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Liquidity Adjustment in Value at Risk (VaR) Model: Evidence from the Indian Debt Market

Sunando Roy*

Conventional Value at Risk models are severely constrained while dealing with liquidity risk. This inevitably leads to an underestimation of overall risk and consequently misapplication of capital for the safety of financial institutions. Standard Value at Risk (VaR) model assumes that any quantity of securities can be traded without influencing market prices. In reality, most markets are less than perfectly liquid and many securities cannot be traded with ease in markets. This is especially true for emerging market economies where the process of financial sector reform and deepening is currently taking place. Despite episodic evidences of liquidity crisis in the Indian financial markets, risks associated with market illiquidity have not been effectively incorporated into the VaR models. In the face of sudden and persisting off-market prices of some of the securities in their portfolio, the Indian financial organizations often find it difficult to offload these securities without booking significant trading losses. As a consequence, several securities exhibit very low levels of turnover in the secondary segment of the debt market. Also, in most cases, measures of market risk fail to capture the costs of carrying illiquid assets in their portfolio. This becomes a constraining factor for market growth. In this context, the paper attempts to construct a Liquidity adjusted VaR model (L-VaR model) that incorporates liquidity risk in Value at Risk models. The paper tests the performance of L-VaR model *vis-a-vis* existing VaR models and finds that in the Indian context, the liquidity risk is an important component of the aggregate risks absorbed by the financial institutions.

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Introduction

Liquidity in financial market implies the ability to transact large amount of securities quickly at low cost. Classically allied to the notions of marketability and market depth, the accepted definition of liquidity is in terms of the deviation of the market price from fair value due to trading frictions. This is quantified by, among others,

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the bid-ask spreads, turnover information and processing costs. According to Black (1971), a market is liquid if, at any time, (a) there is an 'ask price' and a 'bid price' for an investor who wants to buy or to sell immediately a minimal quantity imposed by the market authorities; (b) the bid-ask spread is always tight; (c) in the absence of a 'special' information, an investor who wants to buy or to sell a big quantity can expect a price, on average, close to the current market price; (d) an investor can buy or sell a large 'block' immediately by paying a premium (discount) which is positively related to the volume.

BIS (1999) defines asset liquidity according to at least one of three dimensions: depth, tightness and resilience. Tightness, measured by bid-ask spread, indicates how far transaction price diverges from the mid-price. Depth defines the maximum number of shares that can be traded without affecting prevailing quoted market prices. Finally, resilience denotes the speed with which price fluctuations resulting from trades are dissipated or how quickly markets clear order imbalances.

Despite episodic evidences of liquidity crisis in Indian financial markets, risks associated with market illiquidity have not been effectively incorporated into the Value-at-Risk (VaR) models. In the face of sudden and persisting off-market prices of some of the securities in their portfolio, the Indian financial organizations often found it difficult to offload these securities without booking significant trading losses. Moreover, in most cases, risk measures failed to capture the costs of carrying illiquid assets in their portfolio. As a consequence, a whole bunch of securities were not traded by financial firms. This became a constraining factor for market growth. With the gradual move towards marking to market of the portfolio to truly capture the risks of holding the securities, the pricing of untraded illiquid assets posed an additional challenge. For many securities, actual trades were absent on many trading days and it was clear that prices derived from zero coupon yield curve differed significantly from trading prices in reality.

In the Indian debt market, the challenge of incorporating liquidity risk was faced in the measurement of value at risk for Primary Dealers (PDs) in Government Securities. The Value at Risk model was introduced for the PDs as a pioneering approach to effectively assess

the market risk of these highly leveraged entities. At the initiative of the Reserve Bank of India (RBI), the PDs were asked to put in place Value at Risk models along with the duration based measures of risk in December 2000. The regulatory response to inefficiencies in risk measurement of PDs arising out of lack of liquidity and low/no trading of several securities over a period of time was to impose a higher holding period of 30 days in VaR calculation, thereby providing a higher capital cushion as a cover for inefficient risk measurement. The overriding concern for financial stability thus contributed to higher cost of capital, with grumblings from the market.

The markets developed significantly over the years 2001-2005 with secondary market turnover showing quantum jumps. As the assets began to be churned at a faster rate, the extended time horizon came to be extensively debated during the interface between market participants and regulators. A need was thus felt to explore if a quantification of liquidity could be factored into Value at Risk models that may more efficiently measure the market risk faced by the financial firms as compared to a large time horizon. This has assumed special significance as more and more banks prepare themselves towards greater sophistication in risk measurement models in the context of the Basel II recommendations.

In this context, the paper examines the models of capturing liquidity risk in the Indian debt market. Using data on the Indian Government securities market, the paper tries to provide a Liquidity Adjusted Value at Risk (L-VaR) model that incorporates liquidity risk in Value at Risk models. The paper tests the performance of L-VaR model *vis-a-vis* existing VaR models. The paper is structured as follows. In Section I, the existing methodologies for incorporating liquidity risk in Value at Risk models are discussed. Section II presents a brief analysis of liquidity risk in the Indian debt market. In Section III, a Liquidity Adjusted Value at Risk Model is estimated for the Indian Government Securities market. Section IV presents the concluding observations.

I. Existing Models of Liquidity Adjusted Value at Risk Models : A Survey

The existing approaches to liquidity adjustment in Value at Risk modeling can be categorised into six broad groups.

1) *Ad-hoc Approach (Lengthening Time Horizon)*

The common practice of incorporating liquidity risk in VaR model is to integrate this liquidity risk by adjusting, in an *ad hoc* way, the time horizon according to the characteristics of liquidity of the assets considered. Indeed, if the liquidation has effectively an impact on the price, the classical VaR turns out to be insufficient because the period used for its calculation does not allow for an 'orderly liquidation'. From then on, the lengthening of the holding period ensures an 'orderly liquidation'. The increase of the VaR number following the extension of the holding period can therefore be directly linked to the risk of liquidity. This has been the practice in the Indian government securities market, prescribing a 30-day holding period to account for liquidity risk in contrast to the 10-day time horizon prescribed by the BIS.

2) *Optimal Liquidation Approach/ Transaction Cost Approach*

According to Lawrence and Robinson (1995), the best way to capture liquidity issues within the VaR would be to match the VaR time horizon with the time investor believes it could take to exit the portfolio. For example, if investors believe liquidity is a problem for the given portfolio, they could estimate the time needed to exit the positions and use this as the VaR time horizon. As this time horizon is increased (due to the illiquidity of the portfolio), the reported VaR would also increase to reflect higher risk. From an example of estimation of Value at Risk, the authors find that the largest amount of money a position could lose, with a given degree of confidence, over a one day time horizon is underestimated. Lawrence and Robinson (1995) provide a model of Value at Risk by deriving the optimal execution strategy incorporating the market risk using a mean-standard deviation approach.

Glosten and Milgrom (1985) equate the adverse selection costs to the compensation for losses to informed traders that the market maker extracts from trades with uninformed investors. This compensation directly translates into the width of the bid-ask spread. Holthausen, Leftwich and Mayers (1987 and 1990) estimate the impact of block sales of NYSE stocks on the stock prices. Their studies focus on the market impact of a large trade whose size exceeds the normal quote depth. In the same way, Bertsimas and Lo (1998) derive dynamic

optimal trading strategies that minimize the expected cost of execution over an exogenous time horizon. Then, they obtain an optimal sequence of trades as a function of market conditions. Almgren and Chriss (1998) consider the problem of portfolio liquidation with the aim of minimizing a combination of volatility risk and transaction costs arising from permanent and temporary market impact. From a simple linear cost model, they build an efficient frontier in the space of time-dependant probability. They consider the trade-off of incurring a transaction cost by selling quickly *vis-à-vis* the exposure cost of holding on to the asset over a longer period. Their analysis leads to general insights into optimal portfolio trading, relating risk aversion to optimal trading strategy. Unlike Almgren and Chriss (1998), Hisata and Yamai (2000) turn the sales period into an endogenous variable. This model incorporates the mechanism of the market impact caused by the investor's own dealings through adjusting Value at Risk according to the level of market liquidity and the scale of the investor's position.

3) *Liquidation Discount Approach*

Within the VaR framework, Jarrow and Subramaniam (1997) provide a market impact model of liquidity. They consider a trader with an optimal liquidation problem and attempt to determine the optimal holding period by (a) estimating possible impact of trader's own strategy on the market, (b) adding the average liquidity discount to the trader's losses to account for the cost of not being able to sell at the mid-price, but rather settling at the bid-price, (c) also adding a correction to the lognormal VaR with the help of the mean and the standard deviation of an execution lag function. The model of Jarrow and Subramaniam is intuitively appealing but difficult to implement in practice as model derivation requires additional parameters for which data are not readily available.

4) *Exogenous Liquidity Approach*

Bangia, Diebold, Schuermann and Stroughair (1999) provide a model of VaR adjusted for what they call exogenous liquidity defined as common to all market players and unaffected by the actions of any one participant. It encompasses such execution costs as order processing costs and adverse selection costs resulting in a given bid-ask spread

faced by investors in the market. In contrast, endogenous liquidity is specific to one's position in the market, depends on one's actions and varies across market participants. It is mainly driven by the size of the position: the larger the size, the greater the endogenous illiquidity. The dividing line between exogenous and endogenous liquidity is the depth of the quote in the market. An investor subject to exogenous liquidity trades a quantity smaller or equal to the quote depth and does not affect the market price. He sells at the bid or buys at the ask. As he starts to trade positions larger than the quote depth, his trade price will deteriorate depending on the size of his trade. This taxonomy of liquidity, however, ignores the issue of frequency of trading which relates to the length of the time interval for which the quote depth exists. Therefore, it lacks the time dimension by assuming that the quote depth stays constant over time. Bangia *et al.* (*op cit*) argue that the deviations of this liquidation price from the mid-price are important components to model in order to capture the overall risk and derive an additive correction to a Gaussian single-asset VaR by computing the exogenous cost of liquidity.

5) *Market Price Response Approach*

Berkowitz (2000) highlighted that unless the potential loss arising from the liquidity risk is quantified, the models of Value at Risk would lack the power to explain the risk embedded. These costs will be more important if the market is 'illiquid'. The first attempts to model this liquidity risk consisted in trying to associate it to various measurable quantities such as the capitalisation, the average turnover, the daily average turnover adjusted to the market capitalization, the quoted spread or even the quotation itself, the Normal Size of Block (NSB). But, because liquidity is to be considered only if it contributes to the potential loss, the ideal 'natural' unity of expression of this risk would be the 'monetary' unity of the position. The inherent concept associated to the VaR therefore seems completely adequate to take into account the liquidity risk.

6) *Intraday Liquidity Risk*

Le Saout (2000) distinguishes interday and intraday Value at Risk. The author proposes a new intraday measure of liquidity risk which is constructed from the return during a market event defined

by a volume movement. His results indicate that we can distinguish a systemic liquidity risk, which refers to liquidity fluctuations driven by factors beyond individual investors' control, from an endogenous liquidity risk, which refers to liquidity fluctuations driven by individual actions such as the investors' position.

From the above models, the liquidity discount model appears to be the most comprehensive and efficient of all models. However, it remains difficult to implement due to extensive data requirements for model estimation. The transactions cost approach fails to incorporate spread risk and endogenous liquidation strategy. The exogenous spread approach fails to cover endogenous liquidity. The market response approach focuses on endogenous liquidity and neglects other dimensions of liquidity risk.

II. Liquidity Risk in the Indian Debt Market

The Indian experience with Value at Risk models started in December 2000 when the Government securities market was just starting to develop and gain some depth. Since there was no mechanism as well as data to factor in liquidity risk in the Value at Risk calculations for Primary Dealers, it was decided to opt for a substantially higher holding period of 30 days.

In October 2002, the Reserve Bank of India issued a set of guidelines for banks on managing market risk that includes liquidity risk. The first step towards liquidity management included measures to put in place an effective liquidity management policy to, *inter alia*, spell out the funding strategies, liquidity planning under alternative scenarios and prudential limits. Banks can make use of key ratios such as Loans to Total Assets, Loans to Core Deposits, and Borrowed Funds to Total Assets to assess their liquidity position. The RBI has prescribed a format in this regard under the ALM system, which needs to be adopted for measuring cash flow mismatches at different time bonds. The cash flows should be placed in different time buckets based on projected behavior of assets, liabilities and off-balance sheet items. All banks are required to produce a contingency funding plan approved by their Asset Liability Committees (ALCO). The plan is to be submitted annually as a part of the liquidity and capital plan that would be reviewed quarterly. ALCO will have the authority to implement the contingency funding plan. It can also amend

the plan with the approval of the Risk Management Committee, wherever it feels necessary, to meet the changing conditions.

The Indian debt market underwent a complete transformation during 1997-2005. The secondary market yields, which were kept artificially low in an administered interest rate regime till the early 1990s, began to be market determined. With the introduction of Primary Dealers in 1996, the improvements in settlement systems and the introduction of Liquidity Adjustment Facility (LAF) by the Reserve Bank in June 2000 and the institution of the central bank repo corridor, the market saw tremendous expansion over 1997-2004. The outright transactions have increased almost ten fold over past seven years. The growth of repo market was also phenomenal - it grew faster than the outright market and as a result the share of outright transactions in total transactions in secondary market fell from 82 per cent in March 1997 to 44 per cent in March 2005 (Table 1).

Within this growing depth of the market, lay, however, liquidity holes. Only a few securities were traded in the market on a regular basis. This illiquidity has been of serious concern to banks and other financial market participants, as there is no established mechanism to price the cost of illiquidity. The liquidity of a bond is typically measured through (a) number of trades, (b) trade volume, (c) turnover ratio of a bond (trade volume as a ratio of outstanding amount) and (d) the bid-ask spread.

Table 1: Secondary Market Transactions in Indian Government Securities: 1997-2005

(Rupees crore)

Monthly Volumes	Outright	Repo	Total	Outright/Total Ratio
1	2	3	4	5
Mar-97	12890.6	2745.0	15635.6	0.82
Mar-98	15882.7	4161.7	20044.4	0.79
Mar-99	25379.0	7368.0	32747.0	0.78
Mar-00	31287.1	12667.0	43954.1	0.71
Mar-01	64238.9	12618.7	76857.6	0.84
Mar-02	66199.4	47653.3	113852.7	0.58
Mar-03	125310.4	74235.7	199546.2	0.63
Mar-04	126851.8	103676.7	230528.5	0.55
Mar-05	84224.9	113830.7	110113.5	0.44
June-05	120937.2	128721.2	249658.4	0.48

Source : Handbook of Statistics on the Indian Economy, Reserve Bank of India (2004).

The bid-ask spread reflects liquidity of a bond. Bonds with greater liquidity generally have finer bid-ask spread. The bid-ask spread data also became available as the secondary market participants started reporting their indicative quotes in the electronic platform provided by the Reserve Bank, known as the Negotiated Dealing System (NDS). The traders were asked to report indicative data on the electronic platform to facilitate trading and price discovery. The data is now available for one full financial year 2003-2004. The present paper uses the data and tries to incorporate the liquidity risk in Value at Risk models. The paper examines whether some characteristics of liquidity risk may be factored into a VaR framework in place of the long time horizon as presently prescribed by the Reserve Bank of India.

III. Liquidity Adjusted Value at Risk (L-VaR) Model

In the present paper, we adopt a modified version of the exogenous approach suggested in Bangia *et al.* (1999). This approach looks beyond the traditional practice of Value at Risk modeling to look only at average asset prices or mid prices. The mid price is, however, surrounded by the corridor of bid and ask prices of the traders. This bid-ask spread, according to Bangia *et al.* (1999) reflects the liquidity risk. Any individual transaction is small relative to market size and cannot influence liquidity in a significant way. The emphasis is thus on market illiquidity rather than illiquidity arising out of the actions of an individual trader trying to dispose unusually large positions. This specification allows us to define liquidity risk in terms of the bid-ask spread and its volatility.

We substitute a GARCH model for volatility estimation, instead of the *ad hoc* fat tail correction measure employed by Bangia *et al.* (1999). GARCH models are especially suitable to financial market data as it can efficiently capture randomly varying volatility. Superior treatment of volatility in data enables the GARCH model to track thick tails in the data.

The model can be written as follows:

The return equation can be written as

$$R_t = \ln(P_t) - \ln(P_{t-1}) \dots\dots\dots(1)$$

Standard Parametric Value at Risk (VaR) can be estimated as

$$\text{VaR} = P_t \{ 1 - e^{(-2.33 \theta \cdot \sigma_t)} \} \quad \dots\dots\dots(2)$$

The Conditional Volatility equation is based on the Generalized Autoregressive Conditional Heteroscedasticity model (GARCH (1,1) represented by equations (3) and (4) below

$$Y_t = X_t' \theta + \varepsilon_t \quad \dots\dots\dots(3)$$

$$\sigma_t^2 = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 \quad \dots\dots\dots(4)$$

where ω is the constant term, ε_{t-1}^2 captures the news of volatility from previous period with the help of lagged squared residual of mean equation and σ_{t-1}^2 is the last period's forecast variance.

The liquidity Risk equation takes the following form

$$\text{COL} = \frac{1}{2} \{ P_t (S + \alpha S_\sigma) \} \quad \dots\dots\dots(5)$$

where

COL = Cost of Liquidity

P_t = mid-price of the asset

S = average relative spread, where relative spread is defined as (ask-bid)/mid. Relative spread acts as a normalizing device among spreads.

S_σ = standard deviation of relative spread and

α = a scale factor to get 99 percent coverage.

The Liquidity Adjusted Value at Risk Measure thus is

$$\text{LVAR} = P_t \{ 1 - e^{(-2.33 \theta \cdot \sigma_t)} \} + \frac{1}{2} \{ P_t (S + \alpha S_\sigma) \} \dots\dots\dots(6)$$

According to the study, the spread distributions are non-normal. Therefore, instead of the Gaussian multiplicative factor of 2.33 times the standard deviation of spreads, one needs to raise the factor anywhere between 2.5 to 4.

Empirical Exercise for India

In the Indian context, our study compares two government dated securities prefixed by coupon and suffixed by year of maturity. The first one, 8.07%GS 2017 was the most traded in 2003-04 accounting for 5.28 per cent of the secondary market outright turnover. The other security is 9.39% GS 2011, which was moderately traded accounting for 1.57 per cent of total turnover in 2003-04, but for which indicative bid-ask spread are available at a fairly representative frequency (Table 2).

Table 2: Outright Transactions of Selected Securities : 2003-04

Security	Outright transaction (Rs. crore)	Share in secondary market (%)
1	2	3
8.07% GS2017	170445.39	5.28
9.39% GS 2011	50817.87	1.57

GS : Government of India dated security, prefixed by coupon and suffixed by year of maturity.

Spread Behaviour of Selected Government Dated Securities

The spread behaviour of the securities is presented in Tables 3 and 4 on a monthly frequency for the financial year 2003-2004 (April-March). Data on the number of executed trades, average trade size, average monthly price and yield and turnover are also presented.

Table 3: Monthly Turnover and Spread Behaviour of 8.07% GS2017 in 2003-04

Month	Number of Executed Trade	Average Trade Size	Average Price@	Average Yield@	Turnover#	Bid Price (average for month)*	Ask Price (Average)*	Relative Spread
	Number	Rs. crore	Rs.	%	Rs. crore	Rs.	Rs.	(ask-bid)/mid
1	2	3	4	5	6	7	8	9
Apr-03	2862	5.43	117.50	6.16	15548.49	117.47	117.52	0.000426
May-03	3430	5.81	118.35	6.07	19941.95	118.32	118.37	0.000422
Jun-03	2971	5.71	119.54	5.95	16981.60	119.48	119.57	0.000753
Jul-03	2265	6.46	119.78	5.91	14640.78	119.75	119.83	0.000668
Aug-03	3488	6.00	121.53	5.74	20929.91	121.50	121.55	0.000411
Sep-03	1638	6.11	122.69	5.62	10023.83	122.65	122.74	0.000734
Oct-03	2914	6.35	125.09	5.35	18509.66	125.05	125.12	0.00056
Nov-03	1592	6.46	124.00	5.35	10293.29	123.95	124.05	0.000806
Dec-03	1880	6.08	122.38	5.56	11435.15	122.31	122.43	0.000981
Jan-04	1710	6.28	123.77	5.38	10745.43	123.73	123.80	0.000566
Feb-04	1389	6.63	122.55	5.40	9217.87	122.50	122.59	0.000734
Mar-04	1902	6.40	123.30	5.34	12172.44	123.26	123.34	0.000649

@ : Weighted by transaction volume.

: Refers to Outright turnover .

* : As these are indicative quotes, simple averages are used.

Note : Data are monthly averages.

Source : RBI data, SGL Transactions from www.nds.rbi.org.in.

**Table 4: Monthly Turnover and Spread Behaviour of
9.39% GS2011 in 2003-04**

Month	Number of Executed Trade	Average Trades Size	Average Price	Average Yield	Turnover	Bid Price (average for month)	Ask Price (Average)	Relative Spread
	Number	Rs. crore	Rs.	%	Rs. crore	Rs.	Rs.	(ask-bid)/mid
1	2	3	4	5	6	7	8	9
Apr-03	832	6.581439	121.9453	5.970055	5475.757	121.89	122.05	0.001312
May-03	790	6.19702	122.7598	5.830273	4895.646	122.65	122.8	0.001222
Jun-03	477	7.818973	123.4512	5.7134	3729.65	123.31	123.54	0.001863
Jul-03	603	7.450232	123.8809	5.62283	4492.49	123.72	123.96	0.001937
Aug-03	704	6.487642	125.5396	5.369749	4567.3	125.45	125.61	0.001274
Sep-03	525	7.976686	126.5621	5.170698	4187.76	126.5	126.63	0.001027
Oct-03	433	9.145507	127.7036	4.664304	3969.15	127.57	127.82	0.001958
Nov-03	327	9.329037	127.025	4.714135	3050.595	126.85	127.12	0.002126
Dec-03	598	7.38768	126.2909	5.030547	4417.833	126.2	126.35	0.001188
Jan-04	442	10.04699	126.4031	4.711879	4440.769	126.3	126.45	0.001187
Feb-04	1006	7.227951	125.1892	5.146397	4163.3	125.1	125.28	0.00143
Mar-04	394	7.897765	125.1877	4.867976	3427.63	125.05	125.29	0.001917

Note : See Table 3.

Source : Same as Table 3.

The relative spread seems to be negatively correlated to turnover. An increase in the volume of trade results in a lowering of the bid-ask spread. An increase in trade size produces a positive impact on spread, indicating the existence of an endogenous liquidity cost of thin markets. The usual inverse relation between yield and price gets reflected in the correlation matrices presented in Tables 5 and 6.

Table 5 : Correlation Matrix for 8.07% GS 2017 : 2003-04

	Spread	Turnover	Trade Size	Average Price	Average Yield
1	2	3	4	5	6
Spread	1.00	-0.67	0.39	0.38	0.42
Turnover		1.00	0.52	-0.44	0.56
Trade Size			1.00	0.74	0.79
Average Price				1.00	-0.97
Average Yield					1.00

Table 6 : Correlation Matrix for 9.39 % GS 2011

	Spread	Turnover	Trade Size	Average Price	Average Yield
1	2	3	4	5	6
Spread	1.00	-0.85	0.35	0.14	-0.29
Turnover		1.00	-0.52	-0.44	0.56
Trade Size			1.00	0.74	-0.79
Average Price				1.00	-0.97
Average Yield					1.00

Comparison of VaR and L-VaR Model in the Indian Debt Market

The end-March 2004 Value at Risk and Liquidity adjusted Value at Risk is presented for both securities. Market risk calculations for the Indian debt market were done by taking into account both the market and liquidity components to total market risk. Of principal interest here is the marginal impact of the liquidity component, as shown in Table 7. The standard parametric VaR model is estimated as normally distributed with 99 per cent tail probability. The estimated volatility is the conditional volatility estimated with the help of GARCH (1,1) model.

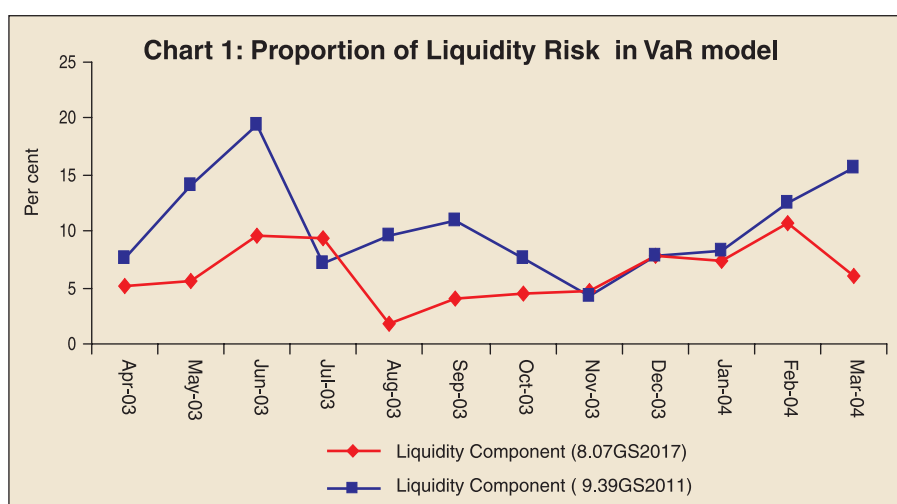
For the highly liquid security, the market risk for a 1-day VaR was 0.779 per cent, while the Liquidity adjusted VaR (L-VaR) was 0.828 per cent. For the 9.39 GS 2011, which had a lower turnover, the market risk based on 1-day VaR was 0.541 per cent while the L-VaR was 0.641 per cent. Thus the liquidity risk component for 8.07%

Table 7: Liquidity Risk in Indian Debt Market : end March 2004

	Highest Traded Security 8.07% 2017	Moderately Traded Security 9.39% 2011
1	2	3
Turnover in 2003-04 (Rupees crore)	170445.39	50817.87
Share in Secondary Market Turnover (%)	5.28	1.57
Return Volatility (σ_t) 2003-04	.335	.235
Market Risk (Delta Normal VaR)	0.779%	0.541
Liquidity Risk Factor (exogenous)	0.049%	0.100%
Total Adjusted Value at Risk (L-VaR)	0.828%	0.641%
Liquidity Risk Component (%)	5.92%	15.60%

GS 2017 was 5.92 per cent of total adjusted Value at Risk (L-VaR) while for 9.39% GS 2011, the liquidity risk component turned out to be much higher at 15.6 per cent. This indicates that the liquidity risk in the Indian debt market differs significantly between a highly traded instrument and a less traded Government security. The method of using bid-ask spread data for deriving the liquidity component thus gives some understanding of latent liquidity risks in the Indian debt market.

We also compare month end estimates of Value at Risk with and without the liquidity component (Chart 1). The Chart plots the proportion of liquidity risk in Value at Risk calculation and shows the month end component of liquidity risk as a proportion of the L-VaR figures arrived at after adjusting for liquidity. The empirical exercise demonstrates that the liquidity risk component can be as high as 20 per cent of the Value at Risk measure estimated by traders to judge the risk in their portfolio. It is also observed that the liquidity risk in the moderately traded security was higher than the security with the highest turnover. It, therefore, seems quite likely that liquidity risk may be still higher for many lowly traded securities in the Indian debt market.



IV. Conclusion

Liquidity risk is an aspect of market risk that has been largely neglected by standard value at risk models. This negligence is partly due to the fact that no single measure can effectively capture the various aspects of liquidity in financial markets. In this paper, we apply the Liquidity Adjusted Value at Risk model provided by Bangia, Diebold, Schuermann and Stroughair (1999) to the Indian debt market.

While the overall market liquidity is being monitored and fine tuned by the Reserve Bank of India through its Liquidity Adjustment Facility (LAF) and Open Market Operations(OMO), pockets of illiquidity continue to exist in the market. Large exposures in illiquid assets can be potentially harmful as they cannot be offloaded at market related rates. In this paper, a measure of Liquidity Adjusted Value at Risk based on the bid-ask spread is presented for the Indian debt market and the liquidity risk is found to be an important component of the aggregate risks absorbed by the financial institutions.

The liquidity risk is characterised through an adjustment based on the average weighted price spread of Government securities. Given the data limitations in the Indian debt market, this paper can be treated as a starting point in integrating liquidity risk in a VaR framework. As the market develops and trades become more frequent, the model can be improved upon by trying to quantify simultaneously the exogenous liquidity risk and the endogenous liquidity risk.

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The Interbank Money Market in India: Evidence on Volatility, Efficacy of Regulatory Initiatives and Implications for Interest Rate Targeting

Himanshu Joshi*

The working of the interbank money market (the call money market) and the conduct of monetary policy are inextricably linked in economies that depend predominantly on indirect instruments of monetary policy. The stability of the call money rate, namely, the rate at which short term funds are lent and borrowed is, therefore, of critical importance to central banks which view it as an operational target to signal the stance of monetary policy. Experience shows that regulatory initiatives taken to improve the efficiency of market functioning also help in fostering market stability. In the Indian case, for example, it may not be inappropriate to postulate that permitting a wider section of market constituents to operate in the repos market (*viz.*, outside the central bank) since March 2003 led to a reduction in the volatility of the call money rate caused by improved matching of demand/supply between deficit/surplus segments. By the same token, therefore, there is a case for encouraging increased participation and, more importantly, expanding the range of eligible collateral for market repos to enhance the efficacy of short term interest rate targeting. The measures announced in the Annual Policy statement for 2005-06 and the suggestions made by the Technical Advisory Committee on Money Market to further expand the scope of activity in market repos are, therefore, highly significant in the present context.

JEL Classification : E52

Keywords : Call money market rate, Liquidity Adjustment Facility (LAF), Autoregressive Conditional Heteroscedasticity, Conditional Variance.

Introduction

The overnight call money or the inter-bank money market rate is presumably the most closely watched variable in day-to-day conduct of monetary operations and often serves as an operating target for policy purposes. The choice of operating tactics from

* The views expressed in the paper are solely those of the author and must not be ascribed to the institution to which he belongs.

quantity to rate based targeting, following the IS/LM based analysis of Poole (1970), has been largely accepted in favour of interest rate targeting, because of the diminished link between monetary aggregates and economic objectives of monetary policy as a result of the fast pace of financial innovations. Most central banks, therefore, presently use indirect instruments in an attempt to maintain the short term interest rate at a desirable level with the use of appropriate liquidity management practices. The most common of these instruments of liquidity management is the central banks' repo facility which enables modulation of the marginal liquidity on a day to day basis so as to ensure stable conditions in the money market and, particularly, to maintain the short term money market rate as close as possible to the official/policy rate. Changes in the short-term policy rate made by central banks provide signals to markets, and various segments of the financial system, therefore, respond by adjusting interest rates/returns depending on their sensitivity and the efficacy of the transmission mechanism. Economic implications for investment and spending decisions of producers and households follow as usual, thereby affecting the working of the real sector *viz.*, changing aggregate demand and supply, and eventually inflation and growth in the economy. It is, therefore, clear that the interest rate stance of a central bank and its implications for economic activity and inflation play an important role in the conduct of monetary policy.

The objective of the paper is, therefore, to assess the volatility pattern of the call money rate in India during the last three years and to estimate its sensitivity *vis-à-vis* the Reserve Bank of India's liquidity adjustment facility (LAF) auction decisions for the purpose of eliciting underlying market characteristics. Attempt is made to provide evidence, *albeit* indirectly, on how regulatory changes related to other instruments in the money market may have affected the functioning of the interbank call money market. Finally, some evidence is also offered on the link between money market volatility and interest sensitive financial markets, particularly the government securities market.

The remainder of the paper is structured as follows. Section I provides an overview of liquidity management in India while cross-

country experience is set out in Section II. Data used in the analysis are explained in Section III. Methodology used and the empirical analysis are presented in Section IV and concluding observations are given in Section V.

Section I

Liquidity Management in India

The liquidity management practice in India has undergone significant changes in the 1990s, from greater reliance on direct instruments to almost full dependence on indirect instruments over these years. The transition to this framework has been enabled because of far reaching changes in the framework of monetary policy enabled especially by the introduction of market based price discovery mechanism and reduction in the financing of government deficits by the Reserve Bank. As a consequence, it was possible to achieve a successful transition, since June 2000, to a full fledged liquidity adjustment facility (LAF) permitting eligible participants such as banks and primary dealers (PDs) to manage their day to day liquidity needs through recourse to the facility. The evolution in liquidity management practices over these years is a logical outcome of the economic reforms which led to the phasing out most of the standing facilities and reduced the emphasis on direct monetary policy instruments. The LAF allows the Reserve Bank to have a strong grip on system's liquidity, on a day to day basis, and consequently helps in achieving its goals of policy more successfully than was the case hitherto. In the recent times, as liquidity conditions have turned surplus because of capital flows, reverse repo auctions have been operated to sterilise excess liquidity to maintain stability in the money market rate around a desired level. Reverse repo operations are conducted on a daily overnight basis and, also for relatively longer period to enable absorption of excess liquidity depending on evolving conditions. Although the presence of excess liquidity naturally ordains that bids are fully accepted to gain the comfort of maintaining the market rate around the official rate, the decision on the acceptance of a given proportion of bids out of the total submitted is taken in keeping, *inter alia*, the daily

primary liquidity flow projections arising from various transactions of the Reserve Bank with the rest of the economic system. While a number of transactions capturing liquidity flows are pre-known to the Reserve Bank, quite a few like ways and means advances, changes in currency demand and cash balances of the government are not known *a priori* with certainty.

The inevitability of large open market operations under conditions of unabated capital flows is virtually preordained given the sensitivity of the inter-bank market to sudden changes in liquidity flows. However, the declining stock of Central Government securities with the Reserve Bank made it necessary to evolve alternative mechanisms to augment the inventory of repoable securities to ensure stability of the money market. Towards this end, the Reserve Bank in consultation with Government introduced the Market Stabilisation Scheme (MSS) in 2004 to absorb excessive/ enduring liquidity in the system. Yet given the unrelenting surge in foreign exchange inflows, the task of maintaining stability in the money market continues to remain a difficult task. In the current milieu, when the auction rate for LAF is generally kept fixed, the quantity is automatically determined, as all reverse repo bids are fully accepted. In this case, the market rate also quickly stabilizes around the reverse repo rate as the system's surplus liquidity is taken away at a given price. The comfort level achieved through daily liquidity management based on LAF however is occasionally disturbed when sudden liquidity shortages cause sharp fluctuations in the money market rate. Although, such spikes have often been short lived given the timely liquidity support offered by the Reserve Bank, yet there is a need to moderate these fluctuations in the larger interest of overall liquidity management.

On the other hand, for prudential reasons and as recommended by the Narsimham Committee in 1998, the Reserve Bank has transited to a system of pure interbank call/notice money market. Accordingly, the average lending by non banks in a reporting fortnight, based on their average daily lending in call /notice market during 2000-01, was progressively reduced from 85 percent (May 2001) to 75 percent (June 2003) to 60 percent (December 2003) to 45 percent (June 2004)

to 30 percent (January 08, 2005) to 10 percent (June 11, 2005) and completely phased out from the fortnight beginning August 06, 2005. Non bank participants except PDs are also not permitted to borrow from the call/notice market. As these limits on lending have been imposed, the parallel development of the repos market outside of the RBI managed by the Clearing Corporation of India Limited (CCIL) as a central counterparty has taken shape. Non banks are expected to take recourse to the collateralised repos outside the RBI for purposes of borrowing and lending of funds.

The CCIL meanwhile also introduced an innovative money market product called the Collateralised Borrowing and Lending Obligation (CBLO) in January 2003 which provided investors the benefit of guaranteed settlement and an exit option before maturity. As a result of the introduction of market repos and the CBLO and phased removal of non bank participation in the call money market, the trading volumes in these markets have increased substantially. Between 2003-04 and 2004-05, for example, the CBLO market grew by a phenomenal 1180 percent. The CBLO segment can be further encouraged by making it more attractive especially for urban cooperative banks to participate in the market by expanding the range of eligible repoable assets by making assets such as state development loans more acceptable through consolidation. Technical initiatives such as enabling repo transactions through secured and cost effective communications links could also be introduced to improve the reach amongst a multiplicity of small participants, thereby integrating dispersed pools of idle liquidity with the needs of solvent borrowers. In the past, significant regulatory reliefs such as that in March 2003 were offered when constituent subsidiary general ledger (CSGL) account holders were permitted to participate in the interbank repo market. More measures in this direction especially, permitting wider sections of the constituents of PDs to participate in the CBLO segment would in all likelihood help in further deepening of the money market. In regard to the range of eligible collateral assets, depending on the comfort level of the central counterparty, there is a need also to permit interbank repos in PSU bonds and private and corporate debt securities for market repos provided they are held in dematerialised form and transactions are done through recognised stock exchanges. This position has been indicated by the Reserve Bank

earlier. The same could, hence, also be considered in the case of CBLO market. The range of participants in the market has also been widened over time. In case of CBLO, for example, while banks, PDs and co-operative banks who are members of the Negotiated Dealing System (NDS) are permitted, non-NDS members like corporates, co-operative banks, NBFCs, Pension Funds and Trusts also became eligible as associate members of the CCIL's CBLO segment to borrow and lend in the CBLO market from January 2004. With the phasing out of the non-bank participation in the interbank call money market, once a greater range of market participants, especially deficit/surplus segments, is encouraged to participate together in a common but secured market for repos/CBLO and a wider array of repoable collateral is available, the efficiency of targeting of the inter-bank call money market would improve on account of better liquidity smoothing across market participants, especially during phases when liquidity shocks result in overshooting of the short term interest rate.

International evidence also underlines the fact that contrary to unsecured markets (especially, call money market), a collateralised repo market is able to achieve much better liquidity smoothing across solvent market participants despite the difficulties in the management of collateral risk (Freixas and Holthausen, 2001). In actual practice, the growth in the global market for repos with a widening pool of collateral has been driven by the improved confidence in the management/mitigation of risk and increased outsourcing of collateral risk management to central counterparties.

Section II

Some International Liquidity Management Practices

Different market based intervention techniques are employed by central banks to manage liquidity on a day-to-day basis. Central banks have been increasingly favouring market operations, especially buying and selling securities than standing facilities in conducting their monetary policies. While different practices and operational frameworks exist, the objective continues to be the same, namely, fostering stability of short-term interest rates around the operating target announced by central banks. The review of the liquidity

management practices presented here is based on several published sources or material otherwise available in the public domain.

The European Central Bank (ECB) intervenes in the money market through its most important policy instrument namely the Main Refinancing Operations (MRO) conducted through repos. The MROs provide the bulk of liquidity support and are implemented through weekly tenders for a maturity period of two weeks. The remaining liquidity needs are met by Long Term Refinancing Operations (LTRO) which are operated once a month and have a maturity of three months. Since June 2000, the MROs are conducted at variable rates. However, the ECB announces a minimum bid rate at which no bids are acceptable. Bids at the highest rate are accepted first and bids with successively lower rates are accepted in turn until the total liquidity to be injected is exhausted. The minimum bid rate indicates the stance of monetary policy. Besides the MRO the ECB also offers a marginal lending and standing deposit facility to counterparties. Since June 2000 the ECB has set its lending rate one percentage point above and its deposit rate one percentage point below the minimum bid rate announced for its MRO. The deposit facility is operated by the ECB in order to facilitate overnight deposits with the ECB. In principle, the deposit facility allows banks to reduce reserves when they have surplus reserves. The lending and deposit facilities of the ECB are made available half an hour after the closure of TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system) – a RTGS system used for settlement of central bank operations, large-value euro interbank transfers as well as other euro payments providing real-time processing and settlement in central bank money with immediate finality. The Eurosystem accepts a wide range of collateral assets from non financial institutions for its refinancing operations. Eligible collateral includes, apart from marketable debt instruments, non marketable debt instruments and even some equities. No difference is made between these assets in terms of quality as they fulfil minimum eligibility criteria specified by the Eurosystem. In retrospect, given this framework for liquidity management, it has been found that the overnight inter-bank rate EONIA (Euro Overnight Index Average) has generally remained within the corridor defined by lending and deposit rates, usually within one-half of a percentage point of the minimum bid rate. As a result, the marginal

standing facilities that define the corridor for policy rates have seldom been used by market participants in the Eurosystem.

The Bank of England (BoE) introduced fundamental changes in the operating procedures following the grant of operational independence in 1997 and the separation of Debt Management Office (DMO) in 2000. Accordingly, the BoE presently sets its own official rate of interest so as to meet the target rate of inflation set by the government. The daily operations of the BoE include an initial forecast of the liquidity need which is amended throughout the day. Market interventions are made at two regular times during the morning and noon. Additional facilities are offered late in the day above the official repo rate, which sets the ceiling for the overnight interest rate. Besides, the BoE also offers a standing deposit facility remunerated at rate lower than the official repo rate by one percentage point which, in effect, sets a floor to the overnight interest rate. In an assessment of the open market operations of the BoE, especially, in regard to the introduction of the special deposit facility, Allen (2002) suggests that its introduction since June 27, 2001 somewhat narrowed down the range of fluctuation of short rates around the official repo rate. The deposit facility, in fact, introduced as a “mopping” facility for surplus liquidity successfully limited the extent to which short dated rates could fall below the official rate, resulting in a proper control over the volatility of short rates.

The US Federal Reserve (USFR) intervenes through outright and temporary operations. Outright operations are conducted to offset long term imbalances in liquidity mismatches and conducted by way of treasury bill and coupons. Temporary operations are conducted through repos in treasury securities and are used to offset daily imbalances. The liquidity operations of the USFR are supported by discount window borrowings which serve as a marginal lending facility. The Federal Reserve System accepts a wide range of collateral such as mortgage based securities issued by federal agencies and government sponsored enterprises, apart from securities that are direct obligation of the US treasury or other securities that are fully guaranteed as to principal and interest by government agencies or government sponsored enterprises (Edwards, 1997).

Besides the central banks' own initiatives aimed at liquidity management, the repurchase transactions among domestic counterparties have increased phenomenally. The collateral acceptable for these transactions in the US includes, apart from treasuries, securities issued by Agencies (Fannie Mae, Ginnie Mae, *etc.*) and mortgage based securities guaranteed by Agencies. The Federal Reserve Banks also provide daylight overdraft facilities at a charge of 36 basis points to allow dealers to finance positions. Obviously, this is done to ensure that all genuine liquidity needs of the wider market are met and the settlement is completed without any problems. As at end December 2004 the outstanding volume of domestic market repos in the US was \$ 5 trillion. In the case of Eurosystem also the growth in repo market has been encouraging although this segment is less integrated than the swap and unsecured segments, due to existing differences in practices, laws, regulations and fragmentation of market infrastructure. The ECB has been keenly interested in the activity in the repo market segment and has supported the integration of the euro market for short term securities. As at end December 2004, the Euromarket had about EURO 5 trillion outstanding as market repos. The enormous growth in the repos transactions has resulted from the perceived benefits of such transactions. Repo markets compete with banking system by providing a method of granting and receiving loans and generally tend to reduce interest rates for borrowers while increasing it for depositors. In addition, the market for repos based on bonds helps in improving the efficiency and liquidity of bond markets and minimise the probability of undue price fluctuations.

Besides the rapid growth of domestic repos markets, the international financial system has experienced increasing global integration and depth of the money markets in the recent years, helping to cover short term liquidity mismatches experienced by large banks/other financial institutions by means of repurchase transactions facilitated by the International Securities Market Association (ISMA). At present repurchase transactions are easily carried out across national borders besides those among domestic counterparties. According to the survey carried out by the ISMA in December 2003,

the total size of repo outstanding was estimated at EUR 3.77 billion. Survey results also suggested that whereas 39.3 per cent of reported outstanding repo contracts were with domestic counterparties, 52.1 per cent were cross-border including both euro and non-euro zone counterparties. The share of electronic trading of these transactions was also on the rise. The collateral analysis suggested that while fixed income securities issued by the sovereign governments in the EU were predominantly used as collaterals in repo transactions, the pool of collateral was widening with the increasing acceptance of non-government bonds (Pfandbrief and mortgage backed securities) and equity. It is widely believed that the growth of the collateralised repo market has served an important role, *viz.*, enhancing the overall stability of the financial system by removing counterparty risks by means of funded credit protection against risky transactions in unsecured wholesale financial markets.

An empirical analysis of the behaviour of volatility of short term money market rate conducted by Thompson (2003) for major developed countries shows that while volatilities have generally been reduced over time in the recent years, higher volatilities in countries such as the UK are ascribable to low reserve requirements. According to Thomson (also Kasman, 1992) low reserve requirements have tended to impede the flexibility of banks in managing their reserve positions leading to higher fluctuations in the overnight rate. However, most central banks in the developed world have taken initiatives to expand the scope of the market by enhancing the range of collateral acceptable for monetary operations and in some cases improving the participation rate itself.

Section III

Data : Sample and Definitions

As mentioned before, the empirical exercise is devoted to eliciting the volatility of the call money rate in the recent past including possible relationship with certain important regulatory initiatives taken by the Reserve Bank. The analysis is also devoted to assessing the sensitivity of interest rate targeting especially in

relation to the LAF auction decisions of the Reserve Bank on a day to day basis. Daily data on reverse repo auctions (submitted and accepted), weighted call money rate and the official repo rate are taken for the period from April 2002 to March 2005 which, by and large, has been a period characterised by surplus liquidity except for some sporadic periods of liquidity stress. The data employed is available in the public domain and is regularly disseminated through the official website of the Reserve Bank (www.rbi.org.in). Wherever required, data have been appropriately transformed for testing the hypothesis put forward in the paper.

Section IV

Methodology and Empirical Evidence

The econometric methods used in estimation are the Nelson Beveridge (NB) time series decomposition and an ARCH-M[1,1] (Autoregressive Conditional Heteroscedasticity in Mean) model estimation which is widely used for modelling volatility in financial markets. While the NB decomposition serves to differentiate between permanent and cyclical components in a time series, the ARCH model introduced by Engle (1982) imposes a systematic structure to the variance process making it amenable to interpretation and use in forecasting. These methods are briefly explained below in an understandable language, without using mathematical notations. References pertaining to the statistical methods are given at the end.

(i) Nelson Beveridge Decomposition

This decomposition method was proposed by Beveridge and Nelson (1981). The NB method is based on the presumption that stationary short term fluctuations tend to shift the long run path or the trend of the series in question. In the NB method, the contemporaneous innovation to the trend is perfectly negatively correlated with itself. For example, a positive shock to the call money rate because of consistent tightening of liquidity will be contemporaneously negatively correlated with the trend until shocks force the trend to adjust upwards over time. The NB method was applied to the weighted call money

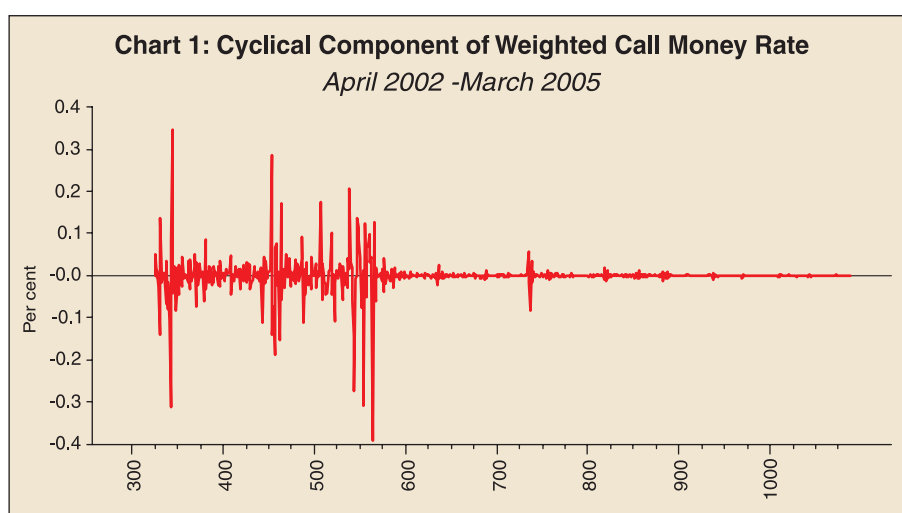
rate with ARIMA(1,0,1) structure to obtain estimates of the cyclical (or temporary) component which are plotted in Chart 1 below.

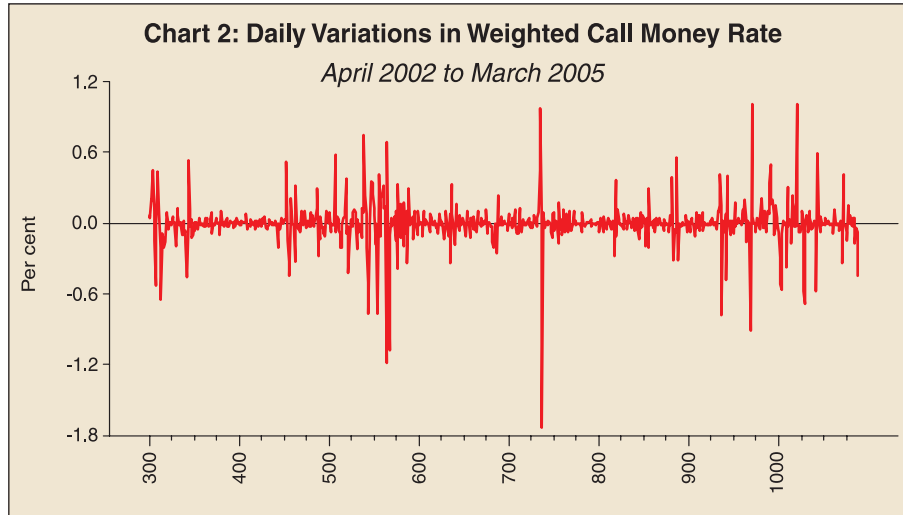
Chart 1 clearly reveals a substantial containment of market volatility beginning March 2003 (observation number 600 onwards on the X-axis when the transient component looks considerably subdued) coinciding with the Reserve Bank's decision to permit CSGL account holders to participate in the market for interbank repos.

(ii) The ARCH-M Model

The standard ARCH effect in data implies 'volatility clusters' which can be captured to place appropriate structures to the volatility of the series, which may be otherwise highly unpredictable and difficult to interpret. The coefficients derived from estimated ARCH models are more efficient than those obtained from simple OLS method and offer a special ground for inference making. Chart 2 provides evidence on ARCH effects in call money rate suggesting episodic volatility including clusters of low amplitude variations followed by lower values and vice versa. It is, therefore, reasonable to specify the model for call money rate in terms of the mean and conditional variance equations in ARCH models.

As a variant to the general ARCH model described above, we employ here the ARCH-M model introduced by Engel *et.al* (1987)





wherein each time the mean of the process is determined by additional information contained in standard deviation seen at the same time. The ARCH-M modelling is of special interest in studying financial time series as the conditional variance plays an important role in determining an explicit trade-off between expected returns and the variance or the covariance among returns. In the traditional capital asset pricing model (CAPM), for example, the expected excess return on the market portfolio is linear in its conditional variance, suggesting the usefulness of ARCH-M type models.

The algebraic structure of the ARCH-M model is presented below.

The Mean Equation

$$DIFRATE_t = f\{ TOTACCP_{t-i} \} + h_t + error_t$$

where $i = 0, \dots, n$ lags

DIFRATE = the difference between weighted call money rate and the reverse repo rate (%).

TOTACCP = total amount of reverse repo bids accepted daily (Rs crore)

h = model based conditional variance

ERROR = error term

The mean equation explains the variations in the gap between call money rate and the policy rate (*viz.*, repo rate) by decision taken by the Reserve Bank in respect of the daily amounts of bids accepted from counterparties in reverse repo auctions and the recursive conditional variance itself. The model posited above does not use any lag(s) of the dependent variable in the equation. Taking lags of the dependent variable in the equation is often subject to criticism from practitioners, especially, the rationale of taking past information on the dependent variable into account. Critics often also question the validity of such empirical models arguing that since much of the explanation in the estimated equation is attributed to lagged dependent variables, they do not have much practical use. By dropping lagged endogenous variables therefore, we avoid this criticism, and the only term that is left unexplained is the error term, which may arise from factors such as less accurate projections of cash flows in the banking system arising from exogenous factors such as changing demand for currency by the public, government cash flows and flows on account of external capital/private remittances and even news and expectations *etc.* These mismatches in supply and demand of funds can be addressed by expanding the scope of the repo market especially when regulatory concerns require that the participation in the interbank call market should be limited to banks only. The error term is expected to be highly variable but can be suitably modelled by imposing systematic structure as proposed in the econometric literature so as to be useful in decision-making.

Conditional Variance

$$h_t = f \{ \text{error}_{(t-1)}^2 \} + \text{white noise}$$

$$i=1, \dots, n$$

As the system is highly volatile and shows volatility clusters, the conditional variance of the process can be systematically captured using the square of previous error terms obtained from the mean equation. The estimation of conditional variance based on ARCH models has been customarily found quite successful in modelling financial markets with high frequency market operations and

volatility. They have also been used to forecast volatilities to address the needs of trading desks to help in evolving operating strategies.

As is evident from the recursive nature of the estimation, coefficients of the ARCH-M models are obtained from non linear numerical optimisation techniques applied to the joint estimation of the mean and variance equations. In this paper we employ the Berndt, Hall, Hall and Hausman (BHHH) procedure for maximising the log-likelihood function.

The estimated model specifies the daily difference between the weighted call rate and the official reverse repo rate as a function of the amount of the reverse repo bids accepted by the Reserve Bank daily and the conditional variance - assuming that conditional volatility itself plays an important role in explaining the gap between the two rates.

The coefficient estimates of the model suggest that variations in amounts accepted in reverse repo auctions have a statistically significant, though small, impact on the gap between the weighted call money rate and the reverse repo rate (aggregate coefficient estimate is invariant if even the first lag of the accepted amount is included in the estimation). For example, for the time sample under consideration, accepting additional Rs 10,000 crore on a current day would have reduced the said gap between the call money rate and the reverse repo rate, on an average, by barely two basis points. The

Empirical Estimate of the daily ARCH-M model
[April, 2002 to mid November, 2004]

(i) The ARCH in Mean Equation :

$$\text{DIFRATE}_t = -0.044 - 0.0000020 \text{TOTACCP}_t + 0.43h_t$$

(3.73) (-7.26) (15.58)

(ii) ARCH-M Conditional Variance :

$$h_t = 0.0088 + 1.15 \text{error}_{(t-1)}^2$$

(23.55) (9.46)

Convergence : 132 iterations, Criterion 0.0000068 < 0.00001, Function Value : 540.35
Figures in parenthesis are respective t-statistics for testing significance

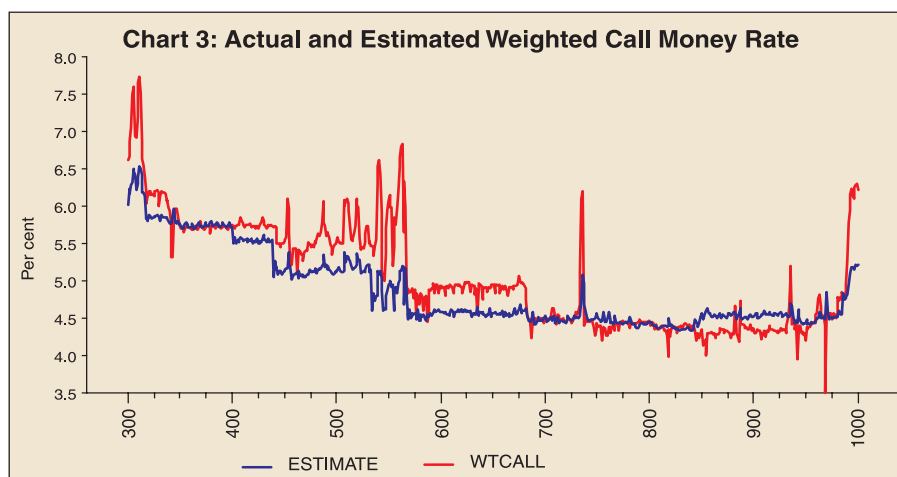
implication of this finding is that even as the entire bid amount at reverse repo auction is accepted, and if the amounts accepted were to actually signify the total excess liquidity in the system, the model should be in a position to explain the gap almost fully. However, since the model, on an average, explains only 24 percent of the actual average gap of 25 basis points over the sample period, the usual law of equilibrium wherein if a rate is fixed, the amount is automatically determined and *vice versa* appears to be perceptibly violated. As it will be shown later, the average margin of error between the estimated gap and the actual gap reported above is attributable mainly to the phases when the money market suddenly became tight and the Reserve Bank had to offer accommodation through its repo window. On the other hand, the actual gap between the call rate and reverse repo rate during times of surplus liquidity especially, when the reverse repo window was open, is fairly well explained by the model with a minimal margin of error. It therefore, follows that any unexplained gap between the two rates could be ascribed to market segmentation (especially, the inability of the cash surplus and deficit segments to meet fully to clear the market) instead of auction decisions alone. It appears that the impedance in reaching an overall market wide equilibrium is because of frictions in the functioning of the money market which may need to be resolved to allow the market operate near its potential strength. This conclusion is corroborated by the fact that the coefficient of the ARCH-M effect in the mean equation is significantly much higher at 0.43 and hence, explains a large proportion of the average gap between the call and the reverse repo rate as compared to the reverse repo accepted variable. It is obvious that reduction of the gaps between the market rate and the policy rate could be achieved satisfactorily by containing the volatility of the money market, especially that occurring during instances of sudden liquidity stress, by widening the participation rate of economy wide deficit (demand)/surplus (supply) segments and expanding the range of repoable collateral in the repos market. It is noteworthy that recognising this aspect, the Reserve Bank in March 2003 permitted Constituent Subsidiary General Ledger (CGSL) account holders to participate in the repo market, thereby increasing the participation rate of constituents and substantially reducing the volatility in the market - a fact substantiated by empirical NB decomposition. Given

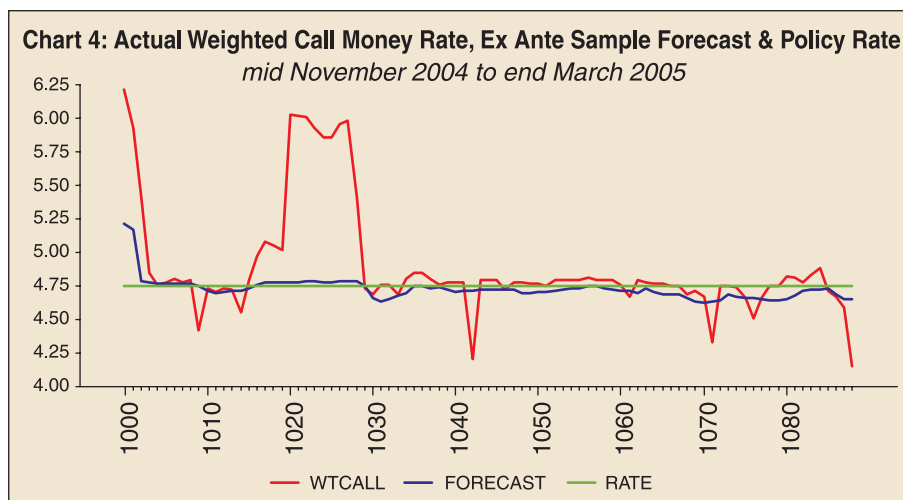
the integral link between the money and government securities market, increasing the range of repoable securities may also help in insulating the government securities market from exposures to market risks caused by random liquidity shocks.

Chart 3 compares the actual call money rate with the estimated rate derived from the mean equation of the ARCH-M model estimated above. It is observed that though the estimated trajectory tracks the actual path of call money rate closely throughout the sample period, there are certain occasions when large spikes are observed which are not explained fully by the empirical model. These spikes caused by sudden mismatches in liquidity of the otherwise stable equilibrium require appropriate balancing through timely liquidity injection measures.

The daily *ex-ante* (out of sample) forecasts of call money rate for the period from mid November 2004 up to end March 2005 are plotted against the actual out turns in Chart 4.

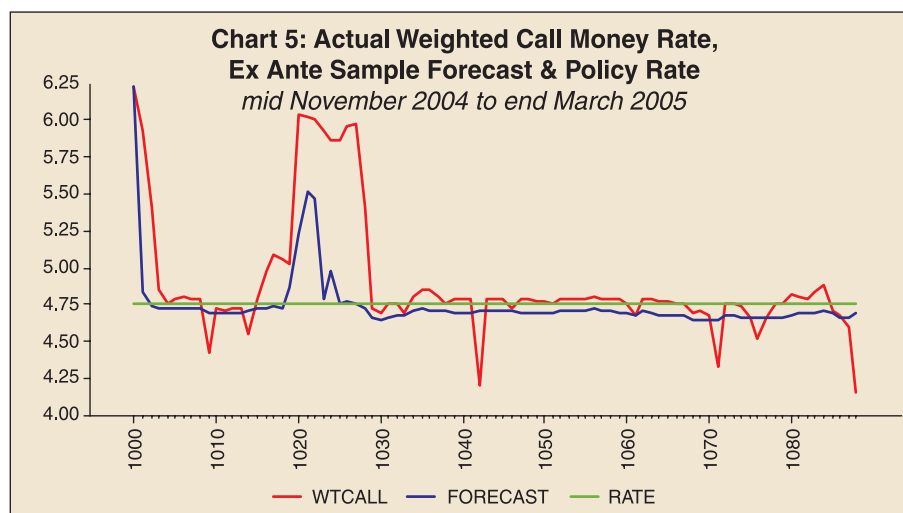
Model estimates suggest that while the out of sample forecasts closely track the policy rate following the law of equilibrium mostly during periods of surplus liquidity with an average error of just three basis points, the call money rate shows the tendency to overshoot (average *ex-ante* tracking error of 17 basis points) during times of liquidity shortages which are seen as large spikes in the Chart 4, necessitating RBI to open its repo window. As depicted in Chart 5 the forecast performance is not significantly improved





even if the model is augmented with the information on repo interventions (*viz.*, repo amounts accommodated by RBI during periods of liquidity shortages). Therefore, since the accommodation provided during shortages does not explain the variation in gaps substantially, it appears that much more explanation should be owed by other factors, namely the operational aspects in the market itself.

The inter-bank money market volatility may be transmitted to other financial markets causing financial entities to bear the costs of portfolio adjustments. One of these financial markets is the



government securities market which has a significant bearing on the balance sheets of banks and other financial institutions (especially, insurance companies and pension funds) given the large holdings of such securities in their portfolios. In order to test the impact of money market volatility on the volatility in the yields of government securities, a simple AR1 regression for the full sample is performed to compute the volatility in the yield of government securities (based on secondary market yield of the representative central government security with 10-year residual maturity). A regression is then performed with volatility of government securities as independent variable and the conditional volatility derived from the ARCH-M model as explanatory variable.

The empirical evidence suggests that the volatility in the government securities market is significantly influenced by the volatility (or liquidity shocks) in the money market, explaining about 22 per cent of the fluctuation in yield. It is therefore necessary that the volatility in the money market caused by liquidity shocks is moderated to the maximum extent possible so that securities yields are determined on the basis of fundamental economic factors such as inflationary expectations rather than day to day liquidity conditions.

$$\text{Volatility}_{(10 \text{ year GSEC yield})} = 0.0027 + 0.008 \text{ Cond. Variance}_{(money \text{ market})}$$

$$(2.80) \quad (3.21^*)$$

$$\bar{R}^2 = 0.22 ; \text{SEE} = 0.01 ; \text{DW} = 2.10$$

*' denotes that the coefficient is significant at 1%

Section V

Concluding Observations

The deviations of the call money rate from the policy rate particularly aggravated during periods of liquidity stress, notwithstanding complete accommodation offered to eligible

counterparties by the RBI suggests that encouraging greater participation and permitting a wider range of collateral in the repos market would help in improving the efficiency of interest rate targeting. The task of doing so though is admittedly difficult under the present circumstances given the perceived difficulties in collateral management such as pricing and risk mitigation for classes of collaterals other than sovereign securities.

It may, however, be mentioned that the willingness of central banks particularly those in developed economies to accept a wider array of commercial collaterals even for direct monetary operations is predicated upon the need to uphold the integrity of the policy rate and to minimise the cost of volatility in interest sensitive financial markets. It is in this context that the present structure of the money market needs to be viewed, given the implications for related financial markets. The evidence provided by the empirical model brings out that while the call money rate is tracked reasonably accurately during surplus liquidity conditions, the predictive power suffers a loss when liquidity shortages suddenly emerge. The fluctuations in the call money rate during these periods of shortage are observed to continue for a couple of days notwithstanding the fact that most often full accommodation is provided by the Reserve Bank. The average daily in-sample bias of 25 basis points in forecast seen during the sample period is attributable mainly to random liquidity shocks experienced by the market. This bias could be expected to increase whenever the market begins to return to the deficit mode. It, therefore, stands to reason that further integration of the money market by expanding participation in market repos and, perhaps more importantly, finding ways to introduce other classes of eligible collateral could help in the timely matching of the needs of the surplus and deficit sectors. Meanwhile, the feasibility of increasing the number of LAF operations alongside options to separate the timing of repo and reverse repo operations for market stabilisation could also be considered.

Given the increasing market orientation of the financial system and the significant interest sensitivity in the recent years, ensuring long term consistency between the policy rate and the targeted rate would serve to limit the volatility in different segments of interest sensitive financial activities.

The experience regarding the improvement in the stability of the money market rate since the expansion, in March 2003, of inter-bank repos market due to the participation of CSGL account holders, lends support to the idea that enhanced participation rate in the repos market would promote stability. The Annual Policy Statement of the Reserve Bank for the year 2005-06 has taken important initiatives to increase participation by permitting non-scheduled urban co-operative banks and listed companies having gilt accounts with scheduled commercial banks subject to eligibility criteria. The development of the market repos would also be benefited by the draft guidelines in respect of securitisation of standard assets leading to orderly growth of the market for asset backed papers, which may then have the likelihood of being accepted as eligible repoable collateral. The proposal for an electronic trading platform for market repos would also improve the price discovery process.

The introduction of other eligible collateral for repos/CBLO would reduce risk of unsecured lending in the call money market, and in others such as in the inter-corporate deposit market and hence serve to foster greater stability of the financial system. It is notable that the report of the Technical Advisory Committee on money market has also favoured the introduction of asset backed commercial papers. An expected externality from the expansion of eligible securities for market repos is the stimulus that would be imparted to the hitherto dormant markets for these financial products.

Finally, as a technical point of interest, since systematic or conditional element in volatility is a dominating feature of the market process, it is desirable that conditional volatility is estimated on an ongoing basis for forecasting the volatility of inter-bank money market rate for policy support.

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Boom and Slump Periods in the Indian IPO Market

Saurabh Ghosh*

This paper attempts a detailed investigation of the boom and slump phases in the Indian primary capital market. It concentrates on two key variables, namely, IPO volume and initial returns and analyses their nature and interrelation during these two periods. This study also analyses the firm-specific characteristics and their influence on the timing of a company getting listed in the hot and cold market. The IPO volume series was autocorrelated over the entire period and especially during the boom period. This shows a firm's decision to go public over the last decade depended on the number of other companies that were getting listed over the previous months. Turning to the interrelation of volume and initial return, the empirical exercise (Granger causality test) found no significant relation between IPO volume and initial returns during the hot and cold periods. This suggests that over the sample period, the Indian issuers' did not depend on the information content of the initial returns while taking their decision to go public. Amongst the other characteristics that might have influenced the likelihood of IPOs during hot and cold market (*e.g.* industry classification, age, size and underpricing of new issues), this paper finds no significant influence of industry affiliation on the IPOs during the boom period. The results also documented that more established firms have greater likelihood to get listed on the capital market to raise large amounts and underprice more during the slump period.

JEL Classification : G32

Keywords : Going public, IPO, Underpricing, Cycles.

Introduction

It has been empirically documented that the IPO market experiences cycles in terms of volumes of new companies, which is referred to in the literature as “hot” and “cold” periods. It is considered to be an empirical anomaly for which no unanimous explanation is yet provided for. The most well known among the sighted explanations is technological innovation or positive productivity shock that changes the prospects of IPOs from a

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particular industry. Empirical studies have found that small and young firms time their offers to use investors' optimism in their favour and get listed during the booming period. There are evidences of high underpricing¹ and industry clustering during the hot periods, though their nature and extent have differed from country to country.

Only four countries in the world (namely U.S.A., India, Romania and Canada)² have more than three thousand listed companies in their stock exchanges. In India, during 1990s alone, 3,537 companies got listed on the Bombay Stock Exchange (BSE). The last decade is also important, since the Indian economy in general and primary capital market, in particular, has undergone remarkable changes during this period. The liberalisation programme initiated in 1992 along with other changes have enabled large Foreign Direct Investment (FDI) and Foreign Institutional Investment (FII) inflows, giving a 'big push' to the capital market. The abolition of the Controller of Capital Issues (CCI) also had a major impact on the activities in the Indian primary market. It witnessed a boom phase (1993-96) when more than 50 companies got listed every month. However, from end 1996 till recently the primary market has witnessed a considerable decline in the number of new issues and the total amount of capital raised.

This paper attempts a detailed investigation of the boom and slump phases in the Indian primary market. It concentrates on two key variables, namely IPO volume and initial returns series and analyses their nature and interrelation during these two phases. This study also analyses the firm-specific characteristics (*i.e.*, age, industry type, size) and their influence on the timing of a company getting listed during high volume period as compared to low volume period.

The remainder of the paper is organised as follows. Section I contains a survey of international literature. Section II outlines the data sources for this study and Section III discusses the methodology used and presents the results. Section IV summarises the main findings with some concluding remarks.

Section I

Literature Survey

Ibbotson and Jaffe (1975) were the first to document the existence of the “hot issue market”. Since then a large number of academic studies have concentrated on the cyclical nature of IPO market. While different authors have used different definitions of hot market (IPO volume, initial return, market adjusted initial return), the financial community has been unanimous about the existence of cycles with dramatic swings in the new issue market. The dramatic swings refer to the fact that often the periods of high volume and high initial return are followed by periods when the number of issues and the high initial returns completely die down. Besides the existence of dramatic swings, empirical literature has also documented the presence of autocorrelation in IPO volume series, underpricing series along with lead-lag relation between these two series [Ibbotson and Jaffe (1975), Ritter (1984), Ibbotson, Sindelar and Ritter (1988, 1994), Lowry and Schwert (2002)]. While economists are unanimous about the existence of hot and cold markets, there remain some differences in the underlying explanations provided by them.

Theoretically, a firm’s objective is to collect as much money as possible from the investors for a given quantum of shares offered and thus firms are expected to go public when initial returns are low. The empirically established positive relation between initial return and IPO-volume poses a puzzle and underlines the signalling role (or information content) of initial return series. Ritter (1984) justified this phenomenon as an equilibrium relation between risk and initial return. He argued that during hot issue market a large number of firms come from high-risk industries and as a consequence the initial return goes up. Explaining why a large number of firms would get listed in a particular period of time, Ritter (1984) argued that this might be in reaction to a technological innovation or a positive productivity shock that might have convinced the investors about the high profitability of a particular sector. On a similar line, Hoffmann-Burchardi (2001) argued that a hot issue market typically arises from bunching of IPOs and activities in few industries. Both IPO clustering and underpricing, according to Hoffmann-Burchardi (2001), are the result of positive surprise about industry prospects.

While the above mentioned literature suggests concentration of IPOs during the hot periods and change in the firms' characteristics during hot and cold markets, Helwege and Liang (2001) found that the IPOs in hot and cold periods came from similar industries and had similar characteristics. The authors claimed that this result does not contradict the idea of IPOs clustering into new products and industries during different market conditions.

Another explanation of the large volumes and large initial returns during the hot market is based on Allen and Faulhaber's (1989) IPO signalling model. The signalling theory predicts that following a technological and productivity shock, a large number of good companies will come to the market during the hot period. They will underprice their issues to gain investors' confidence and to prove their better quality to the investors.

While the signalling model appears convincing, there exists an antithesis to it. It is well documented in the literature that there remains an information gap between the investors and the issuers at the time of offering and there are periods when enthusiastic investors overvalue the newly listed companies. The IPO literature has frequently emphasised the role of investors' optimism and the consequent hot market. Ritter (1984) provided empirical evidence of investors' over-optimism in bidding up the aftermarket prices. Empirical literature [Ritter (1991), Jain and Kini (1994), Ibbotson, Sindelar and Ritter (1988 and 1994), Lowry and Schwert (2002), Helwege and Liang, (2001)] has documented that the underperformance is more for small and young companies that mostly go public during the hot market period.

Companies planning to go public try to predict the investors' sentiment on the basis of market behaviour. Lowry and Schwert (2002) using third order VAR models and the Granger causality tests found positive relation between average initial return and subsequent IPO volume. The authors argued that the initial returns might be interpreted by the potential issuers and investment bankers as an indicator of investors' optimism and hence this might explain the observed lagged relation between initial return and volume of IPOs. Ibbotson, Sindelar and Ritter (1994) argued that investors' follow a positive feedback

strategy. This theory says that the investors are willing to bid up the price of an issue if another recent issue has risen in price. If a large fraction of investors follow this logic, then it generates a positive autocorrelation among IPOs in a self-fulfilling prophecy.

Against the above backdrop, the objective of this paper is to study the hot and cold phases in the Indian IPO market and to analyse the factors that influenced the volume, underpricing and timing of issues during these two phases. In particular, this paper addresses the following questions:

1. Is there any time pattern evident in the IPO volume and the underpricing series observed during the 1990s? Are the two series affected by their past behaviour?
2. Does the initial return series convey any information that affects the volume of subsequent IPOs? In other words, did the issuers in India time their IPOs in response to the information content of initial return series?
3. Whether the firm-specific characteristics have a role in influencing the decision of firms getting listed during the hot and cold phases?

Section II

Data

The main data sources for the present analysis are the Monthly Reviews published by the Centre for Monitoring Indian Economy (CMIE) and the Prowess Dataset. The monthly reviews contain information on companies' name, issue date, listing date, issue price, listing price and the issue amount. A large number of new companies got listed on the Bombay Stock Exchange (BSE) during the last decade. Before May 1992, the Controller of Capital Issues (CCI) used to determine the issue amount and offer price of the IPO companies. After the abolition of the CCI, the new Securities and Exchange Board of India (SEBI) guidelines gave considerable freedom in terms of deciding the issue price, issue amount and a large number of IPO got listed in the subsequent years. This analysis is based on 1842 IPOs

that got listed in the post CCI period³ (between January 1993 and March, 2001) on the Bombay Stock Exchange (BSE) and information on these companies is available on Prowess dataset. Before discussing the trends in the Indian primary market in more detail, an explanation of the different variables used in this analysis is set out :

‘Initial return’ or ‘underpricing’ (U_D) is defined as the percentage difference between the listing price (closing price of first day’s trading) and offer price. The monthly average underpricing gives the average of all the companies, which got listed in that particular month. IPO volume represents the number of companies that got listed in a particular month on the BSE. The variable ‘Issue Amount’ (IA) or SIZE reports the total amount of money collected by the issuer from the investors through the IPO. The value of money has changed substantially over the period under consideration. This calls for the adjustment in the issue amount and implicit GDP deflator is used to convert the same at constant prices. In India, over the sample period, the offer to listing lag was long and varied considerably among the issues. Because of the long time lapse, the use of market index adjusted initial return has often been suggested, rather than initial return, as a preferable measure of underpricing in India (Shah, 1995). The variable A_UD reports the underpricing after adjusting for the BSE Sensex returns over the issue-listing period.

Section III

Empirical Findings

Table 1 reports the average of the key variables over the entire 1990s. It shows that the average amount raised over the years has increased in the second half of 1990s. The number of new issues that got listed on the BSE went up considerably during 1993-96. These three years were followed by a slump when the number of IPOs went down substantially.

As mentioned earlier, for the empirical analysis, this study considered the post CCI period (1993 onwards). Following Loughran and Ritter (1995) and Helwege and Liang (2001), the analysis classifies the market as “hot” or “cold” on the basis of the IPO volume. A close inspection of the monthly volume of IPOs shows that there

Table 1: Averages of Key Variables for Indian IPOs

Year	SIZE (Rs. crore)	U_D	A_UD	Volume
1	2	3	4	5
1991-2	9.89	300.72	270.85	8
1992-3	14.01	237.25	221.42	15
1993-4	8.88	81.58	70.54	50
1994-5	9.24	100.26	100.52	81
1995-6	11.30	41.45	42.15	86
1996-7	9.68	38.60	38.43	42
1997-8	41.39	87.54	82.58	3
1998-9	18.54	85.43	85.31	2
1999-0	29.71	537.73	519.92	4
2000-1	22.11	103.56	104.52	6

Size : Money raised by the issuers from public at constant prices;

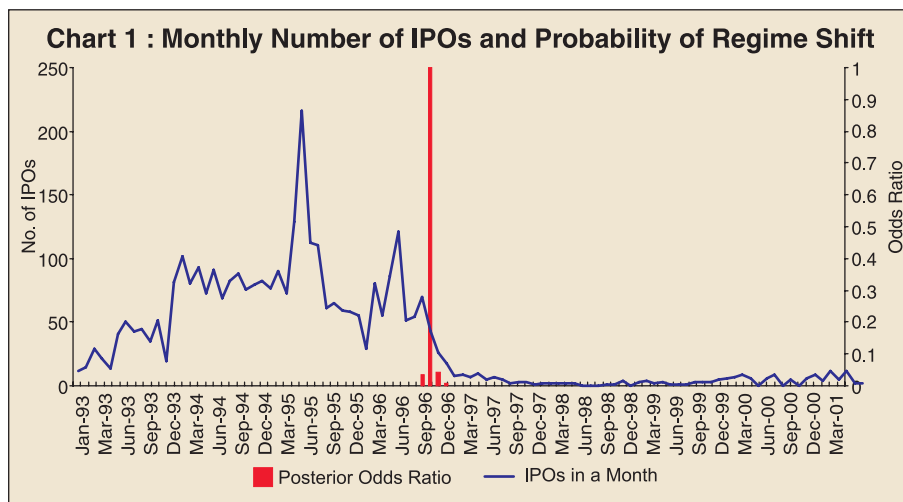
Underpricing (U_D) : percentage difference between listing and offer price.

A_UD : Underpricing adjusted for the market return over the issue-listing period;

Volume: The average of the 'number of IPOs getting listed on BSE in a month' over the financial years considered here.

Note : All averages reported in the Table are significantly different from zero at 1 per cent level.

were two distinct phases in 1990s. Empirically the timing of this structural break has also been confirmed by the Markov Switching process. Chart 1 shows the number of IPOs over the months and the probability of the structural break (switching regression model) in the Indian primary market. There was a boom phase when (on average) more than fifty IPOs got listed on BSE per month (1993:01



to 1996:09) and subsequently a slump when only a handful of companies raised money from the stock market.

It is evident from the literature survey that the IPO volume and the underpricing series follow a certain time pattern. The periods of large number of IPOs and the high initial return are followed by periods when only a handful of companies get listed in the market. Empirical evidence suggests that the firms' decision to go public could also depend on the behaviour/decision of the other companies and on the observed initial returns. The decision to get listed and its timing are also found to depend on firm-specific characteristics (e.g. industry affiliation, size of the issue, age).

Having identified the boom and slump periods, and in light of the above observations, the subsequent sections of this paper analyse the pattern and characteristics of the key variables over different phases in the Indian IPOs market.

Time Pattern of IPO Volume and Initial Returns

In this section we analyse the IPO volume and underpricing series individually taking into account different phases in the Indian IPO market during 1993-2001. Lowry and Schwert (2002) argued that the fluctuation in IPO volume series could be related to three factors. These are changes in private firms aggregate demand for capital, changes in cost of issuing equity (underpricing) and variation in investor optimism. In face of cyclical pattern in the IPO market, empirical evidence from the developed countries suggests that the volume and underpricing series depend considerably on their past behaviour. Table-2 reports the autocorrelation in the monthly volume, underpricing and index adjusted underpricing series for the Indian IPO market.

Empirical results show that the monthly volume of IPOs has a large autocorrelation (first lag coefficient being 0.62) that dampens slowly over the increasing lags. However, the other two series, namely, underpricing (U_D) and market adjusted underpricing (A_UD) did not show signs of any strong autocorrelation or uniform damping pattern over the sampling period. The inertia or time dependence is indicative of the

Table 2: Autocorrelation in Volume and Underpricing Series in Different Periods

Lag	Whole Period			Hot Phase			Cold Phase		
	U_D	A_UD	Vol	U_D	A_UD	Vol	U_D	A_UD	Vol
1	0.17	0.14	0.62	0.54	0.55	0.86	0.06	0.05	0.33
2	0.22	0.20	0.46	0.33	0.38	0.80	0.16	0.15	0.46
3	0.13	0.12	0.36	0.26	0.30	0.76	0.06	0.05	0.29
4	0.12	0.10	0.22	0.14	0.18	0.70	0.04	0.03	0.14
5	0.26	0.25	0.19	0.14	0.17	0.69	0.21	0.21	0.23
6	0.05	0.03	0.11	0.05	0.01	0.65	-0.04	-0.04	-0.13

Note : Underpricing (U_D) is the percentage difference of listing and offer price; Underpricing adjusted for the market return over the issue-listing period (A_UD); Here U_D and A_UD are equally weighted averages over the months. Vol: No. of IPOs getting listed on BSE in a particular month. Whole period (Jan 93 to Mar 2001); Hot Period (Jan 1993 to Sep 1996)–more than fifty IPOs in a month, Cold Period (Oct 1996 to March 2001)–less than fifty IPOs in a month.

information content of the IPO volume (number of IPOs in a month) which could have signalled the issuers about the buoyant market conditions or the new profit prospects.

From Table 2, the differences in the pattern of the autocorrelation coefficients over different phases become quite evident. For the boom period, the coefficients display a high initial autocorrelation coefficient and a slower damping pattern over the lags while during the cold period, the same show a weak and mixed pattern. So, it appears that during the boom period, a company's decision to go public depended more on past IPO volume as compared to the slump periods. The above analysis suggests that the nature and pattern of autocorrelation over the entire period of time and over the sub periods differ considerably. The high autocorrelation in the monthly IPO volume during the hot market might be indicative of the investors' optimism resulting from the array of liberalisation measures announced during the first half of 1990s. The underpricing series also illustrated considerable autocorrelation and slow damping pattern over the increasing lags during the boom period. The similarity in the autocorrelation pattern of the IPO volume series and underpricing series might be indicative of one influencing the other during the hot market period as observed in the developed markets. We investigate the interrelation between the volume and underpricing series in greater detail below.

Interrelation of IPO Volume and Underpricing Series

Besides the observed autocorrelation, the other question that needs due attention is the relation between the IPO volume and underpricing. This is important since the existence of such a relation would imply that the issuers' time their offers in response to the 'value-relevant information' (Lowry and Schwert (2002)) available from the underpricing series and *vice-versa*.

For empirical investigation of the IPO volume and underpricing relation, following Lowry and Schwert (2002), this paper attempts Granger causality tests to examine the presence of any causal relation between IPO volume and past underpricing.

Granger causality test assumes that 'X causes Y' if the past values of X help in predicting Y in addition to past values of Y. The causality test is generally done by running regression of the following form:

$$Y_t = \sum_{i=1}^m \alpha_i Y_{t-1} + \sum_{i=1}^m \beta_i X_{t-1} + U_t$$

If the β_i coefficients ($\forall i=1, \dots, m$) are jointly and significantly different from zero (the F-test statistics is greater than its critical value) then the null hypothesis "X does not cause Y" is rejected. In order to determine the optimal lag length (m) this paper uses the Schwarz information criterion.

Before proceeding to test the causal relation between monthly volume of IPOs and the monthly average underpricing one must ensure that the two series considered are either stationary or have 'same statistical property'. By 'same statistical property' it is meant that the series have to be differenced or de-trended the same number of times to render them stationary. To test for the stationarity of the series, Augmented Dickey Fuller (ADF) test⁴ was performed. The ADF test found the presence of unit root (at one per cent level) for the three series considered during the whole period and for the hot period. However, all the three series were stationary during the cold period. Perron (1993) has argued that the stationary property of a series runs into problem if the period considered consists of two sub-periods of different statistical property. So, for the causality test this

paper considers the hot and cold periods separately and not the entire period. To take care of the non-stationary problem during 1993-96, IPO volume and underpricing series were differenced⁵ for the hot period. However, the series in levels were used for the cold phase.

Table 3 reports the coefficients and Granger-F statistics for volume and underpricing for the periods considered, the lags being selected on the basis of Schwarz information criterion as mentioned

Table 3: Causal Relation Between Volume and Underpricing

1	Hot Phase				6	Cold Phase			
	U_D cause Vol		Vol cause U_D			U_D cause Vol		Vol cause U_D	
	Coeff	P-Val	Coeff	P-Val		Coeff	P-Val	Coeff	P-Val
2	3	4	5	7	8	9	10		
U_D1{1}	0.08	0.53	-0.45	0.02	U_D{1}	0.002	0.13	0.14	0.43
U_D1{2}	0.11	0.42	-0.37	0.05	U_D{2}	-0.001	0.81	0.36	0.05
U_D1{3}	-0.09	0.53	-0.11	0.58	U_D{3}	-0.001	0.47	-0.13	0.47
U_D1{4}	-0.02	0.88	-0.15	0.42	U_D{4}			-0.21	0.25
U_D1{5}	0.03	0.76	-0.13	0.49	U_D{5}			0.22	0.15
U_D1{6}	0.01	0.97	-0.36	0.15	U_D{6}				
U_D1{7}	0.02	0.85	-0.04	0.81	U_D{7}				
U_D1{8}	0.02	0.81	0.08	0.45	U_D{8}				
U_D1{9}			0.06	0.51	U_D{9}				
VOL1{1}	-0.30	0.11	-0.08	0.75	VOL{1}	0.143	0.41	-39.93	0.18
VOL1{2}	-0.18	0.34	-0.21	0.43	VOL{2}	0.365	0.14	-29.38	0.34
VOL1{3}	-0.11	0.58	-0.20	0.46	VOL{3}	0.272	0.20	49.36	0.11
VOL1{4}	-0.31	0.13	0.11	0.68	VOL{4}			19.58	0.57
VOL1{5}	-0.09	0.65	0.04	0.89	VOL{5}			-32.94	0.19
VOL1{6}	-0.21	0.29	-0.05	0.86	VOL{6}				
VOL1{7}	-0.07	0.75	-0.10	0.73	VOL{7}				
VOL1{8}	-0.22	0.23	0.26	0.34	VOL{8}				
VOL1{9}			0.08	0.78	VOL{9}				
Const	0.99	0.70	-4.42	0.51	const	0.78	0.30	102.93	0.42
F-Stat	0.29	0.96	0.33	0.97		1.69	0.15	1.16	0.34

Note : Hot Period (Jan 1993 to Sep 1996): more than fifty IPOs in a month; Cold Period (Oct 1996 to March 2001): less than fifty IPOs in a month; Granger F test for causal relation of volume of IPO and initial returns and vice versa; Underpricing (U_D): percentage difference of listing and offer price; Vol: No. of IPOs getting listed on BSE in a particular month; and, Vol1 (volume) and U_D1 (Underpricing) reported here refer to the first differenced series vol and U_D for the hot market.

above. The coefficients of underpricing over different lags in the causality test (for whether underpricing caused the IPO volume) reported low values and none of them were significant at 10 per cent level (Table 3, Column 2 and 3). The value of the Granger F-Statistics (0.29) and its P-value (0.96) also confirm the joint insignificance of the estimated underpricing coefficients and reject the hypothesis that monthly IPO volume was Granger caused by past values of the underpricing series. The causality analysis for the cold period (that used the above mentioned variables in the levels) supported the finding for the hot period. The coefficients of underpricing (as indicated in Table 3, Column 7 and 8) took low values. These results reveal that the issuers' decision to go public during the boom and the slump periods did not depend on the past values of the underpricing series⁶. They also show that, unlike the international experience, the Indian issuers' decision to go public was not directly dependent on the information content (investors' optimism or the cost of raising funds) of underpricing series. This might be because, the time consumed by a company for getting listed in a stock exchange in India was very high over the study period. The average time lapsed in between the offer date and listing date being 4 months, the company deciding to go public was able to get listed only after six months (two months are considered for registration and other official formalities prior to the offer). Underpricing being the percentage difference of the offer price from the listing price (the former being decided six months before the latter) might have recorded the breaking news over this long time lag rather than the investors optimism *per se*. Given such an institutional structure, it might have created considerable uncertainty on the issuers' part to decide about the investors' sentiments and/or cost of raising funds after a considerable period of time from the observed underpricing.

We also test the existence of any reverse causality (underpricing is caused by IPO volume) in the Indian IPO market. Ritter (1984) argued that the underpricing might increase during the hot market period with the increases in the number of listing, since the hot market is often a result of technological innovation or positive productivity shock that increases the number of companies getting listed from new and high risk industries. The high risk factor pulls up the initial returns during

the hot periods. Empirical results for India reject this reverse causality hypothesis for both hot and cold periods (Table 3, columns 4 and 5, 9 and 10). These findings apparently question the hypothesis of positive technological shock resulting in industry clustering - an argument that is often forwarded to explain hot market. The industry clustering issues are discussed in more detail later.

The above empirical analysis might be summarised by saying that the issuers in India during the 1990s did not base their decision to go public on the past values of underpricing series. The boom during the first half of 1990s was perhaps a result of the investors' optimism and business conditions rather than the information content of the underpricing series. While the above analysis concentrated on the time pattern and the information content of the underpricing and IPO volume series, it remained silent about the firm-specific characteristics and their influence on the timing of a firm going public during hot and cold periods. The next sub-section is devoted to a detailed study of these factors influencing the companies' decision to go public during the hot and cold periods.

Firm-Specific Characteristics of IPOs during Hot and Cold Phases

In order to test as to how the firm-specific characteristics influence likelihood of listing across two periods, the analysis in this sub-section following Helwege and Liang (2001) examines the likelihood of an IPO in hot phase *vis-à-vis* a cold phase, conditional upon the companies that actually went public during these phases. This is done by employing a logit model where the dependent variable is a coding for a discrete qualitative outcome [e.g. whether a particular company is going public in high volume (hot phase, Y=1) or low volume (cold phase, Y=0)]. The general specification of the model is as follows:

$$\begin{aligned} \text{Probability (Event 'j' occurs)} &= P(Y=j) = F(\text{Relevant factors, Parameters}) \\ &= F(x, \beta) \end{aligned}$$

where the set of parameters β reflect the impact of changes in X on the probability. The logistic distribution used here is given by:

$$\Pr(y = 1) = \frac{e^{\beta x}}{1 + e^{\beta x}}$$

Like other non-linear distributions, the β coefficients do not represent the marginal effect of the change in a particular variable. The marginal effect in such case is given by

$$\frac{\partial E(y/x)}{\partial x} = \left\{ \frac{\partial F(\beta x)}{\partial \beta x} \right\} \beta = f(\beta x) \beta$$

where $f(\cdot)$ is the density function to the corresponding cumulative distribution $F(\cdot)$ ⁷.

In an attempt to examine whether the likelihood of IPOs getting listed from a particular industry is more during the hot period, all industries were broadly classified as Primary, Manufacturing (MNF), Services (SER) and computer related industry (SOFT) and were included as explanatory variables in the logit model. It is documented in the IPO literature that small and young companies are likely to go public during the hot period to take advantage of investors' enthusiasm. To examine the validity of this argument the issue amount (SIZE) and the age of the IPO companies are included in the model to evaluate their influence on the likelihood of the Indian companies getting listed in the hot market. The other factor of interest is the underpricing of the IPO firms. Signalling theory claims that the good firms would get listed during the hot market and underprice more to win investors confidence. The IPO underperformance school, on the other hand, believes that new firms would try to collect as much money as possible from the enthusiastic investors during the hot market. So, the above mentioned model includes underpricing as an explanatory variable and evaluates companies' pricing decision during the hot and cold periods. The constant term was not included in the model in order to avoid the dummy variable trap problem. The ' β ' coefficient of the logit model estimated using maximum likelihood estimation technique is reported in the Table 4.

Table 4 shows that the primary, manufacturing and services sector considered here have similar positive coefficients. The value of the β -coefficient for the software sector is however considerably less (1.4) than that of other sectors. All the sector-specific coefficients were significant at one per cent level. This might be interpreted as the non-existence of industry clustering in India during hot market,

Table 4: Factors Influencing the Likelihood of IPOs During Hot and Cold Phases

	Coeff.	P-value	ME*
1	2	3	4
PRI	4.30	0.00	0.15
MNF	4.23	0.00	0.15
SER	3.08	0.00	0.11
SOFT	1.40	0.00	0.05
SIZE	-0.002	0.01	-0.0001
AGE	-0.04	0.00	-0.001
U_D	-0.15	0.00	-0.01

Note : *ME is Marginal Effect of the logit model

PRI is the dummy variable which takes value one if the company is from Primary Sector, otherwise zero. Similarly, MNF, SER and SOFT are the dummies for Manufacturing, Service and Software sector respectively. SIZE is issue amount adjusted by GDP deflator; U_D is Underpricing: percentage difference of listing and offer price [$(P_1 - P_0) / P_0$]; Age is the difference between the incorporation year and the listing year.

since companies from primary, manufacturing and service sector got listed in the market during this period. The β -coefficient for the software sector reported low value because this sector was just emerging during the hot period (1993-96) considered here. The marginal effect (ME) reported in Table 4 confirms this finding as the ME figure for the software sector was lower than the other three sectors. Table 4 however, shows that the coefficients of size, age, and underpricing have negative signs and were significant at 1 per cent level. The negative signs of the size, age and underpricing coefficients suggest that the large and well-established firms got listed in the cold period and underpricing was more. It might be because investors being less enthusiastic during the cold period, only the well-established firms could convince them about their prospective investments and raise funds through IPOs. It is generally believed that firms raising large amounts of money are scrutinised more by the market than their small size counterparts. So a larger size might have acted as a signal to the market and helped the issuers to raise more money during the cold period. The IPO firms during the cold period might have used underpricing as a signalling device (as suggested by the signalling theory) to persuade the investors about their good quality and raise large amounts of money from the market.

The results thus do not support the industry-clustering hypothesis explaining hot period for the Indian IPO market in 1990s. Firms from all the existing sectors of the economy took advantage of the booming primary market and investors' optimism and raised funds from investors in the first half of 1990s. The evidence presented in this paper suggests that the likelihood of established companies raising large amount from the primary market and underpricing considerably is more during the cold phase whereas the small and young companies time their issues during boom phase in the primary market.

Section IV

Conclusions

This paper attempted a detailed analysis of the Indian IPO market over the boom and slump phases. It documented that (like the developed market) the Indian IPO market experienced a dramatic swing in terms of volume of new IPOs. The IPO volume series was autocorrelated over the entire period and especially during the hot period. This shows a firm's decision to go public over the last decade depended on the number of other companies that were getting listed over the previous months. The autocorrelation in the underpricing series was weak as compared to the IPO volume series. Turning to the interrelation of volume and initial return, the empirical exercise (Granger causality test) found no significant relation between IPO volume and initial returns during the hot and cold period. This suggests that Indian issuers' did not depend on the information content of the initial returns while taking their decision to go public. A key reason for these findings could be that, unlike the developed countries, it took a long time (more than six months on an average) for Indian companies to get actually listed on the stock market after the promoters decided to go public. Underpricing derived from the price changes over the six months (or more) perhaps also captured the changing investors' expectation with the availability of new information rather than investors' optimism *per se*. So Indian corporate bodies might have depended more on long lasting market sentiments to decide on the timing of their IPOs.

Turning to the other characteristics that might have influenced the likelihood of IPOs during hot and cold market (*e.g.*, industry

classification, age, size and underpricing of new issues) the evidence in this paper suggests no significant influence of industry affiliation on the IPOs during the hot period. It is generally observed that hot market is triggered off by positive productivity shock in some sectors and companies from such sectors mostly go public during the hot period. However, the empirical exercise in this paper did not support the hypothesis that companies' from any particular sector timed their issues to take advantage of the hot phase in Indian primary market. The results also documented that more established firms came to the capital market to raise large amounts and underprice more to signal their better quality during the cold phase.

Notes

- ¹ The objective of the issuers and their investment bankers is to fetch maximum price per share conditional upon the intrinsic value of the shares. The risk is that the issue might get undersubscribed if it is perceived to be overpriced. The market price for an IPO is observed only on the listing day and the percentage difference of listing and offer price is defined as underpricing.
- ² The Emerging Stock Market Factbook.
- ³ This study concentrated on companies that decided to go public after abolition of CCI. The post CCI period is considered from January 1993 (and not from May, 1992) since it took on average six months for a company to get listed in Indian stock market after it decided to do so. Four months is the average offer to listing time lag and two months considered for pre offer formalities.
- ⁴ ADF test is given by

$$Y_t - Y_{t-1} = \alpha + \beta t + (\rho - 1)Y_{t-1} + \sum_{j=1}^p \lambda_j \Delta Y_{t-j} + \varepsilon_t$$

Here again the lag length 'p' is decided on the basis of Schwarz information criterion. The ADF test is considered for the null hypothesis $\gamma = (\rho - 1) = 0$, as against the alternative hypothesis $\gamma \neq 0$. If the test accepts $\gamma = (\rho - 1) = 0$ on the basis of critical ADF values, then unit root is said to exist and the series considered to be non-stationary. The ADF test reported above is in the most generalized form. The incorporation of the intercept term (α) and the trend term (βt) in the equation are optional and might be decided on the basis of the graphical pattern that the series actually follows.

- ⁵ The differenced series are found to be stationary.
- ⁶ Since the time laps was long between the issue and offer date and market movement could influence underpricing, index adjusted underpricing (A_UD) was used in the causality analysis instead of raw underpricing. However, the results with this modified variable support the above findings.

⁷ The appropriate marginal effect for a binary independent variable, say, d would be $\Pr[y=1(x^*, d=1)] - \Pr[y=1(x^*, d=0)]$, where x^* denotes the mean of all other variables in the model. Simply taking the derivative with respect to the binary variable as if it were continuous provides an approximation that is often surprisingly accurate. See Green (2000).

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Special Notes

A Revisit*

S. L. N. Simha

I am very happy to respond to Governor Reddy's request that I write "a detailed Preface to the reprint of the First Volume of the History of the Reserve Bank of India, which would give the readers the full background."

It is an excellent idea of Dr. Reddy to elicit from the author, after about thirty-five years, important and interesting aspects of the background of the History that may contribute to a full understanding of the contents of the History, not even a comma of which has been changed in this Reprint. For the first edition, the Chairman of the Editorial Committee, Dr. C.D. Deshmukh, wrote the Preface, though it reflected fully my ideas. Whatever I say in this Preface now is not a repetition of what has already been said. My hope is that at this advanced age (87), my memory has not failed me, at least on important matters.

Why the Project Taken Up in 1968?

The first question that may strike the readers is as to why the History project was embarked upon in 1968, only 33 years after the Bank's establishment, whereas very much older central banks had their history prepared after a very long interval. It is customary for us to compare the positions here with those of England, whatever be the subject. The first volume of the official history of the Bank of England was brought out about 250 years after its establishment in 1694!

In his Foreword, Governor Jha has given the reasons for understanding the preparation of the Reserve Bank's history. Though it was a young institution, the Reserve Bank of India (RBI) was one

* By Shri S. L. N. Simha who was entrusted with the compilation of the First Volume of the History of the Reserve Bank of India.

of the oldest central banks in the developing countries. Its formative years were eventful in many respects. “All these make the Bank’s initial years of special interest. The Bank therefore felt that it would not be too soon for a history of its earlier years to be written”.

The Governor also stated that a factor influencing the Bank’s “decision was that at this stage it was possible to draw upon the knowledge of those who were connected intimately with the Bank in its earlier years”. The Governor made particular reference to Deshmukh, the first Indian Governor, who had agreed to chair the Editorial Committee.

I think other influences were also there to make the Reserve Bank take up the History project. In the matter of the preparation of the history of central banks, commercial banks and other institutional agencies and organisation, there was a marked change in the 20th century, especially after World War II. There was a notable tendency for institutions to become publicity conscious, an aspect of which was to arrange for the compilation of a history of the institution. Central banks too fell in line. International financial institutions like the IMF and the World Bank also started compiling their history, after something like two decades of their establishment towards close of 1945. In India, the State Bank of India authorities took steps, sometime in the early 1960s, for the compilation of the history of their predecessor institution, the Imperial Bank of India.

Undoubtedly, all this influenced, gradually, the Reserve Bank of India to embark upon a history of the Institution. I remember, distinctly, that when sometime in 1958 I went to see Governor H.V.R. Iyengar to give him the first copy of a new edition of the Bank’s *Functions and Working*, he remarked “ I suppose that before long we have to think of starting work on the Bank’s history. Keep this in mind”. I am sure he would have taken some action on this during his tenure of office but for the Mundhra affair, which dampened the spirits of this dynamic Governor.

It took about a decade for Iyengar's expectations to be realised. Early in 1968, the Bank decided to have a history of the Bank compiled. A memorandum in this regard was placed before the Committee of the Central Board for its concurrence.

I think it is fair to let the reader to know that the Bank's decision to embark on the History project early in 1968 rather than sometime later, was also related to the Bank's desire to keep me in the Bank's service, as I had thrown many hints that I might leave the Bank as I found it impossible to work with my official superior at the Industrial Development Bank of India (IDBI), which was then a subsidiary of the RBI. When I returned to India on 1st July 1964 from my assignment at the IMF, I was transferred to the IDBI, out of displeasure of the bosses, since I had declined to go to the UTI as the Executive Trustee. I accepted this in protest, though the silver lining was that I would be working with Dr. Madan, as my boss. He and I had worked together very cordially and productively from the time I joined the Bank in 1945. I found it impossible to carry on with Dr. Madan's successor and I proceeded on leave, from sometime in September 1967, not an uncommon phenomenon! I did not trouble the new Governor, L.K.Jha, who had assumed office earlier in July.

Sometime in January 1968, I met the Governor to discuss my future in the Bank. In particular, I asked him about my going back to the Bank proper. He said that would be possible, but I had to take a salary cut, the extra amount which I had been given as General Manager of the IDBI, as compared to my emoluments at the RBI. This meant getting the same emoluments and status that I had before I left for the IMF in December 1961, and this after what was generally regarded as good performance at the IMF and also as a delegate, on behalf of India, to some U.N. Committees, including the most important of these, the General Assembly of the U.N. at the 18th session. I hinted, in somewhat strong language, that I might leave the Bank's service and the Governor said, raising his voice, that I was welcome to do it. By that time tea arrived and we sipped the beverage in silence, he in between his puffs of cigarette. He looked

at his watch and then said “Simha, we have spent more than an hour and let us leave this matter for a while”. The next time I met him was to give the draft outline of the History I had prepared for the use of the Editorial Board!

In parenthesis, I must say that I did not believe the story that the Governor was helpless that if I went back to the Bank I could not get the present emoluments and some corresponding increase in my status. It was obvious to me that some people in the Bank did not want me to go back to my old department - Research and Statistics, which held much scope for work and raise, and cooked up a case to achieve their object.

From the foregoing, it would appear that the timing of the History project to commence in March 1968 was related to the expiry of my leave by the end of February. Since I did not wish to go back to the IDBI and the Bank envisaged difficulties in taking me back to the RBI, without reduction in the salary, the only way of keeping me in the Bank's service was to entrust to me the writing of the History, without looking for anyone else, giving me the special designation of “Officer-on-Special Duty”, with the emoluments unchanged. I considered that the arrangement was good for the Bank as well as me, particularly since I had the requisite qualifications for the job.

Editorial Committee

I may add that Deshmukh was quite pleased with my choice as the writer of the History, since he had watched my work, at close quarters, at the RBI for four years and learnt about my work at the IMF too, as a staff member and later as a member of the Executive Board. During these years, I had many occasions to meet him in Washington, Mumbai, New Delhi and Hyderabad.

I was very happy at the choice of the Editorial Committee. Besides Deshmukh, I knew the remaining three members too very well. Anjaria and I worked together in the RBI, for about a year, and at the IMF for about two and half years. He was my senior in both the places. I also knew him as a fellow economist from 1940. He

wrote an excellent review of my M.A. thesis, *The Theory of Interest*, published by the University in book form. I had many contacts with Saraiya, thanks to my dear friend Hasmukhbai Parekh. Bhabatosh Datta too was known to me well, especially after he joined IMF service for 3-4 years, as Division Chief.

I must add, however, that knowing the Editorial Committee members intimately is not an unmixed blessing, especially if a member has had official connections with the institution whose history was being written. It could lead to situations when the author may have to yield to the Committee against his best judgment. Writers of history must ever be vigilant. I must hasten to add that I was fortunate in this regard with regard to my Editorial Committee colleagues.

I must mention 2-3 matters in this connection. Anjaria and Saraiya complained that I had said very little about the 'outstanding' role which Sir Manilal Nanavati, Deputy Governor in the years 1936-41, had played in the matter of agricultural credit. I said that from the documents available, the Governor, Sir James Taylor, had taken direct interest and responsibility in regard to agricultural credit, and I could find very little material about Sir Manilal's role. Chairman Deshmukh came to my rescue. He said that what I mentioned was correct and added that Sir Manilal's contribution was considerable but much of this was behind the scenes. Since he happened to be the Secretary of the Bank when Nanavati was Deputy Governor, he had personal knowledge of the matter and so he drafted something in 3-4 places to bring out Nanavati's contribution. Anjaria and Saraiya were not quite satisfied, but did not pursue the matter.

I had to disappoint Deshmukh himself on two matters. First, he said that in connection with the visit to India of Sir Otto Niemeyer in 1936, to conduct a financial enquiry in terms of the Government of India Act, 1935, and in particular to make proposals for the assignment of 50 per cent share of income tax to the provinces, he (Deshmukh) had prepared a memorandum to be submitted to Sir Otto, on behalf

of the C.P. and Bearer Government, and that the memorandum was very much appreciated by Sir Otto. Deshmukh gave us the gist of what he had written and inquired if the matter could be put at a place he considered appropriate. I said No. I must have a copy of the actual memorandum. I tried my best with the Maharashtra Government to secure a copy, but it was an impossible task, was the reply. Deshmukh did not pursue the matter.

Deshmukh was largely responsible, as Finance Minister, for the All-India Rural Credit Survey organised by the Reserve Bank in 1951 and completed in 1954. He inquired, at a meeting of the Editorial Committee, whether the gist of the report, including the proposal for nationalisation of the Imperial Bank could be mentioned briefly, in two-three pages in our Report. Saraiya said he had no objection, but I was not in favour of it. Here again, Deshmukh did not pursue the matter.

Other than what I have mentioned above, there was no item, small or big, on which there was any difference between me and the Editorial Committee. It was totally a smooth affair!

Staff for the Project

Although the professional staff that I asked for the History project was relatively small, just eight, it was not easy to get them. With great difficulty, I could secure the services of only five junior officers, of whom two were meant wholly to cover the subjects of the RBI's role in the spheres of agricultural credit and banking regulation, respectively. Of the remaining three, one officer, an excellent person otherwise, was not in good health and was planning to seek premature retirement. So, really for the major part of the History work, I had only two assistants, both ladies, but I must say their capacity for work and dedication were of the highest possible order. Another person of great help was our liaison officer with the Bank's administration department, Nispat Desai, an exceptionally pleasant chap. With his long service in the Secretary's section of the Bank, he was very helpful in getting us documents from

within the Bank, and also photographs. I rejected recruitment from outside, after careful consideration.

Our stenographic staff was also adequate, considering that in those years there were neither computers nor zerox facilities. At least six copies had to be taken of the drafts. But they rose to the occasion and did a magnificent job, inspired by my long-standing secretary, Kurup, who was also exceptionally strict in the matter of maintenance of the secrecy of the papers.

My experience in the History project brought out vividly what miracles can be achieved by the motivation of the staff, at all levels. Shortly after the History project started in March (1968), one Saturday I took the five officers to my house, close to the Bank, and spoke to them about the importance of the project on which we have embarked, the first one of its kind the Bank had undertaken. It was the duty of all of us to endeavour to achieve excellence in every aspect of the work and bring glory to the Bank.

Apart from loyalty and exceptionally high sense of duty to the institution, I sought from them personal loyalty to me. It is interesting that of the five officers selected to assist me, one, Pilo Mirza, worked in my section right from the time she joined the Bank in 1946 or so. I also took her to Washington as our technical assistant, when I went there in 1961, to work at the IMF as India's Alternative Executive Director. She assisted Anjaria too. The IMF personnel department used to say that they had not seen at all a technical assistant of Mirza's devotion.

Krishna Murthy, who assisted me in drafting the sections on banking, was my student at the University of Mysore. I think he was of Brahmananda's batch. Ramanathan, who was to assist me in monetary matters, was in the Research Department of the Bank for many years, and so I knew him very well. However, he could not give his best as he was not in good health and, as mentioned already, was planning to seek early retirement. Varadarajan, the expert in rural credit, was known to me intimately, though he was working in another department, where he had earned reputation for his expertise and dedicated work.

All the five swore loyalty to me and over the months their loyalty and hard work rose higher and higher. The same was true of the secretarial staff. To them, during the two years they worked on the project, the clock did not exist nor did they think of taking even casual leave. I think they all know that I was leaving the Bank after the completion of the History project; they must give me their best.

Office Accommodation

In those days, there was acute shortage of accommodation in the Bank, while recruitment of staff was going on merrily. In many sections, an employee could get a chair and table only if some other employee was on leave! I told the management I must have accommodation in the main building, so that it was easy for me to get the records I wanted and meet people. The credit for obliging me in this regard goes entirely to D.N. Meluste, Executive Director; he was an officer who knew the relative importance of my assignment and was blessed with rare vision.

The accommodation was just enough for my staff, almost touching the shoulders of one another; they had neither the inclination nor the time to grumble or complain. Right from day one they concentrated on work. My staff sat just adjacent to my cabin, which enabled me to communicate with them frequently and for the staff to walk into my cabin as and when they needed, without any protocol. I hardly used the electric calling bell during my 25-year service in the Bank; it was even more so during the two year stay in that cabin, much to the relief of the occupants in the two adjacent cabins. In those days, ringing the bell to call the office boy (crudely called 'peon', officially) was regarded as a great privilege of an officer, and so it was exercised freely! It need hardly be mentioned that the office boys resented the bell ringing frequently.

Material for the History

I did not envisage any difficulty in securing enough material for the History on the lines I conceived and I felt that the RBI's archives

and those of the Central Government in New Delhi, which also had the papers of Sir Purshotamdas Thakurdas, the most important Director of the Central Board, should give me plenty of material. There were numerous books by Indian authors like Professor C.N. Vakil, which shed some light on the Bank's history. The Asiatic Society Library and the libraries at leading colleges contained books and Reports that could help.

I was confident that the Bank's Governors, Deputy Governors, senior executives and Directors of the Central Board, past and present, and leading financial papers, all constituted reasonably good sources. As a teacher of economics at the University, with special interest in monetary and banking matters, I also possessed a lot of knowledge relevant to the Bank's History. I was also familiar with the history of the Bank of England, right from the inception, having taught it for some years at the University.

I did not consider it necessary to obtain material from foreign sources, especially the U.K., both at the Bank of England and the office of the Secretary of State for India. There was none besides me who could be deputed for the purpose. I was not willing to stir out of Bombay till the History project was over! Information on any specific point could always be obtained through correspondence, with the help of Governor, the Ministry of Finance and the Office of the Indian Higher Commissioner.

It is not my practice to pack my books with all kinds of details, more by way of display of scholarship than real utility. Nor is it my practice to give footnotes liberally. Moreover, it was my wish that the book should be around 750 pages, royal size, inclusive of the index. Actually, it went beyond this, by about 130 pages!

Period to be Covered

Very early in the History project, when Deshmukh happened to meet me in the Bank's apartment building, where his brother also

stayed, he mentioned that he was keen that the History must cover about twenty years. I think he had in mind that the History must cover the period roughly until the time he laid down office as Finance Minister, in 1956. I had some ideas about the period the History must cover, but I told him he must first discuss the subject with the Governor and then we discuss it in the Editorial Committee. Accordingly, Deshmukh spoke to the Governor.

The Governor decided to discuss the subject with the Editorial Committee, after a week or so. I feel that meanwhile he consulted the Finance Secretary or Finance Minister.

At the meeting, as I had guessed, Deshmukh said he would like the History to cover a twenty-year period so that he might give to the author and the Committee the benefit of his experience during the five and odd year period he was Finance Minister.

The Governor then asked for my views. I mentioned that a 20-year History would require at least three years, even if I were given additional staff. In this connection, I also mentioned that the feeling in me to leave the Bank's service, soon after the History project, was getting stronger and so I would prefer a shorter period, say until the time Deshmukh relinquished the Governor's office. That would mean we take the History up to mid-1949, or the end of that year. I added that if the decision was as per Deshmukh's preference, I would not abandon the project. I would make adjustments and arrangements such that the History project did not suffer.

After further discussion, a 16-year period, 1935-51, was decided upon. In his Foreword, the Governor has said as under, about this matter:

1951 constituted a water-shed in the country's annals, since it witnessed launching of India's first Five Year Plan. It was also felt that the period that followed was too close for it to be viewed in the kind of time perspective that history needs.

Time Frame

I was very happy that the period to be covered by the History was fixed at 16 years. No time was fixed either by the Bank or the Editorial Committee for the completion of the project. From experience, I felt that I should be able to do the job by about the end of June 1970, certainly not later than September, to allow time for binding of the book. The Editorial Committee felt this was all right. Actually, the work was completed in two years, for reasons mentioned below.

Following nationalisation of the major segment of banking in September 1969, it looked as if Jha would not continue as Governor. Sometime in October or November, he called me to mention that he would probably go in March 1970 and would I please finish the History project before that, so that he may have the pleasure of writing the Foreword: I said it was difficult, but I would try.

About the same time, Deshmukh, during one of his visits to Bombay, requested me to speedup the History work, since he had other important things to do, especially the writing of his biography. He said that until the history work was over, he would not embark on any major work.

That was not all. Anjaria, whose term of appointment as Deputy Governor was to conclude in February-March 1970, felt that he might not get extension of service and so he also expressed a desire that the History project be speeded up, though he did not mention any date for this.

The last straw on the camel's back was my goodself! Towards the close of 1969, I began to feel rather strongly that I had enough of the RBI and that I should get back to academic life, not necessarily a university. The ICICI was planning to set up a financial management and research institute in Madras and it looked as if they were keen to have me as the first Director. It appears that H.V.R. Iengar, who had agreed to be the Chairman of the Board of Governors of the Institute, also expressed a strong desire that I be the first Director. The Institute

was to come up in the last quarter of 1970. I needed about six months to make arrangements for my children's education in Bombay.

For all these reasons, the History work had to be advanced by almost six months. Drafting, proof-reading and various other tasks connected with the History project had to be done under exceptional pressure, but I found that my staff, at all levels, professional and non-professional, rose to the occasion and did such a magnificent job that it did not seem that we had really advanced the work by several months. In particular, the two ladies, Mirza and Vimala, worked in a manner that was far out of this world.

I need hardly mention that the pressure on me was also terrible. I was also burdened, much against my wish, with supervising the drafting of a new edition of the Bank's publication *Functions and Working*, which the Governor said was most urgent. Even earlier, my time used to be taken away now and then for other work. Thus, for a week I had to go to Sri Lanka to give lectures at the SEANZA course, since some other person could not come, at the last minute. Articles had to be written for the new house magazine of the RBI. There were also occasions when I was called by the IDBI in connection with some major projects that had been taken up for consideration during the time I was the General Manager.

The pressure of work on my secretary and the stenographers was no less severe, generally and in particular in the last three months of 1969. The task of preparation of typed material for circulation to the members of the Editorial Committee was enormous. The matter had to be typed in two sets and compared. The era of the zerox machine had not arrived. Printing technology was such that it was difficult to incorporate additions and alterations. Proof-reading at three stages – galley, page and final page – proved onerous. Yet, none grumbled or complained or even showed signs of exhaustion. They were driven by a missionary spirit; they were participating in a great venture!

Anyway, for all the last minute hurry, the History volume came all right. It was received very well by economists, the press (many wrote editorials), former Finance Ministers, Governors and Deputy Governors, past and present and my senior colleagues in the Bank. There was general appreciation that the project was completed in two years. I had also a good word from the Managing Director of the IMF, Mr. Schweitzer. If my memory serves me right, he said that I had set such a high standard that it would be difficult for others to follow. Some went so far as to call the work monumental! There was a brief and appreciative review in *Finance and Development*, the quarterly publication of the IMF and the World Bank. If my memory does not deceive me, in two-three places in that short review, the adjective 'admirably' was used.

Freedom for the Author

It is widely accepted that the person entrusted with the writing of history of any institution must have the fullest freedom. For this purpose, it is considered desirable to select someone totally unconnected with the institution to write the history. Likewise, any committee, such as an Editorial Committee, to help the author, should consist of people, at least the majority, who have had no connections with the institution, either in the past or at present.

The above principles were not followed in the case of the first volume of the History of the Reserve Bank! All the same, the principle of freedom to the author was achieved in a full measure, without the slightest hitch of any sort on any issue, during the entire period of the History! This feat is explained by the character and philosophy of three parties involved in the History project, namely, (1) the Bank's Governor, L.K.Jha (2) the Editorial Committee and (3) my humble self as the author.

Jha was an outstanding civilian, with academic distinction at Cambridge when Keynes was there. He believed in total delegation of work to his deputies, without the slightest interference when an eminent personality was the chairman of Editorial Committee.

After I was appointed to write the History, he did not call me even for the sake of courtesy, nor to give me instructions of any sort. When I sent him a copy of the outline of the History I had prepared, he had no comments. When I sent him the draft of the first one or two chapters, for his information, he wrote to say that he would see the History in print and nothing needed to be sent to him earlier! In fact, I even wondered if he was indifferent to the History project! He was indifferent to the point of not saying a good word about my work or any word when printed copies were given to the Directors at a board meeting, his last as Governor. Advance copies of the History came from The Times of India press that morning. He told me “ Just place copies on the table. That is enough!”

Earlier, it appears, an Executive Director proposed to the Governor that after the entire manuscript was completed, the Deputy Governors and Executive Directors must be given an opportunity to go through the manuscript and make suggestions. The Governor rejected it summarily. He said this was a matter for the Editorial Committee, especially me, to decide. But for Jha, I wonder if the History volume would have seen the light of the day for quite sometime. The only occasion Jha overruled me was with regard to the number of copies to be printed. I proposed 10,000 copies. He thought 2,500 copies. I think the book has been out of print for many years now. But this was mainly an administrative matter, which he had the right to decide.

Towards the close of 1969, Anjaria mentioned to me a different idea with regard to the publication of the volume. He wanted the whole manuscript to be sealed and kept away for a year, after which the Editorial Committee must assemble to review the manuscript and finalise it for printing! I told him it was too late to think of this as about two-thirds of the manuscript had already been printed! He was a little surprised to hear about this rapid progress of printing. I told him that without this progress, the volume would not be ready by the end of March 1970.

I must also mention here that at my request, Mr. K.C. Raman, production manager of the Times of India Press, had instructed the staff to accept my instructions freely, as though I was the production manager! Since the press was close to my apartment building, nearly every morning I used to visit the press, after my morning walk in the company of our morning club members! The cooperation of the press was magnificent. I also arranged for the manufacture of natural shade paper, at the Andhra Pradesh Paper Mills, especially for the History volume.

The Editorial Committee too gave me total freedom. In fact, it was fundamental to my accepting the responsibility for writing the history. At the very first meeting, before I could say anything about total freedom, Deshmukh himself referred to it in something like the following words:

“Simha, even as the Bank has given the Editorial Committee complete freedom as regards the scope, pattern and size of the volume, the Editorial Committee is giving you the fullest freedom. When we discuss the scope of the volume, as soon as you have prepared the outline, we may have some suggestions as regards some additions. We will discuss this thoroughly and leave it to you to decide in the light of our views.

He went on to say:

Freedom carries with it responsibility. I have seen, very closely, your work at the Bank for about four years and I had nothing but the highest regard for your work, in quality and balanced presentation of your views, be it interest rate policy or stock exchange regulation or gold policy. And, you know what freedom I gave you the newly appointed research boys in all your work. I am sure there will be no problem on either side in the history project”.

Anjaria endorsed Deshmukh’s views. He said that he was quite pleased with my work, during the four years I had worked with him,

first in the Bank and then in the IMF, marked by frankness, and fair and balanced outlook. Anjaria said “we have to give complete freedom in our own interests. We cannot be expected to bear the burden. We are only an Editorial Committee. The show is really his”.

I had absolutely no problem with the Editorial Committee nor did they have any with me. It was an exceptionally smooth affair; otherwise, the History project could not have been completed in two years, not just the drafting by me and scrutiny by the Editorial Committee, but printing, binding, etc, concerning a book of 878 pages, royal size, in days of poor technology by today’s standards.

This completes Governor Reddy’s mandate to me to write “ a detailed preface to the second edition of the volume I, which would give the readers the full fledged background”. Readers must also read carefully the Preface written by the Editorial Committee Chairman Deshmukh. It explains the scope and philosophy of the History volume. The Preface reflects very much my ideas which I mentioned to the Editorial Committee at the first meeting, and which the Committee accepted, without any reserve. In fact, Deshmukh asked me to stay with him when his Preface, the draft of which I had sent him at Hyderabad, was finalised. He said it might look odd if both he as a Chairman, and I as author, wrote separate prefaces on the same matter. I said I would do only the thanks giving in the little piece I would write in the introductory section.

In the first paragraph of the Preface, Deshmukh has mentioned “Actually, the Chairmanship of the Editorial Committee to compile an authentic and comprehensive history of the Reserve Bank of India has been for me an extremely interesting and responsible assignment”. I would say that it reflects very much my own feelings as an author. I feel it is, without doubt, the best piece of work I have done in my writing life spread over sixty-five years. It was a source of immense joy to me to be engaged in writing a book of these magnificent contents, without the usual rigmarole of ordinary facts and figures. I

now realise, much more than I did in 1968-70, the favour conferred on me by the Bank in appointing me to write the History volume!

Before I conclude, may I convey my profound thanks to Governor Reddy for having asked me to write this Preface? It has been a source of immense pleasure to me to recall to my mind personalities and events relating to the History volume thirty-five years ago. May the History projects of future years achieve great success.

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Trends in Total Factor Productivity of Manufacturing Sector in West Bengal: A Sectoral and Temporal Analysis

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This paper seeks to examine the overall industrial scenario of West Bengal for the past three decades. The paper studies the productivity of capital and labour for the two-digit industry groups and the total factor productivity (TFP) of the manufacturing sector of West Bengal as a whole *vis-à-vis* all-India and also for some selected groups of industries for West Bengal. West Bengal has lost its earlier status of one of the highly industrialised States of the country. Its share to all-India net value added, share of employment and factories has come down drastically. Profitability of total manufacturing sector has gone down. Productivity of capital of the manufacturing sector has declined, while labour productivity has increased. However, the latter has increased mainly due to a few industry groups, which are highly capital intensive and have contributed around 85 per cent of the profit of the total manufacturing sector. TFP of the West Bengal manufacturing sector as a whole has been declining, while it has been increasing in case of India. TFP of six industry groups which played a dominant role during the early 1960s has gone down except Jute industry, which itself is a dying industry. That means no new industry groups have come up to take up the position of these industries, which have been performing badly. Therefore, while the State of West Bengal has shown an impressive improvement in case of rural sector, industrial slowdown has not been arrested as yet in the State.

JEL Classification : D24, O33

Keywords : Production Function, Labour Productivity, Capital productivity, Total Factor Productivity Growth (TFPG)

Introduction

West Bengal in general and Calcutta in particular was the 'commercial and industrial hub' of the whole of Eastern India before 1947 (Bagchi 1998). The State was a leader in respect of concentration of industrial capital. The State's share in all-India stock of capital in the CMI (Census of Manufacturing Industries) sector was 24.6 per

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cent in 1950 (Banerjee 1998). Coal, jute, tea, engineering and iron and steel were the major industries of the State on the eve of Independence. In 1946 West Bengal had a larger number of factories and factory employees than any other province in India. However the situation had started changing from the partition of Bengal. Two major industries, *viz.*, jute and tea had been adversely affected by the partition. Infrastructure sector, particularly loss of Chittagong port, had also got adversely affected due to this cause. Migration from erstwhile East Pakistan also created large pressure. In the process, the State lost its industrial base. It not only fell far behind some States like Gujarat, Maharashtra, Karnataka and Andhra Pradesh, but the State had to suffer a process of deindustrialisation as well¹. Now the State has come a long way since the pre-Independence period. But the situation does not seem to have changed; rather it appears to have become worse as discussed in the following sections.

The objective of the paper is to analyse the present condition of the industrial sector of the State. The study tries to examine the factor productivity growth, especially of capital and labour across industry groups in West Bengal. The most important aspect of the paper will be estimates of total factor productivity (TFP) growth for West Bengal, supposed to be the first comprehensive attempt in this area.

The remainder of the paper is structured as follows. Section I discusses the theoretical background and the methodology of the study. Section II discusses the structure, composition and growth of industrial sector in West Bengal. Section III deals with capital intensity, and capital and labour productivity. TFP is discussed in Section IV. Concluding observations are presented in the final Section.

Section I

Measuring Productivity

Although technological progress did not get importance in the work of classical economists like Malthus, Ricardo and Mills, it is considered to be a major determinant of economic growth today. Subsequently, in the works of Marx and Scumpeter it got some

importance with varied degrees. Later on, the concept came to the fore after the works of Tinbergen (1942), Schmookler (1952), Kendrick (1956), Fabricant (1954), Abramovitz (1956) and Solow (1957).

Any growth in output that is not explained by some index of input growth is attributed to changes in technology or more broadly productivity. Thus, TFP growth is a catch-all measure that captures changes in efficiency in addition to pure technical change in the sense of shifts in the production function. As has been aptly pointed out by Goldar (1986) that since there are constraints to resource expansion in developing countries, a high rate of industrial growth to be achieved and sustained over a long period requires substantial improvement in total factor productivity.

TFP may be defined as the ratio of output to a weighted combination of inputs. “Productivity growth is generally understood to represent the exogenous shift of a frontier (best practice) production function. The distance from the frontier technology is X-inefficiency” (Srivastava 1996). Therefore, a precise decomposition of growth of output into the contribution of change in inputs and that of total productivity is based on the economic theory of production function.

There are two main approaches in estimating the productivity, *viz.*, Production Function Approach (PFA) and Growth Accounting Approach (GAA)². However, as discussed in Trivedi *et al.* (2000), there are various problems associated with the production function approach like multicollinearity, autocorrelation and degree of freedom. In order to avoid those problems we have restricted our analysis of TFP to GAA only.

The key feature of the GAA is separation of change in production on account of changes in the quantities of factors of production from residual influences, which include technological progress, learning by doing, *etc.* Multi Factor Productivity (MFP) actually surrogates these residual influences. The genesis of this approach can be traced back to Tinbergen (1942) and Solow (1957). Basically there are three main indices used in the GAA. These are (i) Kendrick Index (KI) (ii) Solow Index (SI) and (iii) Translog Index (TLI). However, KI and SI suffer from some limitations³. In contrary, TI is superior to both KI and SI because TI numbers are symmetric in data of different

time periods and also satisfy the factor reversal test approximately⁴. It is based on Translog Production Function characterised by constant returns to scale. It allows for variable elasticity of substitution and does not require the assumption of Hicks-neutrality.

The translog production function of output (Y) emerging from use of labour (L), capital (K) and time (T) is written as

$$\log Y = \alpha_0 + \alpha_K \log K + \alpha_L \log L + \alpha_T T + \frac{1}{2} \beta_{KK} (\log K)^2 + \beta_{KL} (\log K) (\log L) \\ + \frac{1}{2} \beta_{LL} (\log L)^2 + \beta_{KT} (\log K) T + \beta_{LT} (\log L) T + \frac{1}{2} \beta_{TT} T^2$$

Constant returns to scale requires

$$\alpha_K + \alpha_L = 1; \quad \beta_{KK} + \beta_{KL} = 0; \quad \beta_{KL} + \beta_{LL} = 0$$

Corresponding to the above equation, we get

$$\Delta \log Y = \bar{V}_K (\Delta \log K) + \bar{V}_L (\Delta \log L) + \bar{V}_T$$

where

$$\Delta \log Y = \log Y(T) - \log Y(T-1)$$

$$\Delta \log K = \log K(T) - \log K(T-1)$$

$$\Delta \log L = \log L(T) - \log L(T-1)$$

and

$$\bar{V}_K = \frac{1}{2} [V_K(T) + V_K(T-1)]$$

$$\bar{V}_L = \frac{1}{2} [V_L(T) + V_L(T-1)]$$

This expression for V(T) in equation is termed the average translog quantity index of technological change. $\Delta \log Y$, $\Delta \log K$ and $\Delta \log L$ are obtained as weighted averages of the rates of growth in their components. Thus, we get,

$$\Delta \log Y = \sum_i \bar{S}Y_i (\Delta \log Y_i)$$

$$\Delta \log K = \sum_j \bar{S}K_j (\Delta \log K_j)$$

$$\Delta \log L = \sum_u \bar{S} \bar{L}_u (\Delta \log L_u)$$

where, we have

$$\bar{S} \bar{Y}_i = \frac{1}{2} [SY_i(T) + SY_i(T-1)]$$

$$\bar{S} \bar{K}_j = \frac{1}{2} [SK_j(T) + SK_j(T-1)]$$

$$\bar{S} \bar{L}_u = \frac{1}{2} [SL_u(T) + SL_u(T-1)]$$

It has been shown by Diewert (1976) that indexes formed in such a fashion are exact for a translog aggregator function and that they are exact only for a translog aggregator function.

Estimating Translog Production Function

The discrete approximation of the Translog Production Function in the form of Translog Index has been used in most of the recent studies on the measurement of productivity in the Indian industries⁵. The Translog Index can be defined as the following:

$$\frac{\Delta TFP_t}{TFP_t} = \frac{\Delta V_t}{V_t} - \left[\frac{(w_t + w_{t-1})}{2} \right] \frac{\Delta L_t}{L_t} - \left[\frac{\{(1 - w_t) + (1 - w_{t-1})\}}{2} \right] \frac{\Delta K_t}{K_t};$$

Where, V is real value added, w denotes the share of labour in nominal value added, L and K indicate labour and capital, respectively.

The equation is based on the general neo-classical production function for which the elasticity of substitution need not be infinite, equal to unity or even constant. The above equation actually measures the difference between the rate of growth of real value added and the rate of growth of factor inputs.

Data, Variables and Coverage

This study is based on the Annual Survey Industries (ASI) data. Net value added at constant prices is taken as the measure of output. Number of employees (including workers and persons other than workers) is taken as the measure of labour input. However, there is

no unique measure of capital. Hence several methods are applied in estimating capital stock. In this study the perpetual inventory accumulation method (PIAM) has been used for generating the series on capital stock, which has been used in various studies. The PIAM requires the estimates of capital stock for a benchmark year and investment in the subsequent years. The time series on capital stock at current prices has been generated by using the following equations:

$$I_t = B_t - B_{t-1} + D_t$$

$$K_t = K_o + \sum_{i=1}^t I_i$$

I is the gross capital formation/investment, B is the book value of fixed capital, D is depreciation, K is the stock of capital at current prices. Subscript 't' has been used to denote time. Data on all the variables mentioned above are available in ASI.

The study covers the period from 1967-68 to 1999-2000. Data prior to this period is not available in the format required for calculating the index. Initially the TFPG is calculated for the whole manufacturing sector in West Bengal *vis-à-vis* all-India manufacturing as a whole to assess the position of the manufacturing sector in West Bengal as against the all-India average. Subsequently the TFPG is calculated for six selected industries. Selection has been done on the basis of contribution to total net value added. These six industry groups have played a pivotal role in the industrial arena of the State. The intention here is to observe their relative position *vis-à-vis* other industries in order to investigate whether these industries are slipping from their strong position. If it is really so, then it is also worth investigating whether any new industry group is taking up their position.

Section II

Structure and Growth of Industry in West Bengal

The sectoral composition of State Domestic Product in West Bengal shows some structural transformation in the State during the past four decades (*viz.*, 1960-61 to 1999-2000). While the share of

primary sector in NSDP has gone down marginally from 39.2 per cent in 1960-61 to 38.7 per cent in 1999-2000, the share has gone down substantially (by around 10 percentage points) in case of the secondary sector. The decline of share in NSDP is more pronounced in case of the manufacturing sector. It has gone down from over 25.2 per cent in 1960-61 to mere 10.0 per cent in 1999-2000. However, the tertiary sector has gained the share at the cost of both manufacturing and agriculture over this period. At the all-India level also, there has been a change in the structure of the economy. However, in this case the scenario is a bit different from West Bengal. Unlike West Bengal, the share of secondary sector has gone up from 19.4 per cent to 21.6 per cent during the same period, notwithstanding the fact that the share of manufacturing sector has slipped downward marginally. However, like the case of West Bengal, at the all-India level, the shares of the primary sector in general and agriculture in particular have gone down to a larger extent from 48.2 per cent and 44.4 per cent, respectively, during 1960-61 to 30.5 per cent and 26.3 per cent, respectively, during 1999-2000. Tertiary sector, on the other hand, has increased its share in case of all-India as is the case with West Bengal from 32.4 per cent in 1960-61 to 48.0 per cent in 1999-2000 (Table 1). Furthermore, the state's share in all-India NDP has gone down, *albeit* marginally, from 7.7 per cent in 1960-61 to 7.6 per cent in 1999-2000.

The decline in West Bengal's stronghold position in respect of industrial status can be gauged from the declining share of secondary sector, in general, and manufacturing sector, in particular, in all-India NDP. It implies that the other States have come forward gradually in respect of industrial development and surpassed the leading position of West Bengal. It can be observed from Table 2 that the relative share of secondary sector has gone down from 10.9 per cent in 1960-61 to 6.4 per cent in 1999-2000. Furthermore, the share of the State's total manufacturing sector in all-India NDP has also gone down from 13.1 per cent in 1960-61 to a mere 6.6 per cent in 1999-2000 entirely due to the registered manufacturing sector.

Structural change can also be noticed from the contribution of different industries in net value added. The contribution of major industries of the manufacturing sector at the 2-digit level (2-3) was more than 90 per cent of the total manufacturing sector during 1979-80.

Table 1: Composition of NSDP of West Bengal vis-à-vis All-India NDP

(Per cent)

	1960-61		1970-71		1980-81		1990-91		1999-2000	
	West Bengal	All India	West Bengal	All India	West Bengal	All India	West Bengal	All India	West Bengal	All India
1	2	3	4	5	6	7	8	9	10	11
1. Primary of which:	39.2	48.2	45.1	48.0	38.7	41.3	33.6	34.7	38.7	30.5
<i>Agriculture</i>	34.7	44.4	41.5	44.2	34.6	36.3	28.6	29.9	33.7	26.3
2. Secondary of which:	27.6	19.4	22.7	19.9	24.7	23.0	26.2	25.5	18.1	21.6
<i>Manufacturing (Registered)</i>	19.8	7.3	12.9	7.6	14.0	9.1	9.7	11.0	4.5	8.5
<i>Manufacturing (Unregistered)</i>	5.4	7.5	4.7	6.6	4.7	7.8	7.8	7.1	5.5	5.2
Manufacturing (Total)	25.2	14.8	17.5	14.2	18.7	16.9	17.5	18.1	10.0	13.6
3. Tertiary	33.3	32.4	32.2	32.2	36.6	35.7	40.2	39.8	43.2	48.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Almost two decades later, the contribution had come down to 59 per cent. That means more than 40 per cent of net value added is contributed by those industries, which are outside the domain of the manufacturing sector. However, within the manufacturing sector there has not been any significant change in the contribution to net value added with a few exceptions. The significant change has occurred only in case of the jute industry and manufacture of transport equipment and parts whose contributions have come down to 10.8 per cent and 1.0 per cent, respectively, in 1997-98 from 23.3 per cent and 10.5 per cent, respectively, in 1979-80. On the other hand, the share went up marginally in case of leather and leather products and rubber, plastic, petroleum and coal products.

In brief, although there has been a structural change in the State, the industry, as a whole, could not gain much during the last 26 years. This is evident from both the share of the State in all-India NSDP

Table 2: Share of Manufacturing Sector of West Bengal in All-India NDP

(Per cent)

	1960-61	1970-71	1980-81	1990-91	1999-2000
1	2	3	4	5	6
1. Manufacturing - <i>Registered</i>	21.0	14.7	12.4	6.5	4.4
2. Manufacturing - <i>Unregistered</i>	5.5	6.1	4.8	8.2	10.4
3. Manufacturing - <i>Total</i>	13.1	10.7	8.2	7.2	6.6
4. Secondary	10.9	9.9	10.4	7.7	6.4

Source: National Accounts Statistics, Government of India, various issues.

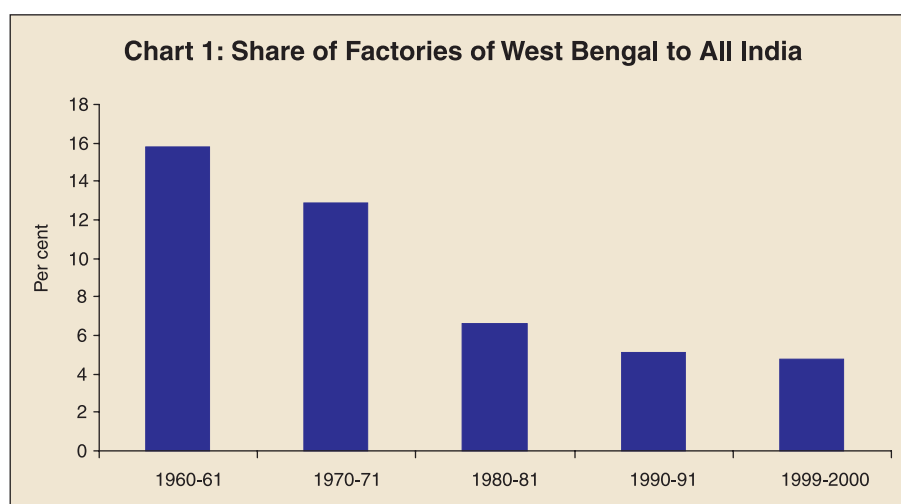
Table 3: Index of Industrial Production -Compound Growth Rate for West Bengal vis-à-vis All-India (Per cent)

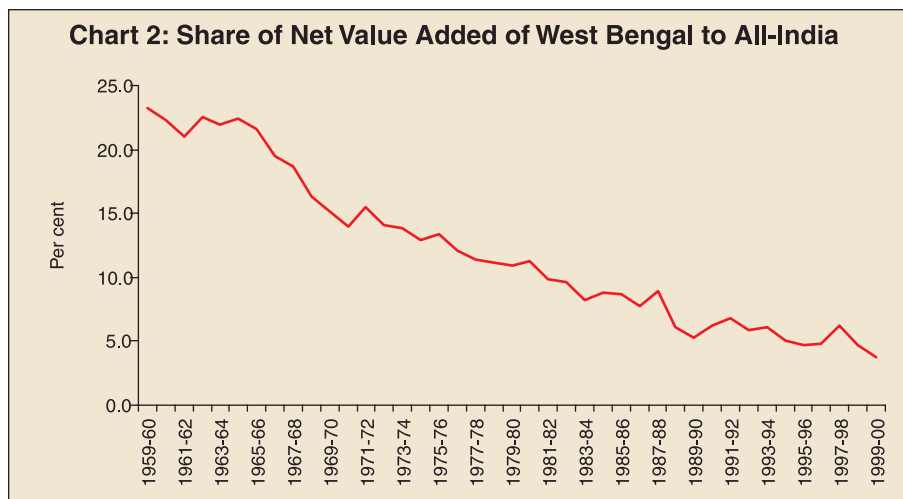
Period	Mining & Quarrying	Manufacturing	Electricity	General
1	2	3	4	5
1970-71 to 1980-81 (at 1970=100)				
West Bengal	0.01	1.82	1.43	1.62
All-India	4.26	4.05	7.33	4.42
1980-81 to 1992-93 (at 1980-81=100)				
West Bengal	0.10	1.84	8.80	2.23
All-India	6.94	6.41	8.63	6.75
1993-94 to 2000-01 (at 1993-94=100)				
West Bengal	0.78	3.37	6.59	3.62
All-India	3.98	7.63	6.40	7.20

Sources : 1. Economic Review, Government of West Bengal, various issues.
2. Handbook of Statistics of Indian Economy, RBI, various Issues.

and share in all-India net value added in total manufacturing sector. A similar picture emerges from an analysis of the trends in the IIP of the State (Table 3).

Concomitantly, the share of the State in the country's total number of factories, employment and value added has witnessed a gradual decline. The share of factories has gone down from 15.8 per cent in 1960-61 to 4.8 per cent in 1999-2000 (Chart 1). Similarly, the share





in net value added has gone down from 23.2 per cent over the decade of 1960s to 5.4 per cent during the decade of 1990s, while that of employment has gone down from 23.1 per cent to 8.4 per cent over the same period (Charts 2 and 3 and Table 4).

During the period 1973-74 to 1999-2000, the net value added (NVA) of the total manufacturing sector grew at an annual compound rate of 1.8 per cent, while employment had grown at an annual compound rate of (-)1.3 per cent. However, fixed capital had grown at a relatively high annual compound rate of 5.2 per cent. Industry-wise performance is presented in Table 5.

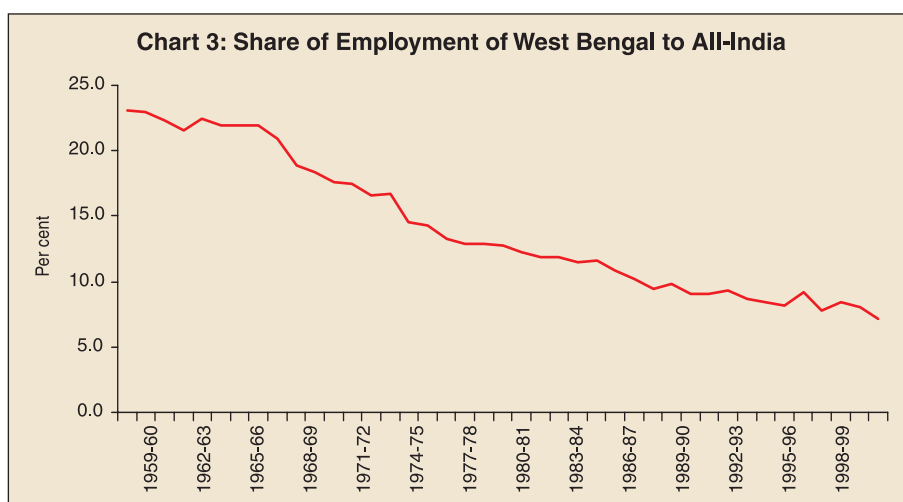


Table 4: Percentage Share of West Bengal in All-India

Period	NVA	Employment
1	2	3
1959-60	23.2	23.1
1960-61 to 1969-70	20.1	21.3
1970-71 to 1979-80	12.8	14.9
1980-81 to 1989-90	8.5	10.8
1990-91 to 1999-2000	5.4	8.4

Industrial Deceleration

The industries which played a vital role in West Bengal during the period of 1960s were food products (20-21), textiles (23-25), rubber plastic and petroleum products (30), basic chemical and chemical products (31), basic metal and alloy (33), and manufacture of machinery and equipment (including electrical machinery) (35-36). All these industries contributed significantly to all India net value added in respective industries during 1960. However, over the next four decades, the share of these industries in net value added to all-India level fell sharply. The share of textiles went down to 12.3 per

Table 5: Industry-wise Performance of Major Indicator (1973-74 to 1999-2000)

	Negative	Below 2 per cent	Between 2 and 4 per cent	Above 4 per cent and below 7 per cent	Above 7 per cent
1	2	3	4	5	6
NVA	31,37	23-25,34,35-36,38	28,29,33	20-21, 26, 30, 27, 32	22
VO	37	23-25	28,35-36	20-21, 29, 30, 31, 32, 33, 34, 38	22, 26, 27
EMO	28, 31, 35-36, 37	23-25, 29, 34, 38	20-21, 22, 26, 27, 30, 32, 33		
TE	23-25, 28, 29, 31, 32, 33, 34, 35-36,37,38	20-21, 26, 30	27,	22	
FC	37		31	23-25, 30, 32, 33, 34, 35-36,38	20-21, 22, 26, 27, 28, 29

Note : 1. NVA : Net Value Added; VO: Value of Output; EMO: Emoluments; TE : Total Employment; FC: Fixed Capital

2. Explanations of industrial codes are given in Annex 2.

cent in 1999 from 16.2 per cent in 1960 while that of chemical products went down to merely 0.7 per cent from 16.4 per cent over the same period of time (Table 6). Further, the share of food products fell to 2.8 per cent in 1999 from 13.5 per cent in 1960. While machinery and equipment including electricity contributed 33.9 per cent during 1960, the joint contribution of these two industry groups to value added came down to only 3.8 per cent in 1999. Rubber, plastic and petroleum products showed an even more dismal picture as their contribution came down from 43.2 per cent in 1960 to a mere 1.7 per cent in 1999. On the other hand, the contribution to all-India net value added increased for some industries such as food products; rubber, plastic, petroleum; and basic metal and alloys.

It is also interesting to note that the share of manufacturing sector in total net value added has gone down from 90.0 per cent in 1970 to 59.2 per cent in 1997-98, while in case of India, the fall has been relatively moderate (from 88 per cent to 81.2 per cent during the same period). The industries which have taken up the share from core manufacturing sector are electricity, gas, water supply, non-conventional energy, storage & warehousing services, sanitation, *etc.* As we have seen in Table 3, the IIP growth in electricity has gradually

**Table 6: Share of Net Value Added of Select Industries
in West Bengal to All-India**

Year	Food Products (20-21)	Textiles (23+24+25)	Rubber Plastic, Petroleum etc. (30)	Basic Chemical and Chemical Products (31)	Basic Metal and Alloy (33)	Manufacture of machinery including electrical machinery (35-36)	All
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)
1960	13.5	16.2	43.2	16.4	10.6	33.9	22.3
1965	10.8	19.7	48.1	12.5	8.5	29.3	21.6
1970	8.5	16.5	30.2	8.6	6.7	16.1	14.0
1974*	8.6	15.2	15.1	7.6	16.6	14.8	12.9
1980	3.9	16.7	7.2	5.7	16.5	10.7	11.3
1985	6.5	11.2	5.2	3.9	17.0	6.3	8.6
1990	4.6	9.4	4.5	6.5	8.5	6.4	6.2
1995	2.4	9.8	2.3	4.0	8.3	6.1	4.7
1999	2.8	12.3	1.7	0.7	6.2	3.8	3.7

* Data for 1975 is not available.

Source : Annual Survey of Industries, Government of India, various issues.

increased from 1970-71 to 1999-2000. That means contribution of electricity in overall industrial sector has been high in West Bengal. But it is also true that the growth of electricity is not high enough to generate high industrial growth. This is evident from the low industrial growth depicted in Table 3.

Section III

Capital Intensity, Productivity of Labour and Capital

Capital Intensity

Factor intensity can be discussed with the help of fixed capital per employee and value added per employee. However, there is no unique measurement of capital intensity or labour intensity. Industries can be grouped into labour-intensive or capital-intensive on the basis of average capital-labour ratio (K/L). If the capital-labour ratio of a particular industry is above the average then the industry may be considered as a capital-intensive one. However, this methodology is admittedly arbitrary in nature since there is no specific capital-labour ratio for the industries.

The average capital per employee for the entire manufacturing sector was Rs.190.1 in 1973-74, Rs.184.4 in 1980-81, Rs.251 in 1990-91 and Rs.1070.2 in 1999-2000 at constant prices (1981-82 = 100). As per the norms discussed above, the industries with capital per employee above these respective averages may be regarded as capital-intensive and those with capital per employee below them as labour-intensive. The industries coming under each of these categories in 1973-74 and 1999-2000 are listed below:

	Industry Category
i) Capital-intensive industries	
1973-74	28, 30, 31, 33, 35-36, 37
1999-2000	28, 30, 31, 33, 35-36
ii) Labour-intensive industries	
1973-74	20-21, 22, 23-24-25, 26, 27, 29, 32, 34, 38
1999-2000	20-21, 22, 23-24-25, 26, 27, 29, 32, 34, 37, 38

It may be observed from the above list that there has not been any significant change in the structure of industries by factor intensity over the period. However, there is only one exception. Manufacture of transport equipment and parts (37), which was in the capital-intensive category during 1973-74 shifted to the labour-intensive category in 1999-2000.

The share of capital-intensive industries in the manufacturing sector also declined over the three-decade period. During the year 1973-74, the capital intensive industries contributed 58.1 per cent to both total value added and output and 45.5 per cent to employment. In 1999-2000 the share of value added had gone down to 41.9 per cent, output to 53.7 per cent and employment to 35.9 per cent. That means labour-intensive industries provided employment to more than 64 per cent of total employment in the manufacturing sector by using lesser quantity (around 30 per cent) of the capital asset. However, it is interesting to note that the share of profit of the capital intensive industries increased from 61.8 per cent in 1973-74 to 85.5 per cent in 1999-2000. The share of profit of the labour intensive industries concomitantly fell from 38.2 per cent to 14.5 per cent. It is worth mentioning that out of 17 two-digit industry groups only five were capital intensive in 1999-2000. Therefore, only five industry groups are contributing over 85 per cent of total profit in the manufacturing sector in West Bengal, whereas the rest 12 industry groups are contributing below 15 per cent.

Productivity of Labour

Labour productivity is considered to be one of the oldest and widely used measures of productivity (Trivedi, *et al.* 2000). “The wide usage of labour productivity is due to the fact that it can be used as proxy for the amount of goods available for consumption per labourer. Hence increase in labour productivity is very often regarded as an end in itself and in such a situation the role of capital gets reduced merely to that of enabling labour productivity to rise.” Moreover, in comparison to per capita real GDP, labour productivity is viewed as a superior indicator since the former ignores importance of working hours per person/employment rates in the growth process (Maddison, 1987). In many industrialised countries labour

productivity is calculated as the real value added per man-hour. However, most of the studies in India are based on data on number of employees or workers for estimation of labour productivity. Following this convention, we have also used the data on number of employees in calculating labour productivity.

The growth rate of labour productivity in the manufacturing sector as a whole increased from 1.6 per cent in 1970s to 2.6 per cent in the 1980s and further to 5.7 per cent in 1990s. During 1970-71 to 1999-2000, it increased at an annual compound growth rate of 2.5 per cent. Out of 15 two-digit industry groups only 4 groups (*viz.*, manufacture of beverages, tobacco and related products; manufacture of wood and wood products; manufacture of basic chemical and chemical products; and manufacture of transport equipment and parts) recorded negative annual compound growth in labour productivity (Table 7).

Productivity of Capital

Generally there is an inverse relationship between capital intensity and output to capital ratio (Srivastava, 1996). However, it is found that all the industries, both labour and capital intensive, have shown declining capital productivity. The fastest decline in the output to capital ratio is in manufacture of chemical and chemical products (except products of petroleum and coal) (31), manufacture of leather, leather and fur products (29) and manufacture of paper and paper

Table 7: Growth Rate of Labour Productivity of the Manufacturing Sector (Industry-wise) in West Bengal

Period/Industry Groups	20-21	22	23-25	26	27	28
1970-71 to 1999-2000	2.3	-0.3	2.1	3.9	-3.2	3.8
Period/Industry Groups	29	30	31	32	33	34
1970-71 to 1999-2000	2.5	5.5	-0.2	3.2	4.7	1.8
Period/Industry Groups	35-36	37	38	Manufacturing Sector (Total)		
1970-71 to 1999-2000	3.2	-0.2	2.5	2.5		

Note: Descriptions of industrial codes given in Annex 2.

products, printing and publishing and allied products (28). The slowest decline is observed in manufacture of beverages, tobacco and tobacco products (22), manufacture of textile products (26) and manufacture of rubber, plastic, petroleum and coal products (30).

Profitability of Industrial Sector

The industrial sector has suffered low profitability since 1979-80 and in fact, negative profitability during 1983-84 to 1990-91 (excepting 1987-88), whereas at the all-India level the scenario is entirely opposite (Table 8). It has been hypothesized by Ray (1996) that loss-making units in the public sector (assuming that private sector firms cannot continue to exist as loss making ones in the long run) perhaps dominated profit making firms in West Bengal leading to this perverse phenomenon of persistent negative profitability of the overall industrial sector. However, this hypothesis appears to be only partly true. This is because, as has been observed in the early part of discussion, there has been a gradual decline in number of factories in West Bengal. As a result, the share of factories in total has gone down drastically. That means, the industrial units incurred

Table 8: Profitability: Profits/Output in terms of ASI Aggregate Data

(Per cent)

Year	West Bengal	India	Year	West Bengal	India
1	2	3	4	5	6
1973-74	6.6	11.5	1987-88	2.1	2.1
1974-75	5.9	8.3	1988-89	-4.0	4.0
1975-76	4.0	17.2	1989-90	-3.9	3.9
1976-77	3.7	17.2	1990-91	-0.8	4.2
1977-78	3.3	16.5	1991-92	-1.3	3.2
1978-79	3.5	6.7	1992-93	-1.5	4.0
1979-80	3.5	5.9	1993-94	2.1	6.7
1980-81	1.1	3.4	1994-95	0.6	7.2
1981-82	-0.2	4.6	1995-96	-0.4	6.6
1982-83	0.4	4.1	1996-97	2.2	7.7
1983-84	-1.5	4.9	1997-98	5.7	5.1
1984-85	-1.6	3.1	1998-99	0.2	6.7
1985-86	-0.4	2.9	1999-2000	-6.7	5.3
1986-87	-1.8	3.1			

Source : Estimated from time series data on ASI (Various Issues).

losses over time and as a process became sick and finally had to close down the unit. Hence the obvious economic consequence has been exit of all inefficient industrial units. Since the exit process occurred in a phased manner it perhaps led to a gradual and systematic decline of aggregate industrial output and employment - a process termed de-industrialisation.

Section IV Total Factor Productivity

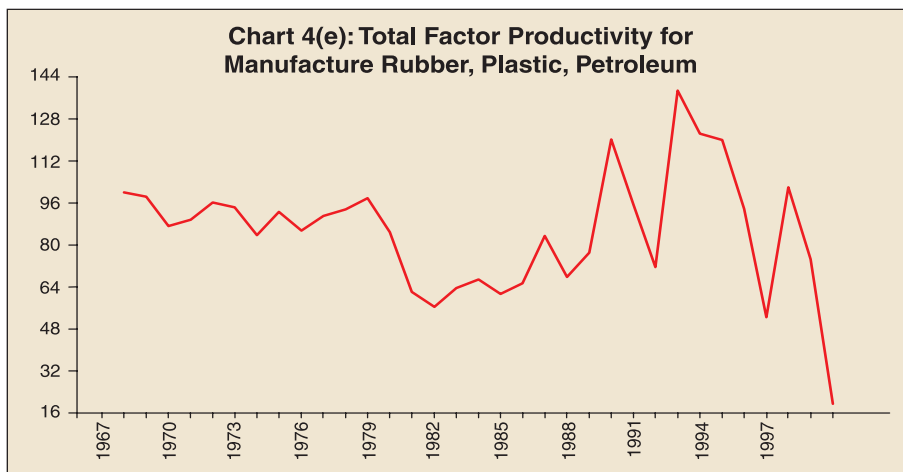
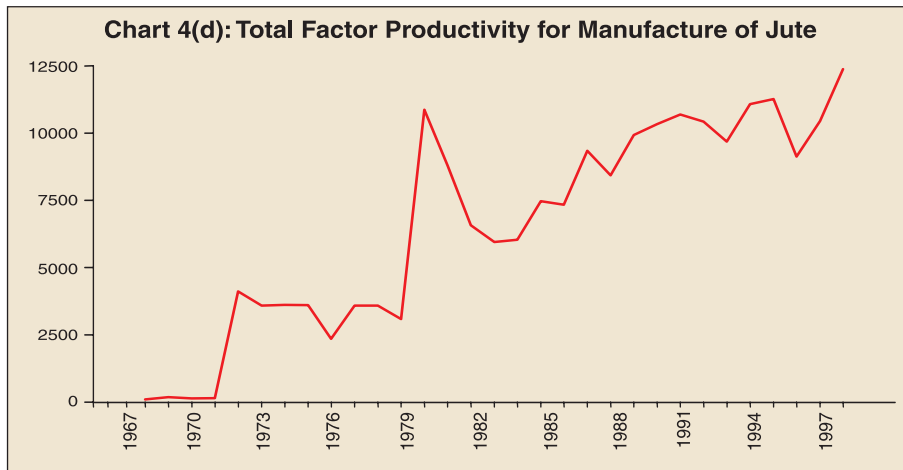
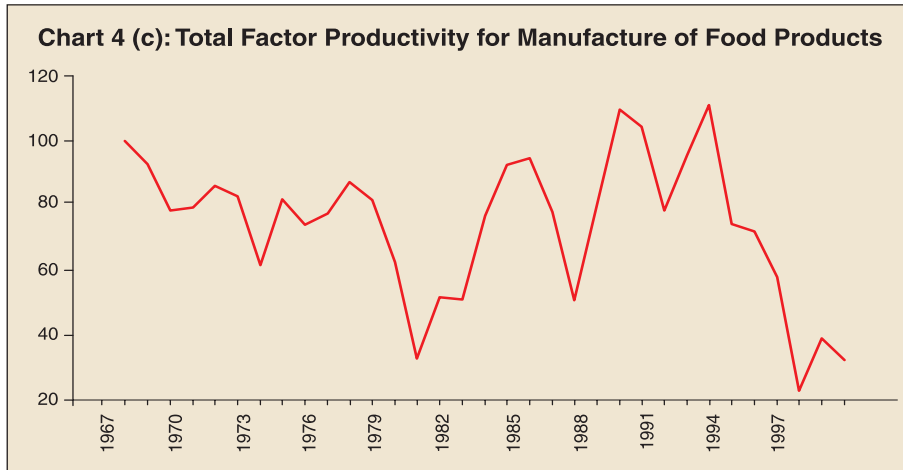
The total factor productivity of West Bengal decreased gradually during the period 1966 to 1999 in contrast to the rising trend for India as a whole. As stated earlier, we have tried to examine the total factor productivity of six industry groups, which played dominant role during the early 1960s. It can be seen that except jute all the remaining five industry groups have shown declining TFP growth. Machinery and machine tools initially showed rising trend, but after 1970s it remained stagnant (Charts 4a-4f). The TFP growth contribution to output is negative for two out of six industry groups (Table 9). For the remaining four groups, however, the TFP growth

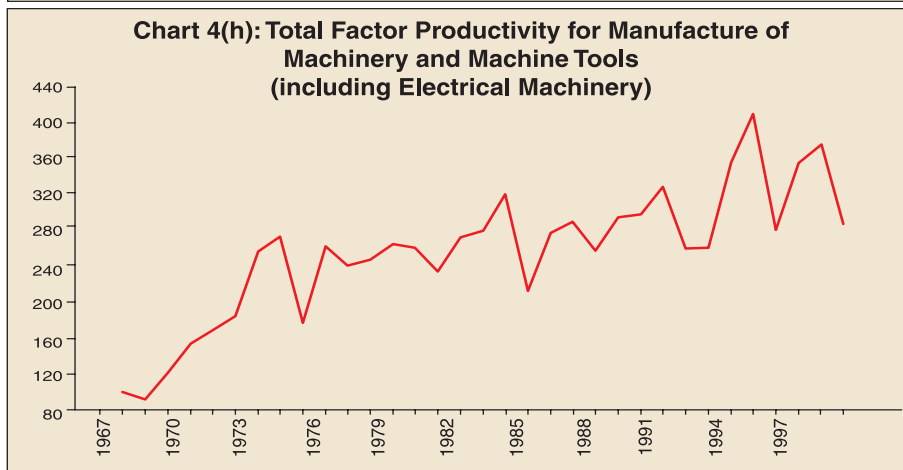
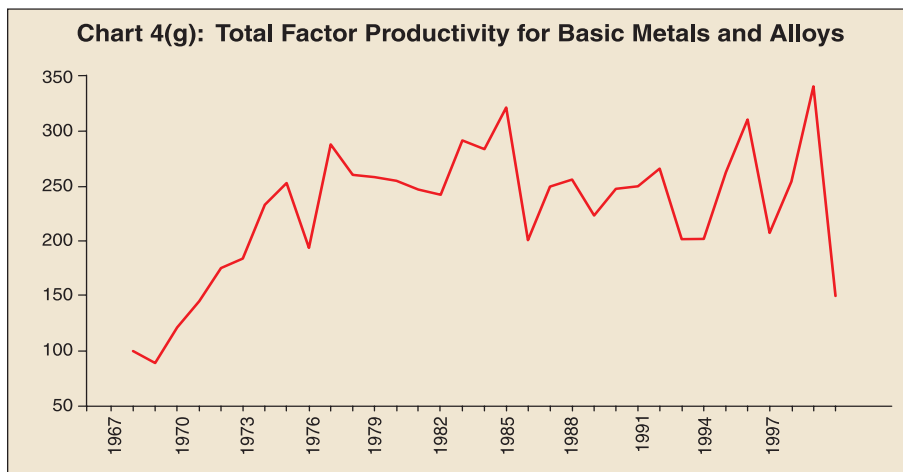
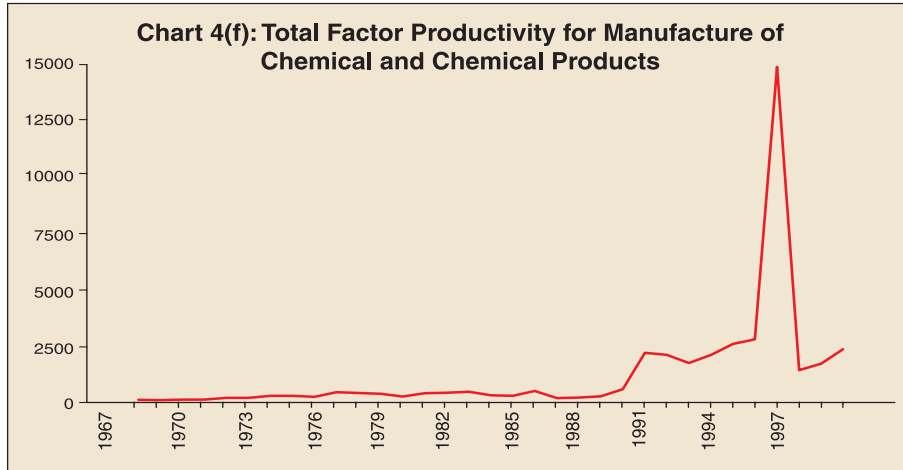
**Table 9: Trend Growth Rates of Productivity of Various industries
1966-1999 (Per cent per annum)**

Industry Group	Trend Growth Rate of Real Value Added	Trend Rates of Growth of TFP	TFP contribution to Output growth
1	2	3	4
Manufacture of Food products	2.0	-1.4	-70.0
Manufacture of jute, hemp etc.	13.1	12.0	91.6
Manufacture of Rubber, Plastic, Petroleum etc.	0.4	-0.8	-200.0
Manufacture of Chemical and Chemical Products	7.9	10.6	134.2
Basic Metal and Alloys	3.3	1.6	48.5
Manufacture of Machinery, Machine Tools (including electrical machinery)	3.2	2.9	90.6
Manufacturing Sector (West Bengal)	2.1	-1.2	-57.1
Manufacturing Sector (All India)	6.3	4.6	73.0

Source : Estimated from time series data on ASI (Various Issues).

contribution to output growth is substantial. Manufacture of chemical and chemical products recorded more than 100 per cent contribution from TFP growth. For the period 1966-1999, TFP contribution to output growth is negative for the whole manufacturing sector, whereas at the all-India level TFP contribution to manufacturing sector output is positive and significant.





Section V

Conclusion

The study shows that West Bengal has gradually lost its stronghold position once enjoyed during the early 1960s. The State's shares in net value added, employment and number of factories have gone down drastically over the years. Looking at the 2-digit level industry group, it is observed that only one industry (*viz.*, manufacture of beverages, tobacco and related products) has registered annual compound growth rate of above 7 per cent in net value added, while 5 industry groups have recorded annual compound growth rate of between 4 and 7 per cent. So far as employment is concerned, majority of the industry groups has witnessed negative growth rate. It is interesting to note that only 5 industry groups, which are highly capital intensive, contributed over 85 per cent of total profit in the manufacturing sector. It has also been found that growth of labour productivity in the manufacturing sector as a whole increased from 1.6 per cent in 1970s to 2.6 per cent in the 1980s and further to 5.7 per cent in 1990s. The share of net value added of six important industry groups in West Bengal to all India NVA has declined over the past 30 years. Because of deceleration in growth rate of these industries, the overall industrial scenario of the State was adversely affected. Moreover, the total factor productivity of the manufacturing sector of the State declined during the period, whereas it has gone up at the all-India level. The six most important industries which were the main contributor to industrial growth of the State have lost their position and their TFP growth rates have gone down drastically except Jute which itself is a dying industry. The TFP growth contribution to output is found to be negative for two out of the six industry groups. However, as a whole, the industrial sector does not seem to have come out from decelerating condition. Technological obsolescence of these six important industry groups may be one of the major reasons of industrial deceleration in the State. Furthermore, although some industries have lost their base, no new industry has come up to take over that position. It cannot be denied that the rural Bengal has changed a lot. In the rural sector the State has set an example for other States in regard to implementation of land reform, and institution

of panchayati raj well in advance of the 73rd and 74th constitutional amendment which could enable the State to regain its pre-eminent position, by taking advantage of a boost from domestic farm sector. In contrast, as the analysis in this paper suggests, the situation is entirely different in the arena of industrial development of the State.

Notes

- ¹ See Bagchi (1998)
- ² For details see Trivedi et al (2000).
- ³ Properties of these indices and their limitations have been discussed by Goldar (1986) and Trivedi *et al* (2000).
- ⁴ Divisia Index or Translog Index is discussed in Annex 3.
- ⁵ See Trivedi et al (2000), Balakrishnan and Pushpangadan (1994), Ahluwalia (1991), Goldar (1985) etc.

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Annex - 1
The Concordance Table

<u>NIC 1987 code</u>	<u>NIC 1998 code</u>
20-21	151+152+153+154
22	155+16
23+24+25	171
26	172+173+181
27	20+361
28	21+22
29	182+19
30	24
31	23+25
32	26
33	27+371
34	2811+2812+289
35-36	2813+29+30+31+32
37	34+35
38	33+369
39	725

Source : National Industrial Classification, Central Statistical Organisation, Ministry of Planning and Programme Implementation, Government of India, New Delhi 1998.

Annex - 2
The Concordance Table

<u>NIC Code</u>	<u>Description of Industry</u>
220-21	Manufacture of Food Products
22	Manufacture of Beverages, Tobacco and Related Products
23	Manufacture of Cotton Textiles
24	Manufacture of Wool, Silk and Man-made Fibre Textiles
25	Manufacture of Jute and Other Vegetable Fibre textiles (Excl. Cotton)
26	Manufacture of Textile Products (Including Wearing Apparel)
27	Manufacture of Wood and Wood Products, Furniture and Fixtures
28	Manufacture of Paper and Paper Products and Printing, Publishing & Allied Industries
29	Manufacture of Leather & Leather Products, Fur & Leather Substitutes
30	Manufacture of Basic Chemicals and Chemical Products (Except Products of Petroleum and Coal)
31	Manufacture of Rubber, Plastic, Petroleum and Coal Products; Processing of Nuclear Fuels.
32	Manufacture of Non-metallic Mineral Products
33	Basic Metal and Alloys Industries
34	Manufacture of Metal Products and Parts, except Machinery and Equipment
35	Manufacture of Machinery and Equipment, Electrical (other than Transport equipment (and excl. Manufacture of Scientific Equipment, Photographic/Cinematic Equ. and Watches & Clocks)
36	Manufacture of Machinery and Equipment, Non-electrical (other than Transport, Scientific, Photographic/Cinematic Equ. Watches & Clocks)
37	Manufacture of Transport Equipment and Parts
38	Other Manufacturing Industries (Including Manufacture of Scientific, Photographic/Cinematic Equipment, Watches & Clocks)
39	Repairs of Capital Goods

Annex - 3
Divisia Index – Translog Index

The need for Divisia index has been noted by Solow (1957) and Jorgenson and Griliches (1967). Subsequently Christensen and Jorgenson (1969,1970), Jorgenson and Griliches 1972), Gallop and Jorgenson (1980) have used approximations to the Divisia index known as translog index in their studies.

The properties of the Divisia index, which make its application highly desirable, have been discussed in the seminal paper of Christensen and Jorgenson (1970). It has been pointed out that the rates of growth of the Divisia indexes of prices and quantities add up to the rate of growth of the value (factor reversal test) and that such indexes are symmetric in different directions of time (time reversal test). Divisia indexes also have the reproductive property that “a Divisia index of Divisia indexes is a Divisia index of the components.” For application to data at discrete points of time an approximation to the continuous Divisia index is required. The translog index is a discrete version (developed by Tornquist) of the continuous Divisia index. Translog index numbers are symmetric in data of different time periods and also satisfy the factor reversal test approximately. But they do not have the reproductive property. The translog index of technological change is based on a translog production function, characterised by constant returns to scale. It allows for variable elasticity of substitution and as pointed out above it does not require the assumption of Hicks-neutrality.

To describe the Divisia index we may consider a somewhat general model. Let’s consider an aggregate production function with two factors of production:

$$Y = F(K, L, T) \quad \text{_____ (1)}$$

Where Y denotes aggregate output, K aggregate capital, L aggregate labour and T time. It is assumed that F is continuous, twice differentiable and characterized by constant returns to scale. These aggregates are taken as functions of their components

$$Y = Y(Y_1, Y_2, \dots, Y_m) \quad \text{_____ (2)}$$

$$K = K(K_1, K_2, \dots, K_n) \quad \text{_____ (3)}$$

$$L = L(L_1, L_2, \dots, L_q) \quad \text{_____ (4)}$$

Similar assumptions about continuity, differentiability and homogeneity are made for these functions. Corresponding to them there are m output prices, n capital prices and q labour prices, denoted respectively by

$$P_1, P_2, \dots, P_m; \quad r_1, r_2, \dots, r_n; \quad w_1, w_2, \dots, w_q$$

Correspondingly, aggregate prices are denoted by p, r and w. Under the assumption of perfect competition and profit maximization, the conditions of producer’s equilibrium require that the shares of the factor prices be equal to their elasticities, so that

$$V_k = \frac{rK}{pY} = \frac{\delta \log Y}{\delta \log K} \quad \text{---(5)}$$

$$V_L = \frac{wL}{pY} = \frac{\delta \log Y}{\delta \log L} \quad \text{---(6)}$$

Because of constant returns to scale, $V_k + V_L = 1$. Similarly, for individual components the conditions of producer's equilibrium require

$$SY_i = \frac{p_i Y_i}{pY} = \frac{\delta \log Y}{\delta \log Y_i}, i = 1, \dots, m \quad \text{---(7)}$$

$$SK_j = \frac{r_j K_j}{rK} = \frac{\delta \log K}{\delta \log K_j}, j = 1, \dots, n \quad \text{---(8)}$$

$$SL_u = \frac{w_u L_u}{wL} = \frac{\delta \log L}{\delta \log L_u}, u = 1, \dots, q \quad \text{---(9)}$$

SY_i is the share of the i 'th output component in aggregate output. Similarly SK_j and SL_u are the shares of the j 'th capital input and the u 'th labour input in aggregate capital and aggregate labour respectively. Linear homogeneity requires

$$\sum_i SY_i = \sum_j SK_j = \sum_u SL_u = 1$$

Differentiating equation (1) totally with respect to time and rearranging terms, we obtain

$$\frac{d \log Y}{dT} = V_k \frac{d \log K}{dT} + V_L \frac{d \log L}{dT} + V_T \quad \text{---(10)}$$

This expression for V_T is called the Divisia quantity index of technological change. It should be noted that in the above expression

$$\frac{d \log Y}{dT} = \sum_i SY_i \frac{d \log Y_i}{dT} \quad \text{---(11)}$$

$$\frac{d \log K}{dT} = \sum_j SK_j \frac{d \log K_j}{dT} \quad \text{---(12)}$$

$$\frac{d \log L}{dT} = \sum_u SL_u \frac{d \log L_u}{dT} \quad \text{---(13)}$$

Thus, a weighted average of growth rates of individual components gives the growth rate for the aggregate. These are respectively called the Divisia quantity Indexes of output, capital and labour.

On the price side, it is seen that the assumptions of constant returns to scale, perfect competition and profit maximization require that the prices of output, capital and labour be consistent with the following equation

$$pY = rK + wL \quad \text{_____}(14)$$

Given this equation, we can express p as a function of r , w and T

$$p = p(r, w, T) \quad \text{_____}(15)$$

This is referred to as the price function. From the point of view of the price function, technological change is defined as

$$VT = - \frac{\delta \log p}{\delta T} \quad \text{_____}(16)$$

Also it is possible to write

$$\frac{d \log p}{dT} = V_K \frac{d \log r}{dT} + V_L \frac{d \log w}{dT} - V_T \quad \text{_____}(17)$$

This form gives us the Divisia price index of technological change.

For application to data at discrete points of time, an approximation to the continuous Divisia index, known as translog index, may be used. This assumes that translog function describes the relationships between Y , K , L and T (production function) and also the relationships between the aggregates and components. Constant returns to scale is assumed for all these functions.

International Trade in Goods: Performance of India vis-à-vis a Few Important Economies in South and East Asia

P. Bhuyan*

This paper analyses India's performance in international trade in goods with a few important economies in South and East Asia, *viz.*, China, Hong Kong SAR (China), Taiwan (China), Indonesia, Republic of Korea, Malaysia, Philippines, Singapore and Thailand based on certain trade indicators during the years 1980, 1990, 2000, 2001, 2002 and 2003. It is observed that performance by India in merchandise trade did not compare well with these economies. However, the study reveals that India managed a less concentrated trade structure in products exported than many of the economies under study except the USA, China, Hong Kong SAR (China) and Indonesia. On the other hand, a more concentrated trade structure signified India's imports trade. Also, merchandise trade by India is found below expected levels with many Asian economies under study.

JEL Classification : Classification: F10, F14, F19

Keywords : International Trade, Trade indicator

Introduction

One main objective of the Foreign Trade Policy (2004-09) announced by the Government of India is to double the country's percentage share of global merchandise trade within the next five years. In 2003, India accounted for around 0.75 per cent of world exports and 0.93 per cent of world imports. In 1980 these shares were 0.42 per cent in case of exports and 0.72 per cent in case of imports.

During the same period a few economies in South and East Asia, *viz.*, China, Hong Kong SAR (China), Taiwan (China), Republic

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of Korea, Malaysia, Philippines, Singapore and Thailand almost doubled or more than doubled their exports. The four Newly-Industrializing Countries (NICs) of East Asia [Hong Kong SAR (China), Singapore, Republic of Korea and Taiwan (China)] together with the Asean-4 (Indonesia, Malaysia, Philippines and Thailand) and China accounted for almost 80 per cent of the increase in the value of manufactures exported by all developing countries from 1980 to 1990 (Maizels). Except Hong Kong SAR (China) and Philippines all the other South and East Asian economies mentioned above had continuous trade surplus in all the years from 2000 to 2003. Strong economic performance in East Asia was driven, to a considerable extent, by robust export growth. Percentage share of exports to GDP of each of the economies mentioned above rose above thirty per cent in 2003 against a world average of around 21 per cent and around 10 per cent for India.

A question of considerable interest is how does global trade in goods by India compares with the emerging economies in South and East Asia mentioned above. A comparative analysis in that direction is presented in this paper. The analysis has been done based on certain important trade indicators as discussed in Section I. Section II describes the data used while Section III presents the results of the analysis. Section IV concludes.

Section I

Methodology Used

The analysis in this paper has been done based on certain important trade indicators *viz.*, share in world trade, growth, trade balance, percentage share to GDP, market concentration indices on commodities traded, country-wise distribution of exports and imports, terms of trade indices [*viz.* ‘net barter terms of trade’ (NBTT) and the income terms of trade’ (ITT)] and trade intensity indices. Indicators on share in world trade, growth, trade balance, and share to GDP are quite straightforward in concept. However, a discussion may be helpful on indices on ‘market concentration’, ‘terms of trade’ and ‘trade intensity’ and this is presented below.

Market Concentration Index on Products Traded

Market concentration index measures the degree to which a country's exports is dispersed over various products and is called index of market concentration or Herfindahl-Hirschman index. The index reveals the degree of market concentration and is computed according to the following formula:

$$H_j = \frac{\sqrt{\sum_{i=1}^N \left(\frac{x_i}{X}\right)^2} - \sqrt{1/N}}{1 - \sqrt{1/N}}$$

where, H_j = country index, x_i = value of exports of product i , $X = \sum_{i=1}^N x_i$ and N = number of products traded. Values of this index range between 0 and 1. Values closer to one indicate more concentrated trade structures. Countries with more concentrated trade structures depend on certain specific products and therefore remain vulnerable to high price movements of those products. Countries with lower export concentration have a well diversified trade structure and thereby reduce the impact of international trade risks due to possible price fluctuations of specific products.

Terms of Trade: Definition and Concept

Terms of trade of a country refers to two concepts *viz.* the 'net barter terms of trade (NBTT)' and the 'income terms of trade (ITT)'. When the phrase 'terms of trade' is used without qualification it refers to the NBTT concept. The terms of trade measures the relative change in export and import prices. It is defined as percentage ratio of the export unit value index to the import unit value index. Changes in the relative prices of exports and imports are important factors in influencing the values of exports and imports and the balance of payments of a country. A rising terms of trade results if import prices are rising slower than export prices. Conversely, if import prices are rising faster than export prices, it results in a fall in the terms of trade. Increase in the terms of trade index number is an encouraging movement, as a unit of exports will buy more imports. For the same reason, decline in the terms of

trade index is described as an adverse movement in trade (a unit of exports will buy fewer imports).

One limitation of NBTT is that it does not take into account the influence of changes in trade volumes. Due to this fact, the NBTT can not completely indicate the impact of changing market conditions on the trade balance of a country. This limitation is overcome by the second concept *viz.* 'the income terms of trade' (ITT). ITT is defined as the NBTT multiplied by export volume. An alternative interpretation is that the ITT measures the purchasing power of exports in terms of importable goods and services.

Change in a country's terms of trade directly affects the balance of payments position of the country. Any adverse change will worsen a country's trade balance. In order to restore balance it will need to export more and/or import less. Substantial cut in imports may seriously hamper the economic growth of many developing countries as they depend heavily on imported capital equipment. On the other hand, a rise in a country's NBTT, or in its ITT, would allow it to expand imports, including imports of capital equipment, and thus help the country for a continuous or accelerated economic growth.

Trade Intensity Index

The trade intensity index (TII) is used to determine whether the value of trade between two countries is greater or smaller than would be expected on the basis of their importance in world trade. It is defined as the share of one country's exports going to a partner divided by the share of world exports going to the same partner. It is calculated as:

$$T_{ij} = (x_{ij}/X_{it})/(x_{wj}/X_{wt}) \quad \dots \quad (1)$$

where x_{ij} is the value of country i 's exports to country j , x_{wj} is the value of world exports to country j , X_{it} is country i 's total exports and X_{wt} is total world exports. In this formula, x_{wj} and X_{wt} will also include x_{ij} and X_{it} . The formula given at (1) above may be slightly modified using Rest of the World's (RoW) exports instead of world exports as shown below (RoW is defined as World excluding the country 'i'):

$$T'_{ij} = (x_{ij}/X_{it})/(x'_{wj}/X'_{wt}) \quad \dots \quad (2)$$

where x'_{wj} = Rest of the World's exports to country $j = x_{wj} - x_{ij}$ and X'_{wt} = Rest of the World's exports = $X_{wt} - X_{it}$. We define T'_{ij} as modified TII. For countries with insignificant share in world exports, values of T_{ij} and T'_{ij} will remain almost same. The difference may be significant for countries with a significant share in world exports. Value of the index (T_{ij} or T'_{ij}) will be one for an expected bilateral trade flow. Share of one country's exports to its partner should be at least equal to the share of world exports to the same partner for an expected bilateral trade flow. Otherwise, it means that the country fails to exploit the market in its partner country and there is scope for expansion of its exports trade in the partner country. An index of more (less) than one indicates a bilateral trade flow that is larger (smaller) than expected, given the partner country's importance in world trade.

Section II

Sources and Nature of Data

The analysis has been done based on the trade data published in the United Nations Conference on Trade and Development (UNCTAD) Handbook of Statistics (2004) and IMF's Direction of Trade Statistics (DTS) (1997 and 2004). In both the publications, exports data are published as per free on board (f.o.b.) value while imports data are published as per 'cost, insurance and freight' (c.i.f.) value. Most of the data are published country-wise as well as various group wise. Data are available at the highest aggregate level *i.e.*, the world as a whole. In the Handbook (2004), data are also presented in three broad groups *viz.* 'Developed economies', 'South East Europe (SEA) and Commonwealth of Independent States (CIS)' and 'Developing economies'. These three groups are mutually exclusive and combined together present the world total. India, China and all the East Asian economies mentioned earlier are in the third group *viz.* 'Developing economies'. Needless to mention that the USA and Japan are in the first group *viz.* 'Developed economies'. Erstwhile USSR is in the second group *viz.* 'SEA & CIS'.

Section III

Analysis Based on the Indicators

This section presents the factual analysis based on the values of the indicators discussed above. Although the focus of this analysis is on the trade performance of India *vis-à-vis* the South and East Asian economies mentioned above, values of the indicators are also presented for the USA and Japan, the two most important trade partners of the economies under study. Analysis is also presented for the three groups *viz.* 'Developed economies', 'South East Europe (SEA) and Commonwealth of Independent States (CIS)' and 'Developing economies' mentioned above wherever relevant. Values of indicators pertaining to growth, market concentration, distribution and terms of trade were readily available in the UNCTAD Handbook (2004). Indicators pertaining to share in world trade, percentage share to GDP and trade intensity indices were compiled using trade data available in the Handbook (2004), IMF's DTS(2004, 1997) and the UNCTAD website (www.unctad.org). Data used for compilation were all in US dollar.

Share in World Exports

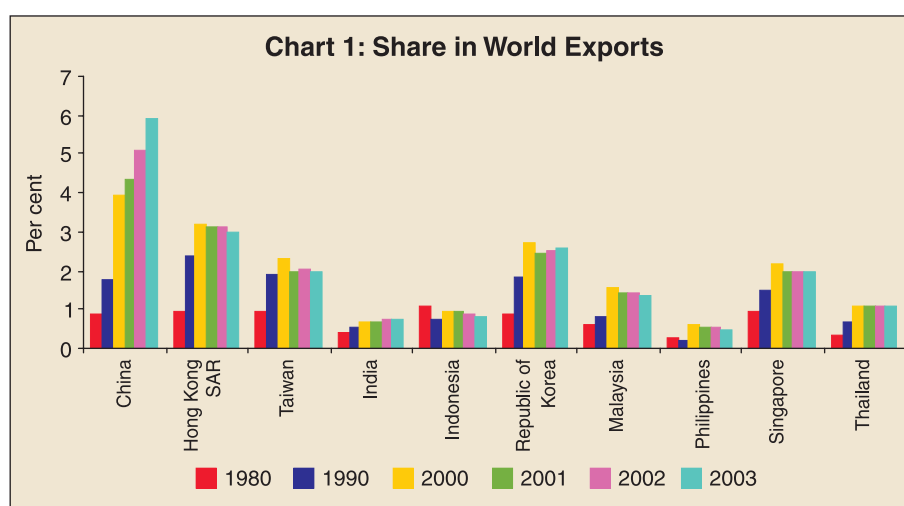
Table 1 presents the share in world trade by the economies under study. Share of Developed Economies in exports came down noticeably after 1990 and remained around 65 per cent during the years 2000 to 2003. Share of the South-East Europe & CIS economies too declined from 5.27 per cent in 1980 to around 2.68 per cent in 2000. The same, however, increased marginally in the subsequent years and remained around three per cent. During the period after 1990, Developing Economies have been able to exhibit a significant improvement in their exports. Share of these economies in world exports increased from 24.21 per cent in 1990 to around 32 per cent in 2000 and remained almost same in the subsequent three years. The noticeable improvement in the share of Developing Economies can be mainly attributed to the striking performance of the economies in the South and East Asia *viz.* China, Hong Kong SAR (China), Taiwan (China), Republic of Korea, Malaysia, Singapore and Thailand. Share of China in world exports increased from 1.78 per

Table 1: Percentage Share in World Exports

	1980	1990	2000	2001	2002	2003
Developed Economies	65.31	72.08	65.34	66.03	65.29	64.53
Developing Economies	29.43	24.21	31.97	31.18	31.87	32.39
South-East Europe and CIS	5.27	3.70	2.68	2.79	2.84	3.08
USA	11.10	11.27	12.27	11.94	10.85	9.72
Japan	6.42	8.24	7.53	6.59	6.51	6.34
China	0.89	1.78	3.92	4.35	5.09	5.88
Hong Kong SAR (China)	0.97	2.35	3.17	3.10	3.13	3.01
Taiwan (China)	0.97	1.92	2.32	2.00	2.04	1.94
India	0.42	0.51	0.67	0.71	0.77	0.75
Indonesia	1.08	0.74	0.98	0.92	0.91	0.84
Republic of Korea	0.86	1.86	2.71	2.46	2.54	2.60
Malaysia	0.64	0.84	1.54	1.44	1.46	1.33
Philippines	0.28	0.23	0.63	0.53	0.57	0.49
Singapore	0.95	1.51	2.17	1.99	1.96	1.95
Thailand	0.32	0.66	1.09	1.06	1.08	1.08

Source : Author's calculation based on UNCTAD Handbook (2004) data.

cent in 1990 to 5.88 per cent in 2003 (Chart 1). During the same period, the share of the USA and Japan declined from 11.27 per cent and 8.24 per cent, respectively, in 1990 to 9.72 per cent and 6.34 per



cent, respectively, in 2003. During this period, share of India in world exports increased from around 0.51 per cent in 1990 to 0.75 per cent in 2003, substantially lower than many of its South and East Asian neighbours under study.

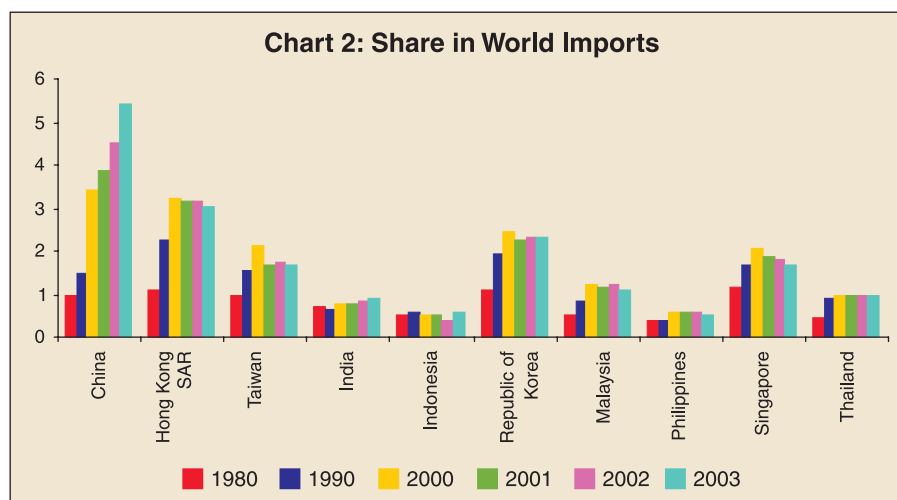
Share in World Imports

Share in world imports by Developing Economies also followed similar trends to that of exports during the period 1980 to 2003 (Table 2 and Chart 2). After 1990 share of these economies significantly went up, mostly because of the South and East Asian region. China increased its share in world imports from 1.48 per cent in 1990 to 5.42 per cent in 2003. Share of India in world imports increased from 0.65 per cent in 1990 to only 0.93 per cent in 2003. As in case of exports, share in world imports by India did not rise much during the period under study. The share was found to be lower than all the economies under study except for Indonesia and Philippines. During the same period, the share

Table 2: Percentage Share in World Imports

	1980	1990	2000	2001	2002	2003
Developed Economies	70.93	73.05	69.21	69.26	68.77	68.18
Developing Economies	23.90	22.53	28.99	28.59	28.93	29.28
South-East Europe and CIS	5.17	4.42	1.80	2.15	2.30	2.54
USA	12.40	14.31	19.21	18.69	18.40	17.14
Japan	6.82	6.51	5.79	5.53	5.16	5.03
China	0.96	1.48	3.43	3.86	4.52	5.42
Hong Kong SAR (China)	1.08	2.28	3.25	3.19	3.18	3.05
Taiwan (China)	0.95	1.52	2.13	1.70	1.73	1.67
India	0.72	0.65	0.79	0.80	0.86	0.93
Indonesia	0.52	0.60	0.51	0.49	0.39	0.55
Republic of Korea	1.08	1.93	2.45	2.24	2.33	2.35
Malaysia	0.52	0.81	1.25	1.17	1.22	1.08
Philippines	0.40	0.36	0.56	0.55	0.57	0.52
Singapore	1.16	1.68	2.05	1.84	1.78	1.68
Thailand	0.44	0.91	0.94	0.98	0.99	1.00

Source : Author's calculation based on UNCTAD Handbook (2004) data.



of the USA increased from 14.31 per cent to 17.14 per cent. However, share of Japan in world imports declined from 6.51 per cent in 1990 to 5.03 per cent in 2003. Share of South-East Europe and CIS economies in world imports trade also declined significantly after 1980 (from 5.17 per cent in 1980 to around 1.80 per cent in 2000) but made a turnaround in 2001.

One important observation regarding share in world trade by developed economies vis-à-vis developing economies is that the share of imports by the former, especially the USA, in world imports is found to be higher in the years under study than the same observed in case of exports (and the opposite is the observation for the other group).

Growth in Exports

Exports by the Developing Economies experienced rapid growth than that by the Developed Economies after 1990 except for the year 2000-01 (Table 3). During that year, there was a decline in exports by Developed as well as Developing Economies. The world trade in exports had a negative growth of around four per cent in that year. China and India were among the few countries that showed positive, although lower, growth in that year. Annual average growth rate of exports from India during the period under study stood above world average except during the year 2002-03. The growth was also higher than many economies under study after 1990.

Table 3 : Annual Average Growth in Exports

(Per cent)

Year	1980-90	1990-2000	2000-01	2001-02	2002-03
World	6.0	6.6	-3.8	4.5	16.4
Developed Economies	7.3	5.7	-2.8	3.3	15
Developing Economies	3.2	9.0	-6.2	6.8	18.3
South-East Europe and CIS	2.9	6.7	0.2	6.4	26.2
USA	5.7	7.3	-6.4	-5.1	4.3
Japan	8.9	4.1	-15.8	3.3	13.2
China	12.8	14.5	6.8	22.4	34.5
Hong Kong SAR (China)	16.8	8.3	-5.9	5.4	11.8
Taiwan (China)	14.9	7.2	-17.1	6.5	10.5
India	7.3	9.5	2.3	13.8	13.5
Indonesia	-0.9	8.1	-9.1	3.0	7.8
Republic of Korea	15.1	10.1	-12.7	8.0	19.3
Malaysia	8.6	12.2	-10.4	6.0	6.5
Philippines	3.9	18.9	-17.9	11.8	0
Singapore	9.9	9.9	-11.7	2.8	16.1
Thailand	14.0	10.5	-5.7	5.6	17.1

Source : UNCTAD Handbook (2004).

Growth in Imports

As in the case of exports, developing economies experienced higher growth in world trade in imports than developed economies after 1990 except during the year 2000-01. During this year, there was negative growth in world trade in imports. China, however, managed an impressive growth in its import trade by around 8.2 per cent in that year. Barring 2000-01, imports by India grew impressively after 1990 and the growth was above the world average and above that of many other important economies.

Share of Exports and Imports to GDP

Share of exports and imports of Developing Economies to their GDP (at current prices) went up significantly after 1990 and remained

Table 4: Annual Average Growth in Imports

(Per cent)

Year	1980-90	1990-2000	2000-01	2001-02	2002-03
World	6.1	6.5	-3.7	3.6	16.5
Developed Economies	6.9	6.0	-3.7	2.8	15.5
Developing Economies	4.2	8.3	-5.1	4.8	17.9
South-East Europe and CIS	4.2	3.5	14.7	11.1	28.5
USA	8.2	9.5	-6.4	2.0	8.6
Japan	5.1	4.6	-8.0	-3.4	13.6
China	13.5	13.1	8.2	21.2	39.9
Hong Kong SAR (China)	15.0	8.8	-5.5	3.3	11.7
Taiwan (China)	12.4	8.5	-23.3	5.1	12.9
India	4.3	10.1	-2.2	12.2	25.1
Indonesia	2.6	2.7	-7.5	-18.1	64.2
Republic of Korea	11.9	7.1	-12.1	7.8	17.6
Malaysia	7.7	9.5	-9.9	8.1	2.6
Philippines	2.9	12.5	-5.7	6.5	6.3
Singapore	8.0	7.8	-13.8	0.4	9.9
Thailand	12.7	5	0.2	4.2	17.3

Source : UNCTAD Handbook (2004).

very high in comparison to that of world ratio as well as to that of Developed Economies and 'SE Europe and CIS' economies (Table 5). Share of exports and imports trade to GDP is more than 100 per cent in case of Singapore and Hong Kong SAR (China) and around 100 per cent in case of Malaysia in exports. Philippines, China and Thailand are the other three countries under study which raised their shares of exports and imports to their GDP very significantly. Share of exports and imports to GDP in case of all the developing Asian economies under study except India remained substantially higher than that observed for the USA and Japan.

Trade Balance

Developing economies and 'S.E. Europe and CIS economies' had trade surplus consecutively in the first four years of the new

Table 5: Percentage Share of Exports and Imports to GDP

	Percentage Share of Exports to GDP (at current prices)						Percentage Share of Imports to GDP (at current prices)					
	1980	1990	2000	2001	2002	2003	1980	1990	2000	2001	2002	2003
World	18.98	16.12	20.20	19.62	19.77	20.53	19.36	16.68	20.80	20.22	20.20	21.00
Developed Economies	16.47	14.78	17.21	16.94	16.78	17.21	18.25	15.50	18.77	18.31	18.06	18.60
Developing Economies	24.76	22.55	30.75	29.25	31.09	33.31	20.51	21.72	28.72	27.65	28.83	30.81
SE Europe and CIS	45.41	14.52	23.68	20.94	19.81	20.69	45.45	17.93	16.39	16.59	16.39	17.42
USA	8.14	6.84	7.96	7.24	6.62	6.59	9.27	8.99	12.83	11.67	11.47	11.88
Japan	12.16	9.42	10.09	9.69	10.49	10.97	13.17	7.71	7.99	8.39	8.49	8.90
China	8.97	17.51	23.06	22.63	25.72	31.06	9.89	15.04	20.83	20.71	23.31	29.30
Hong Kong SAR (China)	69.32	109.86	122.07	116.62	123.87	141.09	78.77	110.30	128.69	123.49	128.55	146.22
Taiwan (China)	47.77	41.88	47.76	43.57	46.27	50.42	47.72	34.24	45.23	38.16	40.00	44.49
India	4.69	5.67	9.20	9.15	10.01	9.73	8.13	7.44	11.18	10.64	11.47	12.29
Indonesia	28.08	22.44	41.36	39.41	33.53	30.07	13.89	19.08	22.31	21.65	14.65	20.01
Republic of Korea	28.15	25.74	33.67	31.22	29.71	32.02	35.83	27.65	31.36	29.28	27.81	29.54
Malaysia	51.91	66.90	108.95	100.03	98.27	96.32	43.22	66.46	90.91	83.96	84.15	79.44
Philippines	17.66	18.31	53.21	46.00	47.54	46.07	25.51	29.33	49.52	49.17	48.42	49.86
Singapore	165.34	143.80	148.80	141.58	141.80	159.14	204.87	165.73	145.28	134.89	131.91	140.06
Thailand	20.11	27.03	56.26	56.35	54.19	56.24	28.48	38.72	50.45	53.71	50.95	52.95

Source : Author's calculation based on UNCTAD Handbook (2004) data and GDP values available on UNCTAD web site (www.unctad.org).

millennium under study (Table 6). Developed Economies had trade deficit in all these years. Trade deficit as percentage of imports for the USA went up from 37.97 per cent in 2000 to 44.55 per cent in 2003. China and all the East Asian economies under study except Hong Kong SAR (China) and Philippines had trade surplus in these years. India had trade deficit in all these years and the same as percentage to imports declined in 2001 and 2002 but increased to 20.83 per cent in 2003. Trade deficit of India as percentage of imports also remained higher than the world average in all these years.

Table 6: Trade Balance as Percentage of Imports

	1980	1990	2000	2001	2002	2003
World	-1.98	-3.36	-2.91	-2.99	-2.11	-2.24
Developed Economies	-9.75	-4.63	-8.33	-7.52	-7.06	-7.48
Developing Economies	20.69	3.84	7.07	5.78	7.84	8.13
South-East Europe and CIS	-0.08	-19.02	44.44	26.19	20.88	18.77
USA	-12.23	-23.87	-37.97	-38.02	-42.30	-44.55
Japan	-7.68	22.18	26.28	15.59	23.59	23.21
China	-9.24	16.40	10.71	9.26	10.31	6.01
Hong Kong SAR (China)	-12.01	-0.40	-5.14	-5.56	-3.64	-3.51
Taiwan (China)	0.11	22.34	5.61	14.20	15.70	13.31
India	-42.24	-23.80	-17.75	-13.98	-12.75	-20.83
Indonesia	102.22	17.58	85.36	82.03	128.93	50.26
Republic of Korea	-21.44	-6.91	7.34	6.62	6.80	8.38
Malaysia	20.09	0.66	19.85	19.14	16.77	21.26
Philippines	-30.76	-37.58	7.44	-6.46	-1.82	-7.59
Singapore	-19.29	-13.24	2.42	4.96	7.50	13.63
Thailand	-29.40	-30.19	11.52	4.92	6.36	6.22

Source : Author's calculation based on UNCTAD Handbook (2004) data.

Table 7 presents trade balance as a per cent of GDP (at current prices). Developed Economies' trade deficit to GDP ratio remained below two per cent. But, in the case of the USA, trade deficit as per cent of GDP increased from 1.13 per cent in 1980 to 5.29 per cent in 2003.

Market Concentration Indices for Commodities Traded

Table 8 furnishes the market concentration indices on exports and imports for commodities traded in the years 1992 and 2002, respectively. As noted earlier, the index value closer to one indicates higher market concentration which means higher impact on trade due to possible price fluctuations of specific products. Data in Table-8 show that merchandise trade of the Developing Economies has higher concentration than that of Developed Economies. The indices reveal very low market concentration of merchandise trade by the USA indicating a well diversified trade structure. In case of exports trade, China also shows very low concentration. In case of imports the same

Table 7: Trade Balance as Percentage of GDP

	1980	1990	2000	2001	2002	2003
World	-0.38	-0.56	-0.61	-0.61	-0.43	-0.47
Developed Economies	-1.78	-0.72	-1.56	-1.38	-1.28	-1.39
Developing Economies	4.24	0.83	2.03	1.60	2.26	2.51
SE Europe and CIS	-0.04	-3.41	7.28	4.35	3.42	3.27
USA	-1.13	-2.15	-4.87	-4.44	-4.85	-5.29
Japan	-1.01	1.71	2.10	1.31	2.00	2.07
China	-0.91	2.47	2.23	1.92	2.40	1.76
Hong Kong SAR (China)	-9.46	-0.44	-6.62	-6.87	-4.68	-5.13
Taiwan (China)	0.05	7.65	2.54	5.42	6.28	5.92
India	-3.43	-1.77	-1.98	-1.49	-1.46	-2.56
Indonesia	14.20	3.35	19.05	17.76	18.88	10.06
Republic of Korea	-7.68	-1.91	2.30	1.94	1.89	2.48
Malaysia	8.69	0.44	18.04	16.07	14.11	16.89
Philippines	-7.85	-11.02	3.69	-3.18	-0.88	-3.79
Singapore	-39.53	-21.94	3.52	6.69	9.90	19.08
Thailand	-8.37	-11.69	5.81	2.64	3.24	3.29

Source: Author's calculation based on UNCTAD Handbook (2004) data and GDP values available in UNCTAD web site (www.unctad.org).

is observed for Japan. Among other Asian economies under study, concentration indices on products traded increased significantly in the case of Hong Kong SAR (China), Republic of Korea, Malaysia, Philippines, Singapore and Taiwan (China).

Indices indicate that India's exports were somewhat more diversified in 2002 in comparison to the position in 1992. In 2002, market concentration of India in products exported was lower than the world average as well to all other economies under study except USA, China, Hong Kong SAR (China) and Indonesia. However, in case of imports trade, degree of concentration increased in 2002 in comparison to 1992 and was higher than all the economies under study in 1992 and all economies except Malaysia and Philippines in 2002. High oil imports along with higher prices of oil might have increased the concentration in import trade for India.

Table 8: Concentration Indices for Products Traded

	Export		Import	
	1992	2002	1992	2002
World	0.139	0.157	0.083	0.103
Developed Economies	0.098	0.115	0.074	0.088
Developing economies	0.25	0.234	0.096	0.139
USA	0.081	0.084	0.096	0.102
Japan	0.14	0.149	0.106	0.099
China	..	0.085	..	0.113
Hong Kong SAR (China)	0.09	0.119	0.065	0.118
Taiwan (China)	0.089	0.153	0.085	0.165
India	0.14	0.13	0.195	0.248
Indonesia	0.195	0.12	0.063	0.119
Republic of Korea	0.109	0.148	0.107	0.139
Malaysia	0.156	0.216	0.12	0.262
Philippines	0.293	0.417	0.161	0.305
Singapore	0.184	0.249	0.107	0.203

Source : UNCTAD Handbook (2004) (data on Thailand were not available).

Distribution of Exports by Main Regions of Destination

Table 9 furnishes the percentage distribution of exports by main regions of destination for the years 1990, 1995, 2000 and 2003. Due to unspecified destinations, the total may not add to 100 per cent for some economies. It is observed that in case of all the Asian economies under study except China, share of exports to the Developing Economies in 'Other Asia¹' (Asia other than West Asia²) increased significantly and share of exports to the Developed Economies decreased with almost equal proportion after 1990. Similar change in direction of exports trade is also observed in case of the USA and Japan. In case of Hong Kong SAR (China), Philippines, Singapore and Thailand, the reduction in share of exports to Europe, the USA and Canada is more prominent. In case of Korea, the decrease in share is more prominent in case of exports to the USA, Canada and Japan. Share of exports to 'Other Asia' from China declined substantially from about 54 per cent in 1990 to around 33 per cent in 2003 but share of exports to Europe, the USA and Canada increased with almost equal proportion.

Table 9 : Distribution of Exports by Main Regions of Destination*

(Per cent)

	Developed Economies						SEA & CIS	Developing Economies				
	Year	Total	Europe	USA & Canada	Japan	Other		Total	America	Africa	West Asia ²	Other Asia ¹
China	1990	35.7	11	9.2	14.7	0.8	3.7	59.8	1.2	2.1	2.2	54.1
	1995	52.2	14.1	17.6	19.1	1.4	1.5	46.3	2.1	1.7	2.2	40.4
	2000	58.4	16.5	24.2	15.8	1.9	1.2	40.4	2.6	1.8	2.3	33.7
	2003	56.2	18.3	22.4	13.6	1.9	2.4	41.5	2.7	2.3	3.2	33.2
Hong Kong SAR (China)	1990	53.6	20	26	5.7	1.9	0.3	46.1	1.8	1.8	1.4	40.8
	1995	47.4	16.1	23.3	6.1	1.8	0.2	52.3	2.8	1.5	1.4	46.6
	2000	48.6	16.4	24.9	5.5	1.8	0.1	51.3	2.4	0.9	1.1	46.7
	2003	41.5	14.4	20	5.4	1.7	0.2	58.3	1.4	0.7	1.2	54.9
Taiwan (China)	1990	68.3	18.3	35.1	12.5	2.4	0.2	30.9	1.9	1.1	1.8	26.1
	1995	52.7	13.9	25	11.8	2.1	0.2	46.4	2.4	1.5	1.7	40.8
	2000	53.5	15.8	24.8	11.2	1.7	0.2	45.6	2.6	0.9	1.4	40.6
	2003	42.8	13.9	19.4	7.7	1.7	0.4	56.1	2.8	0.8	1.4	50.9
India	1990	57.3	30.5	16	9.3	1.5	16.8	21.5	0.4	2.5	6.3	12.2
	1995	55.8	28.6	18.3	7	1.9	3.8	36.4	1.2	4.9	8.3	22
	2000	54.6	25.5	22.8	4.1	2.2	2.7	39.4	2.2	5.3	10.9	20.9
	2003	52	24.5	22	3.2	2.4	1.7	42.9	3	4.8	8.4	26.5
Indonesia	1990	70.5	12.4	13.6	42.5	1.9	0.4	29.1	0.4	0.7	2.7	25.2
	1995	59.5	15.4	14.7	27.1	2.3	0.4	40.1	1.6	1.4	3.3	33.6
	2000	54.7	14.6	14.3	23.2	2.6	0.3	45	1.7	1.8	3.3	38.1
	2003	52	13.8	12.7	22.3	3.2	0.6	47.5	1.4	2	3.3	40.6
Japan	1990	59.1	22.1	34	0	3	1	39.9	3.4	1.9	3.2	31.1
	1995	48.2	16.9	28.9	0	2.4	0.3	51.5	4.2	1.7	1.9	43.6
	2000	51.6	17.6	31.7	0	2.3	0.2	48.2	3.9	1	2	41.2
	2003	45.5	16.5	26.3	0	2.7	0.5	54	3.2	1.2	2.8	46.2
Republic of Korea	1990	67.1	15.7	31.2	18.6	1.6	..	24.6	3	1.8	3	16.7
	1995	48.6	14	19.9	13	1.7	1.7	44.7	5.4	2.3	3.2	33.7
	2000	52.4	15	23.4	11.9	2.1	0.9	46.7	5.3	1.9	4.1	35
	2003	44.7	14.5	19.8	8.4	2.2	1.2	54.5	6.2	2.4	4	41.3
Malaysia	1990	50.8	15.8	17.7	15.3	1.9	0.8	48.4	0.7	0.8	2.4	44.5
	1995	50.4	14.6	21.6	12.5	1.8	0.2	48.9	1.6	1.1	2.4	43.8
	2000	51.4	14.2	21.4	13	2.8	0.1	48.4	1.5	0.8	2	44.1
	2003	46.3	13.4	20.9	9.4	2.6	0.3	53.3	2.8	1.1	2	47.4
Philippines	1990	79.3	18.8	39.4	19.8	1.3	0	20.6	0.9	0.3	1.6	17.5
	1995	71.6	17.9	36.9	15.8	1	0	28.3	1.1	0.2	1.2	25.6
	2000	64.7	18.3	30.8	14.7	1	0	34.9	1.1	0.1	0.4	33.2
	2003	52.7	15.2	21.8	14.4	1.4	0.1	47.2	1.8	0.2	0.5	44.7
Singapore	1990	50.3	16.4	22.1	8.8	3	0.9	48.8	1.3	2.1	2.4	41.8
	1995	43.6	14.3	18.7	7.8	2.7	0.9	55.6	1.4	1.3	1.4	51
	2000	42.5	14.5	17.7	7.5	2.8	0.1	57.4	1.9	1.2	1.5	52.2
	2003	39.7	14.7	14.6	6.7	3.8	0.2	60	1.8	1.2	1.9	54.5
Thailand	1990	68.1	24.8	24	17.2	2.1	0.6	30.8	1.4	2.5	4.8	22
	1995	54.1	17	18.7	16.6	1.8	0.9	45	1	1.7	4	35.6
	2000	57.7	17.2	22.5	14.7	3.3	0.2	41.7	1.5	1.9	2.4	35.8
	2003	52.4	16.4	18.2	14.2	3.7	0.5	47	1.5	2.1	2.9	40.4
USA	1990	64.9	28.2	21.1	12.4	3.3	1	33.8	13.7	2	2.6	15.4
	1995	58.6	22.9	21.6	11	3.1	0.8	40.5	16.5	1.7	2.5	19.8
	2000	57	23.2	22.6	8.4	2.8	0.5	42.4	21.6	1.4	2	17.2
	2003	56.4	22.8	23.4	7.2	3	0.6	43	20.6	1.5	2.1	18.7

* Total may not lead to 100 per cent due to unspecified destinations.

Source: UNCTAD Handbook (2004).

Share of Indian exports to developing economies in 'Other Asia', notwithstanding an increase after 1990, remained substantially lower than the other Asian economies under study. Share of exports from India to Europe and Japan reduced by around 12 percentage points in 2003 *vis-à-vis* that in 1990; however, share of exports to the USA increased by around 6 percentage points during the same period. Among all the economies under study, share of Indian exports to the S.E. Europe and CIS economies was substantially higher in 1990. However, the share which was around 16.8 per cent in 1990 decreased to around 1.7 per cent in 2003, indicating that India's business with the economies in that region has drastically reduced in the last decade.

Distribution of Imports by Main Regions of Origin

Table 10 furnishes the distribution of imports by main regions of origin for the years 1990, 1995, 2000 and 2003. Due to unspecified origins, here also the total may not add to 100 per cent for some economies. It is observed that in case of all the Asian economies under study, shares of imports from developed economies reduced noticeably after 1990. As was observed in case of exports, share of imports too from 'Other Asia' by all the Asian economies under study except China increased substantially after 1990. A similar trend is observed for imports by the USA and Japan. However, in case of China, there has not been much change in the share after 1990, although the same remained higher than Taiwan (China), India, Korea and Thailand in the years under study. Share of Indian imports from the USA and Canada reduced substantially after 1990 and the share remained much lower in comparison to other Asian economies under reference. However, imports from developed Europe account for a significantly higher share in case of India (although the share declined after 1990) *vis-à-vis* the other Asian economies while opposite is the fact in respect of imports from 'Other Asia'. These trends about India have to be read with the fact that for India, share of imports from origins unspecified was very high, around 23 and 21 per cent in 2000 and 2003, respectively.

Table 10: Import Structure by Main Regions of Origin*

(Per cent)

	Developed Economies						SEA & CIS	Developing Economies				
	Year	Total	Europe	USA & Canada	Japan	Other		Total	America	Africa	West Asia ²	Other Asia ¹
China	1990	51.3	19.3	15	14.2	2.8	4.8	43.1	2.8	0.7	1	38.5
	1995	55.7	17.2	14.2	21.9	2.3	3.9	38.7	2.2	1.1	1.6	33.7
	2000	46	14.3	11.2	17.8	2.6	3.1	47.9	2.1	2.1	3.9	39.6
	2003	43.5	14.1	9.3	18	2.2	3.3	47.1	3.6	2	3.5	38
Hong Kong SAR (China)	1990	38.6	12.3	8.5	16.1	1.7	0.1	61.3	0.8	0.6	0.3	59.6
	1995	36.8	12	8.4	14.8	1.6	0.3	63	0.6	0.4	0.6	61.3
	2000	30.8	10	7.5	12	1.4	0.2	68.9	0.6	0.3	0.5	67.5
	2003	28.9	9.9	6	11.9	1.2	0.3	70.8	0.8	0.4	0.8	68.8
Taiwan (China)	1990	76.1	17.7	25	30	3.6	0.2	23.5	2.4	0.5	6.1	14.5
	1995	70	16.2	21.6	29.2	3	1.9	28	2.3	1.8	3.7	20.2
	2000	61.7	12.3	18.9	27.5	3.1	1.3	36.9	1.5	2.3	4.5	28.5
	2003	52.6	10.8	14.5	24.8	2.5	1	46.1	1.3	1.9	6.3	36.6
India	1990	58.6	35	12.3	7.5	3.8	6.3	34.6	2.2	3.1	18	11.2
	1995	49.6	29	10.6	6.5	3.5	3.5	41.1	1.5	5	20.5	14.1
	2000	41.6	27.3	7	4	3.2	1.6	33.4	1.5	6.4	8.3	17.2
	2003	37.3	22.6	7.4	3.2	4.1	3.7	38.2	2.9	5	8.1	22.2
Indonesia	1990	66.2	22	13.3	24.8	6	0.4	33	2.3	0.7	5.1	24.8
	1995	63.4	21.6	13.7	22.7	5.5	1.3	35.1	2.6	1.5	4	26.8
	2000	47.1	13.2	12	16.1	5.7	0.7	51.3	1.8	2.5	8.5	38.4
	2003	39.8	11.9	9.3	13	5.5	1.1	58.2	1.7	4.9	8	43.1
Japan	1990	50.8	18.3	26.1	0	6.4	1.5	47.7	4	1.6	13	28.8
	1995	47.5	16.3	25.8	0	5.5	1.5	50.9	3.4	1.4	9.1	36.6
	2000	39.9	13.8	21.4	0	4.7	1.3	58.8	2.8	1.3	12.8	41.7
	2003	36.7	14.4	17.6	0	4.6	1.3	62.1	2.5	1.7	13.2	44.5
Republic of Korea	1990	66.9	13.1	24.7	25	4.1	..	20.7	2.3	0.8	7	10.3
	1995	67.9	14.9	24.4	24.1	4.4	1.8	29.6	2.9	1.7	8.4	16.4
	2000	54.8	10.9	19.6	19.8	4.4	1.6	43.6	2	2	15.6	23.9
	2003	51.2	12.1	15	20.5	3.6	1.2	47.6	2.4	1.4	13.7	30.1
Malaysia	1990	63.8	17.5	17.9	24.2	4.1	0.4	35.7	1.8	0.5	1.2	32
	1995	64.5	17.3	16.8	27.3	3.1	0.4	34.4	1.2	0.5	0.8	31.8
	2000	52.7	12.3	17.1	21.1	2.3	0.3	45.1	0.8	0.5	2	41.8
	2003	38.5	11.6	12.5	12.5	1.8	0.6	59.6	0.9	0.4	1.8	56.4
Philippines	1990	56.5	12.8	21	18.4	4.3	0.4	43.1	2.6	0.7	11.4	27.9
	1995	57.2	11.5	19.4	22.3	4	0.3	39.8	1.7	0.6	7.9	29.1
	2000	52.2	9.8	19.2	18.9	4.3	0.3	46.8	0.8	0.2	9.1	36.5
	2003	49.6	8.8	18.5	20	2.3	0.5	49.1	1.1	0.2	6.7	41
Singapore	1990	54.6	15.5	16.7	20.1	2.3	0.3	45	1.2	0.8	10.8	32.3
	1995	53.6	15.2	15.5	21.1	1.8	0.4	46	0.9	0.6	6.4	38.1
	2000	48.5	13.8	15.4	17.2	2.1	0.3	50.7	0.7	0.5	7.9	41.6
	2003	43.6	15	14.5	12	2.1	0.6	55.7	0.9	0.6	8.4	45.7
Thailand	1990	63.7	19	11.9	30.4	2.4	0.7	34.9	2	0.9	3.8	28.1
	1995	61	17.1	12.2	29.3	2.4	1.8	37.2	1.5	0.9	3.4	26.7
	2000	51.4	11.7	12.3	24.7	2.7	1	45.5	1.3	1.3	9.7	33.1
	2003	48.5	11.4	10	24.1	3	1.1	48.5	2	1.3	9.3	35.7
USA	1990	59.7	21.7	18.1	18	1.9	0.4	39.8	13	3.3	3.4	20.1
	1995	56.7	19.6	19.2	16.5	1.4	0.7	42.5	14	2.1	1.8	24.6
	2000	52.3	19.9	18.5	12.1	1.8	0.9	46.9	17	2.3	2.4	25.1
	2003	49.7	21.2	17.4	9.3	1.7	0.9	49.4	17.1	2.6	2.7	27

* Total may not lead to 100 per cent due to unspecified destinations.

Source: UNCTAD Handbook (2004).

Terms of Trade Indices

Table 11 furnishes the terms of trade indices for the economies under study. In the years under study, except 1980, terms of trade remained more favourable to Developed Economies vis-à-vis Developing Economies. Korea, Malaysia, Singapore and Thailand enjoyed very good terms of trade in the 1990s. However, the same deteriorated significantly in 2001 and 2002. Among the developing Asian economies under study, China exhibited stable terms of trade. Moreover, after 1995, China has been able to manage better terms of trade than the Developed Economies as a whole in almost all the years under study. India's terms of trade fluctuated in the years under study. The deterioration in 2001 and 2002 may possibly be attributed to depressed prices for exports and high prices of oil [Economic Survey (2002-2003)].

Purchasing Power Indices of Exports

Table 12 furnishes the purchasing power indices of exports for the economies under study. It is observed that in all the years under

Table 11: Terms of Trade Indices(Terms of trade indices³ 2000 = 100)

	1980	1990	1994	1995	1996	1997	1998	1999	2001	2002
World	105	102	104	104	104	103	104	103	100	101
Developed Economies	97	103	105	105	104	103	105	105	101	102
Developing Economies	117	100	102	102	102	103	100	99	99	100
China	117	102	102	102	107	110	110	104	103	102
Hong Kong SAR (China)	100	100	100	99	100	100	102	101	101	102
Taiwan (China)	-	97	94	91	97	99	101	104	111	117
India	72	86	119	108	99	114	117	105	98	88
Indonesia	-	95	85	90	98	99	82	66	94	100
Republic of Korea	114	134	137	139	125	122	117	114	95	95
Malaysia	71	103	110	109	112	112	107	104	98	98
Philippines	99	87	78	80	81	83	87	102	96	104
Singapore	127	116	106	104	105	105	105	103	96	94
Thailand	152	119	120	117	114	115	109	107	91	90

'-': Not available.

Source: UNCTAD Handbook (2004).

Table 12: Purchasing Power Indices of Exports(Purchasing power indices³ of exports: 2000 = 100)

	1980	1990	1994	1995	1996	1997	1998	1999	2001	2002
World	33	50	64	70	74	81	85	90	100	105
Developed Economies	35	55	68	73	77	84	89	93	101	104
Developing Economies	23	39	59	66	71	79	78	85	97	106
China	8	26	49	58	60	75	78	81	112	140
Hong Kong SAR (China)	11	40	71	77	82	87	85	86	97	107
Taiwan (China)	-	63	79	85	87	92	82	91	88	97
India	15	30	62	72	75	80	86	87	107	112
Indonesia	-	42	61	64	72	82	79	80	95	97
Republic of Korea	9	32	51	62	67	75	88	96	96	108
Malaysia	13	27	55	64	68	75	74	87	91	98
Philippines	4	21	32	44	48	58	67	88	83	96
Singapore	14	39	66	75	79	85	86	89	92	95
Thailand	15	41	74	82	73	78	81	89	87	98

‘-’ : Not available.

Source: UNCTAD Handbook (2004).

study except for the year 2002, exports by Developed Economies yielded higher purchasing power than that of the Developing Economies. However, purchasing power of exports of Developing Economies improved substantially after 1990 possibly because of strong growth in exports in volume terms. In contrast to a fluctuated terms of trade indices, purchasing power of exports of India increased significantly after 1990 fuelled by strong export growth in volume terms. Furthermore, the country had higher purchasing power of exports in majority of the years than many of the economies under study.

Trade Intensity Index

As stated in Section I, the trade intensity index (TII) can be used to determine whether the value of trade between two countries is greater or smaller than would be expected on the basis of their importance in world trade.

Table 13 furnishes the TII (T_{ij}) and Table 14 furnishes the modified TII (T'_{ij}) for the Asian economies under study for their

Table 13: Trade Intensity Indices – 1990 and 2003
Trading Partner

	Japan	China	Hong Kong SAR	Taiwan (China)	India	Indonesia	Republic of Korea	Malaysia	Philippines	Singapore	Thailand
Trade Intensity Indices – 1990											
Japan	-	1.47	1.89	3.67	0.88	3.35	3.48	2.56	2.23	2.27	3.57
China	2.39	-	17.96	0.35	0.41	1.22	0.39	0.79	0.83	1.95	1.53
Hong Kong SAR	0.93	17.08	-	2.88	0.55	1.75	1.33	0.94	2.69	1.94	1.47
Taiwan (China)	2.09	2.34	4.66	-	0.94	3.86	1.25	3.26	3.21	2.37	2.92
India	1.52	0.07	1.27	0.46	-	0.99	0.53	0.94	0.30	1.05	1.27
Indonesia	6.94	2.24	1.00	2.26	0.35	-	3.04	1.31	1.60	4.51	0.82
Republic of Korea	3.17	..	2.42	1.31	0.99	3.16	-	1.45	1.97	1.69	1.67
Malaysia	2.50	1.45	1.32	1.48	2.42	2.22	2.65	-	3.43	13.98	3.94
Philippines	3.23	0.52	1.67	1.74	0.04	1.42	1.61	2.07	-	1.78	2.14
Singapore	1.43	1.05	2.70	2.46	3.11	..	1.27	17.39	3.26	-	7.43
Thailand	2.81	0.80	1.87	0.99	0.41	1.27	0.98	3.33	1.85	4.48	-
Trade Intensity Indices – 2003											
Japan	-	2.41	2.06	4.09	0.62	2.94	3.34	2.08	3.23	1.95	3.72
China	2.94	-	5.69	1.27	0.93	1.99	2.08	1.23	1.20	1.26	0.96
Hong Kong SAR	1.17	8.47	-	1.50	1.04	0.87	0.93	0.78	1.69	1.28	1.13
Taiwan (China)	1.69	5.37	2.89	-	0.57	0.93	1.46	1.98	1.73	2.20	1.94
India	0.71	1.27	1.56	0.58	-	1.94	0.84	0.88	0.78	1.35	1.45
Indonesia	4.83	1.24	0.63	2.26	3.48	-	3.22	3.40	2.63	5.51	2.51
Republic of Korea	1.94	3.62	2.49	2.26	1.81	3.40	-	1.75	2.62	1.50	1.44
Malaysia	2.32	1.29	2.11	2.22	2.95	3.94	1.32	-	2.33	9.79	4.83
Philippines	3.45	1.18	2.79	4.25	0.34	1.59	1.65	5.96	-	4.17	3.75
Singapore	1.46	1.40	3.27	2.96	2.62	..	1.91	13.87	3.82	-	4.70
Thailand	3.08	1.41	1.76	2.01	0.97	5.60	0.90	4.23	3.43	4.54	-

‘..’ corresponding exports data not available.

Source : Author’s calculation based on DTS (1997 & 2004) data.

bilateral trade flows in exports in 1990 and 2003 (the column in the extreme left lists the exporting economies while the following columns list their trading partners). Any of these two tables suffices for our analysis. As stated earlier, T_{ij} and T'_{ij} remain almost same for countries with low share in world exports. The difference is significant for countries with a large share in world exports. The same can also be observed from the values shown in Tables 13 and 14.

Table 14: Modified Trade Intensity Indices – 1990 and 2003
Trading Partner

	Japan	China	Hong Kong SAR	Taiwan (China)	India	Indonesia	Republic of Korea	Malaysia	Philippines	Singapore	Thailand
Modified Trade Intensity Indices – 1990											
Japan	-	1.54	2.07	4.88	0.88	4.28	4.53	3.00	2.52	2.58	4.69
China	2.45	-	26.45	0.34	0.40	1.22	0.39	0.78	0.83	1.99	1.54
Hong Kong SAR	0.93	28.46	-	3.02	0.55	1.78	1.34	0.94	2.80	1.98	1.49
Taiwan (China)	2.13	2.40	5.03	-	0.94	4.09	1.26	3.42	3.36	2.44	3.03
India	1.52	0.07	1.27	0.46	-	0.99	0.53	0.94	0.30	1.05	1.27
Indonesia	7.27	2.26	1.00	2.28	0.35	-	3.09	1.32	1.61	4.63	0.82
Republic of Korea	3.31	..	2.49	1.32	0.99	3.30	-	1.47	2.01	1.71	1.70
Malaysia	2.53	1.46	1.32	1.49	2.45	2.24	2.68	-	3.50	15.77	4.05
Philippines	3.25	0.52	1.68	1.74	0.04	1.42	1.61	2.07	-	1.79	2.14
Singapore	1.44	1.05	2.78	2.52	3.22	..	1.28	23.47	3.38	-	8.27
Thailand	2.84	0.80	1.88	0.99	0.40	1.28	0.98	3.38	1.86	4.59	-
Modified Trade Intensity Indices – 2003											
Japan	-	2.66	2.22	5.16	0.60	3.39	3.96	2.25	3.81	2.08	4.56
China	3.34	-	8.03	1.29	0.93	2.12	2.23	1.25	1.22	1.28	0.96
Hong Kong SAR	1.18	11.00	-	1.52	1.04	0.86	0.93	0.77	1.73	1.29	1.14
Taiwan (China)	1.72	6.03	3.03	-	0.56	0.93	1.48	2.03	1.77	2.27	1.99
India	0.70	1.27	1.57	0.58	-	1.95	0.84	0.88	0.78	1.35	1.45
Indonesia	4.99	1.24	0.63	2.29	3.56	-	3.28	3.47	2.67	5.72	2.54
Republic of Korea	1.99	3.89	2.59	2.34	1.85	3.63	-	1.79	2.74	1.52	1.46
Malaysia	2.36	1.29	2.15	2.26	3.03	4.11	1.32	-	2.37	11.19	5.11
Philippines	3.49	1.18	2.82	4.32	0.34	1.59	1.65	6.11	-	4.24	3.80
Singapore	1.47	1.41	3.42	3.08	2.70	..	1.94	18.56	4.04	-	5.06
Thailand	3.15	1.41	1.77	2.03	0.97	5.89	0.90	4.39	3.52	4.72	-

‘..’ corresponding exports data not available.

Source : Author’s calculation based on DTS (1997 & 2004) data.

The bilateral trade flows of India have significantly improved as indicated by the TII (T_{ij} as well as T'_{ij}) after 1990, although at the same time they remained below expected levels with many of the economies under study. As indicated by the TII (T_{ij} as well as T'_{ij}), in 2003, bilateral trade flows by India with Japan, Taiwan (China), Republic of Korea, Malaysia and Philippines were smaller than expected. Bilateral trade flows of India which were above expectation level in 1990 with Japan as indicated

by the TII (T_{ij} as well as T'_{ij}) degraded to below expectation level in 2003. On the other hand, Republic of Korea, Malaysia, and Singapore had bilateral trade flows above expectation with all the economies under study in 2003, Japan and Philippines with all but India, China with all but India and Thailand, Taiwan (China) with all but India and Indonesia, Thailand with all but India and Korea, Hong Kong SAR with all but Indonesia, Korea and Malaysia, and Indonesia with all but Hong Kong SAR.

Section IV

Conclusion

A strong external sector is found in most country experiences to be the companion of a growing economy. The most striking and well-known example is the South and East Asian economies' experience. This paper makes a comparative study of India's export performance *vis-à-vis* a few important economies in the region *viz.* China, Hong Kong SAR (China), Taiwan (China), Indonesia, Republic of Korea, Malaysia, Philippines, Singapore and Thailand. In terms of size of the country and economy although India is much larger than most of these economies, the country does not match well with these economies so far as performance in international trade in goods is concerned. Share of India in world trade in exports as well as in imports remains very low in comparison to many of its South and East Asian neighbours under reference.

However, India has enhanced its performance in annual average growth rate in exports as well as in imports after 1990. The growth was mostly above the world average during the period under study and was above that of many other important economies under study. Furthermore, although India's terms of trade indices fluctuated in the years under study, purchasing power of exports (representing the income terms of trade) of the country increased significantly after 1990 due to strong export growth in volume terms. Also, the country managed higher purchasing power of exports in majority of the years than many of the economies under study.

The analysis has shown that India reduced its market concentration index on products exported in 2002 in comparison to the position in 1992. India, thus, managed a less concentrated (*i.e.* more

diversified) trade structure on products exported than many of the economies under study except the USA, China, Hong Kong SAR (China) and Indonesia. However, in imports, the country had a more concentrated (*i.e.* less diversified) trade structure (in terms of products imported) than most of the economies under study. A more concentrated trade structure on commodities traded carries higher risk that may arise due to possible price fluctuations. Finally, it is found that international trade in goods by India with many of the economies under study is below expected level as indicated by the trade intensity indices. Developing economies in 'Other Asia' account for a very low share in India's exports as well in imports *vis-à-vis* the other Asian economies under study. Possibly, the country can improve its performance in international trade in goods by concentrating on higher trade with its Asian neighbours, especially in the South and the East Asian region.

Notes:

- ¹ Other Asia (26 countries): Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Hong Kong SAR(China), India, Indonesia, Korea (Democratic People's Republic of), Korea (Republic of), Lao People's Democratic Republic, Macao SAR (China), Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan (China), Thailand, Timor-Leste, Viet Nam; [UNCTAD Handbook (2004)].
- ² West Asia (14 countries): Bahrain, Iran (Islamic Republic of), Iraq, Jordan, Kuwait, Lebanon, Palestinian territory, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen; [UNCTAD Handbook (2004)].
- ³ Compiled after converting the current value of exports (f.o.b.) or of imports (c.i.f.) to dollars and expressed as a percentage of the average for the base period (2000); [UNCTAD Handbook (2004)].

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Key Issues in Development by Damien Kingsbury, Joe Remenyi, John Mckay and Janet Hunt; Palgrave Macmillan, New York 2004; pages 329, US \$ 58.

The history of thinking and action on ‘development’ is, perhaps, the story of human civilization itself. However, the modern era of development thought and policy dates back to the end of the Second World War. In this era, the development paradigm has had its share of debate. The major questions, in any such debate, have been mostly as follows: What development is all about? How do we measure it? What is (or are) the approach (es) to development? What is the role of the State, the households, the corporate sector, the civil society and the international community? Who are supposed to be the ‘beneficiaries’? Has the development model adopted been ‘all-inclusive’? What have been the intended and the unintended impact of the development model on the environment, on international relations and on the standard of living of people? The book under review ‘Key Issues in Development’ is a latest addition to this debate. The book has 11 chapters, which dwell upon the various facets of development in the past six decades since the Second World War. The first two chapters and the fifth chapter trace the theory and practice of development since 1945, while the rest of the chapters deal with specific issues such as foreign aid, globalisatation, crises in Africa, Asia and Latin America, political development, poverty, community development, gender issues and the environment.

The end of the Second World War saw the emergence of many newly de-colonized ‘nation states’. These nation states had some common characteristics in economic and social terms such as low national income and productivity, high incidence of poverty, agriculture domination, a rising population curve (on the second phase of demographic transition) and thereby low per capita income, higher inequities in income distribution both across regions and individuals, higher unemployment rate with lower participation rate of women in the job market, lower literacy levels and technical capability and lower longevity (an indicator of poor health conditions).

Given the above circumstances and the political exigencies of the times, the governments of these nations embarked on the path to

development, which was mainly identified with economic or 'material' development and measured in terms of economic growth (a simple measure of increase in gross or average income). It was widely believed by the policy makers that the government would be a better allocator of resources than the market in order to enhance the aggregate demand in the economy (the Keynesian approach to development).

In this backdrop, the mix of policies adopted by these governments in the 1950s and 1960s was more or less identical such as: Almost every government prepared a 'national development plan', which documented the development outcomes (Chapter 2). Investments were considered the key to growth as predicated by the Harrod-Domar growth model. These nations embarked on the path to industrialisation (a term accepted as synonymous with 'modernisation') as the engine for economic growth. Increasing the production of goods which were not locally available and so far being imported was the order of the day ('import substitution'). The governments took on the responsibility of investments in physical and economic infrastructure as well as in industries. In this process, the role of private sector was reduced and the existing firms 'nationalised'. The resources for the government's investment in industries and infrastructure were to be obtained through enhancing domestic savings. For this, they set about establishing and/or strengthening the financial system (the institutional framework and the organisations) to garner domestic savings. However, on account of the low income and savings, and less monetised economy, the governments faced a resource crunch, which led them to depend on foreign aid from the developed nations as the second option. On the trade front, they resorted to high tariff and non-tariff barriers to protect the nascent industry.

The 1970s witnessed a growing recognition by the academicians and the policy makers that the 'trickle down' approach to development did not give significant results in terms of poverty reduction as well as social development. This led to many developing nations adopting strategies to attack poverty directly through 'development programmes' and 'minimum needs' or 'basic needs' programmes. Alternative indicators of development were devised by economists

and policy makers, which attempted to measure the improvements in social indicators, such as the literacy levels and longevity. One such measure was the Physical Quality of Life Index (PQLI) developed in 1970. Along the same lines, the 1990s saw the emergence of the Human Development Index (HDI) devised by the United Nations Development Programme (UNDP).

In the 1980s and the 1990s, many developing nations embarked on the path of economic reforms with the objective of enhancing efficiency in the economy. Some of the major measures adopted on the economic front to this end are: reducing the role of the government in economic activities through disinvestment, creating an environment favourable for the private sector to operate, reducing the protection accorded to industry, opening up the economy to freer trade through converting existing quotas to tariffs, reducing the tariff levels and domestic support. To move towards an international trade order under the World Trade Organisation (WTO), capital controls have been increasingly de-regulated.

These moves have seen economic growth of many of these developing countries shifting to higher trajectories. However, the persisting inequities in income and social development indicators across the developing nations have been a cause for concern. As a result, there has been a renewed effort from the global community in setting out the 'Millennium Development Goals' to be achieved by 2015.

The book traces these major developments during the last six decades. The book argues that the development plans of the 1950, were built on 'false' assumptions and 'poor' quality data. Apart from this, the other underlying assumptions were: one, that the growth in income would trickle down across regions as well as individuals; two, that income inequalities would increase initially but decline thereafter (Kuznet's Inverted-U hypothesis); and finally, that there is a unique path to development as codified by the Rostow's stages of growth (Chapter 2). Furthermore, the implicit assumption was that the government must act as the important catalyst for change and the 'key controller and coordinator of the development programme'. The book also argues that the purpose of aid by the donor countries was not just humanitarian but also to enhance their economic and political interest (Chapter 3).

Despite the moves towards economic development, there have been economic crises across Africa, Latin America and recently in East Asia. Chapter 6 discusses the major theories on the causes of these economic crises. On the one end of the spectrum, is the argument (the Washington Consensus) that says that the crises are due to purely internal weaknesses of policy, *viz.*, failure to implement the 'optimal' mix of measures that include trade and financial liberalisation, privatisation of government owned assets, tight monetary and fiscal settings, and the general strengthening of market-based systems throughout the economy. On the other end of the spectrum are the theories that argue that external factors are just as important, such as the structure of the international financial system, the activities of hedge funds and other new financial instruments, the policies of the international agencies such as the IMF, the policies of the stronger Western countries, and the activities of the multinational corporations. The author argues that 'there is no consensus on the causes of economic crises...(but, such crises) allow us to see much more clearly the structure of the international system and assist in identifying some of its weaknesses'.

The book would be useful for students and researchers of development economics as well as policy makers to have a comprehensive view of the arguments and counter-arguments over the development debate. Its large bibliography is a treasure house for researchers. Introduction by Damien Kingsbury beautifully summarises the gist of the book. However, there are some repetitions and typos across chapters, which could have been avoided.

The major takeaway from the book is its stress on the search for alternative development models. The argument of the authors is that development is a process and not merely an outcome; they support the view that development is a 'multi-dimensional' concept extending beyond economic parameters into social, political, cultural and technological arena. The authors favour the need to assess the cost of economic growth, mainly in terms of the deterioration in environment and the over-exploitation of non-renewable resources. In short, the development process needs to be sustainable, people-centered, pro-poor, community based and gender sensitive. Going

by this framework, India has a long way to go in the development arena and to attain the Millennium Development Goals. The international community needs to strive harder to reach a stage where development would be seen as 'freedom'.

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Business Process Outsourcing: Concept, Current Trends, Management and Future Challenges edited by S. Nakkiran and D. John Franklin, Deep & Deep Publications, New Delhi, 2004, pages 308, Price Rs. 660

The title of the book evokes considerable academic interest given its topical significance. The book is broadly divided into nine parts. The theme of the book is on current trends of business process outsourcing (BPO) in India. A detailed study on outsourcing is especially relevant to India in the light of outcry from the West against exporting jobs. In this regard a recent citing may be noted: -

“Catholics outsource prayer requests- Shortages of US priests have churches paying Indian Clergy to handle prayer requests”

Broadly, the book under review covers the areas relating to concept, current trends, management and future challenges. Part one of the book is on the importance of BPO. In this part, the book gives a brief idea about BPO in India. Outsourcing will mainly help the management to focus on the core activities of the business. It mentions that the top 400 growth companies in the world outsource several of their business functions. Competition from other developing countries like China, Taiwan and Korea is a major challenge for India in this field. The authors mention many aspects involved in making a ‘make or buy’ decision. These include endogenous factors and exogenous factors. Endogenous factors include volume of production, the cost of production and the infrastructural facilities. Exogenous factors include the requirement of items on a long term or short term basis, and the availability and reliability of vendors. The make or buy decision is by no means simple. It involves a thorough analysis of the present and future market and a continuous review of the economic circumstances prevailing.

The book mentions various types / models of BPO. These include onsite model of BPO, offsite model of BPO and offshore model of BPO. In the onsite model of BPO, the whole set of processes starting from information gathering to implementation, are done at the client’s premises. This type of model is helpful for those projects which require

constant attention and also need to be done in the clients location. In the offsite model of BPO, the service provider will have its office near the client's location. In the offshore model of BPO, the BPO service provider will not have any presence at the clients location but the client will interact directly with the offshore team. Technological advances have made distance a redundant concern and BPO is, therefore, becoming the new business model for managing corporate change and growth. In such a scenario, India with its cheap educated workforce and quality service is fast emerging as a preferred destination. In this context it may be mentioned that outsourcing in some form or the other existed even during the 1970s or earlier. However, it is the technological advances especially in the IT and the communications sectors since the 1980s which have given a big boost to outsourcing.

In the Indian context, BPO is synonymous with IT enabled services, whereby business processes or services are performed in India and delivered over communication networks, including the internet, world wide. The study points out that even though China is a competitor to India in the field of BPO, it is their lack of English skills, legal and regulatory environment and IPR laws which gives India an advantage. In the Chapter on "BPO in India and USA- An overview", the authors mention about the consequences of BPO in the US. The benefits to the US are cost saving while costs include unemployment and decrease in wage level. However, recent studies show that this viewpoint is not fully correct. The reaction against outsourcing in the West is seen as a serious threat to the growth of these industries in countries like India. There has been a movement in some industrial countries, for example, the USA and Australia, to introduce legislation that would limit outsourcing activities of firms with government contracts. As Bhagwati, Panagariya and Srinivasan (2004) have stressed, outsourcing is a process in which the innovating firms introduce a product in the domestic market and once the product matures, the production of this product is shifted to countries where it is cheaper to produce, with the innovating country eventually becoming an importer of the product. In this process, the home country will lose low wage jobs, but gain high wage jobs. On balance, outsourcing will lead to the transition of the innovator country to a high value job oriented country. According to a study by Amiti and Wei (2004), increases in service outsourcing in the US manufacturing

and services go hand in hand with greater labour productivity. This is likely due to firms relocating their least efficient parts of production to cheaper destinations. Even if outsourcing leads to some shedding of labour, the increased efficiency could lead to higher production and an expansion of employment in other lines of work. For example, a firm might let some employees go because it imports its information technology services but then, as it becomes more efficient, it may decide to expand its research and development department, thereby creating new jobs. When jobs in one sector are outsourced, other sectors could also be affected. As firms that outsource become more efficient, they produce more cheaply and, hence, can provide inputs to other sectors at lower prices. This, in turn, lowers other firms' costs, reducing their prices and leading to higher demand for their products. This higher demand could be met by the increased productivity of existing staff, or, if demand growth is sufficiently strong, it could lead to further job creation, which could, in principle, offset the direct job losses caused by outsourcing. However, there could be a change in the skill mix of jobs. It is estimated that more than 69 per cent of workers who lost jobs due to imports in the USA between 1979 and 1999 were re-employed. This means 31 per cent were not re-employed, highlighting that there may be some rigidity in the labour market. These results suggest that service outsourcing would not induce a fall in aggregate employment; on the other hand, it has the potential to make firms and sectors sufficiently more efficient, leading to enough job creation in the same broadly defined sectors to offset the lost jobs due to outsourcing. Even though service outsourcing is growing rapidly, it still remains a small fraction of industrial countries' GDP. It is not dominated by a lopsided, one-way outsourcing from developed to developing countries. In fact, most industrial countries do not outsource more (when adjusted for economic size) than many developing countries. The United States, for example, which is a larger importer of business services, is also a large exporter of these services and has a growing net surplus in business service trade. In fact, the evidence suggests that job losses in one industry often are offset by jobs created in other growing industries. According to the US Bureau of Labour Statistics data, 69 per cent of US workers in non-manufacturing sectors who lost their jobs to outsourcing over the last 20 years found new work within six months. On average, these workers

earned roughly the same wages. It may also be noted that, a phenomenon known as 'reverse outsourcing' has begun to assert itself. For example, the Indian outsourcing firm Wipro has added many US based consultants to its staff. Companies based in India and China, *etc.*, have begun setting up bases in the US and hiring US workers. While the US and Germany are the largest outsourcers of business services, India and China (portrayed as major recipients of outsourcing in the media) are significant outsourcers themselves valued at US \$ 11 billion and US \$ 8 billion, respectively, ranked 11th and 18th. The US being the largest outsourcer also happens to be the largest insourcer.

The book also discusses current trends in BPO. It distinguishes between two types of outsource services, technology and business processes. Technology services include electronic commerce, software application *etc.* BPO on the other hand includes customer contact, accounting, logistics procurement *etc.* Taxing BPO clients will increase the cost of transacting in India. This will make India less cost effective, thereby adversely affecting the competitive capacity of Indian BPOs against the Philippines, China *etc.* The Chapter "Business Process Outsourcing and the Indian Business" presents a case study on outsourcing by TELCO. BPO combines the right people, processes and technologies to achieve maximum efficiency and a competitive advantage. Companies that want to grow internationally must continuously invest in infrastructure and find talent around the world. Outsourcing is facilitated if the MNC trusts an Indian partner, because the Indian partner would get access to sensitive areas of the business.

The Chapter, "Business Process Outsourcing in India - Gaining Momentum" points out that the perception about outsourcing is changing. The guiding principle used to be: outsource only non-core activities and concentrate on developing core competencies. However, it is difficult to distinguish core and non-core competency. Virtually everything about a business may be outsourced, probably excepting product management, "which is after all the brain of a business and brand management which is often the value of a business". Thus, identification of appropriate activities for outsourcing is a critical factor for its success. The selection of appropriate supplier is a crucial decision

in BPO because improvement in internal performance is easy to achieve but managing the suppliers is not always easy.

In the Chapter “Role of BPO in India”, the authors mention that the outsourcing started with mainly low-end, labour intensive services such as data entry, medical transcription and simple call center functions and now has slowly moved towards more sophisticated operations, like financial research, technical support for R&D and chip design. For India, the US will be the significant BPO market for a long time to come. The Chapter “Business Opportunities for India” presents an interesting analysis of major commodities/ services, which are outsourced from India. It also points out that concern about IPR is a major deterrent for moves looking at outsourcing manufacturing. This is very important if the source is not a subsidiary of the parent company and is an independent vendor.

The major threats to Indian BPOs are the increasing cost and the decline in revenue (labour cost increase), legislations such as anti outsourcing taxation and competition from China. South Africa is emerging as a major BPO destination because it has a time zone compatible with Europe and has a 17-million strong labour pool (compared to India’s 270 million). The book points out that the Philippines is in no way a threat to Indian BPO industries because, India’s geographical spread and huge technical pool of people offers far more choices to international BPO companies than the Philippines. Sixty per cent of the BPO business coming to India is voice related. Voice-based BPO business has the lowest margins due to the fixed costs like dialer running, maintenance costs and wages. The labour costs are rising because voice-based labourers are paid 10 to 15 per cent more than non-voice-based employees, because of odd timings of work.

Globalisation of business and government is affecting every person on earth. As Robert Goizueta, the chief executive of Coca Cola has observed elsewhere: “We used to be an American company with a large international business. Now we’re a large international company with a sizeable American business”. In short, offshore outsourcing is gradually become accepted as a ‘normal’ business tool. The major benefits of global outsourcing for the consumer include: business services and products are subjected to greater transparency when used across many nations;

choice of suppliers becomes more attractive when any global supplier can be chosen rather than just local service providers and competition is created by this choice, ensuring an improved service and better pricing. India is believed to have the best overall climate for offshore outsourcing. Ireland is the strongest competitor to India, although it cannot match India on cost.

The book under review is very topical and relevant. It is a collection of interesting essays. A beginner can use this book to get an idea about the prospects of BPO in India. However, most of the essays lack empirical work. A section on theories of outsourcing would have added to the merit of the book. Some of the essays do not provide any definite conclusions. Another lacuna of the book is that it does not discuss emerging issues regarding outsourcing such as BPO frauds. In recent times, many incidents of data sharing losses have come to light and it is estimated that companies lose 1-2 per cent of their annual revenues due to fraud. Indian companies too will face this predicament. To conclude, the book effectively introduces many concepts related to outsourcing and presents the latest trends in outsourcing. A chart on major services outsourced from India presented in the book is very informative. In retrospect, the book provides useful insights on the prospects of outsourcing from India.

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“Outsourcing to India: The Offshore Advantage” – Mark Kobayashi-Hillary, 2004. Publisher: Springer-Verlag Berlin, Page 274

The world economy has fast turned into a ‘service economy’ since the 1990s. Services revolution across the globe has changed the business map and the way business is conducted. Around the world, phenomenal growth of services sector has outstripped the growth in real GDP in a number of economies from Asia and the OECD. This high growth of services has been aided by the expansion of trade in services due to increased tradability of a variety of business and other services. The growth in international trade in services is now somewhat higher than the trade in goods sector - between 1990 and 2000, the exports of services registered a growth of over 7 per cent as compared with a growth of 6 per cent for goods. Rapid advancement in technology and innovations (especially in communication, transportation, and information processing) accompanied by an increased integration of financial markets have increased the tradability of services, which has further facilitated the expansion of cross-border trade in services.

Amongst various services sectors, trade in business services comprising various back-office operations such as accounting, call centres, computing, management consulting, data processing, hardware consulting have witnessed a phenomenal expansion in the recent years. This is largely attributable to a number of US and European companies, which have taken recourse to outsourcing of such services from other countries to take advantage of labour arbitrage.

A number of economies around the world such as India, Ireland, Philippines, China, Malaysia, Vietnam, Brazil, Russia, Australia, South Africa and Singapore are engaged in the provision of outsourcing services to a number of Western economies. Nevertheless, India stands out as a major outsourcing centre because of its well-developed telecommunication network; an abundant, inexpensive, qualified, skilled and English-speaking labour force; advanced technological infrastructure; and a different time zone with the United States which enables the US firms to offer 24 hours services to their clients at a much lower cost. These positive attributes have rendered India a competitive

edge over other countries in the outsourcing business. Several studies acknowledge India's apex position as the most favoured outsourcing destination. The Nasscom–McKinsey Report 2002 has revealed that if a work is contracted to India, there is a cost saving of 40-60 per cent, quality improvement of 3-8 per cent and productivity increase of 20-150 per cent. This explains as to why a large number of companies from the USA and the UK have already established their offshore operations in India and are outsourcing their work from India.

India has, thus, emerged as the world's back office provider and established its forte in the provision of various services such as call centres, claims processing, accounting, legal operations and service jobs. The rise in stature of India as a *numero uno* outsourcing destination has caught the attention of many academicians, policy makers, corporate professionals and some have described this phenomenon as 'outsourcing revolution'. The author of the book under review is also deeply influenced by India's performance in the outsourcing arena. He aptly describes the outsourcing revolution in the country as no less important than the 'invention of the steamship or railway'.

The author maintains that with the positive attributes that the economy is endowed with, India would maintain its lead as the knowledge economy matures. He comes down heavily on backlashes against outsourcing from India reflected in the introduction of anti-outsourcing bills in the US and European parliaments and other related institutions. Such protectionist legislations are nothing but popular vote-winning ploys and that it is not going to help these economies in any way. He describes the phenomenon as an emotional battle raised by the anti-globalisation lobby and feels that protectionism can only lead in one direction - to failure. The author's concerns are apparently shared by many other studies. Decrying such outsourcing backlashes, Mary Amity and Shang-Jin Wei (2004), economists of IMF, in their study titled 'Fear of Service Outsourcing: Is It Justified?' describe the growing outsourcing of services to countries like India as a mere reflection of the benefits from the greater division of labour and trade that have been described for manufactured goods since the time of Adam Smith and David Ricardo. Downplaying the claim that outsourcing leads to job losses in industrial economies, they argue that only a small number of jobs are lost because of

outsourcing, which finally gets offset with increased efficiency of firms facilitated by outsourcing leading in turn to job creation. In a related study '*Outsourcing and Job Loss: a Protectionist Fallacy*', Rajiv Ahuja (2004) calls the claim of job losses from outsourcing as 'a protectionist fallacy'. He opines that besides cost reduction, outsourcing benefits developed countries through direct and indirect channels. Direct channels include repatriation of earnings of its nationals located in offshore centres in developing countries and an increased market of its goods and services, which is provided by the native offshore service providers. Indirect benefits accrue in the form of saving of capital through cost reduction by outsourcing, which could otherwise be used to create newer, high value jobs in which surplus labour could be absorbed.

According to the author, there are four basic drivers of outsourcing. First, the Government policy of some developed countries such as the USA and other European economies to limit the immigration in these countries. This has created a situation of shortage of skilled work force, which has further been accentuated by the decline in working age population in these economies. Second, globalisation and growth of knowledge economy have made the world a smaller place, which has led to offshore outsourcing becoming a normal business tool. Third, the fast development in technology has improved the information flow and global connectivity leading to a surge in outsourcing. Finally, corporate strategy of focusing on core competencies has also driven outsourcing. The book also surveys the genesis, business models and ownership patterns of major Indian technology firms engaged in outsourcing business and how these firms are coping up with foreign competition. The attractiveness of major cities in the country for setting up outsourcing business is highlighted by drawing a comparison of these cities with oriental cities. The information provided in the book relating to potential partners in business and research and trade associations in India engaged in studying the trends of outsourcing business in the country is expected to be very handy to a company considering setting up its outsourcing base or availing outsourcing services from India.

The book also dwells upon issues relating to the process of organising the outsourcing process. Citing his own experience as a management practitioner in Singapore, wherein his company decided to

outsource from India, the author suggests that the company should have clear-cut and specific objectives that it seeks to achieve from outsourcing. The company should first look at its core competence and see if some of its non-core work could be done by other company (located elsewhere) at a lower cost. It should then strategically decide outsourcing of such non-core activities. For making the outsourcing work, the book recommends a focus on the following five areas: getting people in right place, designing metrics for results, designing Key Performance Indicators (KPIs) for the future, building a great relationship with the new partner and benchmarking the services against others. Since vendor selection is the most important for making the outsourcing work for an organization, careful research on vendor selection is recommended. Given the importance of legal contract that a prospective business partner would sign with an Indian vendor, a number of suggestions are offered. The fact that India does not have Data Privacy Laws should be kept in mind by a firm considering outsourcing from India. Given the importance of quality in the provision, the author advocates that quality issues should form a part of the service level agreement with the vendor. Since the BPO sector faces the risk of high migration and attrition rates which could affect its working, the need for knowledge transfer as and when a skilled person leaves a company to join another one is underscored. The need for cultural awareness about the country is also stressed as one has to work with cross-cultural teams. For smooth operations relating to outsourcing business, companies need to plan the transition that the organization might be exposed because of emerging trends.

This book forms a good starting point for someone who wants to learn about outsourcing. The book benefits from the author's experience as an independent outsourcing consultant and his earlier stints as an employee assigned with the task of managing outsourced relationships in the UK, Singapore and India. The book offers a balanced view on the trend of outsourcing to India. It also elucidates why a business house should utilise India as an offshore outsourcing destination. The book offers a practical guide and would help those companies avoid some of the pitfalls that they might otherwise face when they decide to outsource their work from India. The book is written in an easily readable style and is very captivating. This information packed book is a must reading for those who are in the fray of outsourcing from India. It would be as

indispensable a guide for them as would 'Lonely Planet' be when they first visit India as a tourist.

However, the book suffers from some limitations. While the author builds up a lot on documentation such as highlighting the views of a number of experts whom he might have interviewed, he does not seem to be concluding anything or putting his own viewpoint. Though the book is a compendium of synthesized information on outsourcing, all put in one place, it presents only the tip of the iceberg. The book is also devoid of any empirical analysis. To support his analysis while establishing India's forte over its rival countries in terms of its being the most preferred outsourcing location, providing relevant data such as international comparison of labour cost and telephone tariffs could have been helpful. Some readers who get lured by the title of the book and seek expert information on how to achieve better results from offshore outsourcing to India would probably be disappointed. The chapter on Domestic Travel, besides highlighting the companies operating the airlines in the country could have done well to document in detail the connectivity within the country and with the outside world, which could have been very useful for the prospective investors.

Despite these limitations, the book does a great service to India by highlighting the positive attributes of its BPO sector. The book would surely help India in marketing itself abroad in an improved way. The perception of the readers especially the Westerners about the country is bound to change from India being the 'land of snake charmers' to the 'land of IT geeks'. The future of outsourcing business in India seems promising and is expected to get a boost from the ongoing expansion of the free market supported by the WTO agreements on telecommunications, information technology and financial services. Emerging areas of services trade such as advertising, computer software, distribution services, postal services, accountancy, pharmaceutical research would further add to India's comparative advantage in outsourcing. India would continue to dominate the economic landscape of outsourcing business in the world drawing on its well-endowed skilled and knowledge-based workforce.

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