. Political boundaries are becoming less rigid as in the case of the European Union. The end of the cold war has seen opening up trade relations with China, Russia and other communist countries.

A large number of books and articles are available on the subject, written by Indian and foreign authors. *International Business: Competing in the Global Market Place*, an Indian adaptation, authored by Hill and Jain, is a welcome addition to the vast literature on the subject.

This book contains five parts, divided into 18 chapters. Part I has one chapter and is devoted to the concept of globalisation. Chapter 1 briefly explains Wal-Mart's global expansion and global institutions, such as the World Trade Organisation, the International Monetary Fund and the World Bank. The role of technological change is nicely explained but the sub-heading, "Global Economy of 21st century" should have been explained extensively. The data included in the chapter are not updated.

Part II of the book contains two chapters and deals with the country factors. Chapter 2 gives the arial view of India as a globalised economy. The table, which consists of large companies in terms of market capitalisation, provides an in-depth analysis of these companies.

Chapter 3 discusses the role of culture, society, social stratification, religious and ethical system, language, and education in business. A short note titled, "Gunaxi-ties that bind", is quite interesting. The closing case, titled "McDonald's and Hindu Culture," is well-written and properly presented.

There are six chapters in Part III. Chapter 4 reviews a number of theories that explain why it is beneficial for a country to engage in international trade. The "Absolute cost advantage" and "Comparative cost advantage" theories have been explained, however, the 'Hickscher-Ohlin' theory should have been discussed at length, which has not been done in the book.

Chapter 5, titled "The Theory of Global Competitiveness Alignment," discusses 'country competitiveness alignment matrix' in order to explain the opportunities and challenges that a nation and its firms and people have to face. The authors compare the stage of development of the automobile industry in India with the world-wide evolutionary phase.

How the reality of international trade deviates from the theoretical idea of unrestricted free trade has been described in Chapter 6. The authors explain the main instruments of trade policy, such as tariffs, subsidies, and import quotas, administrative policies and anti-dumping duties. The role of government intervention is also discussed in the chapter, which has become very important regarding the international business. In addition, the case of the Doha round of the WTO has also been included.

Chapter 7 is devoted to the foreign direct investment (FDI). It reviews the theories that seek to explain the pattern of FDI among the countries. The chapter focuses "FDI by Volvo in South Korea" and gives brief idea about the strategies adopted by the company.

In Chapter 8, India's global leadership in the BPO-ITES has been outlined. The authors elaborate India's advantage, value proposition, major drawbacks and worries, and the challenges about BPO-ITES. However, the key fact about the IT hubs in India should have been explained with more depth.

Chapter 9 seeks to explain the working of foreign exchange market. It examines the forces that determine the exchange rate and then discusses the implications of these factors for international business.

Part IV comprises five chapters and is devoted

to the strategy and structure of international business. Chapter 10 explores the global strategy at MTV networks and emphasises the basic principles of strategy, global expansion and pressures that the firms face, such as local responsiveness and cost reduction. The closing case, titled "Global Strategies at General Motors", presents the modus operandi of the general motors.

The organisational architecture that takes into account organisational structure, control system, incentives and organisational culture, and process is discussed in Chapter 11.

In Chapter 12, the authors have covered two related topics, 'The optimal choice of entry mode' and 'Strategic alliances', and the working of the both.

Chapter 13 deals with the importance of efficient manufacturing and material management function. The authors interpret how an international firm has to take decision about the location of manufacturing unit, where it has to face three factors, namely, country, technological factors, and product factors.

The importance of logistics is stressed in Chapter 14, which explains how the logistics provide the shield to a firm while facing the cut-throat competition. Part IV comprises four chapters. Chapter 15 discusses the importance of marketing and R&D in international business. The new technologies that are picked by the R&D units attached to global product divisions and are used to generate new products to save the global market place. But the relationship between the R&D and scale of economy, which is a very important issue, is missing in the chapter.

Human resource management in international business is focused in Chapter 16. Due importance has not been given to the strategic role of international HRM. In the present scenario, the importance of the topic cannot be overlooked. The material given in this chapter does not justify the need and the requirement of the hour. The material should have been given in detail and properly elucidated.

The accounting provides the information regarding the financial aspects of the business not only to management but also investors, creditors

and other parties interested in the information. The financial accounting within multinational firms is the subject matter of Chapter 17. The authors take the case of the International Accounting Standard Board and related issues. Consolidation financial statement, currency translation, exchange rate, and control system are very well described in this chapter.

Chapter 18, titled "The Global Capital Market and Financial Management", consists of two parts. Part A, "tilted Capital Markets", starts with the case, which describes how "China mobile" overcame the financial constraints. The authors explained the functions of generic capital market with diagrams and examples and related aspects, such as risk, foreign exchange, and cost of capital.

Part B is related to the treasury and financial management and includes investment decisions, capital budgeting, and risk. Financial decisions, such as source, structure, management and tax objective, are very well presented. The types of foreign exchange exposures, tactics, and strategies are the subject matter of this part.

Thus, *International Business: Competing in the Global Market Place* excellently interweaves the theory and practice of international business. The case studies make this book further useful. However, because of a large number of complex topics, the book seems to be difficult at various points. The book will be useful not only to the researchers and academicians in the field of international business but also to the students who are pursuing MBA, M.Com. and other business-related programmes as well as to the business managers.

Amit Girdharwal

Lecturer

Delhi College of Advanced Studies

New Delhi – 110 018

M Ashraf Rizvi, *Effective Technical Communication*, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2005, Pages 545, Paperback, Price: Not Mentioned.

In the modern era of globalisation and IT revolution, English has become a *lingua franca* of the

professional world. It has occupied the towering position of the only global language. To quote Krishnaswamy*, '...the English language has become a neutral tool of communication in the new millennium – a global gold mine'. English serves as a link language, library language, language of science and technology, language of computer and internet, language of business, language of law, and language of mass media and journalism. It opens a 'major window on the modern world'. Hence, a level of competence in communicating in English is a pre-requisite for everyone, and, in particular, for the professionals in all multinational companies, large corporations and centres for business process outsourcing all over the world. In fact, to use the Chomskyan term, 'communicative competence' in English has become a basic as well as economic necessity in the present time.

To the existing literature available on the subject of technical and professional communication, the book, *Effective Technical Communication*, by M Ashraf Rizvi, is a remarkable addition. It is a textbook meticulously designed for the teachers teaching communication skill and the students pursuing technical and management courses. If, according to Bacon, some books are to be 'chewed and digested', Rizvi's book deserves to be included among them for aspiration-driven burgeoning and working professionals. The book aims at enhancing all the linguistic skills of the learners by providing them with elaborate material on the relevant topics.

The book has been divided into eight parts, comprising twenty-seven chapters, besides three appendices. Part One, titled 'Fundamentals', comprising three chapters, deals with the basics of technical communication. This part describes the nature, scope and importance of effective technical communication and various barriers to it, its organisation and objective style. The process of communication has been aptly interpreted. The ABC of technical communication is well-engaging. How to ensure objectivity in technical writing has been eloquently demonstrated.

In Part Two, titled 'Listening Comprehension', the two chapters elaborate the process and types of listening, barriers to listening and, above all, how to improve listening skill which is an essential receptive skill. The techniques for effective listening at different situations, and especially the Ten Thumb Rules, offered in this part are really marvellous.

How to ameliorate speaking skill has been discussed in Part Three, titled 'Speaking Strategies'. The three chapters devoted to this immensely important productive skill seek to explain the speech process, phonetics and spoken English and speaking techniques respectively. The chapters on phonetics have been made quite simple but fascinating as everything in them motivates the readers to gain the basics of phonetics. And this feature is missing in most of the books on the subject.

Part Four, 'Professional Speaking', equips the readers with all the relevant information required to face job interviews, participate in group discussions, and make effective presentations in seminars, workshops and conferences. This part helps them enhance such demanding skills for a successful professional career. Some more guidelines should have been added on telephonic communication, video-conferencing, net-meeting, and others.

The strategies for honing reading skill, which is a basic requisite for a good professional, has been elucidated in Part Five of the book. The process of reading, reading strategies, and how to comprehend the technical reading material are explicated in the three chapters of this part. Different sub-skills of reading are adequately treated in it. The two reading techniques — ERRQ Reading Technique** and SQ3R Reading Technique***—are indeed worth adopting for the learners.

* Krishnaswamy, N., and L. Krishnaswamy. *The Story of English in India* (New Delhi; Foundation Books Pvt. Ltd, 2006)

** Developed by Dorothy Watson in 1985. The four stages of this technique are: Estimate, Read, Respond, and Question

*** Developed by F. P. Robinson in 1946. The five stages of this technique are: Survey, Question, Read, Recall, and Revise

Part Six, containing three chapters, devoted to the same linguistic skill of reading, extends to the reader various strategies for advanced study skills such as note-making, summarizing and paraphrasing, and referencing. The techniques of note-making, summarising and paraphrasing, and for proper documentation the methods of referencing according to the MLA style guide are pertinently provided.

In Part Seven, the author predominantly focusses on one of the productive skills, viz., writing skill. The two chapters included in it exquisitely seek to explain how to write good sentences and frame impeccable paragraphs with proper unity, cohesion and coherence, emphasis, and logical order for developing paragraphs in a composition. However, the guidelines for writing various types of composition are lacking in the book.

In the exhaustive but must-not-miss Part Eight, all the eight chapters are dedicated to professional writing. All the chapters present an elaborate discussion with proper format and suitable examples, of different types of routine business letters such as sales letters, inquiry letters, instruction letters, complaint and adjustment letters, supply orders, letters urging action etc., resumes and job applications, business memos, e-mail messages, reports, proposals, and technical papers and articles. This part gives the reader an insight into the writing for correspondence in day-to-day life of a professional. The reader can perfect his/her skill in writing by adopting learn-and-practice method. In addition, this part must have embraced some guidelines on how to write good-news and bad-news messages, and writing for the web. It must have contained some instruction on how to design web resumes and video-resumes as well.

Finally, the appended parts of the book—Appendix A, Appendix B and Appendix C—succinctly present functional grammar review, common errors and the ways for vocabulary development to help the learners in Basic English usage. To make the book learning-centered, the

author has included in it some learning aids in the form of Learning Objectives, Review Tips, Progress Checks, Recap Boxes, Figures and Tables, Exhibits, and chapter-end Exercises as well. Some chapters give quotable quotes in the beginning which are quite motivating.

Thus, it is vivid that the book is a masterpiece of comprehensive teaching and learning package covering all the linguistic skills, namely, listening, speaking, reading and writing, which are essential to excel in professional life. Everything in the book is presented in an effective technical style, that is to say, accurately, briefly, clearly, and, all the more, objectively. Its diction is simple and lucid. To make the book more reader-friendly, the author should have included separately some additional topics related to communication like non-verbal communication, role-plays, interpersonal skills, and public speaking. In harmony with the demand of the present era, the book must have been technology-oriented. Had it been supplemented with some audio-video materials like CD/DVD and interactive software, and some web links with proper teaching and learning aids, it would have been a superb treatise in the relevant field to offer the readers 'the gift of the gab' in English.

In a nutshell, it can be stated that the author has sought to fill the pitcher of the book with an ocean of teaching and learning material on the subject. As a matter of fact, the book has been designed in such a way that it makes the subject 'teachable' for the teacher and 'learnable' for the learner. It is, undoubtedly, a valuable treasure to be preserved in the mind as well as in the bookshelf.

Upendra Gami
Lecturer in English
Shobhit University
Meerut – 250 110

D.P. Goyal, *Management Information Systems: Managerial Perspectives 2006*, Macmillan India Ltd., New Delhi, Pages 372, Paperback, Rs. 245

A management information system (MIS) is an integrated system, which provides information for the managerial decision-making in an organisation.

It is a discipline which consists of the application of people, technologies, data and information products, and procedures, known as information system which help in solving business problems. Academically, the MIS is commonly used to refer to the set of information management methods tied to the automation or support of management decision-making, such as transaction processing systems, office automation system, decision support system, expert system, and executive information system.

The book consists of five parts. Part I comprised of four chapters, lays the conceptual foundations of MIS. This part presents the framework, structure and classification of MIS. Chapter 1 explores an integrated management information system in terms of its components. It explains the importance of MIS, the meaning of three words which form the word MIS, the definition, nature, characteristics and scope of MIS followed by two good case studies. The structure of MIS in terms of physical components, information systems processing functions, decision support, level of management activities, and organisational functions have been presented in Chapter 2. It is followed by MIS classification with details of different kinds of systems. Information and system concepts are discussed in Chapter 3 which includes the definition of information and its types, quality, dimensions, system and its types and other related concepts. Chapter 4 explores the change in the concepts of information systems and its role as a facilitator of decision-making, followed by two case studies. All chapters also include review questions, assignments, references, summaries at the end. However, there is inconsistency in the format of chapters. In addition, the words such as IS and MIS are used interchangeably, which is a bit confusing, and definitions and classifications are not linked with real-life examples. However, case studies are given at the end of all the chapters.

Part II, consisting of three chapters, is dedicated to the information technology, and deals with the basics of computer system, database management, and telecommunication and networks. Chapter 5 presents the concept of computer system and its

various components or peripherals, including classification of computers, generation of computers, and categories of software. Various facets of database management have been explained in Chapter 6, starting with traditional file approach to database approach, database structure, database management systems, query languages, and normalisation, etc. The last chapter of this part presents the basics of telecommunication and networks, beginning with types of signals, communication channels, characteristics of communication channels, communication hardware, communication networks, computer networks in India, and application of networks. All the three chapters contain good case studies. However, this section lacks real-life examples about the usage of telecommunication networks in the organisations and data base technologies and applications, including the new developments in these technologies.

Part III discusses the business applications of information systems. It consists of two chapters of e-Business & e-Commerce and decision-making & decision support systems (DSS). Chapter 8, entitled "E-Business & e-Commerce", starts with a brief introduction followed by cross functional enterprise information system and e-Commerce. However, it lacks clarity between the terms, such as e-Business, cross functional enterprise systems and e-Commerce. Chapter 9 starts without introduction and discusses the concept, application, and technology of decision support system which includes Simon's Model of decision-making, types of decisions, method of choosing the best decision among alternatives. This part related to DSS talks only about characteristics and capabilities with a mention that the rest of DSS is presented in Chapter 2. It would have been better to include major sub-themes or technologies of DSS in the chapter of DSS.

Part IV explores the development of management information systems including system development approach, system analysis and design. Chapter 10, which embodies different facets of system development approaches, includes stages and approaches of system development. The first part of the chapter consists of six phases and the second part four models. The four models, viz., waterfall model, prototyping model, iterative

enhance model, and spiral model are discussed without any managerial implications. Similarly it could have included a small case study to describe all phases of system development. Chapter 11 starts with introduction of system analysis and design followed by requirement determination, and structured analysis tools. It is followed by system design which discusses design objectives, conceptual design, design methods, detailed system design with no managerial input and relation. At the end, a case study of system requirement is presented which consists of more data on file design rather than requirement specifications. The second case study is much more elaborate and written in a comprehensive way. In case of the third case study, questions have no interface with the given data. The fourth case study starts with a paragraph and then introduction. It is a good case study for students to work on identifying its drawbacks.

The management of information resource has been discussed in Part V. Chapter 12 includes implementation process, hardware and software selection, systems maintenance, evaluation of MIS and security issues. The whole chapter does not have any interfacing between the main topics even though there is a sequencing of these activities in all real-life situations. In case of evaluation, the first subsection discusses nine approaches of evaluation; the second presents evaluation classes which includes two terms - effectiveness and efficiency. In the literature these are two ways of measurement rather than evaluation classes. Under information system (IS) security, major threats are mentioned as entering, programming data and error handling which could have been covered under different headings rather than security. The chapter ends with a case study. The last chapter starts with a

section on IS planning followed by planning terminology which also includes objectives and policies. The next section explains the Nolan Stage Model followed by four stage model of IS planning. It also includes other IS planning methodologies. The last part of chapter presents organisation structure, information resource management with no impact analysis in the changing world of information systems across the globe.

The author has sought to drive home the best conceptualization and the philosophy of Management Information Systems but the book lacks consistency, interfacing between sections and sequencing. It has all ingredients of a text book but lacks managerial inputs. Latest and comprehensive trends of information technology and system development phenomenon are partly missing in the book. It has a small list of references at the end of each chapter but nothing has been mentioned related to these references in the text except at one or two places. The book contains case studies at the end of almost all the chapters but nothing as examples from industries is there in the text. There is no consistency in the format of the book in terms of the starting of the chapters. The book is in short of contents for its use as a text book for the students who are pursuing post-graduate programmes in management. In the end, it has lists of questions, summary, assignment, etc., but lacks basic features of a text book on management information systems with managerial perspective. However, it brings together all the facets of MIS to the readers, including academicians and software developers for which author deserve appreciation.

N.P. Singh

Professor, IT Area

Management Development Institute

Gurgaon-124 001

NICE Journal of Business

(Half-yearly Journal of School of Business Studies, Shobhit University, Meerut)

SUBSCRIPTION RATES

	1 Year		3 Years	
	India	Abroad	India	Abroad
Individual	Rs. 200	US \$ 20	Rs. 500	US \$ 50
Institution	Rs. 400	US \$ 40	Rs. 1000	US \$ 100

SUBSCRIPTION ORDER FORM

Please accept the enclosed cheque/demand draft, No. _____, dated _____,
drawn on _____ Bank, favouring **Shobhit University**, for
Rs. ____/- US\$ __ towards subscription of *NICE Journal of Business*, payable at Meerut, for one year/three years.

Name _____

Organisation _____

Mailing Address _____

City _____ PIN/ZIP _____ Country _____

e-mail _____

Mail to: The Editor

NICE Journal of Business
School of Business studies
Shobhit University
Modipuram, Meerut-250 110
(INDIA)

Statement of Ownership and Other Particulars about the Journal

NICE Journal of Business

(Half-yearly journal of Shobhit University, set up by NICE Society, Meerut)

Form IV

(See Rule 8 of the Newspapers (Central) Rules, 1956)

- | | |
|--|---|
| 1. Place of Publication | Meerut |
| 2. Periodicity of Publication | Half-yearly |
| 3. Printer's Name | Kunwar Shekhar Vijendra |
| Nationality | Indian |
| Address | NICE Society
Modipuram
Meerut-250 110 |
| 4. Publisher's Name | Kunwar Shekhar Vijendra |
| Nationality | Indian |
| Address | NICE Society
Modipuram
Meerut-250 110 |
| 5. Editor's Name | Prof. D.P.S. Verma |
| Nationality | Indian |
| Address | Shobhit University
Modipuram
Meerut-250 110 |
| 6. Name and address of individuals who own the newspaper and partners or shareholders holding more than one per cent of the total capital. | NICE Society
Modipuram
Meerut-250 110 |
| 7. Printed at | Print-Ways
G-19, Vijay Chowk, Laxmi Nagar
Delhi-100 092 |

I, Kunwar Shekhar Vijendra, do hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-
Kunwar Shekhar Vijendra
Publisher

INVITATION TO ACADEMICIANS AND PROFESSIONALS AND GUIDELINES FOR AUTHORS

NICE Journal of Business invites academicians and professionals to contribute research papers, articles, abstracts of doctoral dissertations, major research project reports, case studies, comprehensive bibliography and book reviews, from.

The following are the guidelines applicable to contributions.

1. The contribution must be original, neither published nor under consideration for publication anywhere else.
2. The cover page should contain the title of the paper, author's name, designation, official address, contact phone/fax number, e-mail address. The next page should contain an abstract of not more than 150 words, alongwith 5 key words.
3. The main text should not contain the author's name. References should be given at the end of the manuscript and should contain only those cited in the text of the manuscript.
4. References should be given on the following pattern:
 - (i) For books written by a single author:
Malhotra, Naresh K. (2007), *Marketing Research*, 5th ed. (New Delhi: Prentice-Hall of India), p.41.
 - (ii) For books written by two or more authors:
Kotler, Philip, Deepak Jain, and Suvet Maesince (2002), *Marketing Movers* (Boston: Harvard Business School Publishing Corporation), pp. 3-9.
 - (iii) For journal articles:
Lather, Anu Singh, and Shilpa Jain (2007), "Need Behavioural Orientation of Dynamos and Drones in Organisations", *Vikapla*, Vol. 32, No. 1 (January - March), pp. 45-55.
 - (iv) For unpublished Ph.D. theses and M. Phil. dissertations:
Sharma, Deepa, *Consumer Grievance Redressal in India*, unpublished M.Phil dissertation, Delhi University, Department of Commerce, Delhi, 2001, pp. 42-49.
5. Figures and tables should be numbered consecutively and should appear soon after the text where they are first cited. The figures should be accommodated within two-thirds of A-4 size paper. All the figures and tables must be suitably captioned.
6. The text should be in double space, in 12-points font size, leaving 1.5 inch margin on all sides, on A-4 size paper.
7. Authors using questionnaires for collection of data for preparing the paper should send a copy of the questionnaire, along with the manuscript.
8. Two hard copies and one soft copy (in MS Word format) of the manuscript are to be sent.
9. The contributions received for publication shall be referred for review to two experts on the subject, after a preliminary review in the editorial office.
10. Correspondence and proofs for correction, if required, will be sent to the first- named author, unless otherwise indicated. Corrected proofs should be returned within 10 days.
11. The final decision on the acceptance or otherwise of the paper rests with the Editor/Editorial Board, and it depends entirely on the standard and relevance of the paper.
12. The final draft may be subjected to editorial amendment to suit the Journal's requirements. The author will receive one copy of the Journal, along with 10 reprints of his paper, free of charge, soon after its publication.
13. The copyright of the articles and other material, published in the Journal, shall lie with the publisher.
14. *While sending the manuscript, please state that the 'Guidelines for Authors' (for authors of NICE Journal of Business), have been followed.*



Shobhit University

Shobhit Institute of Engineering & Technology, Meerut
A University established u/s 3 of UGC Act 1956

Printed and Published by Kunwar Shekhar Vijendra, Pro-Chancellor, Shobhit University, Meerut
and Vice-Chairman, NICE Society, for and on behalf of NICE Society, 54, Todarmal Road,
New Delhi-110001, at Print-Ways, Delhi-110092, 22514076, 9899094076 e-mail: printways01@gmail.com