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Corporate Choice for Overseas Borrowings: The Indian Evidence

Bhupal Singh*

This paper examines the macroeconomic factors that drive the Indian corporates' preference for overseas borrowings. Foreign borrowings by Indian corporates are characterised by a large number of companies accessing international capital markets for small size loans. The policy framework on foreign commercial borrowings has been effective in achieving a balanced maturity profile as also in channelising funds to productive sectors. It is observed that foreign borrowings by the corporates and import of capital goods display a close positive relationship. Since capital goods import is closely related to growth in industrial production, it implies that the demand for foreign borrowings by the corporates is generated by the underlying pace of real activity. The estimated error correction model revealed that Indian corporates' long-run demand for overseas commercial borrowings is predominantly influenced by the pace of domestic real activity, followed by the interest rate differentials between the domestic and international markets (indicating arbitrage) and the credit conditions. The real variable dominates the price variable in driving the demand for overseas commercial borrowings.

Introduction

The rising access of the emerging market firms to international capital markets reflects the transformation of corporate financing led by cross-border movement of capital, deepening of global financial markets, strong interlinkage across markets and institutional developments, particularly the mechanisms for risk assessment. Large access to international borrowings is also indicative of greater trade linkages and an enhanced exposure of firms to foreign currency

transactions. Liberalisation of capital controls by developing countries coupled with a rising appetite for asset diversification by international investors has also created an environment for firms from developing countries to increasingly access the international capital markets. The above mentioned developments seem to have enabled them to circumvent the credit constraint imposed by the underdeveloped local capital markets, widened their choices of financing and facilitated borrowings at a reasonable cost.

A historical account of India's approach to external commercial borrowings (ECBs) reveals that during the period 1950s to the early 1980s, the domestic firms' reliance on international capital markets was restricted mainly to bilateral and multilateral assistance. In the 1980s, in the context of the widening current account deficit, the traditional external sources of financing were found to be inadequate and were supplemented with commercial borrowings from international markets including short-term borrowings. In the 1990s, the Indian corporates' access to international capital markets increased with the liberalisation of the external borrowings policy, the gradual withdrawal of capital account restrictions and improved credit ratings. During the current decade (2000s), the sustained growth of overseas borrowings and the overall private capital flows to India reflects the momentum in domestic economic activity, resilient corporate performance, a positive investment climate, a long-term view of India as an investment destination and the improved sovereign risk. Besides these factors, the prevailing higher domestic interest rate coupled with a higher growth rate has moderated the risk perception and created arbitrage opportunities.

In the above backdrop of a paradigm shift from official to private capital flows and the emergence of overseas commercial borrowings as an important component of capital flows, this paper attempts to analyse the underpinnings and the key determinants of commercial borrowings by the Indian corporates from international capital markets. Section I provides an analytical review of the shifting policy paradigm of external borrowings. The trends in ECBs, compositional shifts and the pattern of concentration in favour of small or big size borrowings are discussed in Section II. Based on these, Section III

presents analytical underpinnings of corporates' overseas borrowing behaviour from international markets. Estimates of an Error Correction Model (ECM), formulated to capture the long run and the short run corporate borrowing behaviour, are analysed in Section IV. Some key observations emerging from the study are summarised in Section V.

Section I

The Policy Environment: A Paradigm Shift

The recourse to commercial borrowings by the Indian corporates, though began in the 1970s, remained modest due to the dominance of concessional, non-market based finance in the form of external assistance from bilateral sources and multilateral agencies. Towards the end of the 1970s, the concessionality in the aid flows dwindled. Thus, with the rising external financing requirements beginning with the 1980s and the recognition that reliance on external assistance was not favourable, commercial borrowings from international capital markets were preferred. The commercial borrowings were, however, regulated by an approval procedure, subject to conditions on cost, maturity, end use and ceilings on borrowings. The upgrade in the credit ratings also facilitated access to international capital markets. In the second half of the 1980s, financial institutions and public sector undertakings increased their participation in the international bonds market – the Samurai market, the DM and the Swiss Franc public bond and the Euro-Dollar fixed rate bond markets. During the late 1980s, large inflows were also contributed by the development financial institutions which were encouraged to borrow overseas well in advance of their requirements. The rising reliance on commercial borrowings was manifested in the fact that the commercial borrowings constituted 27 per cent of net capital flows to India in the 1980s, more than double from 12 per cent in the 1970s.

Following the balance of payments (BoP) crisis of 1991, the flow of funds from global commercial banks and bond markets virtually receded in response to a down grading of sovereign ratings by the credit rating agencies. The problem that emerged was related to the access of Indian entities to international markets rather than the cost of borrowings. As a consequence, a prudent external debt management policy was

pursued to bring the external debt situation to a more comfortable level. During the 1990s, in the period following the balance of payments crisis of 1991 and the introduction of economic reforms, external assistance ceased to be an important element of capital inflows with the ascendancy of private capital flows – a phenomenon observed across the developing countries. As a consequence, net capital flows to India increased to 2.2 per cent of GDP in the 1990s and 3.7 per cent in the 2000s (2000-08), after remaining at around 1 per cent of GDP during the period 1950-1980. This, however, masks the magnitude of cross border capital flows to India as in gross terms, which increased five-fold from 7.2 per cent of GDP in 1990-91 to 36.4 per cent in 2007-08. In tandem, commercial borrowings, after experiencing some slowdown after the BoP crisis, also rose significantly in the latter half of the 1990s, responding to the strong domestic investment demand, favourable global liquidity conditions, upgrade of sovereign credit rating, lower risk premia on emerging market bonds and an upward phase of capital flow cycle to the EMEs. During this period, ECBs constituted about 30 per cent of the net capital flows to India. Towards the late 1990s and the early 2000s, the demand for ECBs remained subdued due to a host of factors such as global economic slowdown, reversal of a rising phase of capital flows to developing countries and lower domestic investment demand. The period beginning 2003-04 marked the resumption of debt flows to developing countries, which was a combined outcome of the higher interest rate differential emanating from ample global liquidity and the robust growth expectations and a low risk perception towards the emerging markets. During this period, Indian corporates also increased their recourse to ECBs, which contributed to about 25 per cent of the net capital flows to India.[1]

The policy on commercial borrowings, however, continues to lay emphasis on the principles of prudent debt management with regard to access, prioritizing the end use of resources raised, minimum maturity restriction and prudent ceiling on aggregate borrowings.[2] First, from the viewpoint of prudent debt management, ECBs can be accessed under two routes: (i) the automatic route, *i.e.*, which does not require approval, and (ii) the approval route. The maximum amount of ECBs which can be raised by a corporate under the approval route is US$ 500 million or

equivalent with a minimum average maturity of five years during a financial year. However, corporates can avail of ECBs up to an additional amount of US$ 250 million over the existing limit of US$ 500 million with an average maturity of more than 10 years. While borrowings for investment in the real sector, especially the infrastructure sector, fall under the automatic route, the following types of proposals are covered under the approval route: (a) financial institutions dealing exclusively with infrastructure or export finance, (b) banks and financial institutions which had participated in the textile or steel sector restructuring package, (c) ECBs by non-banking financial companies with a minimum average maturity of 5 years, (d) foreign currency convertible bonds (FCCBs) by housing finance companies, (e) special purpose vehicles or any other entity notified by the RBI set up to finance infrastructure companies/ projects, and (f) multi-state co-operative societies engaged in manufacturing activity. The pattern of external commercial borrowings reveals that a dominant part of the borrowings is raised under the automatic route, indicating broadly no restrictions on borrowings by the non-financial entities, i.e. corporates (Table 1). The recent rise in the

Table 1: External Commercial Borrowings through Various Routes

(US $ million)

Quarter	Automatic Route		Approval Route		Total
	Amount	% Share	Amount	% Share	
1	2	3	4	5	6
2004:Q1	857	69.3	380	30.7	1,237
2004:Q2	2,603	96.3	100	3.7	2,703
2004:Q3	2,780	88.8	352	11.2	3,132
2004:Q4	3,077	87.4	445	12.6	3,522
2005:Q1	1,941	90.9	194	9.1	2,135
2005:Q2	2,292	96.2	90	3.8	2,382
2005:Q3	3,746	87.9	514	12.1	4,259
2005:Q4	3,017	96.1	122	3.9	3,139
2006:Q1	6,450	87.3	941	12.7	7,391
2006:Q2	3,930	88.8	498	11.2	4,428
2006:Q3	3,462	85.1	607	14.9	4,069
2006:Q4	2,610	35.9	4,657	64.1	7,268
2007:Q1	7,917	82.6	1,671	17.4	9,588
2007:Q2	4,823	56.7	3,684	43.3	8,507
2007:Q3	5,734	80.7	1,372	19.3	7,105
2007:Q4	4,108	50.6	4,006	49.4	8,115
2008:Q1	5,354	74.1	1,873	25.9	7,227

Source : Compiled on the basis of information obtained from www.rbi.org.in/ecb

share of the approval route reflects large size loans (above US $ 500 million) by non-financial companies in the power, airline and mineral sectors.

Second, the thrust of the policy continues to be directed towards allowing ECBs an additional source of finance for the Indian corporate sector for financing expansion of the existing capacity and for fresh investment to augment resources available domestically. Although till recently, the policy sought to give greater priority to projects in the infrastructure, core and export sectors, all end-use restrictions were relaxed, except prohibiting the use of proceeds for investment in capital markets and real estate so as to avoid any speculative activities (Table 2).

Table 2: End-Use Restrictions on External Commercial Borrowings in India

Domestic Investment	Import of capital goods, new projects, modernisation/expansion of existing production units in real sector - industrial sector including small and medium enterprises (SME) and infrastructure sector - in India. Infrastructure sector is defined as (i) power, (ii) telecommunication, (iii) railways, (iv) road including bridges, (v) sea port and airport (vi) industrial parks and (vii) urban infrastructure (water supply, sanitation and sewage projects).
Foreign Currency Expenditure	ECB above US $ 50 million per borrower company per financial year is permitted only for foreign currency expenditure for permissible end-uses of ECB.
Local Rupee Expenditure	Borrowers proposing to avail ECB up to US $ 50 million for rupee expenditure for permissible end uses would require prior approval of the Reserve Bank under the Approval Route. However, borrowers in infrastructure sector may avail ECB up to US $ 100 million for Rupee expenditure for permissible end-uses under the approval route.
Overseas Investment	ECB proceeds can be utilised for overseas direct investment in Joint Ventures (JV)/Wholly Owned Subsidiaries (WOS) subject to the existing guidelines on Indian Direct Investment in JV/WOS abroad.
Acquisition under the Disinvestment Process	Utilisation of ECB proceeds is permitted in the first stage acquisition of shares in the disinvestment process and also in the mandatory second stage offer to the public under the Government's disinvestment programme of PSU shares.
Micro Finance	NGOs engaged in micro finance activities may utilise ECB proceeds for lending to self-help groups or for micro-credit or for bonafide micro finance activity including capacity building.

A relevant issue that arises is how effective the above policy framework has been in respect of the end use pattern of the ECBs. The emphasis of the ECB policy has been traditionally on the use of funds for the import of capital goods, new projects, modernisation/expansion of existing production units in the real sector. It may be discerned from Table 3 that, on an average, 70 per cent of ECBs are utilised for the import of capital goods, setting up new projects and the modernisation or expansion of existing units. In the context of the end use of ECBs, there have been some new developments. First, with the momentum in Indian investment abroad through Joint Ventures (JVs) and Wholly Owned Subsidiaries (WOSs) to provide the Indian industry access to new markets and technologies, the end-use of ECBs was enlarged to include overseas direct investment,

Table 3: End-Use Pattern of External Commercial Borrowings

(US $ million)

Components	2004-05		2006-07		2007-08	
	Amount	Share (%)	Amount	Share (%)	Amount	Share (%)
1	2	3	4	5	6	7
Import of capital goods	3,060	26.6	5,760	22.7	12,717	41.1
Rupee Expenditure for local sourcing of capital goods	1,899	16.5	3,056	12.1	836	2.7
On-lending or sub-lending	1,401	12.2	883	3.5	712	2.3
New Projects	2,273	19.8	6,970	27.5	4,796	15.5
Modernisation/expansion of existing units	2,057	17.9	5,222	20.6	2,929	9.5
Overseas investment in JV/WOS	265	2.3	1,392	5.5	3,901	12.6
Leasing & hire purchase	–	–	18	0.1	2,518	8.1
Refinancing of old loans	–	–	630	2.5	1,226	4.0
Textile/Steel re-structuring package	100	0.9	–	–	–	–
Others	437	3.8	1,422	5.6	1,317	4.3
Total	11,492	100.0	25,353	100.0	30,953	100.0

Note: Based on Form 83 submitted for allotment of loan registration number prior to draw-down and approvals.
**Source:** Compiled on the basis of the information sourced from www.rbi.org.in.

which has grown in significance. Second, ECBs are also being increasingly used for leasing and hire purchase, reflecting mainly the leasing of aircrafts by domestic airline companies for capacity expansion. Three, the monthly trend in 2007-08 shows that the ECBs utilised for capital goods import have remained significantly higher after the policy changes relating to the end use were effected in August 2007. Simultaneously, the ECBs used for rupee expenditure have significantly come down.

Third, the policy also aims at maintaining a minimum average maturity while keeping an annual ceiling on approvals. ECBs with an average maturity of 8 years and above are, however, outside the purview of the ceiling. Limits on individual borrowings are linked to an average maturity profile. Based on these criteria, the ECBs guideline/approval procedure has been substantially liberalised over time with a view to providing corporates a greater access to international capital markets. As a broad indicator of the maturity profile of commercial loans, the ratio of loans maturing during a year as a ratio to the loans outstanding at the beginning of the year can provide a fair idea about the maturity structure. The policy bias towards balancing of the maturity profile with longer maturity loans during the post-1991 period is amply demonstrated by the ratio of maturing loans to the loans outstanding at about 0.2, implying an average maturity of 5 years (Chart 1).

The computed weighted average maturity of ECB loans during the period 2004-07 has witnessed a balanced maturity structure (Chart 2). The maturity structure, however, seems to respond to the interest rate movements. The average maturity witnessed some compression with the hardening of international interest rates. However, moderation in the interest rate cycle seems to have had a favourable impact on the maturity structure.

Fourth, an important guiding principle of the ECB policy is to keep the costs of borrowings within prudent limits so that the excessive risk taken by the corporates can be avoided. Accordingly, the all-in-cost ceiling for raising borrowing in the international

Chart 1: Repayment as Ratio to Debt Stock
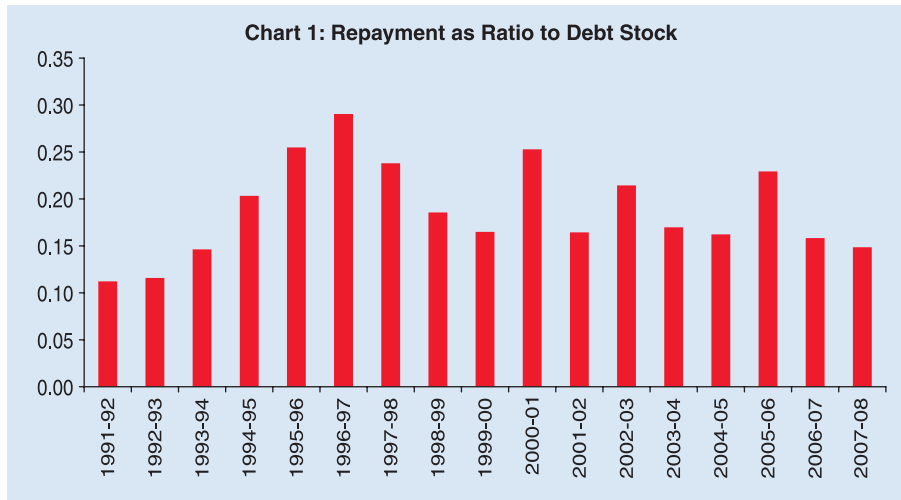
capital markets is linked to the 6-month LIBOR for the respective currencies in which the loan is raised. It can be discerned from Table 4 that the interest rate spread over the LIBOR has been progressively reduced which might be driven by the improved credit rating and finer spreads on Indian bonds in the international markets and better aligning of the domestic interest rate to global rates.

The outcome of the above mentioned policy measures is evident in the secular reduction in the implicit interest rates on external commercial borrowings from 1990-91 through 2006-07 (Table 5).
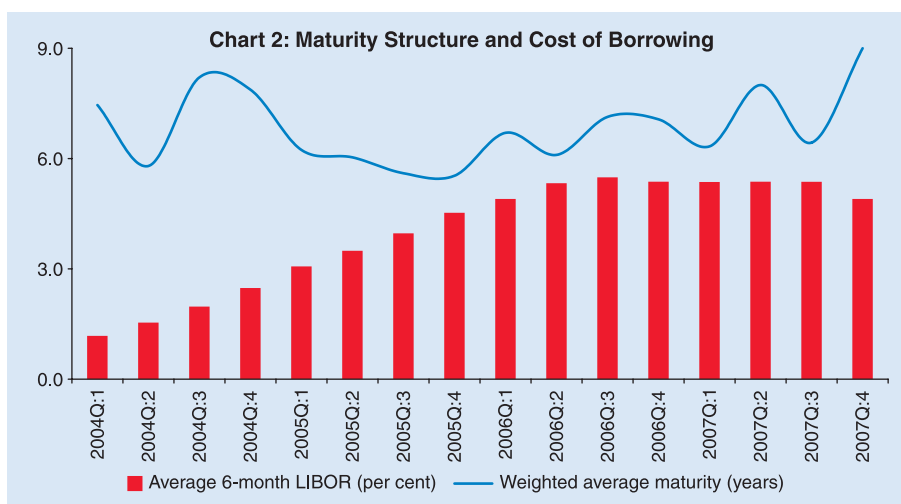
Chart 2: Maturity Structure and Cost of Borrowing

■ Average 6-month LIBOR (per cent) —— Weighted average maturity (years)

Table 4: Price Ceiling on External Commercial Borrowings

(Basis points over 6-month LIBOR)

Year	Normal Projects/3-5 year maturity	Long Term ECBs/more than 5 year maturity
1	2	3
2001	300 (400 for infrastructure sectors	450
2004	200 (3-5 year)	350 (>5 years)
2006	200	350
2007	150	250
2008	200	350

Note: Ceiling represents all in cost ceiling over 6 month LIBOR for the respective currencies.

The implicit interest rate on external borrowings has moved in a corridor between the 6-month LIBOR and the ceiling interest rate. Again, the spread of implicit cost of commercial borrowings over the LIBOR has significantly narrowed down during the period 1991-

Table 5: Interest Rate Dynamics

(Per cent)

Year	6-Month Libor	Average Ceiling rate over Libor	Implicit rate on ECBs
1	2	3	4
1990-91	7.96	–	15.10
1991-92	5.44	–	11.29
1992-93	3.66	–	10.09
1993-94	3.51	–	10.77
1994-95	5.78	–	11.96
1995-96	5.78	–	10.62
1996-97	5.68	–	9.76
1997-98	5.86	–	9.65
1998-99	5.40	–	9.38
1999-00	5.85	9.35	7.88
2000-01	6.36	10.86	8.50
2001-02	2.95	7.45	5.97
2002-03	1.78	6.28	5.00
2003-04	1.35	5.85	4.98
2004-05	2.63	6.13	4.36
2005-06	4.43	7.93	4.98
2006-07	5.42	7.92	6.38

Note: (1) Interest rate (r) is computed by dividing the interest payments (ip) in period t by the debt stock (d) in period t-1, i.e. r = [ip(t)/d(t-1)]-1.

(2) Interest payments for 2003-04 and 2005-06 exclude the interest relating to redemption of Resurgent India Bonds and India Millennium Deposits.

92 to 2006-07 from a peak of about 700 basis points in 1992-93 to 100 basis points in 2006-07, reflecting the deep and liquid global financial markets, benign liquidity conditions and gradual upgradation in the sovereign rating and improved corporate performance.

Fifth, corporates have been permitted to undertake liability management for hedging the interest and/or exchange rate risk on their underlying foreign currency exposures. These products include interest rate swaps, currency swaps, coupon swaps, interest rate caps/collars and forward rate agreements. Prepayment facilities on ECB debt have also been relaxed significantly. As of now, 100 per cent prepayment is permitted where the source of funds is from the Exchange Earners' Foreign Currency account(s) in addition to prepayment out of foreign equity inflow or when residual maturity of such debt is up to one year. Prepayment of ECBs up to US$ 500 million can be allowed by banks without the prior approval of the RBI, subject to compliance with the minimum average maturity period as applicable to the loan.

Section II

Trends and Composition of ECBs

ECBs raised by Indian corporates in gross terms increased seventeen-fold between 1990-91 and 2007-08 (Table 6). A comparison of approvals and actual loans raised by the corporates provides an important indication about the market conditions and the behaviour of the companies intending to raise loans. A higher rate of realisation of the loans approved may take place during the periods of higher credit demand domestically or a higher interest rate spread between domestic and foreign interest rates. A stable and consistently high realisation ratio in the recent years indicates the higher credit demand by the corporates.

In tandem with the increasing levels, the composition of India's external debt reveals that ECBs constitute the largest component of external debt after the external assistance. ECB liabilities witnessed

Table 6: External Commercial Borrowings

(US $ million)

Year	Approvals	Disbursements	Repayments	Net Inflows	Realisation Ratio (%) (disbursement approvals)
1	2	3	4	5	6
1985-86	1,390	1,470	462	1,008	105.8
1990-91	1,903	1,700	1,191	509	89.3
1991-92	2,127	2,798 *	1,146	1,652	131.5
1992-93	2,200	1,001	1,357	-356	45.5
1993-94	2,585	1,859	1,703	156	71.9
1994-95	4,469	2,670	2,513	157	59.7
1995-96	6,286	4,538	3,311	1,227	72.2
1996-97	8,581	7,018	4,032*	2,986	81.8
1997-98	8,712	7,400	3,411	3,989	84.9
1998-99	5,200	6,927 *	3,153	3,774	133.2
1999-00	3,398	2,289	3,460	-1,171	67.4
2000-01	2,837	9,295 *	5,043	4,252	327.6
2001-02	2,653	2,933	4,013	-1,080	110.6
2002-03	4,235	3,033	5,001	-1,968	71.6
2003-04	6,671	5,149	8,015 *	-2,866	77.2
2004-05	11,490	9,084	3,658	5,426	79.1
2005-06	17,172	14,343	11,584 *	2,759	83.5
2006-07	25,353	20,325	3,868	16,457	80.2
2007-08	30,953	28,300	6,119	22,181	91.4

* Disbursements for 1991-92, 1998-99 and 2000-01 are inclusive of special bonds. Similarly, repayments for 1996-97, 2003-04 and 2005-06 are inclusive of redemptions of special bonds.

Source: Status Report on External Debt, Government of India and Reserve Bank of India.

more than a six-fold increase between March 1991 and March 2008 (Table 7). The sharper rise in commercial debt has taken place in the 2000s, the period when corporate demand for external financing rose significantly due to a sustained rise in economic activities domestically and favourable conditions in the international capital markets. As a result, the share of commercial debt in India's external debt increased from 12 per cent in March 1990 to 28 per cent in March 2008.

Another indicator of a broader access to finance through ECBs to the smaller companies can be gauged based on the concentration of the loans disbursed in different size buckets. An interesting

Table 7: Trends in ECB Loans Outstanding

(US $ billion)

End of March	External Commercial Borrowings	Total External Debt	Share of ECBs in Total Debt (%)
1	2	3	4
1990	9.3	75.9	12.3
1991	10.2	83.8	12.2
1992	11.7	85.3	13.7
1993	11.6	90.0	12.9
1994	12.4	92.7	13.3
1995	13.0	99.0	13.1
1996	13.9	93.7	14.8
1997	14.3	93.5	15.3
1998	17.0	93.5	18.2
1999	21.0	96.9	21.7
2000	19.9	98.3	20.3
2001	24.4	101.3	24.1
2002	23.3	98.8	23.6
2003	22.5	105.0	21.4
2004	22.0	111.6	19.7
2005	26.4	133.0	19.9
2006	26.4	138.1	19.1
2007	41.7	169.6	24.6
2008	62.0	221.2	28.0

Source: Status Report on External Debt, Government of India and Reserve Bank of India.

finding that emerges is that about 75 per cent of the total number of loans are concentrated in the category of small size loans, *i.e.,* up to US $ 20 million (Table 8 and Chart 3). Further, if the loan size up to US $ 50 million is considered, about 86 per cent of the total number of loans are concentrated under this category. Thus, it can be concluded that external borrowings are characterised by a large number of companies accessing the international markets for smaller size loans.

It may also be pertinent to analyse the pattern of distribution of external commercial loans under various loan size categories. In terms of the share, smaller size loans (up to US $ 20 million) witnessed a decline in its share in the aggregate amount of loan raised from 22 per cent in 2005 to 9 per cent in 2007 (Table 9). This has occurred due to an acceleration in the pace of large sized loans

**Table 8: Distribution of Number of ECB Loans
under Various Loan Sizes**

(No. of Loans)

Quarter	Up to US$ 20 million	>US$20-50 million	>US$ 50-100 million	>US$ 100 million	Total
1	2	3	4	5	6
2005:Q1	141	10	3	5	159
2005:Q2	111	11	8	5	135
2005:Q3	110	9	16	9	144
2005:Q4	115	14	17	5	151
2006:Q1	122	13	14	22	171
2006:Q2	158	28	11	10	207
2006:Q3	173	23	11	8	215
2006:Q4	188	16	4	15	223
2007:Q1	205	30	12	29	276
2007:Q2	141	31	9	14	195
2007:Q3	113	15	12	19	159
2007:Q4	73	26	10	17	126

Source: Computed on the basis of information sourced from www.rbi.org.in

(>100 million), whose share has risen from 34 to 67 per cent during the same period. This can be, *inter alia*, attributed to the market access by a number of Indian companies for financing overseas acquisitions and sizeable transactions relating to leasing and hire purchase of aircrafts by the domestic airline companies for capacity expansion.
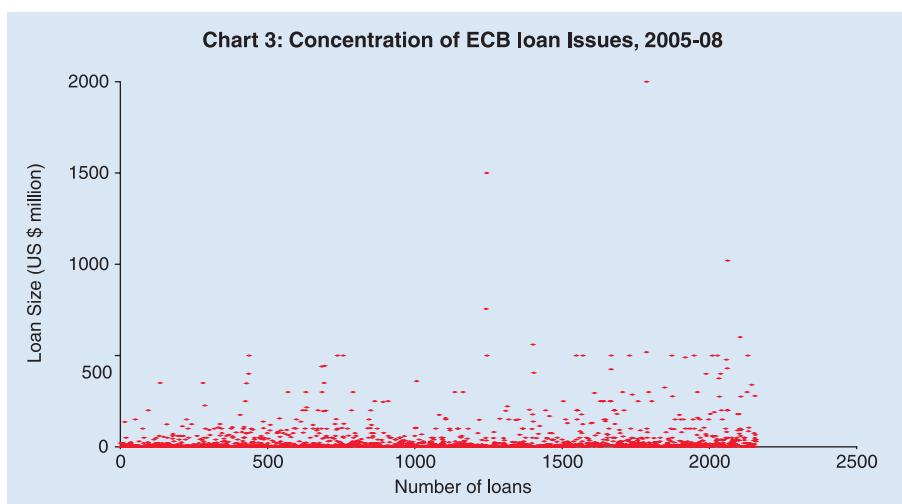

Chart 3: Concentration of ECB loan Issues, 2005-08

**Table 9: Distribution of Amount of ECBs under
Various Loan Sizes**

(Percentage Share)

Quarter	Up to US$ 20 million	>US$ 20-50 million	>US$ 50-100 million	>US$ 100 million	Total
1	2	3	4	5	6
2005:Q1	33.5	17.0	5.7	43.8	100.0
2005:Q2	18.4	19.0	27.5	35.1	100.0
2005:Q3	18.8	9.2	35.8	36.2	100.0
2005:Q4	16.2	21.8	39.9	22.1	100.0
2006:Q1	10.1	5.6	14.3	69.9	100.0
2006:Q2	18.3	25.2	16.9	39.5	100.0
2006:Q3	20.6	19.0	18.7	41.7	100.0
2006:Q4	15.5	9.1	4.9	70.5	100.0
2007:Q1	13.8	14.4	11.4	60.5	100.0
2007:Q2	9.5	12.5	9.9	68.1	100.0
2007:Q3	8.8	7.2	12.8	71.1	100.0
2007:Q4	5.4	14.2	11.2	69.2	100.0

Source: Computed on the basis of information sourced from www.rbi.org.in

Section III

## Analytical Underpinnings of Corporates' Overseas Borrowing

The borrowing behaviour of corporates can be postulated to be determined broadly by the underlying investment demand – a demand led factor and the cost of capital – a supply-side factor. Investment demand can be financed through internal resources in the form of retained profits and external sources, motivated by the choice about the capital structure. The capital structure of a firm entails the firm's choice between debt and equity capital.[3] Equity capital can be raised from the firm's promoters or capital market. Debt in the form of loans and bonds can be raised through floatation of corporate bonds or borrowing from banks and non-bank financial intermediaries.[4] Furthermore, a firm's choice between borrowings from the overseas markets and the domestic capital market is done typically after a deliberate process of long term financial planning (World Bank, 2007). Thus, a firm's decision to raise borrowings from international capital markets can be a complex interaction of

a host of factors. One, a firm's potential demand for domestic investment, which in turn is a function of the expectations about future growth. Two, the credit constraint a firm might be facing in the domestic market due to underdeveloped and less liquid bond markets, which, on the one hand may hamper borrowings by smaller firms and on the other may not facilitate large sized bond issuances as well as offerings of long maturity horizon. International capital markets due to their highly liquid nature and capacity to absorb long maturity bonds, help firms from underdeveloped markets to raise adequate resources, reduce dependence on the narrow local markets and diversify the sources of funds. Three, firms persistently attempt to minimize the cost of capital with the progressive opening up of the trade and investment regime. Persistence of interest rate differential above a threshold level between the domestic and the international markets for similar financial assets together with the expectations about exchange rate movements, may lead to substitution of domestic liabilities with international liabilities by firms. It is argued that companies could raise funds from international capital markets at a lower cost (Saudagaran, 1988). Four, raising loans by the domestic firms from international markets may help firms acquire credibility and reputation, which in turn, may facilitate greater access to domestic markets. It is contended that firms that participate in international markets tend to obtain better financing opportunities and leverage for longer debt maturity (Karolyi, 1998; Chaplinksy and Ramchand, 2000; Miller and Puthenpurackal, 2000; Lins, Strickland, and Zenner, 2001; Schmukler and Vesperoni, 2001; Doidge, Karolyi and Stulz, 2002). Five, a firm achieving global scale of operations and having exposure to receivables and borrowings in foreign currency may provide a natural hedge to its balance sheet. In addition, firms may take recourse to international markets to finance their global operations. Six, foreign currency borrowings may also enable firms in managing risks through more sophisticated financial instruments.

Apart from the above factors, shifts in investor sentiment and phases of global credit cycles may play an important role in

determining access of domestic firms to external markets. Country credit ratings have a predominant impact on the risk perception on corporate bonds and thus, access to international capital markets and also the cost of capital. The East Asian crisis (1997) and the Russian crisis (1998) have amply demonstrated that the currency crisis may have significant adverse spillovers for the corporate sector in terms of credit spreads in the international markets and the access to credit as the general risk perception rises. The exchange rate also constitutes an important element of borrowing cost of the corporate. The corporate tends to take higher recourse to borrowings in international markets when there are strong expectations of the appreciation of domestic currency as the effective cost of servicing such debt goes down in future. The reverse is true when the exchange rate of the domestic currency is expected to appreciate significantly. In a situation of fixed exchange rate, the exchange rate does not pose any risk to the corporate balance sheet and hence the cost of hedging of foreign exchange risk is zero for the corporate. To further extend the argument, if the exchange rate is managed narrowly within a band, it may provide more certainty about the exchange rate movement to the borrowers and hence, dispense with the need to incur additional cost of hedging foreign currency exposures. Besides the above factors, it is argued that certain institutional and economic obstacles may hamper firms from less developed markets to access international capital markets. These mainly include information barriers on firms from less developed markets, relatively low quality of corporate governance, volatile corporate earning cycles and higher country risk premium.

A key issue in the context of a firm's choice about accessing international markets over the domestic market is as to what extent the decision on raising funds are driven by the underlying production activities. However, in the Indian case, the relationship between ECBs and industrial activities is not a direct one. As the ECBs are largely used to finance import of capital goods (machinery, equipments, *etc.*), this is the conduit through which ECB demand is transmitted from the real activity. An analysis of the relationship between ECB

Chart 4: ECB Disbursements and Capital Goods Import

**Chart 5: Capital Goods Import and Domestic Activity**
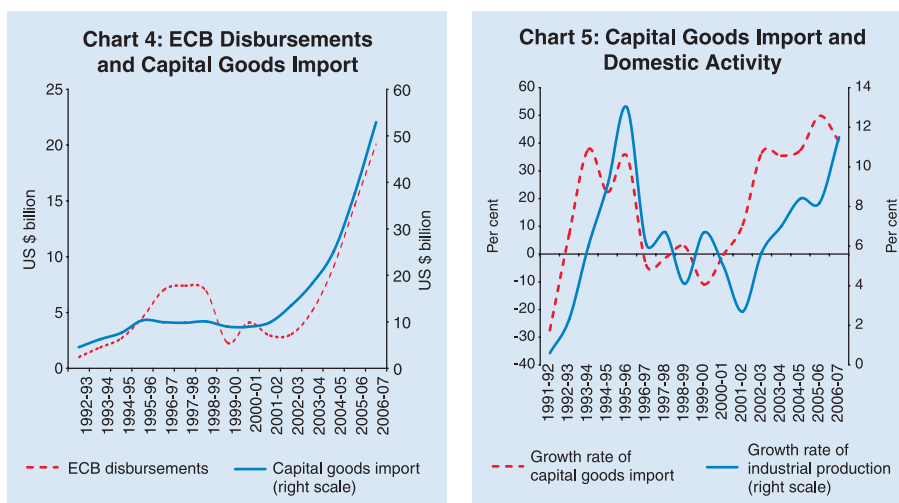
disbursements and the import of capital goods shows that there is a close positive relationship between these two variables (Chart 4). This is also corroborated by a high degree of correlation (0.90) between these two variables during the period 1992-93 to 2006-07. The import of capital goods, in turn, is dependent on the momentum in industrial activity. It is evident from Chart 5 that capital goods import growth closely tracks the movements in industrial production growth. The rising trend in capital goods import financed through ECBs anchors on industrial production. The coefficient of correlation between IIP growth and capital goods import is observed to be relatively high (0.56).

In the Indian case, an analysis of movement in ECB mobilisation and the growth in industrial production, *prima facie*, establishes the conjecture that external borrowings are greatly influenced by the pace of domestic activities (Chart 6). The coefficient of correlation between IIP growth and ECB mobilisation is observed to be relatively high (0.71).

Interest Rate Arbitrage

At the heart of a firm's decision to access alternative modes of finance is the issue of interest rate arbitrage. In the Indian context,

Chart 6: External Commercial Borrowings and Domestic Industrial Activity
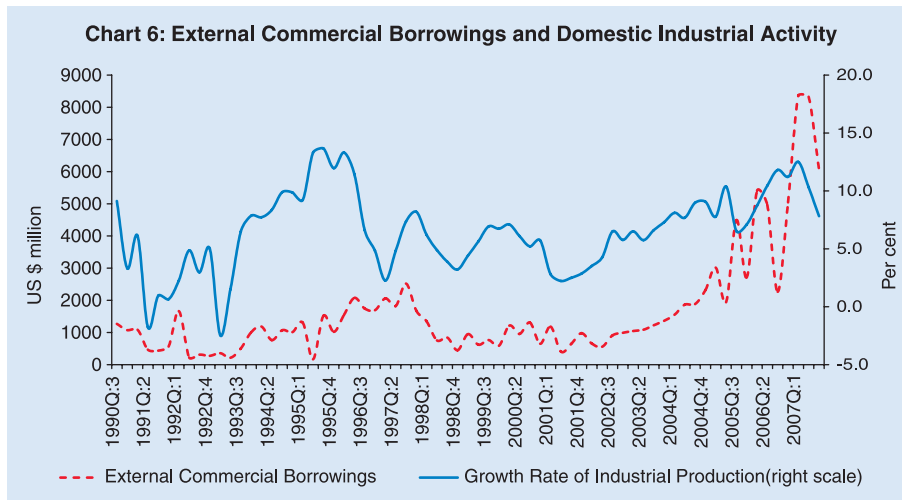
as is the case with many other emerging markets, a dormant domestic debt market and the rigidity built in the interest rate structure may be indirectly contributing to the corporates' recourse to international capital markets. Thus, in the Indian case, a key issue is whether interest rate differentials between domestic and international markets play an important role in influencing the corporate decision to raise borrowings from international markets. An important issue that arises in the context of interest rate arbitrage is the inflation wedge of the domestic economy with the rest of the world (Chart 7).

Chart 7: Inflation Rates - India and the US
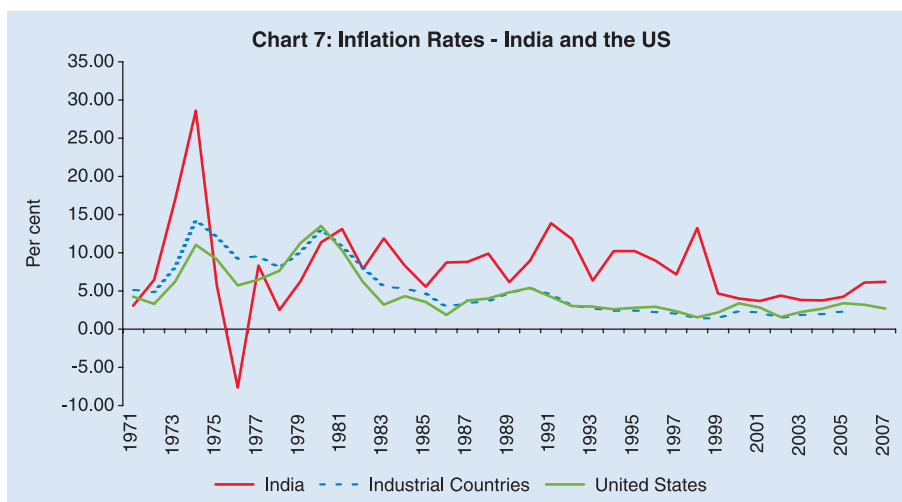
A higher inflation wedge would, in principle, translate into higher nominal interest rates, create the opportunities for cross border interest rate arbitrage and hence encourage domestic firms to tap international capital markets. Consistent with the theory, movement in exchange rate would neutralise this as real interest rate differentials (interest rates adjusted for inflation differentials) are reflected in the movement of the exchange rate. However, in many emerging markets, despite the existence of significant inflation differentials, there is persistent pressure for exchange rate appreciation due to strong expectations of economic growth. Thus, persistence of a higher interest rate along with a higher output growth rate creates a lower risk perception and greater arbitrage opportunities.

In the Indian context, a number of measures of interest rate arbitrage can be constructed (Annex 1). First, a nominal interest rate spread on 10-year Government of India bonds over the 6-month LIBOR (adjusted for exchange rate in terms of 6-month forward premia) provides evidence of the existence of an arbitrage since 2002. Second, the spread of 5 year Government of India (GOI) bonds over the 6-month LIBOR also reveals the same trend. Third, spread of commercial banks' prime lending rate (PLR) over the 6-month LIBOR also shows persistence of significant interest rate arbitrage

Chart 8: Measure of Interest Rate Arbitrage for the Indian Corporates

- - - Prime lending rate of commercial banks
—— 6-month LIBOR adjusted for US$/Rupee 6-month forward premia
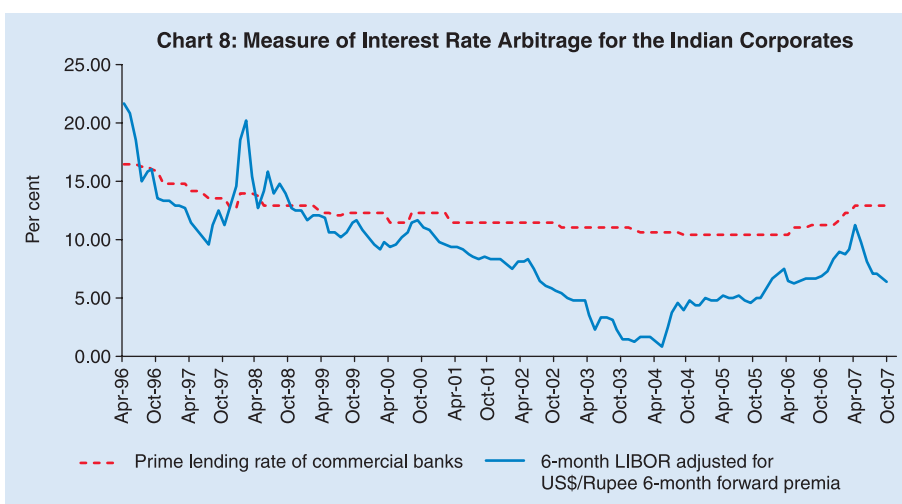
opportunities (Chart 8). Fourth, spread of 5-year AAA rated corporate bonds over the 6-month LIBOR reiterates the presence of significant arbitrage opportunities.

Having established the evidence of significant interest rate differentials and hence the opportunities for the corporates to minimise their cost of capital by diversifying their liabilities, it would be pertinent to examine the relationship between the interest rate differentials and the pace of corporates' recourse to overseas borrowings. There, *prima facie*, seems to be evidence of persistence of significant interest rate differential, which enables corporates to choose between domestic and overseas borrowings and also determines the pace of corporate borrowings in overseas markets (Chart 9)[5] . The coefficient of correlation between ECB disbursements and interest rate differentials between domestic and external markets is observed to be high (0.75).

This paper, with the above mentioned analytical underpinnings, attempts to develop a framework to explore the key drivers of Indian corporates' borrowing behaviour in the international markets in a relatively liberalised capital account regime.

Chart 9: ECB Disbursements and Interest Rate Differentials
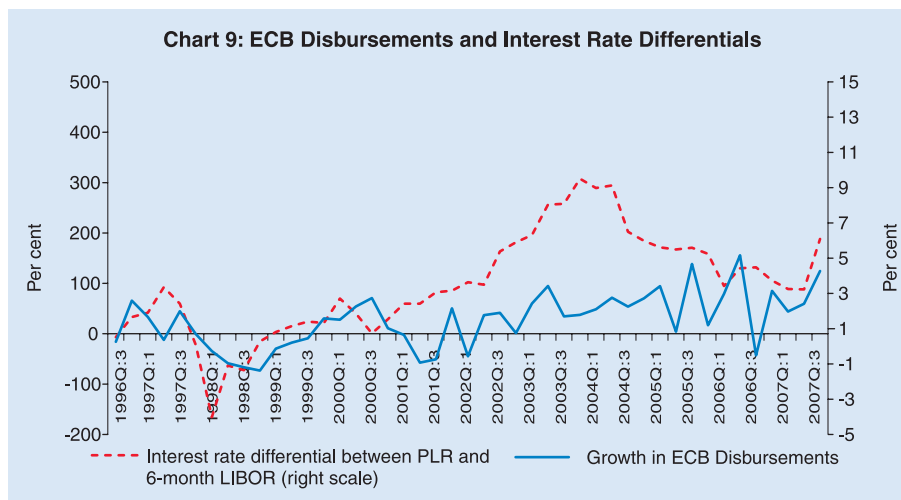
Section IV

The Empirical Framework

A firm's recourse to the international capital markets can be explained through various financial and real variables (Chart 10). From the demand side, real activity plays a crucial role. In a relatively open economy, the higher credit demand generated by the real activity can be financed by a combination of domestic and foreign resources. Among the financial variables, key drivers are interest rate differential, exchange rate and the hedging cost. In the standard economic theory, the demand for funds is inversely related to interest rates i.e., the cost of capital, other things remaining the same. Interest rates differential between home and abroad would be a complex interaction of a host of domestic and international factors. Exchange rate movements can significantly affect the effective cost of borrowings from the international markets. Illustratively, expectations of an appreciation of domestic currency over the medium term may reduce the effective cost of debt servicing and hence provide greater incentives for borrowings from external markets. Hedging costs and the availability of hedging instruments can also impact the borrowings by domestic firms from international markets. Higher hedging costs may narrow down the arbitrage available to domestic borrowers from international markets. Similarly, well developed hedging tools may minimize the risk to the borrower and enhance the incentives to borrow from overseas markets. We broadly follow the above

Chart 10: Factors Influencing Corporate Borrowing Behaviour in the International Capital Markets
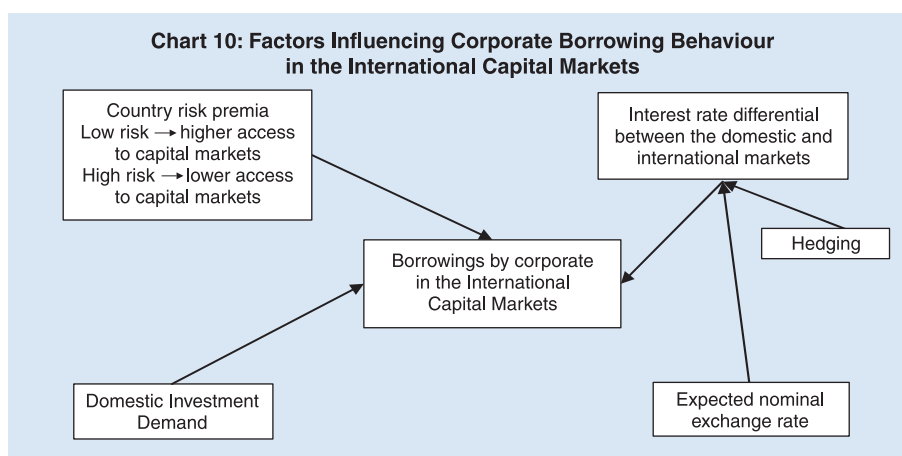
framework in the Indian context in order to examine the demand for external borrowings by the corporates.

Drawing from the above circular interaction of various factors in influencing the borrowing behaviour of corporates, the demand for overseas bottowing of the corporates is explained through an error correction and cointegration model. The error correction model subject to a long term tragectory of demand for ECBs can be specified as :

$$\Delta y_t = \alpha + \theta_1 \Delta x_{t-1} + \ldots + \theta_p \Delta x_{t-p} + \pi e_{t-1} + v_t$$

where y_t = corporate demand for overseas borrowings, $x_t = [r^d, L_t$ and $Q_t]$, vector of veriables i.e., r^d is the interest rate differential between the domestic and the international interest rates, L is the liquidity constraint faced by the firms in the domestic market, Q is the index of industrial production signifying the underlying domestic investment demand by the corporate sector. θ and π are vectors of the short run coefficients and adjustment to equilibrium or long run path, respectively. v is the white note and Δ the first difference operator. The quarterly data for the period 1993:Q1 to 2007:Q4 were used to estimate the postulated model. The data were obtained from the RBI data base. The model was estimated using E-Views statistical package.

The optimal lag order of the model is determined by the Schwarz criteria (SBC); suggesting 2 quarter lag – typical of a financial time series where lag responses are quicker.[6] All the variables were found to be difference stationary, *i.e.*, I(1), suggesting a cointegrating relationship. The results of Johansen's cointegration rank tests pertaining to Trace and Maximum Eigen value statistics are summarized in Table 10. Both the Trace and the Eigen value tests suggest that there is a single cointegrating vector or a long-run relationship among the four variables in the model. Furthermore, the LM test suggests that there is no serial correlation of the first order among the error terms.[7] Chi-Square statistic suggests absence of heteroscedasticity.[8]

Since the objective of the study is to analyse the behaviour of ECBs depending upon other variables, the long-run cointegrating

Table 10: Johansen's Cointegration Test

Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
1	2	3	4	5
None *	0.570054	62.71261	47.85613	0.0011
At most 1	0.164161	15.44327	29.79707	0.7507
At most 2	0.088876	5.401386	15.49471	0.7648
At most 3	0.003371	0.189100	3.841466	0.6637
Unrestricted Cointegration Rank Test (Maximum Eigen value)				
None *	0.570054	47.26933	27.58434	0.0001
At most 1	0.164161	10.04188	21.13162	0.7407
At most 2	0.088876	5.212287	14.26460	0.7149
At most 3	0.003371	0.189100	3.841466	0.6637

** : Significant at 1% level.

vector normalised to the ECB variable (i.e., ECB as the dependent variable) is shown in Table 11. It is evident that real activity, spread and liquidity have a statistically significant long-run effect on the ECB variable. The real activity and spread have a positive association while liquidity has an inverse relation with the ECB.

Given the above long-run cointegration relation, the short-run response of the variables to the error correction term, *i.e.* deviation

Table 11: Long-run Cointegration Path of ECBs: ECM Model

Variables	Coefficients
1	2
Log B_{t-1} (Normalised)	1.000
rd_{t-1}	0.155 [9.97]
Log Q_{t-1}	21.589 [14.46]
Log L_{t-1}	- 8.536 [-13.47]
Intercept	16.347

Note: t-statistics in [ ].

Log B = logarithm of gross loans of ECBs raised by Indian companies, rd = interest rate differential between the bank lending rate and the 6-month LIBOR adjusted for 6-month forward premia, Log Q = log of index of industrial production, Log L = log of broad money supply.

of ECB from the long run trajectory or excess borrowing, is presented in Table 12. The coefficient of the error correction term in the error correction equation of $LogB_t$ suggests that there is a rapid and complete adjustment to deviation from the long run path of ECBs in about 3 quarters. In a theoretical world, any arbitrage should be eliminated by the movement of capital from abroad to the domestic economy. However, the response of the interest rate (rd_t) to higher external borrowings suggests that the interest rate differentials persist despite higher inflows through external borrowings which could be typically attributed to monetary tightening by the central bank to contain the liquidity effects of rising capital flows. Real activity ($Log\ Q_t$) also responds positively to higher external borrowings as greater credit expansion boosts real activity. The subdued response of broad money ($Log\ L_t$) to higher external borrowings broadly reflects the monetary management by the central bank in response to higher capital flows.

Variance Decomposition Analysis

The variance decomposition analysis arising from the ECM provides an important insight of relative contribution of the various factors in explaining the behaviour of ECBs. Over a 10 quarter horizon (2 ½ years)[9], interest rate differentials, real activity and money supply together explain three-fourths of the variation in external borrowings (Table 13). Real activity alone explains about 38 per cent of the variation in external

Table 12: Error Correction - Short-run Dynamics

Variables	Coefficient of EC term
1	2
Δ (LogB)	-0.318 (-1.60)
Δ (rd)	2.293 (2.59)
Δ (LogQ)	0.045 (2.73)
Δ (LogL)	0.011 (1.66)
$\overline{R}^2$	0.59

Note: Figures in brackets are 't' statistics.

Table 13: Variance Decomposition of ECBs

Period	S.E.	LogB	rd	LogQ	LogL
1	0.41	49.63	7.76	39.70	2.91
2	0.45	43.63	8.32	41.91	6.14
3	0.54	38.09	10.73	40.76	10.42
4	0.60	33.85	14.00	39.34	12.81
5	0.66	30.89	16.12	37.97	15.02
6	0.72	28.92	17.83	37.19	16.06
7	0.77	27.67	18.89	36.28	17.16
8	0.81	26.73	19.81	35.76	17.69
9	0.86	25.93	20.40	35.42	18.25
10	0.90	25.28	20.90	35.21	18.62

borrowings over the 10 quarter horizon. Interest rate differentials (arbitrage) is the second most important variable explaining changes in external borrowings with its contribution rising almost three fold from the first period to the terminal period. The contribution of the broad money – representing the credit conditions – though small over the shorter horizon, gets prominent over the medium term with almost a six fold increase by the terminal period. Thus, credit constraints also assume significance for corporates in their decision for overseas borrowings.

Impulse Response

The impulse response analysis of ECBs reveals that a one standard deviation shock to real activity causes a significant variation in demand for the ECBs in the initial three quarters; however, in the subsequent quarters the impact gets stabilised (Chart 11). Further, the shocks to real activity cause persistence in the demand for ECBs, indicating more a permanent nature of such shocks. Positive shocks to interest rate differentials also lead to persistence in the demand for external borrowings. Shock to money supply causes reduction in the demand for overseas borrowings with increasing magnitude over the initial quarters, after which the impact stabilises. To illustrate it further, a high domestic liquidity growth would have a moderating impact on interest rates and also reduce the credit constraint faced by certain corporates thus, persistently reducing the demand for overseas borrowings.

Chart 11: Impulse Response of External Commercial Borrowings to Various Shocks
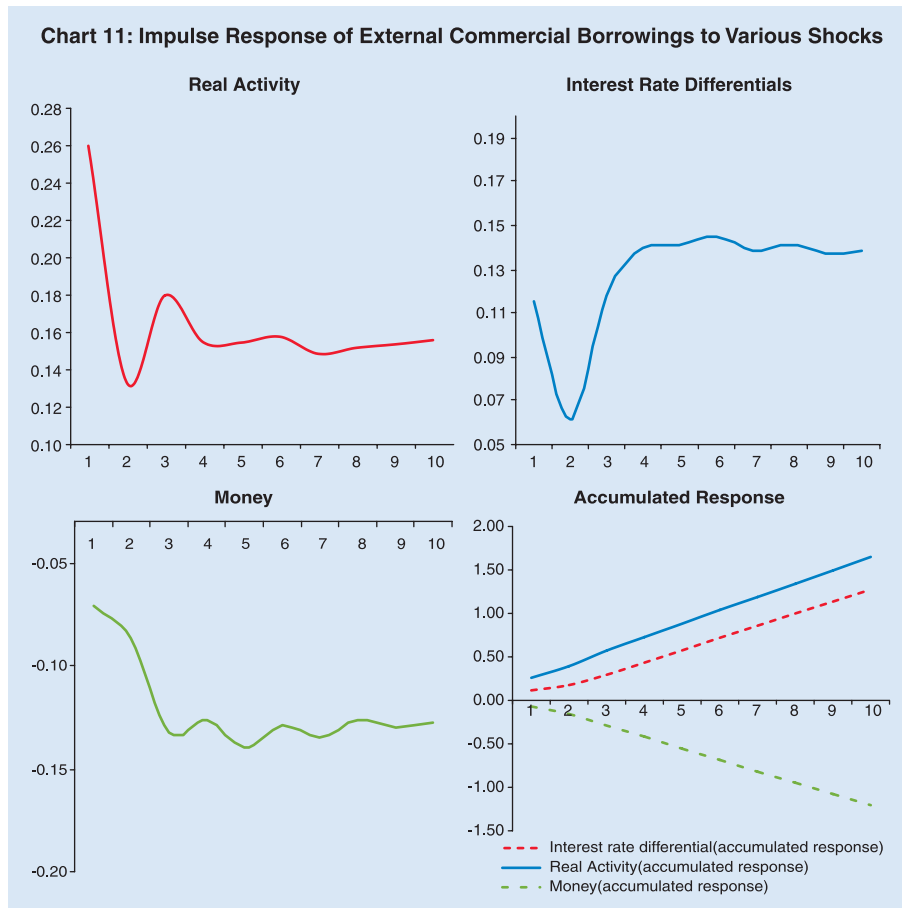
Simulated Trajectory of ECBs

Deriving from the estimates of the ECM presented in Table 11 for the long run behaviour, various scenarios relating to the growth path of ECBs can be numerically simulated based on alternative configurations of output and money (Table 14). These scenarios provide some important perspectives. In the scenario I, under the assumption of stable liquidity (i.e., M3 growth at 17 per cent) and high output growth (i.e., IIP growth at 11 per cent), the ECBs would grow at 24 per cent. In scenario II, high output growth (i.e., IIP growth at 11 per cent) accompanied by expansionary liquidity (i.e., M3 growth at 19 per cent), growth of ECBs would moderate to 19 per cent from 24 per cent in scenario I. In scenario III, with output growth

Table 14: Simulated path of ECBs for Various Combinations of Money and Output

(Per cent)

Period	Growth rate of IIP	Growth rate of Broad Money	Growth rate of ECBs
1	2	3	4
Scenario I. High Output growth and Stable Liquidity			
1	8.0	17.0	7.6
2	10.0	17.0	18.4
3	12.0	17.0	29.2
4	14.0	17.0	40.0
Scenario II. High Output growth and Liquidity Expansion			
1	8.0	17.0	7.6
2	9.8	18.0	15.2
3	12.0	20.0	22.8
4	14.0	22.0	29.4
Scenario III. Lower Output growth and Tight Liquidity Conditions			
1	6.0	12.0	7.5
2	7.0	13.0	10.8
3	8.0	14.0	14.0
4	9.0	15.0	17.3

slowing down to 7.5 per cent and tight liquidity conditions (i.e., M3 growth at 13.5 per cent), ECBs growth would significantly moderate to 12 per cent.

Section V

Conclusion

The foregoing empirical analysis brings forth some important perspectives. First, ECBs are characterized by a large number of companies accessing the international markets for smaller size loans. Second, there is evidence of a balanced maturity structure and a moderation in the interest rate cycle seems to have had a favourable impact on the maturity structure. Third, the utilisation pattern of ECBs reveals that about 70 per cent of borrowings are utilized for import of capital goods, setting up new projects and modernization or expansion of existing units. With momentum in Indian investment

abroad through JVs and WOSs, the use of ECBs for financing overseas investment has also grown in significance. Fourth, an analysis of the relationship between ECB disbursements and import of capital goods shows that there is a close positive relationship between these two variables. As the capital goods import growth is closely related to the movements in industrial production growth, it suggests that the demand for ECBs is generated by the underlying pace of real activity. Fifth, the coefficient of correlation between ECB disbursements and interest rate differentials between domestic and external markets is observed to be high at 0.75, thus indicating the role of arbitrage in influencing the capital inflows. Sixth, the estimates of ECM reveal that real activity, spread and liquidity have a statistically significant long-run effect on the demand for external borrowings. The real activity and spread have a positive association while liquidity has an inverse relation with the external borrowings. The coefficient of the error correction term in the error correction equation suggests that there is a rapid and complete adjustment to deviation from the long run path of ECBs in about three quarters. Seventh, the variance decomposition analysis reveals that interest rate differentials, real activity and money supply together explain three-fourths of the variation in external borrowings. Real activity alone explains about 38 per cent of the variation in external borrowings over the 10 quarter horizon. Interest rate differentials (arbitrage) is the second most important variable explaining changes in external borrowings with its contribution rising almost three fold from the initial to the terminal period. The contribution of the broad money – representing the liquidity conditions – though small over the shorter horizon, gets prominent over the medium term with almost a six fold increase by the terminal period. Thus, credit constraint also assumes significance for corporates in their decisions about overseas borrowings.

Notes

[1]   The share of ECBs in capital flows has been computed by excluding the impact of the exceptional payments of Indian Development Bonds and Indian Millennium Deposits.

2   ECBs refer to commercial loans in the form of bank loans, buyers' credit, suppliers' credit, securitised instruments such as floating rate notes and fixed rate bonds, availed from non-resident lenders with minimum average maturity of 3 years.

3   From the corporate finance perspective, it has been progressively acknowledged that the choice of liability by a firm depends on a number of factors such as the extent of information asymmetry and agency problems between ultimate creditors and ultimate borrowers, growth opportunities and the state of the infrastructure suitable for external financing (Shleifer and Vishny, 1987; Yoshitomi and Shirai, 2001). Illustratively, corporate bond finance can be cheaper than bank loans for reputable, profitable or large firms (Diamond, 1991) since the bond holder views low cost associated with information asymmetry and information problems in respect of credible firms. In other words, well-developed capital markets enable credible firms to access finance through bonds and the equity mode rather than traditional bank lending. Looking through the corporate finance perspective, the perceived benefits of debt financing are: (i) tax exemption on interest payments on debt, and (ii) control over ownership of the company.

4   In a situation of perfect and complete capital markets, the corporates' decisions about the financing decisions are supposed to be optimal.

5   The interest rate differential is defined as the difference between the yield on a 5-year corporate bond (representing interest rate in the domestic market) and the average cost of borrowing overseas for corporates (6-month LIBOR + average ECB borrowing margins above LIBOR + forward premia).

6   The statistics on the significance of the lag structure for an eight quarter window are set out below.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-95.74680	NA	0.000687	4.068502	4.371533	4.184299
1	123.8726	387.5636	2.35e-07	-3.916571	-3.007476	-3.569179
2	166.4723	68.49371	8.42e-08	-4.959698	-3.444541*	-4.380712
3	178.3329	17.20956	1.03e-07	-4.797370	-2.676150	-3.986789
4	227.1241	63.14154	3.04e-08	-6.083299	-3.356016	-5.041124
5	258.8316	36.05949	1.84e-08	-6.699279	-3.365933	-5.425509
6	273.8257	14.70007	2.29e-08	-6.659831	-2.720422	-5.154466

* Singnificant at 1% level.

[7] The LM Statistics at 23.54 for the first order lag is not found significant at 5 per cent level.

[8] The Chi-square statistics with 190 degrees of freedom was found non-significant with probability value of 0.76. Thus, the null hypothesis that errors are both homoscedastic and independent of the regressors, is not rejected

[9] This is equivalent to the average duration of the cycles of industrial activity in India as indicated by some empirical research in the Indian context such as Mohanty, Singh and Jain (2000).
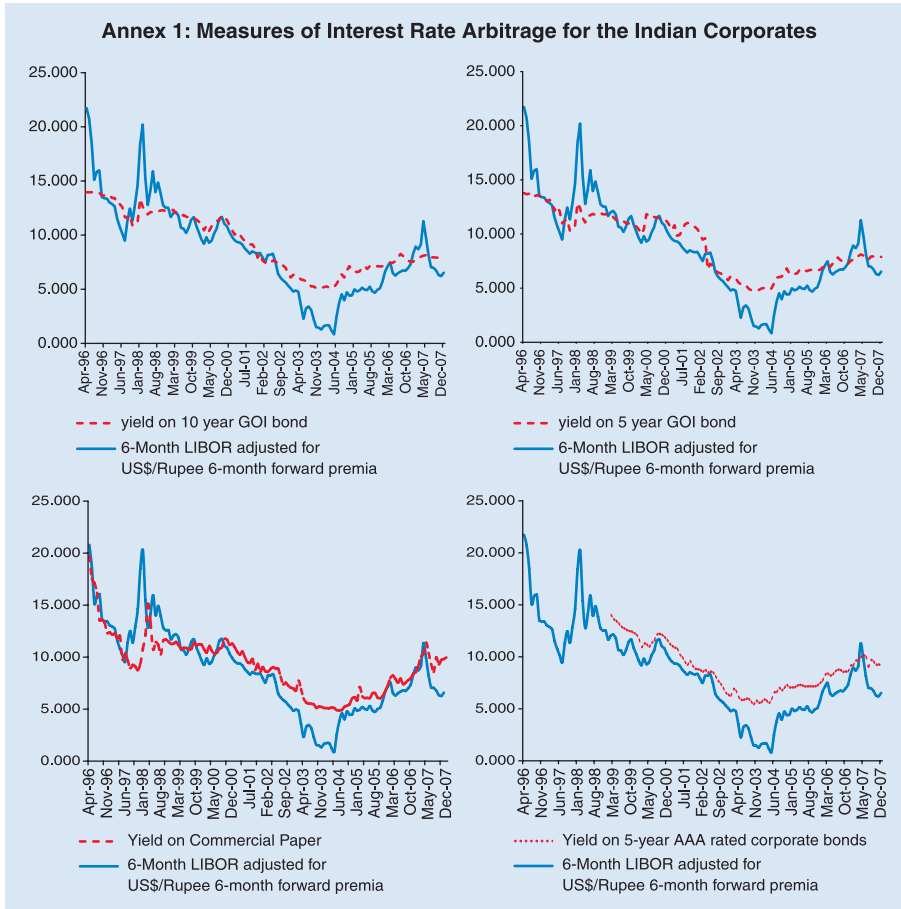
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Annex 1: Measures of Interest Rate Arbitrage for the Indian Corporates

yield on 10 year GOI bond
6-Month LIBOR adjusted for
US$/Rupee 6-month forward premia

yield on 5 year GOI bond
6-Month LIBOR adjusted for
US$/Rupee 6-month forward premia

Yield on Commercial Paper
6-Month LIBOR adjusted for
US$/Rupee 6-month forward premia

Yield on 5-year AAA rated corporate bonds
6-Month LIBOR adjusted for
US$/Rupee 6-month forward premia

Employees' Productivity and Cost – A Comparative Study of Banks in India During 1997 to 2008

Sharad Kumar and M. Sreeramulu*

The study compares the employee productivity and employee cost ratios between the traditional banks and modern banks from 1997 to 2008. The study concludes that the performance of the modern banks (foreign and new private sector banks) was much superior than the traditional banks (public sector and old private sector banks). However, the gap between the performance of modern and traditional banks on all the five variables has shown a decreasing trend, which has significantly reduced during the period of 12 years under study, on account of the measures taken by the traditional banks during the period.

Introduction

Globalization, deregulation and advances in information technology during last 12 years have brought about significant changes in the operating environment for banks operating in India. During this period a slew of financial sector reform measures aiming at increasing operational efficiency of the banking sector as a whole, as well as of individual institutions are witnessed. Policy makers have clearly recognized that inefficiency is the main factor contributing to the high cost of banking services in India. In the process, a number of private sector banks (classified as new private sector banks) were allowed to operate with latest technology and fully automated systems akin to foreign banks.

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The public sector and the existing private sector banks (old private sector banks) faced challenges in the form of competitive pressures and changing customer demands both from foreign banks and new private sector banks. Most of the public sector and old private sector banks (classified as traditional banks for the purpose of present study) had their existence for more than a century with a number of legacy issues to tackle. While the new private sector banks could adopt the best practices and implement latest technology in their operations, the foreign banks acquired the practices and technology akin to their host countries within the regulatory framework of India. Influenced by the varied practices and culture of host countries, this segment of banks operating in India was found to be quite heterogeneous in their operations and performance.

Faced with the threat of competition from the foreign and new private sector banks (classified as modern banks), the traditional banks employed a number of measures to improve the operational efficiency, meeting customer expectations and reduction of operating costs. These include going for fully automated systems (Core Banking Solution based operations) preceded with business process reengineering (BPR), offering VRS to its employees, training and retraining of staff, lateral recruitment of specialists, emphasis on marketing, advertising, customer relationship management and improving brand image, diversification of activities, introduction of electronic based multiple service delivery channels, setting up of back offices and data centers, business process outsourcing. Some of these banks have undergone restructuring exercise with the involvement of international consulting agencies to adopt best international practices and remove bottlenecks in their operations.

The paper is organized in five sections. Section I provides a survey of literature. Objective of the study is discussed in Section II. Section III presents the data and methodology. Analysis of data is discussed in section IV. Finally concluding observations of the study are presented in section V.

Section I
Review of Literature

A number of studies were conducted to compare different types of banks operating in India based on different performance/efficiency criteria/ parameters from time to time. After nationalization of banks, there was a growing concern on the deteriorating of banking sector's efficiency in several spheres. The Reserve Bank of India constituted a number of committees, notably Tondon Committee (1975), Luther Committee (1977), Chakravarty Committee (1986) and Narsimham Committee (1991) which inter-alia examined various parameters of efficiency and given a number of suggestions to improve the efficiency of the banks in India. Nag and Shivaswamy (1990) compared the performance of Foreign Banks operating in India with the Indian scheduled commercial banks in terms of growth of deposits and loans and found that the performance of foreign banks stand out significantly higher. Sarkar and Das (1998) used 15 indicators in their study to compare public sector, private sector and foreign banks based on major criteria representing efficiency viz. profitability, productivity and financial management on which bank-wise/ bank group wise information was available.

Section II
Objective of the Study

For achieving the operational efficiency, meeting customer expectations and other parameters of banks' performance, the role of employees and their efficient utilization cannot be undermined. The present study therefore compares the parameters of employees' productivity viz. "business per employee" (BPE) and "profit per employee" (PPE) between the traditional banks and modern banks. It also compares the parameters measuring employees' cost viz. "employee cost to operating expenses", "employee cost to total business" and "employee cost to total assets". These ratios are widely used in various studies to measure the employees' productivity as well as employees' cost. The time series data on these parameters during 12 year period from 1997 to 2008 have been analyzed to observe the trend and the impact of measures taken by traditional banks to face the challenges posed by the modern banks.

Section III
Data and Methodology

The time series data on the selected variables/ratios viz. 'business per employee', 'profit per employee', 'employee cost to operating expenses', 'employee cost to total business', and 'employee cost to total assets' have been extracted from the publications 'Statistical Tables relating to Banks' and Trend and Progress of Banks in India published by Reserve Bank of India. Detailed definitions of employees' productivity and employees' Cost ratios are given in the Annex A.

To compare the modern and traditional banks on the select parameters of employees' productivity and employees' cost the data has been presented in tabular and graphical forms. The gap indexes have been worked as the percentage of difference of the value of variables between modern banks (MB) and traditional banks (TB) as a ratio of their aggregate value. The purpose of Gap Index construction was to see whether or not the gap between modern and traditional Banks are reduced after several initiatives taken by the traditional banks to meet the challenges and competition from modern banks. The year-wise gaps were adequately displayed with the help of graphs to have an idea about the reduction of gaps. The use of statistical techniques was not considered appropriate at this stage, as the gaps between the two sets of banks on the variables studied were still quite large though they substantially reduced during the period of 12 years under study.

Section IV
Analysis of Data

Employees' Productivity:

The productivity of employees is crucial for the overall efficiency of the banks. A number of measures have been taken by the banks to right size the employees for improving their productivity. The efforts have been ably supported by business process reengineering and technology implementation besides various measures taken for human resource development.

Table 1: Employee Productivity Ratios

(Rs. Lakhs)

Year*	Business Per Employee (Median)		Profit Per Employee (Median)	
	Traditional Banks	Modern Banks	Traditional Banks	Modern Banks
1	2	3	4	5
1997	75.28	397.50	0.57	6.50
1998	97.53	689.90	0.81	7.90
1999	112.93	638.66	0.57	5.66
2000	136.26	735.20	0.79	7.49
2001	166.23	690.83	0.71	5.84
2002	192.30	667.41	1.27	5.37
2003	223.36	717.00	1.68	9.17
2004	263.12	758.46	2.23	10.41
2005	302.02	745.56	1.29	7.82
2006	355.79	891.52	1.68	9.01
2007	439.96	790.44	2.84	11.48
2008	549.21	1216.76	3.87	17.74

 * represents end of financial year

The Employees' Productivity Ratios represented by 'business per employee' and 'profit per employee' for the (12 year) period under study in respect of traditional and modern banks are presented in Table 1 above, Charts I-A and I-B below. (Detailed bank group-wise data on these parameters is also given in annex B).

Chart I-A : Business Per Employee

Chart I-B : Profit Per Employee
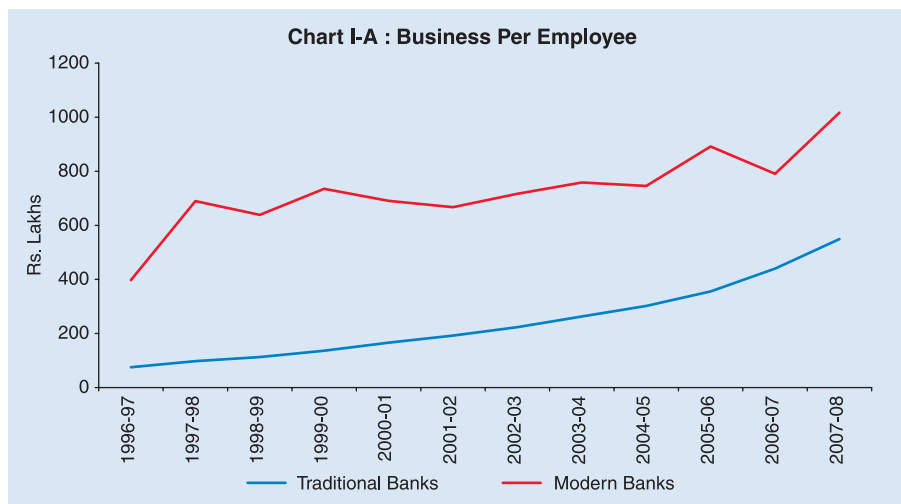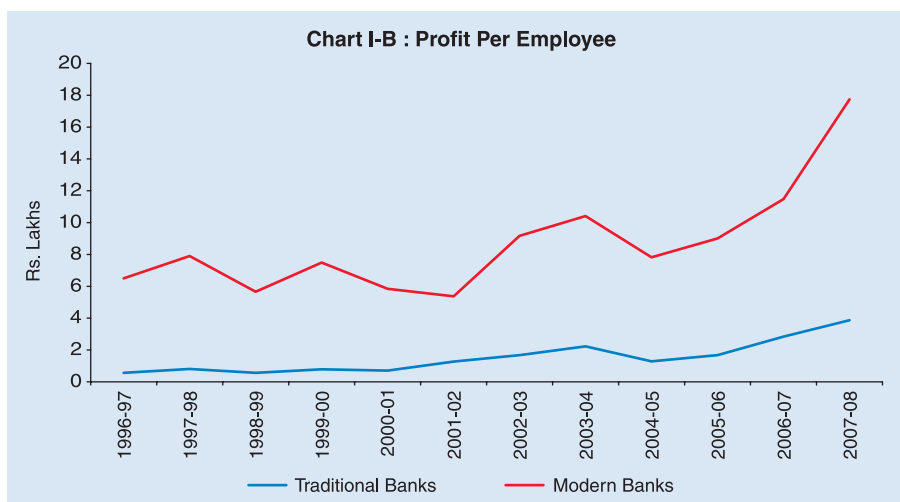
It may be observed from the above Table 1 and Chart I-A that the business per employee for traditional banks is continuously improving during the period of 12 years under study. It has increased 7.29 times (Rs. 75.28 lakhs to Rs. 549.21 lakhs) from 1997 to 2008. In case of modern banks the business per employee has increased only 3.06 times during the same period (less than half compared to the increase for traditional banks). It has, however, marginally declined during 1999, 2001, 2002, 2005 and 2007 compared to the previous years in respect of modern banks. The ratios of business per employee between modern and traditional banks have decreased drastically from 5.28 times in 1997 to 2.21 times in 2008 indicating that the gap in business per employee between modern banks and traditional banks is consistently reducing due to the efforts made by the traditional banks.

Table 1 and Graph IB reveal that the profit per employee has increased both for traditional and modern banks from 1997 to 2008. However, this increase has been significantly higher for traditional banks (6.79 times) compared to modern banks (2.73 times) during the period of 12 years under study. There has been decline of profit per employee during 1999, 2001and 2005 compared to the previous year both for traditional and modern banks indicating effect of some external factors impacting profitability of banks during these years.
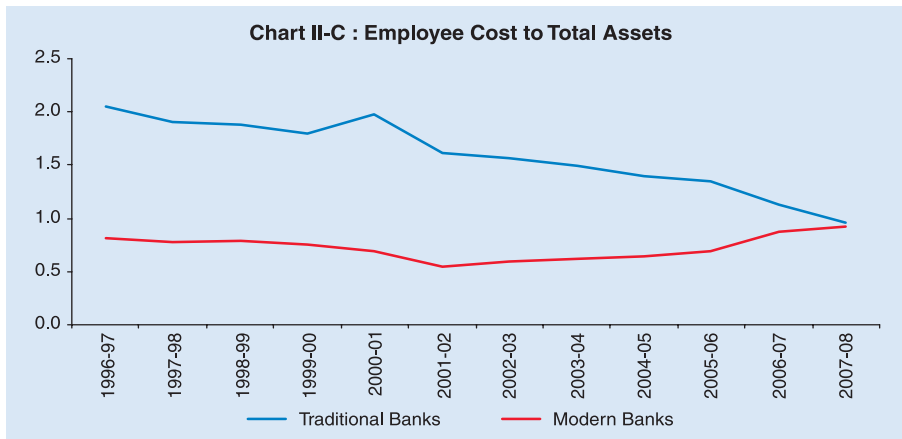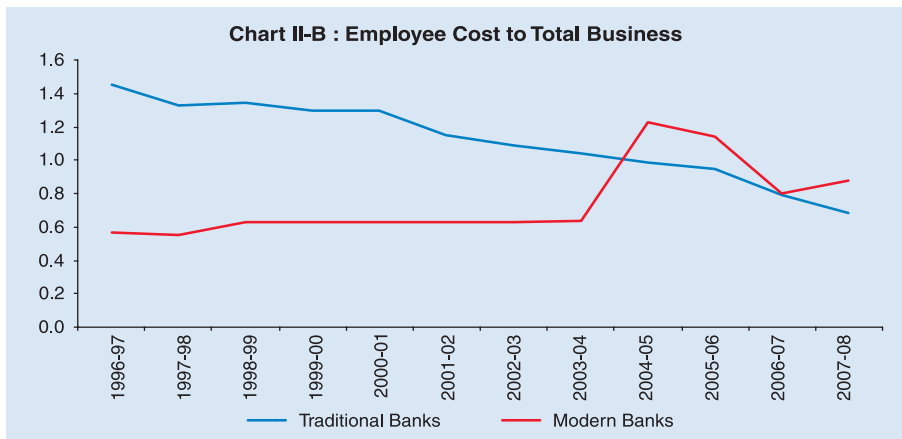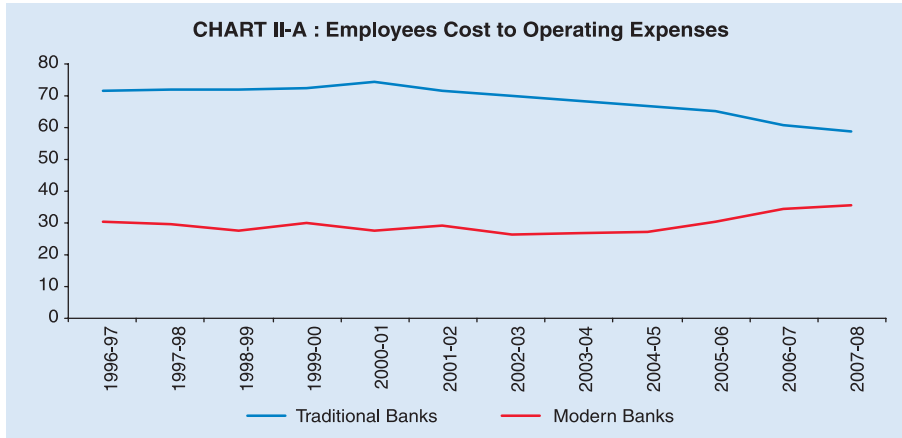
Employee Cost Ratios

The Employees' Cost Ratios which are represented by "employee cost to operating expenses", "employee cost to total business'' and "employee cost to total assets'' are based on the wage bill data of individual banks. Banks have been treating them as critical factors for improving profitability and trying to minimize them in relation to operating expenses, total business and total assets. The employees' cost in relation to these variables for the 12 years period under study in respect of traditional and modern banks is presented in Table 2 and Charts II-A, II-B and II-C below. (Detailed bank group-wise data on these parameters is also given in annex B)

From Table 2 and the Graph II-A it may be observed that the employee cost as a ratio of operating expenses in respect of traditional banks remained more or less constant from 1997 to 2002 and thereafter got reduced gradually. In case of modern banks, the ratio fluctuated within a narrow range and reduced marginally up to the year 2006 before showing upward trend during 2007 & 2008. The employee cost to operating expenses for traditional banks remained more than double of modern banks till 2006, however, this ratio decreased significantly during

Table 2: Employee Cost Rates

(Per cent)

Year	Employee Cost to Operating Expenses		Employee Cost to Total Business		Employee Cost to Total Assets	
	Traditional Banks	Modern Banks	Traditional Banks	Modern Banks	Traditional Banks	Modern Banks
1	2	3	4	5	6	7
1997	71.78	30.41	1.45	0.57	2.05	0.81
1998	72.20	29.52	1.33	0.55	1.90	0.78
1999	71.81	27.64	1.34	0.63	1.88	0.79
2000	72.28	30.07	1.30	0.63	1.80	0.75
2001	74.23	27.79	1.30	0.63	1.98	0.69
2002	71.52	29.36	1.15	0.63	1.62	0.55
2003	70.13	26.49	1.09	0.63	1.57	0.60
2004	68.42	26.96	1.04	0.64	1.49	0.62
2005	66.92	27.39	0.99	1.23	1.39	0.64
2006	65.26	30.43	0.95	1.14	1.35	0.69
2007	60.99	34.35	0.79	0.80	1.13	0.87
2008	58.63	35.53	0.68	0.88	0.96	0.92

CHART II-A : Employees Cost to Operating Expenses

Traditional Banks   Modern Banks

Chart II-B : Employee Cost to Total Business

Traditional Banks   Modern Banks

Chart II-C : Employee Cost to Total Assets

Traditional Banks   Modern Banks

2007 & 2008 (1.77 and 1.65 times respectively), indicating that efforts made by the traditional banks to reduce the wage bills in relation to operating cost made an impact during recent period.

As regards employee cost to total business, it has been consistently reducing for the traditional banks from 1.45 per cent in 1997 to 0.68 per cent in 2008. On the other hand, it has been increasing for modern banks in a very narrow range from 0.57 per cent to 0.64 per cent up to 2004, thereafter increased drastically to 1.23 per cent in 2005 and again reduced to 0.88 per cent in 2008. Employee cost to total business in respect of modern banks, which remained significantly lower compared to traditional banks up to 2004, overtook the traditional banks for last 4 years of the study period. This trend clearly indicates that the traditional banks have reached to the level where they can very well compete with the modern banks as regards to the marginal cost of expanding new business (deposits plus advances).

The employee cost to total assets in respect of traditional banks also consistently reduced from 1997 (2.05 per cent) to 2008 (0.96 per cent) with the exception of 2001, where it has marginally increased from the previous year. Employee cost to total assets in respect of modern banks also reduced marginally during the period of 12 years from 0.81 per cent in 1997 to 0.69 per cent in 2006 and increased thereafter to the level of 0.92 per cent in 2008.

Gap Index Analysis

The Gap Index has been defined as the percentage of difference of the value of variables between modern banks (MB) and traditional banks (TB) as a ratio of their aggregate value. For example the Gap Index of Business Per Employee (BPE) can be worked out as:
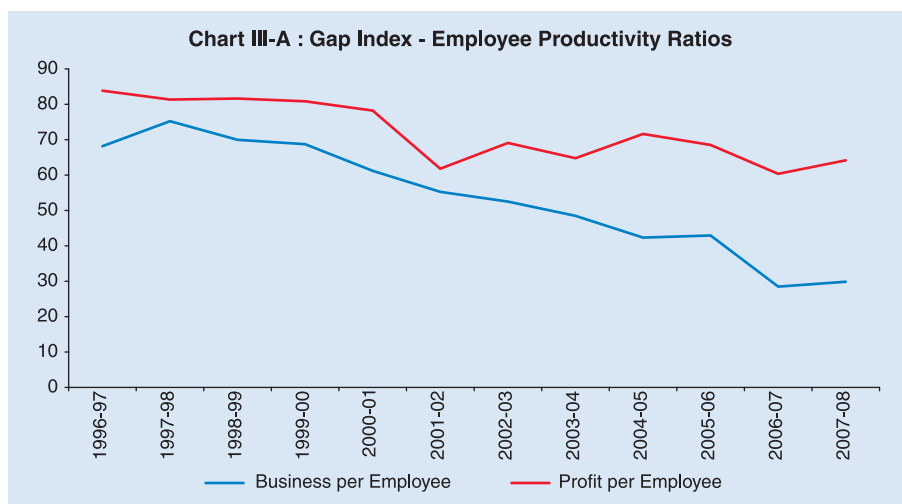
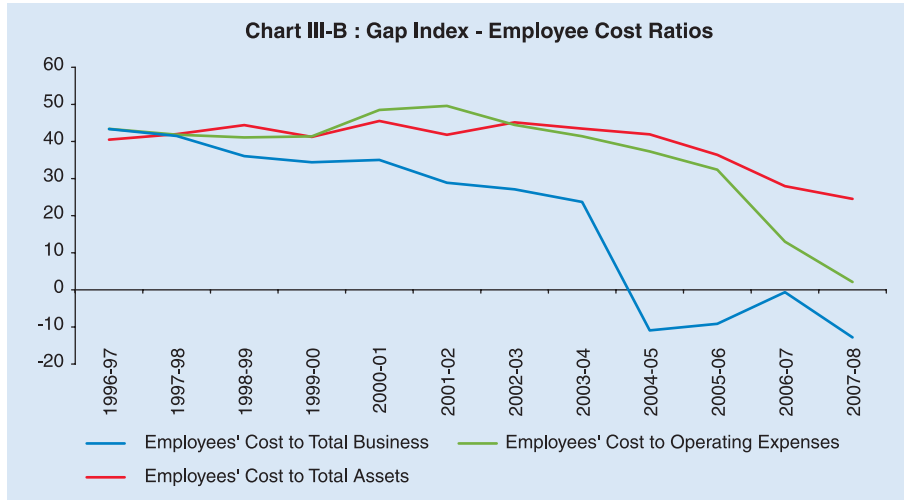$$\frac{BPE(MB) - BPE(TB)}{BPE(MB) + BPE(TB)} \text{ X } 100$$

For cost related variables the cost of modern banks have been subtracted from the traditional banks to get the positive value as the

Table 3: Gap Index

Year	Business per Employee (Rs. Lakhs)	Profit per Employee (Rs. Lakhs)	Employee Cost to Total Business (per cent)	Employee Cost to Operating Expenses (per cent)	Employee Cost to Total Assets (per cent)
1	2	3	4	5	6
1997	68.15	83.84	43.34	40.48	43.41
1998	75.23	81.35	41.48	41.96	41.83
1999	69.95	81.63	36.04	44.42	41.08
2000	68.73	80.86	34.40	41.24	41.38
2001	61.21	78.24	35.02	45.52	48.51
2002	55.26	61.79	28.86	41.80	49.58
2003	52.50	69.08	27.10	45.16	44.46
2004	48.49	64.77	23.70	43.47	41.41
2005	42.34	71.62	-10.93	41.92	37.32
2006	42.95	68.53	-9.17	36.39	32.40
2007	28.49	60.34	-0.63	27.94	13.00
2008	29.86	64.18	-12.82	24.53	2.13
Percentage Reduction from 1997 to 2008 (per cent)	56.18	23.45	129.58	39.4	95.09

value is expected to be lower for modern banks compared to the traditional banks. Table 3 below gives the gap indices of 5 variables under study.

Chart III-A : Gap Index - Employee Productivity Ratios

Chart III-B : Gap Index - Employee Cost Ratios

Legend: Employees' Cost to Total Business — Employees' Cost to Operating Expenses — Employees' Cost to Total Assets

It may be observed from Table 3 above and the Charts III-A and Graph III-B that the gaps between modern and traditional banks on all employee cost ratios have been coming down consistently from 1997 to 2008. The percentage reduction was highest (129 per cent) in case of employee cost to total business, which has drastically come down and assumed negative value from 2005 to 2008. The gap between traditional and modern banks in respect of employee cost to total assets reduced significantly from 43.41 in 1997 to 2.13 in 2008 (95.09 per cent reduction). In the case of employee productivity ratios, business per employee, the gap between traditional and modern banks reduced significantly from 68.15 in 1997 to 29.86 in 2008 (56.18 per cent). The gap in respect of profit per employee between traditional and modern banks was reduced from 83.84 to 64.18 (23.45 per cent) during the same period. However, the gap in absolute terms as at end March 2008 is still high in respect of business per employee (29.86), profit per employee (64.18) and employee cost to operating expenses (24.53). Thus, the traditional banks have to continue to take further steps to improve their productivity and cost reduction efforts for competing with the modern banks. It will be interesting to monitor the trend of gap indices by the banks in future to get an idea about the existing gaps between modern and traditional banks.

Section V

Concluding Observations

While comparing the 12 year's data from 1997 to 2008 on productivity factors viz. 'Business per Employee' (BPE) and 'Profit per Employee' (PPE) and employee cost factors viz. 'Employee Cost to total Business', 'Employee Cost to total Assets' and 'Employee Cost to Operating Expenses' it was observed that the performance of the modern banks (foreign and new private sector banks) was much superior than the traditional banks (public sector and old private sector banks). However, the gap between the performance of modern and traditional banks on all the five variables has shown a decreasing trend, which has significantly reduced during the period of 12 years under study.

The impact of measures taken by traditional banks to meet the challenges from modern banks to improve operational efficiency has resulted in improved performance of traditional banks on all the factors studied. However, the performance of the traditional banks is still quite below compared to the modern banks on these variables except on 'Employee Cost to total Business' in which the traditional banks have surpassed the modern banks during recent period i.e from 2005 to 2008.

The traditional banks are still to resolve a number of legacy issues related to people and processes for improving the productivity and reducing cost in order to compete with the modern banks.

It is interesting to observe the reduction in the gap due to improved performance of traditional banks. This gap is likely to be further reduced in future due to certain measures taken by the traditional banks recently. However, the trend has to be closely monitored to come to a firm conclusion.

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Annex - A

S.No	Ratio	Definition of Ratio
A. Employee Productivity Ratios		
1.	Business per Employee (Rs. Lakhs)	Total Business* / Number of employees
2.	Profit per Employee (Rs. Lakhs)	Net Profit / Number of Employees
B. Employee Cost Ratios		
3.	Employee Cost to Operating Expenses	Payments to and Provisions for employees as a percentage of Operating Expenses
4.	Employee Cost to Total Business	Payments to and Provisions for employees as a percentage of Total Business
5.	Employee Cost to Total Assets	Payments to and Provisions for employees as a percentage of Total Assets

* * Total Business = Deposits + Advances

Annex - B
a) Business Per Employee

(Rs. Lakhs)

Bank Group	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	2	3	4	5	6	7	8	9	10	11	12	13
Nationalized Banks	69.9	87.7	96.2	114.8	153.6	181.7	204.4	249.4	312.4	364.0	464.0	**586.0**
SBI Group Banks	67.5	76.4	93.2	111.2	131.3	168.5	204.2	220.7	271.7	342.6	435.8	526.8
Public sector banks(mean)	68.7	82.1	94.7	113.0	142.5	175.1	204.3	235.0	291.1	353.3	449.9	556.4
Old Private Sector Banks	81.9	113.0	131.2	159.5	190.0	209.5	242.4	291.2	313.0	358.3	430.0	542.0
Traditional Banks	*75.3*	*97.5*	*112.9*	*136.3*	*166.2*	*192.3*	*223.4*	*263.1*	*302.0*	*355.8*	*440.0*	*549.2*
New Private Sector Banks	374.0	797.7	690.0	889.0	749.9	699.5	712.8	716.5	687.9	803.0	569.0	594.6
Foreign Banks	421.0	582.1	587.3	581.4	631.7	635.3	721.2	800.5	803.2	980.0	1211.9	1439.0
Modern Banks	*397.5*	*689.9*	*638.7*	*735.2*	*690.8*	*667.4*	*717.0*	*758.5*	*745.6*	*891.5*	*790.4*	*1216.8*

b) Profit Per Employee

(Rs. Lakhs)

Bank Group	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	2	3	4	5	6	7	8	9	10	11	12	13
Nationalized Banks	0.30	0.50	0.47	0.45	0.54	0.97	1.70	2.23	1.87	2.13	2.76	3.94
SBI Group Banks	0.39	1.11	0.77	0.99	0.81	1.24	1.57	2.42	2.07	2.20	2.76	3.55
Public sector banks(mean)	0.34	0.81	0.62	0.72	0.68	1.12	1.64	2.33	1.97	2.16	2.76	3.75
Old Private Sector Banks	0.80	0.82	0.53	0.87	0.75	1.44	1.72	2.13	0.62	1.20	2.92	4.00
Traditional Banks	*0.57*	*0.81*	*0.57*	*0.79*	*0.71*	*1.27*	*1.68*	*2.23*	*1.29*	*1.68*	*2.84*	*3.87*
New Private Sector Banks	8.00	8.33	7.11	9.37	7.02	4.84	8.22	8.14	5.37	5.77	3.57	4.39
Foreign Banks	5.00	7.48	4.21	5.61	4.66	5.91	12.13	12.68	12.27	12.24	19.39	31.09
Modern Banks	*6.50*	*7.90*	*5.66*	*7.49*	*5.84*	*5.37*	*9.17*	*12.41*	*7.82*	*9.01*	*11.48*	*17.74*

c) Employee Cost to Total Business

(Per cent)

Bank Group	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	2	3	4	5	6	7	8	9	10	11	12	13
Nationalized Banks	1.66	1.53	1.54	1.48	1.62	1.32	1.25	1.17	1.08	0.92	0.77	0.66
SBI Group Banks	1.89	1.72	1.68	1.54	1.69	1.31	1.28	1.28	1.39	1.38	0.94	0.75
Public sector banks(mean)	1.74	1.60	1.59	1.50	1.65	1.32	1.26	1.21	1.18	1.08	0.85	0.70
Old Private Sector Banks	1.16	1.07	1.09	1.12	0.95	0.98	0.93	0.87	0.79	0.83	0.73	0.65
Traditional Banks	*1.45*	*1.33*	*1.34*	*1.30*	*1.30*	*1.15*	*1.09*	*1.04*	*0.99*	*0.95*	*0.79*	*0.68*
New Private Sector Banks	0.22	0.24	0.26	0.26	0.28	0.28	0.40	0.42	0.42	0.44	0.49	0.58
Foreign Banks	0.92	0.86	1.00	1.01	0.97	0.99	0.85	0.86	2.03	1.85	1.11	1.17
Modern Banks	*0.57*	*0.55*	*0.63*	*0.63*	*0.63*	*0.63*	*0.63*	*0.64*	*1.23*	*1.14*	*0.80*	*0.88*

d) Employee Cost to Operating Expenses

(Per cent)

Bank Group	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	2	3	4	5	6	7	8	9	10	11	12	13
Nationalized Banks	72.53	72.07	73.42	73.57	76.04	72.73	70.74	69.53	68.25	64.88	64.36	62.43
SBI Group Banks	72.55	74.98	71.16	71.59	72.99	71.26	71.12	68.86	67.43	67.63	65.49	60.58
Public sector banks(mean)	72.54	73.12	72.57	72.84	74.87	72.20	70.87	69.28	67.95	65.92	64.93	61.50
Old Private Sector Banks	60.80	59.73	61.31	64.58	63.00	61.84	60.29	57.30	53.22	56.45	57.05	55.75
Traditional Banks	*71.78*	*72.20*	*71.81*	*72.28*	*74.23*	*71.52*	*70.13*	*68.42*	*66.92*	*65.26*	*60.99*	*58.63*
New Private Sector Banks	18.01	19.04	19.13	19.20	19.13	23.12	21.73	23.11	24.75	27.30	28.91	31.17
Foreign Banks	35.15	32.00	29.84	33.31	31.82	33.12	31.94	31.98	30.89	35.15	39.78	39.89
Modern Banks	*30.41*	*29.52*	*27.64*	*30.07*	*27.79*	*29.36*	*26.49*	*26.96*	*27.39*	*30.43*	*34.35*	*35.53*

e) Employee Cost to Assets

(Per cent)

Bank Group	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	2	3	4	5	6	7	8	9	10	11	12	13
Nationalized Banks	2.07	1.91	1.93	1.88	2.12	1.74	1.65	1.53	1.41	1.26	1.11	0.95
SBI Group Banks	2.13	2.01	1.92	1.76	1.94	1.50	1.50	1.52	1.44	1.54	1.30	1.02
Public Sector Banks(mean)	2.09	1.95	1.93	1.84	2.04	1.65	1.59	1.52	1.42	1.36	1.21	0.98
Old Private Sector Banks	1.50	1.36	1.36	1.42	1.26	1.28	1.23	1.14	1.07	1.18	1.05	0.93
Traditional Banks	*2.05*	*1.90*	*1.88*	*1.80*	*1.98*	*1.62*	*1.57*	*1.49*	*1.39*	*1.35*	*1.13*	*0.96*
New Private Sector Banks	0.37	0.34	0.34	0.28	0.33	0.26	0.42	0.47	0.50	0.55	0.61	0.71
Foreign Banks	1.06	0.95	1.00	1.04	0.97	1.00	0.89	0.88	0.89	0.98	1.12	1.13
Modern Banks	*0.81*	*0.78*	*0.79*	*0.75*	*0.69*	*0.55*	*0.60*	*0.62*	*0.64*	*0.69*	*0.87*	*0.92*

Profitability of Indian Corporate Sector: Productivity, Price or Growth?

Abhiman Das and Manjusha Senapati*

This paper examines the major sources of strong profitability of Indian manufacturing companies during recent years. Changes over time in the value of a company's profit can arise from many sources. Isolation of them into factors of production and to pin down contributory variables that promote efficiency is challenging both theoretically and empirically. In this context, this paper applies a new index-number theory to data of Indian manufacturing companies over a period of seven years from 2000-2006, allowing changes in the company's profit to be broken down into separate effects due to productivity change, price changes and growth in input quantities used. The productivity of Indian manufacturing companies was found to be 24 per cent higher in 2006 as compared to that in 2000. The actual increase in companies' profit has outpaced the growth in the size of the input quantities on an average. The empirical results indicate that the companies have not passed the benefit from productivity improvement to consumers.

JEL Classification : C43, D24, L60

Keywords   : Productivity, Total Factor Productivity, Törnqvist Index

Introduction

The Indian economy has experienced strong growth during recent times. The acceleration in real gross domestic product (GDP) has been contributed by the sustained expansion in industry and services sector. In fact, growth of real GDP originating from industry has entered the fifth year of expansion, mainly driven by the manufacturing sector. Stepping up of the activity in the manufacturing sector and its robust growth have been facilitated by improvement in investor friendly and sector specific policies and focus on improving the infrastructure facilities.

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Historically, the trends in industrial growth in India were not so robust. During the 1960s, the performance of Indian manufacturing was severely constrained by productivity (Ahluwalia, 1985). Low long-term productivity growth over 1965 to 1986 was, however, followed by definite signs of positive growth in productivity in the decade of 1980s. This improvement was widespread, touching all sub-sectors of manufacturing. Higher investment in power and transport sectors with increased efficiency and trade and industrial policy reforms had resulted in turnaround. This is well reflected in the performance of the manufacturing sectors during the post reform period, especially after 2000. For example, gross profits of the companies have registered an increase of 17 per cent per annum during 2000-2006.

Productivity may be defined as the ratio of output of goods and services to the inputs - human as well as others - used in the production process. Total Factor Productivity (TFP) is the contribution other than that emanating from the increased use of inputs (capital and labour). TFP thus measures the increase in efficiency with which resources are being used through innovations and improved management techniques to increase the output from a given combination of capital and labour. In general, higher productivity is associated with a higher profitability, larger market, a lower degree of import substitution, and lower capital intensity. Recent phase of enhanced profitability has raised the capital intensity of manufacturing sector even more. Against this, it will be interesting to isolate the effects of changes in company's profit, including utilisation of factors of production, and to pin down contributory factors that promote efficiency.

The objective of the paper is to explain the higher profitability of Indian manufacturing sector in recent times. Changes over time in the value of a company's profit can arise from many sources, such as growth in the quantity of inputs used, improvement in productivity and price changes, *etc*. Does higher productivity lead to higher efficiency of the companies? Until now, there have been no attempts in separating and quantifying these influences in the Indian context. The paper applies new index-number method to data of Indian manufacturing companies over a period of seven years from 2000-

2006 allowing for changes in the company's profit to be broken down into separate effects due to productivity change, price change and growth in input quantities used.

The rest of the paper is organised as follows. Section I presents the brief literature review in Indian context. An overview of performance of Indian companies during 1992-2006 is presented in section II. Methodology of decomposing profit growth into size of input quantities, productivity and price changes are described in section III. Results are presented in section IV. Concluding remarks are set out in the final section.

Section I

A Brief Literature Review

The Reserve Bank of India has been publishing annual special studies analysing performance of manufacturing sector since 1951-52. Based on various accounting ratios, these studies provide a comprehensive outlook of the corporate sector. However, issues relating to productivity are in general not attempted. Among earlier studies, Ahluwalia (1985) analysed the trends in industrial growth since mid-1950s and identified a phenomenon of persistent industrial stagnation since mid-1960s. It also pointed out towards the constraining role played by poor productivity growth in Indian industrialisation. Ahluwalia (1991) dealt with the issue of productivity growth in Indian manufacturing sector in greater detail and over a longer period 1960 to 1986 and showed that there was an increase in TFP growth in the late 1980s, the initial period of liberalisation. The two factors contributing to the growth in productivity were found to be infrastructure sector improvement and reorientation in the policy framework. The study had, however, taken the value added at the constant prices as the measure of output. Balakrishnan and Pushpangandan (1994) argued that such a measure is valid only if the prices of material inputs relative to prices of output are somewhat constant over the period of analysis. They made an attempt to construct a standard measure of productivity for Indian industry having accounted for the change in the prices of material inputs. They

observed that contrary to what is believed, productivity growth in the 1980s may actually have been slower.

Rao (1996a) developed a procedure for construction of an index of TFP when output is reckoned in the value-added terms and applied it to the case of Indian manufacturing. He proposed a method for relaxing the assumption of the perfect competition in product markets and concluded that there was a transition in the early 1980s from a high positive rate of trend growth in productivity to a significant negative rate, a result contrary to Ahluwalia (1991) but similar to Balakrishnan and Pushpangandan (1994). Rao (1996b) again argued that the methods of measurement of productivity suffer from significant measurement bias due to high level of aggregation involving manufacturing as a whole. He studied productivity trends in Indian industry on the basis of particular scheme of disaggregation. The disaggregated productivity measures were then suitably aggregated to provide a revised index of productivity of Indian manufacturing.

Several other studies have also attempted to find the trends in productivity in the post reform period; the evidence from empirical studies by researchers is ambiguous, though anecdotal evidence, especially of trends in recent years, shows significant increases in productivity. While studies by Unel (2003) and Tata Services Ltd. (2003) find acceleration in the growth of TFP in the 1990s, Goldar (2004) and RBI (2004) find a deceleration in the TFPG. Despite the uncertainty regarding acceleration in TFP growth it is believed that trade liberalisation since 1991 has had a positive impact on the TFP growth in India (Krishna and Mitra, 1998; Chand and Sen, 2002; Das, 2003; and, Topalova, 2004). At the sectoral level, there is evidence of improved TFP growth for the exporting sectors *vis-à-vis* the non-exporting ones (Dholakia and Kapur, 2001; Unel, 2003). More recently, Kato (2005) finds that the smaller the market share of a firm, the higher is its productivity growth.

All these empirical studies in India have focused predominantly on the TFP growth. In addition to TFP growth, however, it is important

to examine trends in profit achieved by the companies and the impact of the factors leading to higher profit for the companies in India. Moreover, several studies draw upon the data up to the year 2000 while, by all indications, significant gains in productivity have occurred in the more recent years, particularly in manufacturing (Reddy, 2005).

Section II

Performance of Indian Companies during 1992-2006

Performance of Indian manufacturing companies during 1992-2006 is presented in this section using RBI data. During early years of deregulation, the profitability of the companies was not so robust. Growth in gross profits of the companies went down from 22.2 per cent in 1991-92 to 3.7 percent in 1992-93. Companies registered average gross profits growth of 13 per cent during 1990s. There was however, improvement in 2000-2006 when the average rate of profit growth increased to 17 per cent. Growth in gross sales followed more or less the same pattern as that of profit (Chart 1). During the period of apparent economic slowdown, for the three consecutive years, viz., 1996-97, 1997-98 and 1998-99, growth in sales of the companies went down, leading to gross profits growth rate turning negative for these three years. Profits retained increased at the rate of 10 per cent during 1990s, which jumped up to 61 per cent during 2000-2006.

Chart 1: Growth Rates of Sales and Gross Profits
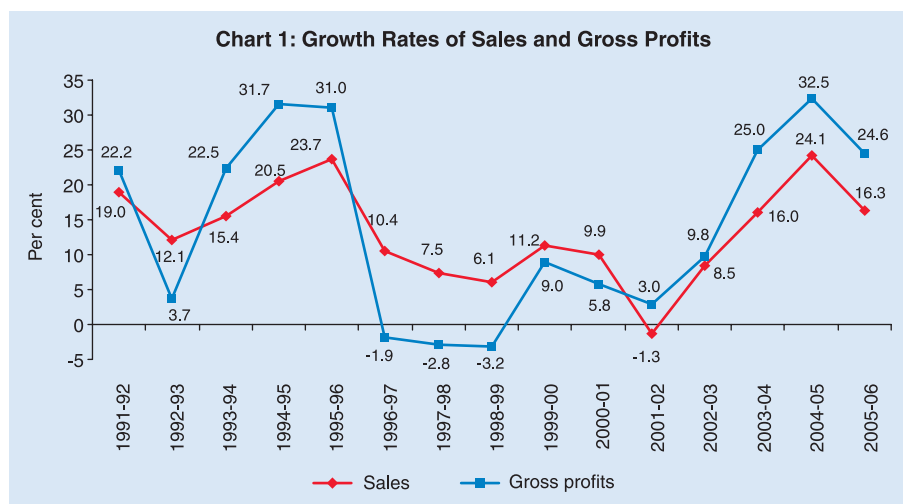
Coinciding with growth phase of the business cycle, profitability ratios also went up during the current decade.

Companies were reinvesting about 74 per cent of their profits in their core business or to pay debts during the first half of 1990s. The ratio declined during the early 2000s. The ratio of 'tax provision to profits before tax' reflecting the amount of profit to be allocated for paying taxes also fell significantly during 2000s as compared to the 1990s. It is clear that the period after the year 2000 witnessed a reversal of reinvestment accompanied by a reduction in increased tax burden.

Soft interest rate regime helped companies' better performance as indicated by their interest payments. For example, interest payments by the companies recorded negative growth since 2001-02. Gross savings of the companies increased at an impressive rate of 21 per cent annually in the six years of 2000s, higher than the earlier range of 13 per cent in the 1990s. As a result, corporate sector witnessed high growth in fixed assets during the post reform period. The growth in borrowings of the companies declined from 17 per cent in 1990s to 6 per cent in 2000's.

Overall, the performance of Indian corporate sector has had three distinct phases: both sales and gross profit were high till the mid 1990s. During the second phase, i.e. the latter years of the 1990s to the early 2000s, the performance of corporate sector was markedly low coinciding with the economic slowdown. Subsequently, as growth prospects of economy improved, performance of the corporate sector boomed back and has maintained a steady growth.

Section III

Methodology

At a basic level, the concept of productivity is relatively easy to define. It is the ratio of output to inputs for a specific production process. Rising productivity implies either more output is produced with the same amount of inputs, or that fewer inputs are required to produce the same level of output. The concept of productivity is

closely linked with the issue of efficiency. If a company is efficient, it is said to be operating on the production frontier (i.e., it is achieving 'best practice'), where the production frontier is defined at some point in time with reference to a particular set of companies. Rising efficiency would therefore mean rising productivity. Equally, the shift outwards of a production frontier also implies productivity growth. In the case of constant returns to scale, efficiency and productivity are same.

Consider a single-output, single-input case; productivity is merely the ratio of company's output to input quantities. Suppose in period 0 if a company produces output y_0 from input x_0, its productivity is $\pi_0 = \dfrac{y_0}{x_0}$

Similarly in period 1, suppose output y_1 is produced from input x_1, the productivity is $\pi_1 = \dfrac{y_1}{x_1}$

The productivity index in period 1 with period 0 as the base is defined as

$$\Pi_1 = \frac{\pi_1}{\pi_0} = \frac{y_1}{x_1} \cdot \frac{x_0}{y_0} = \frac{y_1/y_0}{x_1/x_0}$$

The productivity index shows how the productivity of the company has changed from period 0 to period 1. If multiple inputs and multiple outputs are involved, the simple ratios of input and output quantities in the above equation are replaced by a ratio of quantity indexes of output and input. In that case the index of multifactor productivity is

$\Pi_1 = \dfrac{\pi_1}{\pi_0} = \dfrac{Q_y}{Q_x}$ where Q_y and Q_x are, respectively, output and input quantity indexes of the company in period 1 and period 0.

There are several ways to define Q_y and Q_x. However in the literature, Törnqvist productivity index has been quite popular. It is measured by a weighted geometric mean of the relative quantities from the two periods. Considering the output quantity index first,

suppose, m outputs are involved. The output vectors produced in periods 0 and 1 are, respectively, $y^0 = (y_1^0, y_2^0 \ldots \ldots y_m^0)$ and $y^1 = (y_1^1, y_2^1 \ldots \ldots y_m^1)$. The corresponding output price vectors are $p^0 = (p_1^0, p_2^0 \ldots \ldots p_m^0)$ and $p^1 = (p_1^1, p_2^1 \ldots \ldots p_m^1)$, respectively. Then the Törnqvist output quantity index is $T_Q^y = \left(\dfrac{y_1^1}{y_1^0}\right)^{v_1} \ldots \ldots \left(\dfrac{y_m^1}{y_m^0}\right)^{v_m}$ where $\displaystyle\sum_{j=1}^{m} v_j = 1$. Here $v_j = \dfrac{p_j y_j}{\displaystyle\sum_{k=1}^{m} p_k y_k}$ is the share of output j in the total value

of output bundle.

As the value shares of individual outputs are different in two periods, we use arithmetic mean of v_j^0 and v_j^1 as v_j,

where $v_j^0 = \dfrac{p_j^0 y_j^0}{\displaystyle\sum_{k=1}^{m} p_k^0 y_k^0}$ and $v_j^1 = \dfrac{p_j^1 y_j^1}{\displaystyle\sum_{k=1}^{m} p_k^1 y_k^1}$.

Similarly, let the input

vectors in the two periods be $x^0 = (x_1^0, x_2^0 \ldots \ldots x_n^0)$ and $x^1 = (x_1^1, x_2^1 \ldots \ldots x_n^1)$. The corresponding input price vectors are $w^0 = (w_1^0, w_2^0 \ldots \ldots w_n^0)$ and $w^1 = (w_1^1, w_2^1 \ldots \ldots w_n^1)$, respectively. Then the Törnqvist input quantity index is $T_Q^x = \left(\dfrac{x_1^1}{x_1^0}\right)^{s_1} \ldots \ldots \left(\dfrac{x_n^1}{x_n^0}\right)^{s_n}$ where $s_j = \dfrac{w_j x_j}{\displaystyle\sum_{k=1}^{n} w_k x_k}$ is share of input j in the total cost of input bundle. The Törnqvist productivity index is the ratio of the Törnqvist input and output quantity indexes. Thus, $\Pi_Q^T = \dfrac{T_Q^y}{T_Q^x}$ (1)

This measure based on gross output productivity measure will be referred to as TFP Growth (TFPG). Another measure of productivity using gross operating surplus type approach will be called Capital TFP Growth (KTFP) or simply productivity growth which is defined as follows (Lawrence et. al., 2006).

Let there be N net outputs, or "netputs", denoted by $y^t = (y_1^t ....y_N^t)$ and where $y_n^t > 0$ implies that the nth good is an output, while $y_n^t < 0$ implies that the good is an intermediate input. The price vector corresponding to the net output vector y^t is $p^t >> 0_N$ [1], where $p^t = (p_1^t ....p_N^t)$. In the empirical context considered here, we define "profit" as the gross operating surplus, so that $\pi^t = p^t . y^t$

Then we can define an index of the growth in the profit of the company, between periods t and t - 1, as

$$G^t \equiv \pi^t / \pi^{t-1} \equiv p^t y^t / p^{t-1} y^{t-1} \tag{2}$$

Where p^i and y^i denote price and quantity vectors between periods t and t-1. Dividing this value ratio by the price index for the netputs between periods t and t-1 gives us an implicit netput quantity index as G^t / P^t.

To introduce production into the analysis we assume that production of N netputs involves M primary inputs. The vector of M primary input quantities is denoted by $k^t = (k_1^t ....k_M^t)$ and the corresponding price vector be $r^t >> 0_N$ where $r^t = (r_1^t ....r_N^t)$. If primary input quantity index is denoted by K^t then the index of TFP between periods t - 1 and t can be defined as follows:

$$R^t = \frac{G^t / P^t}{K^t} \tag{3}$$

Consequently, productivity growth in (3) is the growth in the output quantity index that cannot be explained by growth in input utilization. By rearranging equation (3), we obtain:

$$G^t = R^t . P^t . K^t \tag{4}$$

where the ratio of profits can be decomposed into ratios from productivity (R^t), prices (P^t) and primary inputs (K^t).

---

[1] The notation $p^t >> 0_N$ means each element of p is positive.

Any index number formula can be used for constructing the price and input indexes for use in (4). However, the Törnqvist (1936) index has several advantages that suggest its use in this context.

We can then define P^t and K^t in (4), respectively, as

$$P^t \equiv \exp\left[\sum_{n=1}^{N} \frac{1}{2}\left(s_n^{t-1} + s_n^t\right)\ln\left(p_n^t / p_n^{t-1}\right)\right] \tag{5}$$

which is a Törnqvist price index, where $s_n^t = \dfrac{p_n^t y_n^t}{p^t . y^t}$ is the profit share of netput n, ($s_n^t > 0$ if good n is an output and <0 if good is an input), using the notation $p^t y^t = \sum p_n^t y_n^t$, and

$$K^t \equiv \exp[\sum_{m=1}^{M} \frac{1}{2}(\sigma_m^t + \sigma_m^{t-1})\ln(k_m^t / k_m^{t-1})] \tag{6}$$

which is a Törnqvist quantity index, where $\sigma_m^t = r_m^t k_m^t / p^t . y^t$ is the profit share of fixed input m.

By noting that the Törnqvist index formula has the form of a (weighted) geometric mean, we can write the aggregate price index as a product of individual price sub-indexes:

$$P^t = \prod_{n=1}^{N} P_n^t \tag{7}$$

P^t is defined as the nth term in (5), and gives the contribution of the price changes of the nth good to the aggregate price index. Similarly, the primary-input index in (4) can be written as:

$$K^t = \prod_{m=1}^{M} K_m^t \tag{8}$$

K_m^t is defined as the mth term in (6), and gives the contribution of the change in the mth component of the primary inputs to the aggregate primary input index. Together, equations (4), (7) and (8) represent a detailed decomposition of profit growth between t - 1 and t.

Note that by taking inputs as negative outputs, we are using value added (or gross operating surplus) type approach to output and productivity measurement rather than the gross output approach. In the following section, we will use both approaches for calculating productivity growth. Since the input base for KTFP growth is very much smaller than the input base for TFP growth, KTFPG will be very much greater than TFP growth.

The choice of the Törnqvist index over other index numbers has been motivated above by the ability to decompose it easily as the product of sub-indexes, as in equations (7) and (8). In addition, it can be shown that the Törnqvist index closely approximates the Fisher Ideal index, which has a slightly stronger justification from the axiomatic approach. This is a result in numerical analysis and does not depend on assumptions of optimising behaviour. Hence, there are strong reasons for the choice of the Törnqvist index over many other index-number formulae, and therefore a justification exists from the axiomatic approach to index numbers for the profit decomposition represented by equations (4), (7) and (8).

As we wish to consider changes in profit which only relate to industry changes in prices, productivity and inputs, we remove the effects of general inflation by dividing profit in each period by the level of a suitable price index (say cp_i^t), so that the decomposition equation that we use is as follows:

$$G^{t*} = \pi^t / cp_i^t / \pi^{t-1} / cp_i^{t-1} = R^t . P^{t*} . K^t \qquad (9)$$

$$P^{t*} \equiv \exp\left[\sum_{n=1}^{N} \frac{1}{2}\left(s_n^{t-1} + s_n^t\right)\ln\left(p_n^t / cpi^t\right)/\ln\left(p_n^{t-1} / cpi^{t-1}\right)\right] = \prod_{n=1}^{N} P_n^{t*}, \qquad (10)$$

where P_n^{t*} is the nth term in the first line of (10). By dividing the period t prices p^t by the period t price index, cpi^t we can give welfare interpretations to price change contribution terms P_n^{t*} defined in (10). If n is an output and P_n^{t*} is negative, this means that the purchaser of output n gets a benefit from his or her purchases

of commodity n going from period t - 1 to t in terms of paying a lower real price. If n is an intermediate input and $P_n^{t^*}$ is positive, this means that the supplier of intermediate input n gets a benefit from his or her supplies of commodity n to the enterprise going from period t - 1 to t in terms of receiving a higher real price. If n is a type of labour service that is supplied to the company and $P_n^{t^*}$ is positive, this means that the real wages received by this type of worker have increased going from period t - 1 to t. These benefits are made comparable over time by dividing by the natural numeraire price.

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Section IV

Results

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Growth, productivity and Price changes

To analyse the sources of profit growth using the above mentioned methodology, we used the data of Indian manufacturing sector pertaining to 2000 to 2006, collected from Prowess database, Centre for Monitoring Indian Economy (CMIE). It is a balanced panel of top 500 companies on the basis of their total assets. The production process is defined by a single output measured in terms of total sales, and four inputs indicated by 'raw materials stores and spares', 'power and fuel expenses', 'salaries and wages', and 'others'. 'Others' include labour charges, advertising expenses, marketing and distribution expenses.

Due to non availability of price information, all inputs and outputs are measured in terms of cost basis. So the data on all the inputs was divided by the appropriate price indices to get the equivalent quantities. Wholesale Price Index for Manufactured Products (WPI-MP) was used for output costs, wholesale price index for basic metals and others were used as raw material costs, wholesale price index for fuel, power, light and lubricants was used as price index for power, Consumer Price index for Industrial Workers (CPI-

IW) was used for salaries, and CPI-IW for miscellaneous products was used for 'others'.

To analyse the changes in the productivity due to increase in size, the data was divided into four size classes on the basis of size of their total assets. The size classes were chosen so that there are almost equal numbers of companies in each size class. For each year, the companies with size of total assets less than or equal to Rs. 400 crore were taken in size class 1, companies with their total assets in the range of Rs. 400 crore to Rs. 800 crore were taken in size class 2, those with their assets in the range of Rs. 800 crore to Rs. 1200 crore were taken in size class 3 and companies with their assets greater than Rs. 1,200 crore were taken in size class 4.

Total factor productivity (TFP) measures the efficiency with which companies convert inputs into outputs. It differs from productivity concept of equation (3) in the sense that it is measured as a direct (rather than implicit) index of total output quantity formed from the one output component (sales) relative to a total input quantity index formed from the four inputs ('raw materials, stores and spares', 'power and fuel expenses', 'salaries and wages' and 'others'). As explained earlier, Törnqvist index was used for calculating both the input and output indices. The approach followed is the gross output approach for measuring productivity, rather than the value added approach as used in profit decomposition. It is evident from table 1

Table 1: TFP using Output and Input Quantity Indices

Year	Input Quantity Index	Output Quantity Index	TFP	Total Output Price	Wholesale Price Index	Labour Inputs Price
1	2	3	4	5	6	7
2000	1.000	1.000	1.000	1.000	1.000	1.000
2001	1.081	1.067	0.988	1.178	1.072	1.037
2002	0.964	1.005	1.042	1.099	1.110	1.082
2003	0.968	1.066	1.102	1.105	1.148	1.126
2004	0.990	1.084	1.094	1.250	1.211	1.168
2005	1.132	1.105	0.976	1.334	1.289	1.215
2006	1.064	1.124	1.056	1.157	1.345	1.266

Chart 2: TFP and Input Quantity Index (2000-2006)
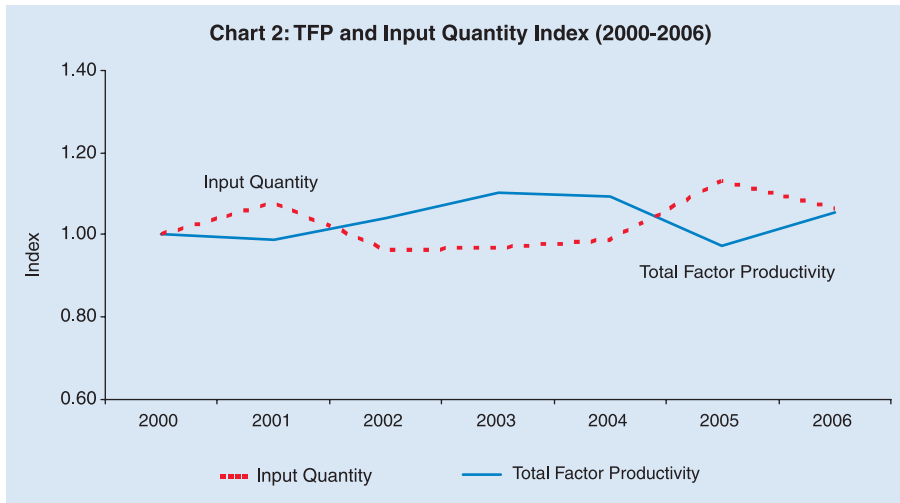
and Chart 2, that the TFP growth was 5.6 per cent higher in 2006 as compared to year 2000.

Chart 3 presents changes in companies output and input price indices during 2000 to 2006. The overall price received by companies from the sales of its output increased by 16 per cent in 2006 as compared to year 2000. It is also interesting to note that the prices of outputs increased by a much faster rate since 2004. Over the same period, the wholesale price index increased by 34.5 per cent.

Chart 3: Output and Input Prices (2000-2006)
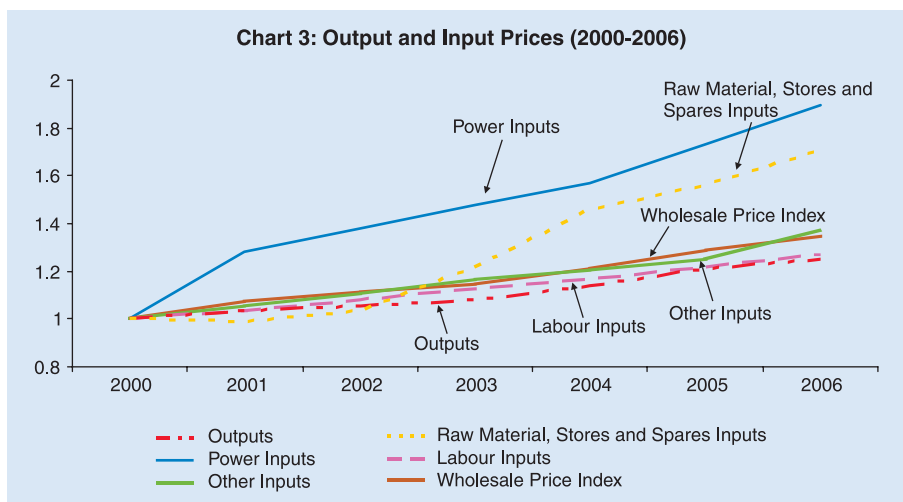
Sources of Change in Gross Return to Capital

In the remainder of the paper we use the term 'productivity' to refer to the 'capital total factor productivity' and denoted as 'prod' in figure 4 and 5 below. As can be seen from eq. (4) and (7), this allows for identification of impacts of changes in input prices also on profit growth. Now, we present sources of changes in real gross return to capital in table 2. Since the input base for KTFP growth is very much smaller than the input base for TFP growth, KTFPG will be very much greater than TFP growth. The KTFPG was 24 per cent higher in 2006 as compared to 2000. A large part of real gross return in 2006 came from improvement in productivity and increase in real output price.

Table 3 presents the percentage annual changes in real gross return to capital along with the percentage changes that could have occurred from each of the sources in isolation *viz.*, size of input quantities, productivity and real output prices.

While all contributions happen simultaneously, the estimates thus have interpretations of being contributions to the real gross return to capital conditional on levels of others variables. Accordingly the fourth column of table 3 shows the year to year percentage change in real gross return to capital attributable to

Table 2: Contributions to Real Gross Return to Capital

Year	Real Gross Return to Capital	Contributions from				
		Input Quantity Index	Total Capital Productivity	Real Output Price	Real Input Price	Labour Input Price
1	2	3	4	5	6	7
2000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2001	1.0795	1.0834	0.9030	1.1778	0.9368	0.9884
2002	1.0265	0.9700	1.1720	1.0988	0.8217	0.9861
2003	1.0230	0.9790	1.3707	1.1050	0.6899	0.9888
2004	1.0988	0.9944	1.3720	1.2496	0.6445	0.9877
2005	1.0569	1.1317	0.8984	1.3342	0.7786	0.9880
2006	1.1129	1.0697	1.2410	1.1575	0.7246	0.9876

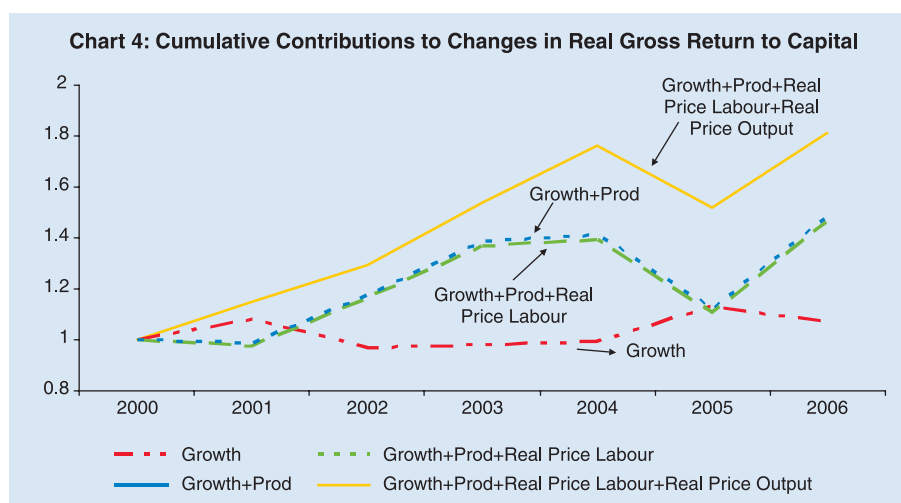**Table 3: Annual changes in Real Gross Return to Capital**

Contributors to Annual Change in Real Gross Return to Capital						
Year	Change in Real Gross Return to Capital	Change in Real Gross Return to Capital solely due to				
		Growth	Total Capital Productivity	Real Output Price	Real Input Price	Real Labour Price
2001	7.95	8.34	-9.70	17.78	-6.32	-1.16
2002	-4.91	-10.46	29.80	-6.70	-12.29	-0.23
2003	-0.34	0.93	16.95	0.56	-16.04	0.28
2004	7.41	1.57	0.10	13.08	-6.58	-0.11
2005	-3.81	13.80	-34.52	6.77	20.81	0.03
2006	5.29	-5.47	38.13	-13.25	-6.94	-0.04
Average	1.93	1.45	6.79	3.04	-4.56	-0.21

* Growth refers to % change in the primary input index K^t

productivity change, the fifth column shows the percentage change in real gross return to capital attributable solely to changes in real output price and the last but one column shows the percentage change in the real gross return to capital attributable solely to changes in real input prices. Over the 6-year period, the real gross return to capital increased by an average 2 per cent per annum. As explained earlier, if there had been no productivity change and no change in real output and input prices but for the same growth in input quantities, the real gross return to capital would have increased by an average 1.5 per cent per annum. This means the actual increase in real gross return to capital has outpaced the growth in the size of the input quantities on average.

If all the benefits from productivity growth had been retained by the companies and there had been no growth in the input quantities and no change in real output and input prices then the real gross return to capital would have increased by 6.8 per cent per annum. In the absence of growth in the input quantities, productivity changes and the real labour price changes, real gross return to capital would have increased by 3 per cent per annum on average given the actual pattern of real output price changes. Finally, real input price changes in the absence of any other changes reduced real gross return to capital marginally by an average of 0.21 per cent annually.

Chart 4: Cumulative Contributions to Changes in Real Gross Return to Capital

The cumulative impact of growth, productivity and real price changes on real gross return to capital is shown in Chart 4. Here we take the real gross return to capital in 2000 as the base and look at the cumulative effect of the actual annual changes in each of the three sources of change and also look at the progressive impact of the sources of change on the real gross return to capital. The dashed line near the bottom of the figure shows what would have happened to the real gross return to capital over 6 years if there had been no productivity change and no change in real input and output prices. By 2006, the annual return to capital for that year would have been 6.97 per cent higher as compared to that in 2000. The small dashed line at the middle of the figure shows what would have happened to the real gross return to capital over the six years if there had been both the observed levels of growth and productivity change but no change in either real labour or average real output prices - by 2006, the annual real gross return to capital for that year would have been 48.37 per cent higher. The big dashed line at the middle of the figure shows what would have happened to the real gross return with growth, productivity and real price labour changes but no change in real output price. Finally, the solid line at the top of the figure shows the cumulative effect of all four contributors to changes in the real gross return to capital.

**Chart 5: Changes in Real Gross Return to Capital and Distributions of Companies'
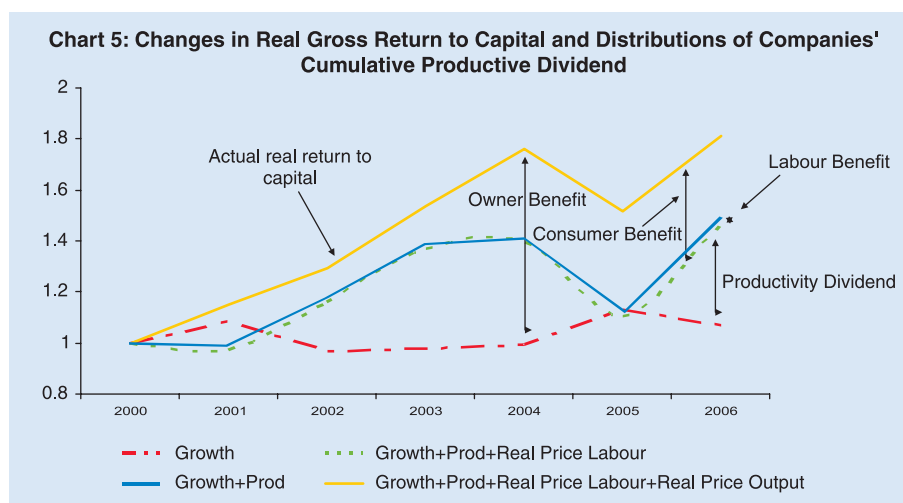Cumulative Productive Dividend**

Chart 5 shows the changes in real gross return to capital and distributions of companies' cumulative productive dividend. The gap between the 'Growth' and 'Growth+Prod' lines indicates the size of the potential contribution to companies' real gross return to capital from productivity improvements from 2000 onwards. The gap between the middle two lines shows the extent to which the benefits from companies' high productivity growth have been passed on to its labour force in the form of higher real wages (although this probably overstates the benefits to labour as it ignores skill and compositional changes). The large gap between the top (solid) line and the dashed line at the bottom of the chart indicates the extent to which the

Table 4: Cumulative Productivity Dividend

Year	Cumulative Real Return Due to				Productivity Dividend			
	Growth	Growth +Prod	(2) +Real Price Labour	(3)+Real Price Output	Total	To Labour	To Consumer	To Owner
	(1)	(2)	(3)	(4)	(5)=(2)-(1)	(6)=(2)-(3)	(7)=(3)-(4)	(8)=(4)-(1)
2000	1.000	1.000	1.000	1.000				
2001	1.083	0.986	0.975	1.153	-0.097	0.012	-0.178	0.069
2002	0.970	1.177	1.161	1.296	0.207	0.016	-0.135	0.325
2003	0.979	1.388	1.372	1.538	0.408	0.016	-0.166	0.559
2004	0.994	1.411	1.393	1.763	0.416	0.018	-0.370	0.769
2005	1.132	1.118	1.105	1.518	-0.013	0.014	-0.413	0.386
2006	1.070	1.484	1.465	1.812	0.414	0.018	-0.346	0.742

companies' owners have benefitted from the companies high productivity growth. The gap between the solid top line and small dashed line in the middle show the benefits of consumer from the companies' high productivity growth.

Table 4 shows the cumulative productivity dividend over the period 2001 to 2006 for productivity change in the year 2000. The companies have not passed the benefit from productivity improvement to consumers as there is reduction of around 84 per cent in this benefit as compared to 2000. However, owners have benefitted in abundance from the productivity changes since 2000 as 179 per cent of the benefits have been passed on to the owners in the form of increased rate of return. Benefits of around 4.5 per cent have been passed on to the labour (in the form of increased salaries). This, however, overstates the benefit to the labour as skill and compositional changes are ignored.

Class-wise comparisons (Chart 6) shows that the 'productivity' indices for different classes follow almost the same pattern as the overall productivity. The productivity growth of smaller companies (companies belonging to size class 1) on, an average, is found to be 6.23 per cent. For size class 2, size class 3 and size class 4 companies, the average productivity growth during the period 2000-2006 were 8.59 per cent, 7.12 per cent and 8.03 per cent, respectively, indicating

Chart 6: Class-wise Total Capital Productivity
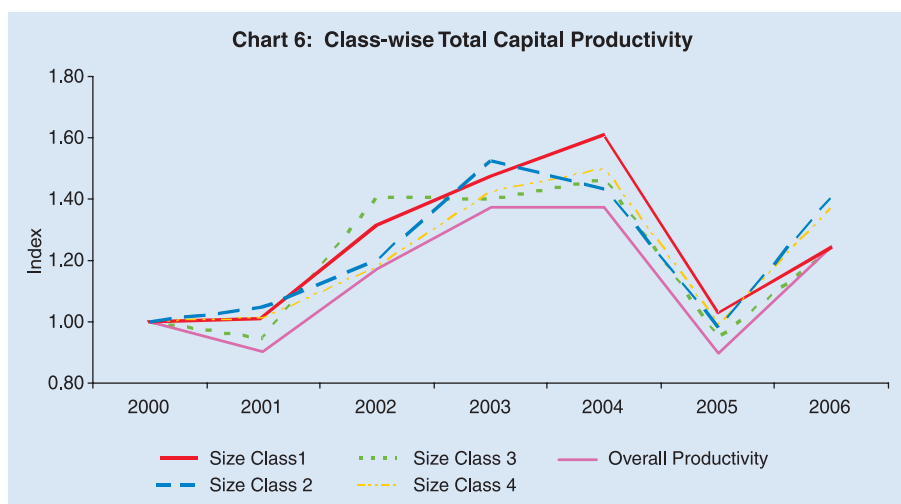
that the productivity growth in size class 2 companies was the highest as compared to the companies belonging to other size classes.

Over the 6-year period, the real gross return to capital increased by an average 0.74 per cent per annum for companies belonging to size class 1, 4.24 per cent for the companies belonging to size class 2, 1.95 per cent for companies belonging to size class 3 and 5.05 per cent for the companies belonging to size class 4. The highest increase in real gross return to capital was experienced by the large sized companies. If there had been no productivity change and no change in real output and labour prices but for the same growth in input quantities occurred then the real gross return to capital would have been the highest for size class 3 and size class 4 companies (it was 0.36 per cent for size class 1 companies, 1.86 per cent in size class 2 companies, 2.77 per cent in size class 3 companies and 2.8 per cent for size class 4 companies). This also means that the actual increase in real gross return to capital has outpaced the growth in the size of the input quantities on average for all size classes except size class 3 companies.

If all the benefits from productivity growth had been retained by the companies and there had been no growth in the input quantities and no change in real output and labour prices then the real gross return to capital would have increased for large sized companies (6.23 per cent per annum for size class 1 companies, 8.59 per cent for size class 2 companies, 7.12 per cent for size class 3 companies and 8.03 per cent for size class 4 companies). In the absence of growth in the input quantities, productivity changes and the real labour price changes, the real gross return to capital would have increased largely for size class 2 companies (3.5 per cent for size class 1 companies, 7.06 per cent for size class 2 companies, 3.62 per cent for size class 3 companies and 2.97 per cent for size class 4 companies) on average given the actual pattern of real output price changes. Finally, real labour price changes in size class 1 companies would have reduced majorly, (in the absence of any other changes) real gross return to capital by an average of 0.33 per cent annually as compared to other size classes (for size class 2, the

Table 5: Contributors to Changes in Real Gross Return to Capital

Size Classes	Change in Real Gross Return to Capital	Change in Real Gross Return to Capital solely due to				
		Growth	Total Capital Produ-ctivity	Real Output Price	Real Input Price	Real Labour Price
1	2	3	4	5	6	7
Size Class 1	0.74	0.36	6.23	3.48	-4.22	-0.33
Size Class 2	4.24	1.86	8.59	7.06	-4.24	-0.18
Size Class 3	1.95	2.77	7.12	3.62	-3.90	-0.22
Size Class 4	5.05	2.80	8.03	2.97	-3.15	-0.14

annual reduction would have been 0.18 per cent, for size class 3 companies, the annual reduction would have been 0.22 per cent, and for size class 4 companies, the annual reduction would have been 0.14 per cent).

Section V

Concluding Observations

During recent period, Indian manufacturing companies achieved high growth in profits. It is, therefore, important to examine trends in profit achieved by the companies and the impact of the factors leading to higher profit for the companies in India. In the paper, the method for decomposing changes in companies' real gross return to capital into contributions from changes in productivity, prices and input growth have been applied to Indian manufacturing companies' database for the period from 2000-2006. The decomposition of profits provides means of quantifying the distribution of benefits from productivity and real price changes. If one group, be it consumers or owners, capture all the benefits then it is detrimental for the sustainability of the reform process.

The productivity of Indian manufacturing companies was found to be 24 per cent higher in 2006 as compared to that in 2000. It was found that the actual increase in companies' profit has outpaced the growth in the size of the input quantities on average. Had the benefits

from productivity growth been retained by the companies, without any changes in the input quantities and real output and input prices then the profit of the companies would have increased by 6.8 per cent per annum. Changes in output prices only would have increased the profit by 3 per cent per annum on average given the actual pattern of real output price changes. Finally, real input price changes in the absence of any other changes would have reduced the profit marginally by an average of 0.21 per cent annually.

It was found that the companies have not passed the benefit from productivity improvement to consumers as there is reduction of around 84 per cent in this benefit in the 2006 as compared to 2000. However, owners have benefitted at the cost of consumers in abundance from the productivity changes since 2000 as 179 per cent of the benefits have been passed on to the owners in the form of increased rate of return. Benefits of around 4.5 per cent have been passed on to the labour (in the form of increased salaries).

Size class wise comparisons show that the highest increase in profit was experienced by the large sized companies (companies with asset size more that Rs. 1200 crore). The actual increase in profits has outpaced the growth in the size of the input quantities on average for all size classes except size class 3 companies (companies with asset size in the range of Rs 800 to Rs. 1200 crore).

Some assumptions were made here to make the analysis practical. In absence of exact price information on inputs and outputs, appropriate price indices were used. We assumed that inter-temporal variation in selected price indices will capture the price change of inputs and outputs. We also assumed that the type and quality of both inputs and outputs used remains constant over time. This in a way will underestimate the consumer benefit as no allowance was made for the increased utility associated with an increase in the consumer's choice set. Conversely, the extent of benefits flowing to labour was likely to be overestimated as no allowance was made for increase in average skill levels associated with technological change and downsizing.

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The Role of Domestic Savings and Foreign Capital Flows in Capital Formation in India

Himanshu Joshi*

As the capital account of the balance of payments (BoP) is not separately represented in the national account identity, its contribution to capital formation remains generally unexamined. Taking various components of domestic savings and the capital account, the existence of a long-term steady state relationship between capital formation and various savings components and capital account balance to GDP. A notable result is that the short-term dynamics of capital formation are guided significantly by the capital account such that disturbances in the steady state equilibrium are corrected over time by means of changes in the desired amounts of capital flows in the balance of payments. The implication of this finding is that a calibrated approach to easing external capital constraints would serve to smoothen and foster the capital acquisition cycle for productive activities and help in achieving higher levels of capital formation and economic growth.

Introduction

Savings form the backbone for investments *viz.*, higher savings lead to higher investments and *vice versa* in accordance with the general perception about the macroeconomic balance in national accounts. An economy can have different forms of savings of which household financial savings generally constitute the largest share in aggregate domestic savings. Other forms of savings comprise physical savings by households, savings by the private corporate sector and the public sector and foreign savings as measured by the

magnitude of the current account balance. Generally, while the current account is considered as foreign savings in the national accounts identity, an attempt has been made in this paper to examine whether, apart from other forms of domestic savings, capital account of the BoP can be considered as an explanatory variable for capital formation in India. Though the capital account of the BoP is not separately represented in the national income identity, it may have a significant role in explaining capital formation.

The capital account balance of the BoP is a useful yardstick to measure the contribution of capital flows to domestic capital formation as it comprises flows such as external commercial borrowings, foreign direct investments and forms of external assistance that may generally be earmarked for specific capital expenditure purposes. On the other hand, while NRI deposits and portfolio flows may not directly contribute to capital formation, they may have indirect effect on domestic capital accumulation rate owing to improvement in market liquidity and sentiments, and by serving to equilibrate the receipt–expenditure imbalance in the current account. Another reason to use the capital account balance than the current account balance stems from the nature of transactions in these accounts. All capital account proceeds in foreign currency are converted in domestic currency, and the foreign exchange so received is partially or fully utilised to cover the deficit in the current account. Eventually, any remaining surplus shows up as addition to country's foreign exchange reserves. The domestic currency denominated proceeds received by resident corporate/other entities in *lieu* of sale of foreign exchange may be subsequently utilised for capital acquisition though, and figure partly as some portion of the current account expenditure, but would not fully capture the actual expenditure on capital formation as would be if the entire capital account was taken into account. Further, as a large part of current account expenditure is made on intermediate inputs and consumables such as crude oil and other commodities, the current account deficit may not serve as an adequate measure for actual capital formation which essentially comprises acquisition of tangible

goods such as machinery, equipment and new construction and change in stocks.

The scenario above would remain much the same even if the current account were in surplus, say, owing to large inflows of remittances. In this case all foreign exchange receipts received by residents (households and corporates) would either show up as household financial savings or as other corporate deposits. The household deposits would be measured as a part of household financial savings while corporate deposits would, in any case, be outside the standard enumeration of aggregate domestic savings.

Considering the above characterisation, this paper presents an empirical examination of the savings and investment behavior in the Indian economy over the period from 1950-51 to 2005-06, in particular, attempting to elicit economic aggregates that might be important for the purpose of capital formation in India. The empirical analysis is based on long time series data on the various components of gross savings and capital formation, accessed from the National Accounts Statistics (NAS), and the balance of payment statistics issued by the Reserve Bank. The paper is schematised in three sections. Section I describes the data. Section II includes explanation of empirical methodology and results and Section III offers some concluding observations.

Section I
Data Employed

Data on different components of savings *viz.*, financial and physical savings of the households, savings by the private corporate sector and the public sector, and foreign capital as reflected by the magnitude of capital account balance were considered along with gross domestic capital formation as the dependent variable. The capital account balance measures the inflow of foreign capital of various types including those that directly or indirectly contribute to capital formation in the economy. The data series on savings components chosen for the empirical analysis are in terms of current prices but converted into respective ratios to GDP at current market prices.
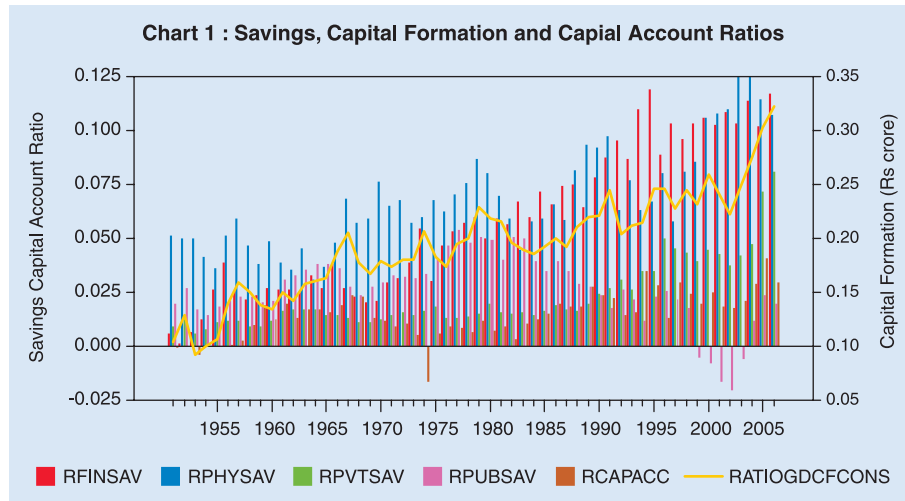
Chart 1 : Savings, Capital Formation and Capial Account Ratios

Chart 1 presents different components of savings alongside gross domestic capital formation as ratios to GDP at current market prices.

   where,

   (i)   *RFINSAV* = ratio of household financial savings to GDP at current market prices

   (ii) *RPHYSAV* = ratio of household physical savings to GDP at current market prices.

   (iii) *RPVTSAV* = ratio of private corporate savings to GDP at current market prices.

   (iv) *PUBSAV* = ratio of public sector savings to GDP at current market prices.

   (v)   *RCAPACC* = ratio of capital account balance of BoP to GDP at current market prices.

   (vi) *RATIOGDCFCONS* = ratio of nominal gross domestic capital formation to GDP at current market prices

   The Chart 1 suggests considerable differences in the data generating processes with frequent peaks and troughs requiring appropriate empirical investigation.

Section II
Empirical Methodology and Results

The empirical methodology is based on multivariate cointegration analysis proposed by Johansen (1988) which permits the estimation of the long-run steady state relationship among the system variables and offers a means to conduct robust test of Granger causality. As the methodology is now commonly known in academic domain - for the sake of brevity, the technical description of method is not provided. Readers may like to refer Johansen (*op.cit*).

Table 1 reports the results of the tests of unit roots conducted for different data series included in the model.

According to Table 1, all variables qualify for inclusion in the cointegrating space as each one of them is integrated of order one *viz.*, I(1).

As required by the Johansen (*op.cit*) procedure the estimates reported in Table 2 are based on all system variables which are non-stationary or I(1) and can exhibit a long-term steady state relationship.

Table 1 : Augmented Dickey Fuller Tests of Unit Root

Variable(Ratios)	Without trend	With trend
1	2	3
Household financial savings to nominal GDP at market prices.	-0.57	-2.40
Household physical savings to nominal GDP at market prices.	-1.20	-3.18
Private corporate sector savings to nominal GDP at market prices.	1.36	-0.05
Public sector savings to nominal GDP at market prices.	-1.88	-2.28
Capital account balance to nominal GDP at market prices.	-1.70	-2.33
Gross domestic capital formation at current prices to nominal GDP at market prices.	0.15	-3.64

Note : All variables are integrated of order one at the customary 5 percent significance level compared to the tabulated critical values. .

**Table 2 : The Long Term Equilibrium- Savings
and Capital Formation (1950-51-2005-06)**

(Normalized Eigenvector)

Explanatory Variable	Long Run Steady State Coefficients
1	2
Financial savings rate of households	0.252
Physical savings rate of households	0.952
Private corporate savings rate	1.924
Public savings rate	1.614
Capital account to GDP ratio	1.761
Constant	0.017

Note : * The coefficients are based on the normalization of the second co-integrating eigenvector corresponding to significant Trace statistic at 127.25 compared to the 5 percent critical value at 103.67. A similar relationship using current account rather than capital account balance is not found cointegrated

These estimates are based on the second cointegrating vector chosen against the significance of the Trace statistic with reference to the tabulated critical value at 5 per cent.

Results in Table 2 provide estimates of long-run steady state relationship between various components of savings, capital account balance and the gross domestic capital formation as ratios of GDP at current market prices. It may be noted that specification chosen here may not be mistaken as an estimation of national accounts identity in the way that the estimates are arrived using the Johansen's vector error correction model (VECM) and also owing to the choice of capital account balance which is not represented in the national income identity. According to Table 2, while a single per cent increase in the household financial savings rate increases the capital formation rate in the long term by just 0.25 per cent, a similar increase in household physical savings rate increases capital accumulation rate by 0.952 per cent. On the other hand a single per cent increase each in the private and public sector savings rate increases the long term capital acquisition rate by 1.924 per cent and 1.614 per cent, respectively. The impact on capital formation on account of capital account balance is also relatively large at 1.761 per cent which is almost as good as the impact made by the private or public sector

savings rate. Of the results reported in Table 2, it is surprising to note that the long-term impact of the financial savings rate of households is much lower than that generally expected despite its larger share in aggregate savings rate, perhaps, owing to the subventions that continue to hinder the accessibility of the private corporate sector to banking resources. The high elasticity of capital formation to private and public savings rate savings indicate the important role played by these components – and emphasizes the need to maintain the tempo of corporate efficiency and fiscal consolidation as suggested in Mohan (2008) as a way forward to ensuring the continuation of the growth momentum of the Indian economy.

Of the above empirical estimates, it is particularly noteworthy that among the various domestic savings components, the highest impact on long term capital formation is made by the private corporate savings. The evidence seems to be gaining ground as pointed out by Acharya (2008) noting that, in the recent five years, the significant acceleration in the investment rate from 24 per cent to 36 per cent occurred simultaneously with higher incremental savings made by the private sector. In addition, a recent International Monetary Fund (IMF) paper (Oura, 2008) also underscores the importance of internally accrued savings for corporate growth in India in suggesting that there could likely be a negative correlation between external financial dependence and corporate growth. In other words, corporates with lower financial dependence (or higher internal savings) have greater potential to grow compared to those more dependent on borrowed/external financial resources.

The model performance in terms of the long term co-integrating relationship between capital formation and various savings components and capital account balance as ratios of GDP at current market prices can be gauged from the plot of actual *versus* the estimated gross capital formation in Chart 2.

While the results in Table 2 are mostly intuitive from the standpoint of macroeconomic understanding, it may be worthwhile to dwell a little more on some standard tests of causality to ascertain the roles of various

Chart 2 : Actual and Model Estimated Ratio of Capital Formation to GDP
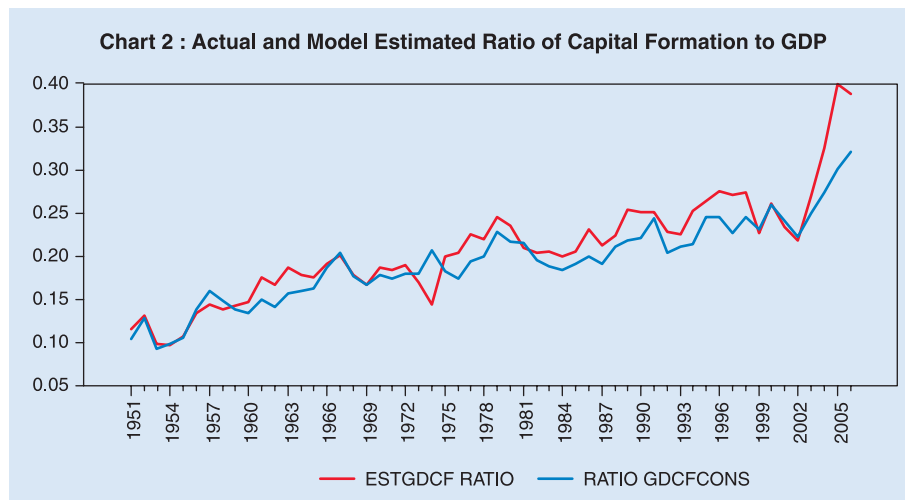
savings components in causing capital formation. Towards this purpose, a robust test of weak exogeneity within the framework of multivariate co-integration analysis was conducted. Table 3 reports the results.

The results reported in Table 3 are revealing from the point of view of the significant causation effect that capital account flows have on aggregate capital formation even as other variables do not have any short-run influence on the parameters of the cointegrating

**Table 3 : Testing of Causality (Weak Exogeneity)
(1950-51-2005-06)**

Gross Domestic Capital Formation Caused by	Chi-Square statistic
1	2
Financial Savings rate of Households	**2.718** *(0.099)*
Physical Savings rate of Households	**0.010** *(0.920)*
Private Corporate Savings rate	**1.184** *(0.178)*
Public Savings rate	**0.274** *(0.601)*
Capital account to GDP ratio	**12.490 **** *(0.000)*

Note : ** Test of weak exogeneity (causality) as reflected by the Chi-square statistic pertaining to the test against the null hypothesis no exogeneity..

space. Thus, in the short-term, any disturbance in long term capital formation process is likely to be corrected by flows through the capital account with the potential to steer the system back to its steady state trajectory. The restoration of the original equilibrium occurs over time as the desired external capital is acquired by domestic agents by means of capital account transactions to maintain their preferred long-term time path of capital formation. The implication of this finding is that calibrated liberalisation of external capital intake would ease and foster the process of capital formation and growth whereas discretionary controls may tend to retard the economy's objective to achieving desired level of capital formation. It may be, hence, not be too far fetched to assume that progressive relaxation of capital controls in the post-reform years have been quite helpful in sustaining the tempo of investment and growth.

Section III
Conclusions

The role of savings in capital formation in India brings forth the finding that whilst the long-run steady state relationship between capital formation and various components of savings and the capital account balance has remained stable, the role of capital account in maintaining the momentum of capital acquisition by restoring the balance between savings and capital investment has been notably significant. In fact, the capital account has played an important role as an equilibrating mechanism by addressing short-term disturbances in the steady state equilibrium thereby avoiding sudden disruptions in the process of capital formation cycles. By this token, it may not be incorrect to state that capital flows have the potential to influence growth positively both in the short and the long-term by helping to maintain the aggregate balance between savings and investment and providing support for long term capital formation. Needless, to mention in terms of the long-term impact, both public and private savings are also crucial for sustaining capital formation as they have highly positive long term impact on capital formation. As should be the case, the impact of household physical saving runs *pari-passu* with capital formation.

An appropriate mix of fiscal and monetary policies besides improved fiscal performance and consolidation under the FRBM Act, 2003 and calibrated liberalisation of the capital account would go a long way in sustaining the pace of capital formation as observed in the recent years. As for the private sector, while the profitability (savings) of Indian industry particularly since 2004-05 has been substantially supported by a significant softening of the interest burden due to sustained reduction in inflation and domestic and foreign interest rates, further improvements in the return on assets (hence savings) could be achieved by improving operational/ managerial and financial efficiency. Finally, mention may be made of the relatively small impact of household financial savings on capital formation (which though has a significant share in the aggregate domestic savings) on account of the subventions on banking resources that continue to hinder the accessibility of the private sector to such resources.

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Waiting To Connect: Indian IT Revolution Bypasses The Domestic Industry-Shubhashis Gangopadhyay, Manisha G. Singh and Nirvikar Singh 2008 - Published by India Development Foundation, Gurgaon, pages 158, price Rs. 395

"Waiting To Connect" offers a very timely analysis since it is the age of connectivity and worldwide the focus is on Information Technology (IT). The book presents a rigorous exposition of impact of IT on the Indian manufacturing industry. The examination is corroborated with descriptive analysis of the ASI data; use of single and simultaneous equation models; and a survey of six cities to cover numerous facets of IT adoption in India. It is widely accepted now that the use of IT products and services has raised productivity in the manufacturing industry worldwide. Indian industry's experience in this respect has been no different. However, there has been no empirical investigation of the fact and this book by the IDF attempts to do just that using factory level data over six year period from the Annual Survey of Industries (1998-99 to 2003-04), Central Statistical Organisation to validate a correlation between the adoption of IT and its positive outcomes.

The book, with foreword by Ratan N Tata, comprises seven chapters starting with introducing the subject, moving on to IT use in the world economy, covering IT use in the Indian manufacturing based on the ASI data, presenting explanatory models, further spelling out the survey results of the six cities, listing out imperative policy implications and offering certain conclusions.

The book provides interesting insights into the state of affairs in the use of IT domestically and reiterates that IT is not a way of doing business, as yet, in India. The IT penetration in India is low, and most of India's IT and ITES[1] prowess is primarily meant for the foreign market. The Indian IT sector comprises IT software, ITES, and IT hardware, the composition of software to hardware being

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[1] Information Technology Enabled Services.

70:30. The hardware growth is sagging primarily on account of poor infrastructure, high cost of finance, unfavourable tariff structure and large scale imports. India has, however, established itself as a preferred outsourcing destination especially in business / knowledge process outsourcing based services, HR services, customer care, and finance & accounting services on the back of low cost operations; quality products and services; aligning with the international standards; skilled manpower; and location and demographic advantages. Bangalore has emerged as the IT capital of India. Major global giants such as IBM, Intel, Microsoft, Oracle and SAP, *etc.* took to India as strategic market and a number of domestic companies such as TCS, Infosys, Wipro, and HCL technologies, *etc.* have grown to be globally competitive. Resultantly, India has moved up the value added chain towards high end development work, from code writing and software testing activities to systems integration, project management, high-end consultancy, and packaged software exports including critical applications, development and support, product design, HR management, and KPO for large and complex projects. *Hitherto* unexplored vertical segments that the Indian companies are now focusing on include financial services, telecom, manufacturing, healthcare, utilities, retailing, travel, transportation & logistics and governance.

Government support to IT industry has come forth in two forms *viz.*, a national IT policy formulated in 1998 and corresponding state government policies with emphasis on e-governance and tax holidays. Further, exemption of export earnings of IT industry from income tax has proved to be a powerful incentive for IT exports. The efforts are also on for spreading e-governance and its benefits to rural areas in a big way. However, considering the vastness of the country, the IT penetration has remained limited.

The book proposes that literature on linkages of spread of IT to productivity growth reveal the following : one no dramatic productivity improvements take place with the introduction of ICT[2]; two positive

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[2] 'C' refers to communication, which has become increasingly digitized, and is counted with IT in many statistical and conceptual exercises.

effects of ICT on productivity can hardly be overemphasised over a period of time and progress in quality and cost efficiency are two most important outcomes; three numerous downstream sectors too benefit from IT application; four work environment gets better leading to employee empowerment and finally, ICT acts as a complementary input and a substitute to other forms of inputs; it frees up resources for alternative use which is termed as capital deepening effect of computers. In a nutshell, the whole process of IT adoption manifests itself as a virtuous cycle with one component feeding into the other and *vice-versa*.

IT affects growth directly and makes the existing capital and labour more productive by raising the total factor productivity (TFP) and facilitating more efficient and effective use of inputs. Typically, studies confirm that in the developed economies IT contributes to productivity growth and overall economic growth. The evidence for developing countries is, however, mixed. In general, the impediments in the way of IT adoption in developing countries include high initial investment and operational costs; low levels of human capital; and the fact that the threshold level associated with positive network effects is yet to be reached in such economies. Researchers stress the criticality of skilled manpower in augmenting rates of return from ICT investment. Education in general and ability to read and speak English, in particular, play a crucial role in ICT adoption and application, and the book suggests that it is this demographic dividend which gives India an edge over other developing countries.

The book suggests that studies in IT application at the unit levels substantiate that performance gap between the firms with IT use and those that did not use IT increased over time. Further, the productivity effects of ICT taper off over time. In general, ICT use is more wide spread in the services sector than in manufacturing; and financial services are amongst the most ICT-intensive. The evidence also suggests that positive impacts occur only when ICT investment is complemented by skill and human capital augmentation, organisational changes, experimentation, and innovations by the ICT-users.

The book goes on to examine the extent of ICT penetration in the Indian manufacturing units, categorising these as small or large (employing < 100 workers or >/= 100 workers) in 15 states (selected as these did not change geographically or administratively over the review period) using the ASI data. The descriptive analysis based on ASI data throws up the following conclusions: first, while smaller units exhibited increasing adoption of ICT, the degree of penetration in such units remained lower than in larger units. Another significant observation is that small units have to spend proportionately more than the large units to gain any technological advantage by investing in computers for the reason of indivisibilities in IT investment. Incidentally, 85 per cent of all units happen to be small with 48 per cent using IT in 2003-04. Further, whereas 55 per cent of large units used IT in 2003-04, overall this percentage turned out to be 49 per cent for all manufacturing units. Third, among the five sectors analysed in this section, auto components sector emerged as the most computerised. Fourth, at the aggregate level, use of IT and profitability are positively correlated, with large units using IT showing much higher CAGR[3] as compared with large units not using IT. The same also was true for small units. Fifth, productivity per worker of non-IT using companies has gone down. Sixth, IT using companies hired more workers (proxy for unskilled) as well as employees (proxy for skilled) during the review period. The ratio of skilled to unskilled labour, however, remained high for IT using units. And finally, industries with a higher proportion of seasonally operating units have a lower proportion of units using IT.

The econometric analysis employs single equation models to assess individual relationships, using logarithmic form of variables. With inter-connected and/or simultaneous decision choices by producers, the issue is that the OLS estimates for each equation are biased. Simultaneous equation models, therefore, offer a more appropriate analysis of simultaneous decisions of the producers regarding the mix of quasi-fixed and/or variable inputs to test various

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[3]   Compound Annual Growth Rate.

relationships. The data are nominal and results confirm the beneficial impact of IT use for producers in terms of enhancing economic value over a span of six years (1998-99 to 2003-04) across all manufacturing registered units. Heckman estimation procedure is used to determine whether the choice of IT adoption by firms is a random or a systematic decision. It is found that the decision to invest in IT is non-random and based on several related economic factors which *inter alia* include assured supply of electricity (purchased or produced in captive plants) and positive significance of having computers, *i.e.*, prior IT capital enhances the probability of additional investment in any given year. Short-term loans have a negative impact on IT adoption, free reserves being lower for units availing such loans. On the contrary, IT using firms show high return in terms of gross value added, operating profits, and sourcing funds from own resources (internal) as well as loans.

One fascinating revelation in the book is positive outcome of IT use on hiring workers (proxy for unskilled personnel) as well as employees (proxy for skilled personnel), the impact being higher for employees. Overall, IT use is beneficial for workers and employees in terms of much higher employment demand, better wages/ salaries and reduced work 'hours', thereby implying enhanced job-quality.

The question of why or how units use IT is addressed in the book, demonstrated through a survey of six cities namely, Bangalore, Chennai, Delhi, Kolkata, Lucknow and Mumbai. An appraisal of 870 companies across these cities revealed that more than half the firms confirmed the positive association between IT use and performance of the company. The industry norms and use of IT by suppliers were quoted as two primary factors driving IT adoption, and thus substantiating 'networking benefits' detailed in the econometric analysis results in the relevant chapter. Major impediments to IT use were identified as opposition from strong labour unions; irregular power supply; and lack of skilled labour, in that order. In the backdrop of the fact that IT is not a way of doing business in India, the book cites Delhi as an exception, which has taken to IT with considerable degree of seriousness. Further, IT can often act as a substitute for

lack of other resources and offers direct connectivity to markets. It is interesting to find in this context that a non-metropolitan city like Lucknow has taken to IT with remarkable intensity. The low level of IT use/ penetration is, however, borne out by the fact that in Indian industry management, clerical and marketing employees have greater access to computers and internet than the skilled workers.

In a nutshell, the book observes that the use of IT increases productivity and profits of the manufacturing firms. IT application encourages productive employment of both skilled and unskilled labour, and this is in sharp contrast to findings elsewhere that use of IT increases demand for skilled labour at the expense of unskilled. Now since IT use also enhances absorption of unskilled workers, it makes growth inclusive. The outcome has policy implications for a country like India where employment generation for a bourgeoning labour force is a daunting task.

The book concludes by outlining certain policy implications. It emphasises that for deriving positive networking benefits of IT, a minimum threshold level of penetration has to be achieved, and this can happen with the Government playing a catalytic role. Further, gains from IT use can be multiplied several-folds if everyone uses it since it recasts the operations, reduces transaction costs, offers networking advantages, enhances transparency and job quality, thus facilitating improvements in the investment climate. The main bottlenecks to the use of the IT are opposition from labour unions; lack of uninterrupted and adequate power supply; and shortage of skilled workers, in that order. In this context, developing a legal framework to promote electronic business; introducing greater flexibility in labour laws; support for wider broad-band access; local language software and content; overcoming infrastructure bottlenecks; educating labour unions about the employment effects of IT and leveraging network effects are some of the policy propositions which could strengthen IT use in the Indian industry. Further, proactive use of IT by the Government departments could facilitate reduction in transaction costs of doing business, better record-keeping, improve operational transparency, reduce corruption,

tighten monitoring and increase revenues. Better infrastructure and improved education for skill empowerment, especially in rural areas is the key to move ahead and make industrial growth more inclusive.

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The Age of Turbulence: Adventures in a New World by Alan Greenspan, Allen Lane, Penguin Group, USA, 2007, pp. 531, Rs. 695

'The Age of Turbulence is the memoir of Alan Greenspan, the influential Chairman of Fed Reserve, who served one of the longest tenures (1987-2006). The book is aptly named as this period would be remembered in economic history for the many crises and changes witnessed by the world economy. Within weeks of assuming office, Greenspan had to face the crisis posed by 'black Monday' as the US stock markets witnessed a historical crash in October 1987. Falling of Berlin Wall and end of cold war followed soon thereafter. While Greenspan witnessed, and some claim, engineered- the boom of 1990s, he also faced the crisis created by 9/11 terrorist attack on US cities. Greenspan received praise for managing these crises skillfully. No doubt, any reader-especially student of economics-takes up the book with great interest to know the insider's account of these turbulent times.

The charisma of Greenspan as Chairman of Fed Reserve was great. He was famous for giving technical and confusing speeches, in true tradition of central bankers who believe that 'constructive ambiguity' gives more flexibility to monetary policymakers[1]. At the same time, however, Greenspan also managed to build credibility in the market for his willingness and ability to fight inflation, thus avoiding rude shocks and disturbances.

The present book appears to be divided in two parts: the first part is autobiographic in nature. The second part is largely devoted to

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[1] American media, however, went great lengths to try to decode the ambiguity. At the height of dot-com boom, the CNBC invented something called 'briefcase indicator'. Cameras would follow Greenspan on the mornings of FOMC meetings and the hypothesis was that if his briefcase was thin, his mind was untroubled and the economy was well. But if the briefcase was stuffed full, a rate hike loomed. Greenspan in his memoir has dismissed the hypothesis completely and has suggested that the size of the briefcase merely depended on whether he had packed his lunch or not.

issues close to Greenspan's heart including current accounts and debt; globalisation and regulation; education and income inequality; corporate governance and energy squeeze, apart from some nation /area specific writings on Latin America, China, Russia and Asia including India.

The autobiographical part includes some interesting details. Greenspan's father was a stock broker and dedicated a book titled 'Recovery Ahead' to young Alan with inscription:

To my son Alan,

May this initial effort with constant though of you branch out into an endless chain of similar efforts so that at your maturity you may look back and endevour to interpret the reasoning behind these logical forecasts and begin a like work of you own.

Your dad.

When Alan Greenspan showed this inscription to people after becoming Fed Chairman, they all concluded that his ability to give inscrutable testimony before congress must be inherited! Notwithstanding this, the present memoir is highly readable and understandable.

Greenspan (b. 1926) attended George Washington High School a few years behind Henry Kissinger. After High School, he was interested in pursuing a career in military like many of his friends but was rejected because of a spot on his lungs that was suspected to be tuberculosis. He then joined Henry Jerome's traveling band to play clarinet. In the band, he was never a soloist, never a star but a sideman, he has observed in the memoir. Even at the New York University, while his friends were absorbed by questions relating to new economic order, he was more interested in numbers and equations. He overcame this 'sideman psychology' and started focusing on 'macro view' rather than on 'technical challenges' only after his interaction with Ayn Rand. Ayn Rand-who nicknamed Greenspan 'The Undertaker' due to his serious manner- served as a stabilising force in Greenspan's life and pushed him to think beyond mathematics and helped him to turn into a libertarian.

Since early on, Greenspan inculcated the habit of reading economic indicators in order to predict everything from 1958 steel recession to the 1990s boom. He writes in his memoirs:

'*My early training was to immerse myself in extensive detail in the workings of some small part of the world and to infer from that detail the way that segment of the world behaves. That is the process I have applied throughout my career*'.

Greenspan has recorded in his memoirs that this habit of inference helped him greatly while serving as the Fed Chairman.

After having worked closely with all the presidents since 1969- except Jimmy Carter- Greenspan, a hard core Republican, is full of praise for Bill Clinton, despite ideological differences. This was mainly due to Clinton's '*consistent, disciplined focus on long term growth*'. Furthermore, about intertemporal fiscal choices he has observed, '*the hard truth was that Reagan had borrowed from Clinton (by running unsustainably high fiscal deficits which later Presidents needed to curb and pay back) and Clinton was having to pay it back…………but I was impressed that he did not seem to be trying to fudge reality to the extent politicians ordinarily do*'.

The memoir is full of Greenspan's frank observations and forthright comments on economic and political policies as well as personalities he interacted. For example, he has criticized his own Republican Party (which abandoned fiscal discipline) for the 2006 loss of majority in the congress. He has observed, '*They (Republican Party) swapped principle for power. They ended up with neither. They deserved to lose*'.

Further, about the war he writes, '*I am saddened that it is politically inconvenient to acknowledge what everyone knows: The Iraq war is largely about oil*'.

Greenspan's extraordinary ability to understand the economic trends is also evident in his writings. For example, during 1996, at the height of tech-boom, when most of FOMC members were '*leaning*

the other way towards an increase (of interest rates) so as to pre-empt inflation', Greenspan was reading something more from the signals: '*But what if this wasn't normal business cycle? What if the technology revolution had, temporarily at least, increased the economy's ability to expand? If that was the case, raising interest rates would be a mistake*'. Greenspan as ususal observed the figures: '*Most companies were reporting rising operating profit margins. Yet few had raised prices. That meant that their costs per unit of output were contained or even falling*'. In the next FOMC meeting he took a tough stance: 'Government had been underestimating productivity growth for years and rise of inflation was too weak to warrant a rate hike'. Persuaded by Greenspan's argument, the FOMC took a decision to 'wait and watch'. The continuing economic growth and controlled inflation for next four years provided enough evidence that Greenspan's insight about the workings of the economy and the resultant policy decision was more accurate than 'what econometric models may suggest'. In his own words, '*This was a classic example of why you can't just decide monetary policy based on an econometric model. As Joseph Schumpeter might have pointed out, models are subject to creative destruction too*'.

Greenspan has devoted a small part of the Chapter 'The Tigers and the Elephant' to India. He has managed to gauge the strengths as well as weaknesses of Indian economy at current juncture rather accurately though the remedies he suggests are debatable. About the image of India in the US as a major provider of outsourcing he observes that '(Americans) *who exaggeratedly viewed India as cutting a wide swath through skilled US white collar jobs. But India's competitive incursion has been modest to small, especially in proportion to its workforce of nearly 450 million*'. After giving the estimates of jobs created in India –directly or indirectly- due to technology industry, he observes, '*………….that's barely 1 per cent of total employment in India and that's the problem*'. Observing the problem of rural poverty in India, his advice is '*For India to become the major player in the international arena, that it aspires to be, it will need to build factories that entice a very large part of its*

agricultural workers to urban enclaves to produce labour intensive exports, the time honored path of the successful Asian tigers and China'. He observes some of the bottlenecks for manufacturing in India: '*Job destroying labour laws, a decrepit infrastructure that can not provide reliable electric power and roads and rails that inhibit movement of manufactured parts and finished products between plants and markets*'. He further observes that '*market competition in agriculture is badly needed* (in India).'

One common theme that is present throughout the book is Greenspan's strong confidence in the power of competitive markets. In his own words, '*If the story of the past quarter of a century has a one-line plot summary, it is the rediscovery of the power of market capitalism*'. This belief has two facets: one is the efficiency of the free markets in which he believes that in case of disturbances like high oil prices *etc.* the markets have the inherent ability to correct themselves. The other facet of his belief is policymakers' inability to 'control' and 'correct' the markets with a view to achieving the results that are deemed desirable. This theme is elaborated time and again in the memoirs.

However, despite Greenspan's belief in the robustness of the markets, the various actions the Fed initiated to control and correct markets — 'black Monday', 9/11 terrorist attack on US cities—appear contradictory. What is more, these incidents where the Fed intervened are not isolated 'special' events but in fact part of an entire chain of such actions, each following the other in quick succession. This is clearly in contradiction with Greenspan's stated confidence in the power of market forces.

Another major contradiction is that time and again, Greenspan has expressed his rejection of Keynesian economics, but this did not stop him from advocating fiscal stimulus at times of crisis.

One of the interesting features of the book-especially against the present international backdrop of sub-prime crisis- is Greenspan's views on the 'soft interest rate' regime that preceded the boom in

housing market in the US. In fact one of the criticisms on Greenspan has been that he maintained the interest rates at very low levels for a long period of time, thereby indirectly helping the housing boom. Greenspan has written,

'*I was aware that the loosening of mortgage credit terms for sub prime borrowers increased financial risk and that subsidized home ownership initiatives distort market outcomes. But I believed then, as now, that the benefits of broadened home ownership are worth the risk*'. This 'belief' is, no doubt, highly debatable.

In the end, against the background of present international economic crisis and slowdown, one only hopes that Greenspan's 'belief' is not ill placed when he writes ' *we are living in a new world-the world of a global capitalist economy that is vastly more flexible, resilient, open, self correcting and fast changing than it was even a quarter century earlier*'. May the resilience and self correcting mechanism work this time round as well!!

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