VII Resource Allocation And The Financial System

7.1 Developments in recent years, worldwide as well as in India, have brought about a fundamental revision in the approach to the role of the financial system in the development process. The near-exclusive emphasis on capital accumulation driven growth has given way to a recognition of financial efficiency gains as an 'endogenous' source of growth. The shift in the development paradigm has propelled several developing countries to undertake programmes of financial liberalisation either by unilateral efforts, or as part of structural adjustment strategies, to free their financial systems from erstwhile repression regimes. In many of these countries, this transformation has been accompanied by a dismantling of the predominant role of the state, as embodied in central planning mechanisms, and its progressive replacement by market-oriented strategies of development. An efficient financial system is now regarded as a necessary precondition for growth. In the 1980s and 1990s, the emphasis in the approach to the financial system in the growth process has shifted from channelisation of resources by directed credit to their allocation among competing uses, largely determined by market forces. In the wake of the financial crises of the 1990s, the role of the financial system in growth has been subjected to critical reassessment and considerations of financial stability have come to occupy equal place, if not higher, with allocative efficiency.[1]

7.2 In India, up to the 1980s, the dominant fear of market failure provided the rationale for state intervention in the financial system's allocative role. The first eight Five-Year Plans, by and large, ignored the role of the financial system in the development process (Patra and Roy, 2000). It was realised that the Indian financial system, though extensive, had only a limited role to play in terms of allocative efficiency under a regime which prevented proper pricing (Joshi and Little, 1996). In the Ninth Five-Year Plan it was recognised that the transformation of desired saving into investment needs to be largely determined by the process of financial intermediation (GoI, 1997). The allocative role of the financial system has been highlighted in terms of the transformations performed by it - liability-asset transformation, size-transformation, maturity transformation and risk transformation - with the gains to the real sector depending on how efficiently the financial sector performs the basic function of financial intermediation (Rangarajan, 1998). Stylised evidence suggests that financial sector reforms have brought about some efficiency in the financial system (Reddy, 1998). With the diffusion and further intensification of reforms, a vision of an efficient financial system has emerged: a well-developed financial structure with multiple intermediaries operating in various segments of the financial markets with different risk profiles (Jalan, 2000 and Jalan, 2001). Urgency has come to be attached to a faster transformation of the financial sector so that it can assume its function of resource allocation on a wider and more penetrative scale than currently seen in the context of a predominantly bank-based system.

7.3 Accordingly, it is recognised that a widening and deepening of the financial market, including equity and debt, with adequate oversight is central to the process of a sustained growth

in saving and investment in the country over the longer run (GoI, 2001). On the other hand, there is no evidence to suggest that stock markets have either led to increase in the overall scale of saving and investment in the economy or have raised the productivity of investment by mere allocation of resources (Nagaraj, 1996; Singh, 1997; Singh, 1998; Nagaishi, 1999). No evidence is obtained of an improvement in the allocative efficiency of the Indian capital market during the post-liberalisation period (Guha Khasnobis and Bhaduri, 2000).

7.4 Against the backdrop of the evolution of views on the financial sector's role in the recent growth experience, this Chapter reviews the performance of the financial system in India in the context of its allocational role. In doing so, it hopes to contribute to an informed assessment of a critical aspect of the on-going financial sector reforms. The following section undertakes a survey of the literature on the relationship between finance and growth with particular emphasis on allocative efficiency. This is complemented by an analytical examination in Section II of the formative evidence on indicators of financial development and performance relating to the principal segments of the Indian financial system perceived to be invested with the allocational role, *viz.*, banks and other financial institutions, and the capital market. Section III analyses the results of several empirical tests undertaken to gauge the allocative efficiency of the Indian financial system. The final section offers pointers for the directions of future development of the financial sector in the conduct of its resource allocation function.

I. FINANCE AND EFFICIENCY

7.5 The critical test of an economic system lies in the efficiency of its allocation of resources, *i.e.*, if all resources are put to their best use so that there are no other allocations that could improve general welfare. The concept of allocative efficiency has remained an empirical constraint in the mainstream literature. In the absence of definitive measurement criteria and the existence of even conceptual ambiguities, it is worthwhile to sift through the relevant literature for specific testable hypotheses that can be assessed in Indian conditions.

7.6 In abstraction, resource allocation from financial savers to investors could be equally efficient as between the Walrasian auctioneer and the central planner; real world structural rigidities and information asymmetries, however, generate both market and state failures (Bardhan, 1990). It has also been pointed out that efficient financial markets foster efficient resource allocation by enabling investors to distinguish between investments and facilitate lenders and intermediaries in screening projects (Diamond, 1984; Boyd and Prescott, 1986). Agency theorists argue that pressures from investors encourage the management to pursue value-maximising investment patterns (Jensen, 1986).

7.7 The initial advances in development economics recognised the importance of capital accumulation but the special role of finance was ignored for the most part. The development of financial institutions was viewed from the angle of resource mobilisation and mere channeling of resources from savers to investors. In most developing countries, following planned development strategies, financial systems were largely geared to raising resources for the government at repressed rates.

7.8 By the 1970s, it was recognised that financial development has a two-pronged effect:

through enhancing the efficiency of investment (Goldsmith, 1969) and by increasing saving and hence, the scale of investment (McKinnon, 1973; Shaw, 1973). Essentially embedded in the tradition of development economics, the McKinnon-Shaw hypothesis posited that policies of administered low interest rates with a view to containing the burden of public debt led to financial repression. Controls that result in artificially low or negative real interest rates, for instance, reduced the incentive to save, which in turn, resulted in lower investment and growth. Liberalisation of these repressed credit markets could foster development since raising interest rates to their 'equilibrium' levels would lead not only to higher savings but also to a more efficient use of investible resources.

7.9 In recent years, theories of endogenous growth have underscored the criticality of efficient financial systems in economic development. The consensus now is that there is a positive two-way causal relationship between economic growth and financial development (Greenwood and Jovanovic, 1990). The process of growth fosters participation in financial markets thereby facilitating financial development, which in turn, enables selection of efficient investment projects and hence, stimulates investment and growth. Financial intermediation enhances economic growth by channeling savings into productive areas of investment, while allowing individuals to reduce the risks associated with their liquidity needs (Bencivenga and Smith, 1991; King and Levine, 1993).

7.10 The role of finance in growth has been validated by recent empirical work (Gelb, 1989; Greene and Villanueva, 1991; Gertler and Rose, 1991; De Gregario and Guidotti, 1995; Levine and Zervos, 1998). Most of these studies are based on cross-country regressions, which find that a measure of financial development, such as credit or market capitalisation, has a positive and significant effect on growth. There is evidence that financially developed economies seem to allocate their resources more efficiently (Carlin and Meyer, 1998; Beck *et al*, 2000). Developed domestic financial markets, proxied by the size of the domestic stock and credit markets relative to GDP, are found to be associated with a better allocation of capital (Wurgler, 2000). Measures of allocative efficiency of stock markets (such as stock price synchronicity) are associated as much with market size, volatility, country size, diversification of economies and the co-movement of firm-level fundamentals, as with measures of institutional development (Morck *et al*, 2000).

7.11 The debate over financial systems in recent years has also been deeply influenced by recent financial crises in the Latin American and SouthEast Asian countries. Increasingly, integrated financial markets transmit disturbances not only to markets within the economy but also internationally. Failures in one segment of the market often emit so-called "negative" externalities, which may affect all segments of the economy, including the non-financial markets. Recent studies across emerging market economies show that corporate governance variables significantly explain economic performance (Johnson *et al*, 2000). Measures of market discipline, such as minority shareholder rights, play a significant role explaining the efficiency of resource allocation (Wurgler, 2000). These findings are in line with international initiatives in crisis prevention and in establishing international financial standards and codes that provide a benchmark for measuring the performance of the financial system, essentially in terms of health and resilience.

7.12 The swiftly changing face of financial systems worldwide and the fundamental shifts in structure that have occurred since the 1970s suggest that the allocative efficiency of the financial system is a dynamic concept, diffused and embedded in overall performance -macroeconomic and financial - and this attribute must be specifically taken into account in empirical analyses of the role of financial intermediation in growth.

II. FACETS OF THE INDIAN EXPERIENCE

7.13 Financial intermediaries (banks, development financial institutions (DFIs), *etc.*) and capital markets are two generic mechanisms for mobilising and allocating resources. There is some controversy as to which mechanism allocates resources more efficiently. It is argued that market-based financial systems provide a constant valuation of the various instruments through price mechanisms, which improves the process of allocating financial resources between alternative projects competing for the same financing. On the other hand, as some critics point out, the capital market-based system may lead to a lower level of investment, particularly in assets where the returns accrue in the longer-term such as technology or intangibles, as shareholders place more emphasis on short-term performance. The argument in favour of financial intermediaries emanates from economies of scale in collecting information and containing the disadvantages of asymmetric information in less developed market conditions and in enabling diversification of savers' risks. In the Indian context, it is argued that at a fundamental level, the banking system and the stock market compete in two dimensions, *viz.*, (a) maximising the quality of their information processes and (b) minimising the transaction costs imposed upon households (Shah and Thomas, 1997).

7.14 India has, historically, followed a financial intermediation-based system where banks, DFIs and other intermediaries have played a dominant role. The share of banks in total financial assets of banks and non-bank financial intermediaries has declined over the last three decades (Janak Raj, 1999). Various indicators suggest that banks and other intermediaries continue to dominate the Indian financial system (Table 7.1).

Table 7.1: Financial Intermediaries and the Capital Market

			(as per cent of GDP at current market prices)	
As at end-March	Financial Assets of Scheduled Commercial Banks	Financial Assets of Financial Institutions	Market Capitalisation	Market Capitalisation as % of Scheduled Commercial Banks' Financial Assets
1	2	3	4	5
1981	31.0	11.6	3.8	12.2
1991	39.2	21.6	16.0	40.8
1996	41.2	23.5	47.5	115.3
2000	43.5	25.6	46.7	107.3

Data are provisional.

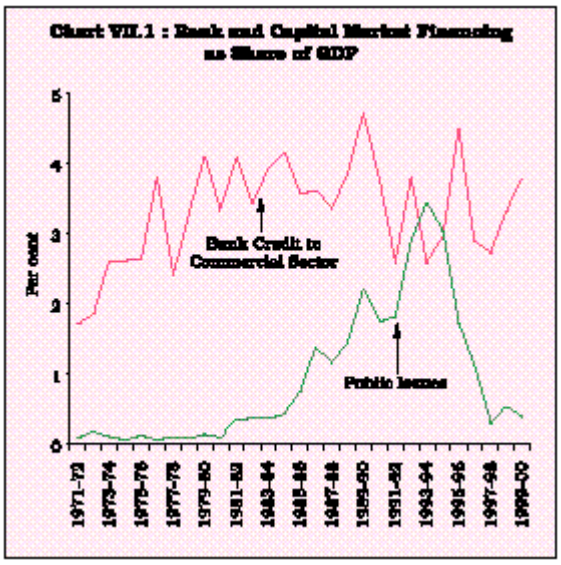
Table 7.2: Sources of Resource Mobilisation

(Per cent of GDP)

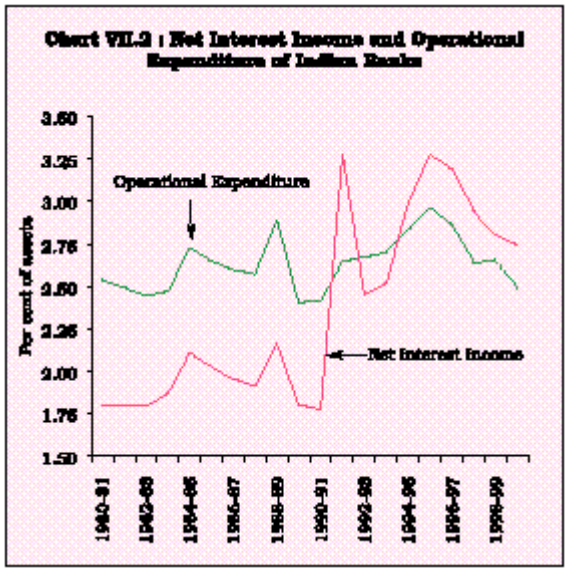
Variable	Period		
	1971 to 2000	1971 to 1992	1992 to 2000
1	2	3	4
A.Credit by Banks	3.3	3.3	3.2
B.Credit by DFIs	0.7	0.6	1.1
C.Credit extended by Banks and DFIs (A+B)	4.0	3.9	4.3
D.Resource mobilisation from Capital Market* (Debt and Equity)	0.9	0.6	1.7

* Excluding private placements. Data are provisional.

7.15 The financing of the commercial sector also essentially continues to be bank-based, with the commercial credit off-take accounting for an average of 3.3 per cent of GDP during 1971-2000 (Table 7.2 and Chart VII.1). Besides conventional credit in recent years, banks have been increasingly investing in non-SLR instruments issued by the commercial sector, following the relaxation of portfolio restrictions.



7.16 During the 1980s, the cost of intermediation, *i.e.*, the operating expenditure as a proportion of total assets, in the Indian banking system generally hovered between 2.5 per cent and 2.8 per cent (Chart VII.2). The spread or net interest income as a proportion of assets varied between 1.8 per cent and 2.3 per cent. Both operating expenditure and net interest income followed an inverted U curve in the 1990s, peaking at 2.9 per cent and 3.3 per cent, respectively, during 1995-96. While the cost of intermediation during 1999-2000 worked out to 2.5 per cent, net interest income amounted to 2.7 per cent.



7.17 Development financial institutions (DFIs) were set up to meet the medium- and long-term requirements of industry, trade and agriculture. Advances from DFIs amounted to an average of 0.6 per cent of GDP during the 1970s and 1980s and thereafter increased sharply to 1.1 per cent during the 1990s.

7.18 The resource mobilisation through equity markets has been limited even though India has a long history of capital markets. During the 1970s and 1980s, the resources mobilised by the capital market amounted to about 0.6 per cent of GDP, partly reflecting the restrictions on public issuances. The primary markets witnessed a sharp increase in issuances during the first half of the 1990s, following the liberalisation of norms governing issues. The primary issues market later turned subdued on account of depressed capital market conditions, largely mirroring the slowdown in real activity. However, in recent years resources are increasingly being mobilised through the private placement route.

7.19 The financial ratios showed a sharp increase during 1970-2000, reflecting a deepening of the Indian financial system as a whole (Table 7.3). The financial inter-relations ratio moved up steadily from the 1950s till the 1980s reflecting the increasing role of the financial system in the process of net domestic capital formation. The finance and intermediation ratios have steadily increased throughout the entire period partly reflecting financial liberalisation.

Table 7.3: Indicators of Financial Development - Summary Statistics

Period	Finance Ratio	Financial Inter relations Ratio	New Issue Ratio	Intermediation Ratio
1	2	3	4	5
1951-52	0.01	0.11	0.18	-0.39
1970s	0.22	1.60	0.91	0.76
1980s	0.37	2.41	1.42	0.71
1990s#	0.46	2.39	1.32	0.82

1990-91 to 1995-96

Note : 1. Finance ratio = ratio of total issues to national income.
2. Financial inter-relations ratio = ratio of total issues to net domestic capital formation.
3. New issue ratio = ratio of primary issues to net domestic capital formation.
4. Intermediation = ratio of secondary issues (*i.e.*, issues by banks and other financial institutions) to primary issues.

Source: Reserve Bank of India, (2000), *Flow of Funds Accounts of the Indian Economy: 1951-52 to 1995-96*.

7.20 In respect of the financing of a sample of non-government non-financial public limited companies, the share of capital market-related instruments in total sources of funds increased sharply during the first half of the 1990s but declined during 1995-2000 (Table 7.4). On the other hand, the share of banks and other intermediaries in the total financing by the corporate sector which had declined during 1990-95, recovered somewhat in the second half of the 1990s.

Table 7.4: Financing of Non-Government Non- Financial Public Limited Companies by Financial Intermediaries *vis-a-vis* Capital Market

(Percentage share in total share of funds)

Category		1985-86 to 1989-90	1990-91 to 1994-95	1995-96 to 1999-2000
1		2	3	4
i)	Capital Market (Debentures + Paid-up Capital)	18.2	26.0	19.0
ii)	Financial Intermediaries (banks and FIs)	22.2	18.5	20.2

Source: RBI Bulletin, various issues.

7.21 The Indian financial system was highly segmented on account of interest rate controls and balance sheet restrictions which inhibited proper pricing of resources and limited allocative efficiency. Directed credit programmes to the priority sectors at subsidised rates had to be covered by charging higher rates from other borrowers, paying lower rates to depositors and limiting profits of the financing institutions. The resource mobilisation in the primary market was subject to several controls, including pricing and timing, which prevented the process of price discovery. During the early 1990s, various reforms were initiated in the Indian financial system with a view to improving allocative and operational efficiency (Box VII.1).

III. MEASURING ALLOCATIVE EFFICIENCY OF THE FINANCIAL SYSTEM

7.22 Efficiency in the financial system can be interpreted differently in terms of i) information arbitrage efficiency, *i.e.*, whether all market information is reflected in the prices, ii) fundamental valuation efficiency, *i.e.*, if the company valuations are reflected in scrip prices, iii) full insurance efficiency, *i.e.*, whether economic agents can insure against all future contingencies either by surrendering some of their own resources now or by contracting to deliver them in future, and iv) functional efficiency, *i.e.*, if saving is allocated to the most socially productive

uses (Tobin, 1984). A financial system is expected to be efficient in all the four forms. It is also possible that one form of efficiency leads to improvement in one or more of other types of efficiencies. For instance, fundamental valuation efficiency and information arbitrage efficiency could both be expected to increase the functional efficiency.

7.23 A financial system could be said to be functionally efficient if it allocates resources to the most productive uses. Although the best indicator of the contribution to economic growth of a project financed by the financial system is its economic rate of return (ERR) which measures (quantifiable) net economic benefits, this is difficult to calculate. Most studies measure allocative efficiency for the system/ industry/sector as a whole, either indirectly by estimating the contribution of a financial variable to economic growth or directly by monitoring some proxy of allocative efficiency (Box VII.2).

Box VII.1
Allocative Efficiency of Resources of the Financial System in India - Recent Measures Initiated

Banking Sector

? Liberalisation of interest rates, with a view to enabling proper pricing of resources. Banks are free to determine deposit rates, barring savings deposit rates and rates on a few other categories. Banks/DFIs are also free to determine most of the lending rates depending on the creditworthiness of the borrower. Interest rates in money markets are now free while prices of Government securities have become market-related.
? Relaxation in balance sheet restrictions in the form of statutory pre-emptions, *viz.*, reduction in reserve requirements (to 5.5 per cent of NDTL of commercial banks) and the statutory liquidity ratio (SLR) (to the statutory minimum 25 per cent of NDTL) and permission to invest in non-SLR securities. Banks are now relatively free to optimise their portfolios across financial markets.
? Increased competition in the banking sector by allowing entry of new private sector banks. The Government has also announced its intention to reduce its holding to 33 per cent in the nationalised banks.
? Improvement in the mechanism of supervision through enhancement of on-site inspection, introduction of off-site supervision, enlargement of the role of statutory external auditors and laying down of enhanced standards for corporate governance for banks.
? Introduction of prudential norms relating to income recognition, asset classification, provisioning and capital adequacy for banks and all other intermediaries such as urban co-operative banks, DFIs, and non-banking financial companies (NBFCs) with a view to improving balance sheet quality.
? Strengthening priority sector allocations in line with social and economic goals through changes in coverage and form of lending. Indirect lending by banks whereby the unfulfilled portion of priority sector lending can be deposited with NABARD and SIDBI has also been allowed.

Capital Market

? Repeal of various restrictions on public issues. In 1992, the Capital Issues (Control) Act, 1947 was repealed and issuers of securities, subject to their fulfilment of certain conditions, have since been allowed to raise capital from the market without requiring any consent from any authority (except for vetting of the offer documents by SEBI) either for making the issue or for pricing it. Restrictions on rights and bonus issues have also been removed. New as well as established companies are now able to price their issues according to their assessment of market conditions.
? Rationalisation of the process of price discovery in the primary market. As it was not easy to determine the price at which the market would clear the issue under the fixed price mechanism, parallel mechanisms of book building (in which an offer price of an Initial Public Offering (IPO) is based on investor demand) were introduced in 1995.
? Enhancing transparency with a view to improving the information content of stock prices through stringent disclosure norms both at the time of issuing securities and continuing disclosures under the listing agreement. Companies issuing capital are required to make sufficient disclosure including justification of the issue price

and also material disclosure about the risk factors in their offering prospectus. All listed companies are now required to publish mandated unaudited financial results on a quarterly basis, half-yearly corporate results on limited audit review, a statement on the actual utilisation of funds, actual profitability, as against projected utilisation of funds and projected profitability on a quarterly basis. To prevent price manipulation, the SEBI issued Insider Trading Regulations prohibiting insider trading in 1992. For ensuring greater market transparency, negotiated and cross deals (where both the seller and the buyer operate through the same broker), which were allowed earlier, have also been banned.

? Improved trading and settlement practices, including uniform settlement cycles in all exchanges, gradual introduction of rolling settlement, and banning of deferral products in the cash segment to segregate forward and cash segments. Reduction in transactions costs by enabling the investor to assess overall supply and demand through screen-based trading.

? Promotion of international best practices, including rolling settlement. The need for adopting such practices has been strengthened both by the introduction of foreign institutional investors (FIIs) in the capital markets in September 1992 with a view to encouraging non-debt creating flows and by permitting Indian companies to raise funds from the international capital market by way of ADRs/GDRs.

? Introduction of a transparent and efficient take-over code.

7.24 Indirect measures such as the growth impact of the size of the credit markets, liquidity and arbitrage efficiency (of stock markets) and asset quality (of banks and other intermediaries) are very general measures of allocative efficiency. These measures, in the context of an evolving financial system, as in India, where the norms/practices are continuously changing, are themselves dynamic. So far as direct measures are concerned, use of synchronicity tests provides an indication of the extent to which economy-wide or firm-specific factors are taken into account when resources are to be allocated. Accordingly, these tests need to be supplemented by other methods.

Box VII.2
Measures of Allocative Efficiency of Financial Systems

Measures of allocative efficiency of the financial system usually attempt to estimate either trends in a certain proxy of market efficiency (such as interest rates or synchronisation measures) or the contributions to growth by some macroeconomic variable such as bank credit that is used as a proxy for the size of the financial market.

Direct measures

Some studies use the interest rate structure as a measure of allocative efficiency (Price Waterhouse, 1988 and Catinat, Eonnai and Italianer, 1988). As efficient allocation of funds from ultimate savers to ultimate borrowers results in distribution and/or hedging of risk at the least cost, the lower is the difference between a benchmark (representing the most efficient path) and the observed interest rates, the more efficient is the system.

Some studies use cost of intermediation and net interest margin as measures of bank efficiency (Demirguc-Kunt and Levine, 1999). The cost of intermediation refers to the operational expenditure incurred by banks in the process of mobilising savings from the ultimate savers and extending loans and advances to the final borrower. It has been argued that high levels of operational costs (as a proportion of assets) reflect waste of investible resources. While many factors influence interest margins, a tighter interest margin is generally attributed to a competitive and efficient banking system.

Some other recent studies have attempted to use a number of synchronicity measures that attempt to delineate the impact of the market and the company-specific factors on equity prices, as measures of allocative efficiency of the capital market. This is based on the proposition that assuming a reasonable degree of economic diversification, allocative efficiency would be higher if investors pay greater attention to company performance rather than market-specific factors (Yu,1998). Synchronicity measures are usually of two types. The first type compares the synchronicity of stock returns, *i.e.*, the fraction of stocks traded moving in the same direction to measure the effect of economy-wide factors. A second methodology follows Roll (1988) to test the returns generating function specified by the market model:

$R_{it} = a_i + b_i R_{mt} + U_{it}$

where R_{it} and R_{mt} are the rates of return of the i^{th} and the market portfolio, respectively at time t.

As the return on the market portfolio is taken as a proxy for economy-wide factors that affect all the shares on the exchange, its explanatory power (R^2) emerges as a proxy of allocative efficiency of resources by the stock market. There is evidence that stock markets in emerging market economies have a higher measure of synchronicity in terms of both measures (Table 7.5).

Table 7.5: Synchronicity Measures

Economy	Percentage of stocks moving together	R^2	Economy	Percentage of stocks moving together	R^2
1	2	3	4	5	6
Brazil	64.7	0.16	Indonesia	67.1	0.14
China	80.0	0.45	Malaysia	75.4	0.43
Germany	61.1	0.11	Poland	82.9	0.57
India	69.5	0.19	US	57.9	0.02

Source: Morck *et al* (2000).

Indirect measures

A number of studies have established that there is a close link between financial development (as measured by credit) and growth. De Gregario and Guidotti (1995) attempted to disentangle the effect of financial intermediation on the volume of savings and investment from those on the efficiency of investment for a cross-country sample of 100 economies during 1960-85 and attributed one-fourth of the impact on the volume effect. Levine and Zervos (1998) use four simple regressions with output growth, capital stock growth, productivity growth and savings as dependent variables and bank credit and turnover as a proxy of the stock market liquidity as independent variables to estimate their contributions.

Some studies have used proxies for resource allocation and tested them against macro-economic factors. Changes in the allocative efficiency following financial deregulation could be tested through changes in the variance of the expected marginal returns to capital (in some cases, marginal cost of capital) across industries before and after the event (Gupta and Lensink, 1996). Wurgler (2000) tests the determinants of the allocative efficiency of capital in a cross-country two-step process by first estimating the degree to which a particular country increases investment in its growing industries and decreases investment in its declining industries and regresses it against a summary measure of financial development (stock market capitalisation and credit outstanding to GDP). Financial market variables explain a significant portion of the variation in capital allocation quality across countries.

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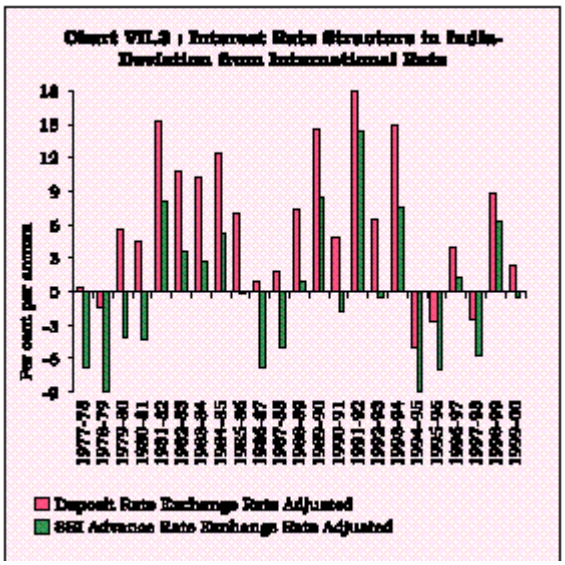
Banking Sector

7.25 In the context of industrialised countries, studies have generally argued that the higher the efficiency of the financial system, the lower the level of the real interest rate. This, however,

may not be true for a developing country like India, given a long history of administered interest rates. Artificially low interest rates may lead to misallocation of resources by introducing a rationing of investible funds. In the context of developing countries, therefore, it is the proximity to benchmark rates rather than the low real interest rate, *per se*, which should be considered as a measure of increased efficiency. The choice of an appropriate benchmark, therefore, assumes importance in this context. Therefore, for evaluating the efficiency of the financial system in India, the London Inter-Bank Offer Rate (LIBOR) could be used as an international benchmark. The deviations from the benchmark interest rate have been particularly noticeable in the 1970s. While the deviations declined during the mid-1980s, they increased thereafter before declining noticeably from the mid-1990s (Chart VII.3). This indicates that there has generally been an increase in the efficiency of the banking system in the 1990s.



7.26 It is useful to examine facets of sectoral resource allocation in the banking system. The sectoral allocation of bank credit and indices of industrial production by sub-sectors are compared for the period 1980-2001. Since the industrial classification used by the Central Statistical Organisation (CSO) for compiling data on industrial production are not exactly similar to those used by the Reserve Bank for data on sectoral deployment of bank credit, a broad correspondence is worked out between these two sets of data so that the results derived by the empirical exercises can be viewed as only indicative (National Statistical Commission, 2001). In terms of weightage assigned by the CSO to work out the general index of industrial production (series with 1980-81 as base year), the sub-sectors covered in column 2 of Table 7.6 account for more than 80 per cent of the total industrial production. The sub-sectors covered in column 1 accounted for, on an average, about 80 per cent of the total bank credit channelised towards large and medium industries.

Table 7.6 : Correspondence between Sectoral Classification of Credit(Reserve Bank of India) and of IIP (CSO)

Classification used by the Reserve Bank	Classification used by the CSO
1	2
Coal	Mining and quarrying

Iron and steel	Basic metal and alloy products
Other metals and metal products	Metal products and parts (except machinery and transport)
All engineering	Machinery and machine tools and parts and transport equipment and parts
Cotton textiles	Cotton textiles
Food products	Food products
Tobacco and tobacco products	Beverages, tobacco and tobacco products
Paper and paper products	Paper and paper products and printing industry
Rubber and rubber products	Rubber, plastic, petroleum and coal products
Chemicals, dyes, paints, *etc.*	Chemicals and chemical products
Leather and leather products	Leather, leather and fur products (except repairs)

7.27 First, correlations are calculated between sectoral output and credit for the purpose of examining the relationships between bank credit deployment and output levels for the two periods,*viz.*, 1980-81 through 1990-91 and 1991-92 through 2000-01 (Table 7.7). All sub-sectors except 'tobacco and tobacco products' show strong and positive correlations between bank credit and industrial output during the first period. At the sectoral level, correlation coefficients in the first and second periods do not show a definite pattern. For 8 out of the 11 sub-sectors, correlation coefficients remained broadly unchanged between the two periods; for 2 sub-sectors, the correlation coefficients during the second period were sizeably larger than those during the first period and for the remaining sub-sector, it was the other way round. The correlation at the aggregate level, however, increased considerably during the second period over the first period, indicating a stronger positive impact of bank credit on the level of industrial output in the second period.

7.28 Differences in sector-wise correlation coefficients, *prima facie*, indicate that industry-specific factors remain important in deciding allocation of bank credit across different segments of Indian industry. Taking sectoral output levels as the dependent variable and bank credit as the independent variable, the estimated elasticities indicate that bank credit has a significant impact on industrial output in both the periods (Table 7.8). The only exception to this empirical regularity has been the industry group of 'tobacco and tobacco products' during 1980-91 - the result is not statistically significant.

Table 7.7: Correlation Coefficient between Bank Credit and Output: Sector-wise

Sector	1980-81 to 1990-91	1991-92 to 2000-01
1	2	3
Coal	0.686	0.849
Iron & steel	0.863	0.857
Other metals and metal products	0.923	0.872
All engineering	0.994	0.768
Cotton textiles	0.853	0.879
Food products	0.974	0.900
Tobacco and tobacco products	-0.278	0.734
Paper and paper products	0.948	0.969
Rubber and rubber products	0.899	0.802
Chemicals, dyes, paints, *etc.*	0.986	0.981
Leather and leather products	0.807	0.853
Overall	**0.329**	**0.526**

Table 7.8: Estimated Sector-wise Credit Elasticities of Output

Sector	Elasticity	
	1980-81 to 1990-91	1991-92 to 2000-01
1	2	3
Coal	0.33*	0.18*
Iron & steel	0.32*	0.34*
Other metals and metal products	0.31*	0.69*
All engineering	0.41*	1.23*
Cotton textiles	0.18*	0.30*
Food products	0.41*	0.26*
Tobacco and tobacco products	-0.06	1.13*
Paper and paper products	0.43*	0.85*
Rubber and rubber products	0.36*	0.42*
Chemicals, dyes, paints, *etc.*	0.56*	0.68*
Leather and leather products	0.39*	0.47*

Note : Elasticities are derived from a log-linear model of the form: $Log(Y_{it}) = a + b\ Log(Bc_{it})$, where Y= Output, BC= Bank Credit, for i= 1 to 11.
* Significant at 1 per cent.

The sectoral credit elasticity of output varied between 0.18 to 1.23. Cross-country studies suggest that different industrial segments have different demand structures for bank credit. Specific characters of the sub-sector including historical trends in corporate financing, the level of maturity, growth performance, capital intensity, *etc.*, are some of the important determinants of the demand for bank credit by the industry segment (Cetorelli and Gambera, 1999). In line with such findings, in the current exercise, the impact of bank credit on different segments is not uniform.

Table 7.9 : Estimated Credit Elasticities of Output - Results from Panel Regression

Period	Model	Elasticity	t-statistic	Hausman test
1	2	3	4	5
1980-81 to 1990-91	Random Effect	0.302	14.58*	34.18*
1991-92 to 2000-01	Random Effect	0.357	10.72*	21.10*

Note: Elasticities are derived from a log-linear model of the form: $Log(Y_{it}) = a + b\ Log(Bc_{it})$, where Y= output, BC= bank credit, for i= 1 to 11.
* Significant at 1 per cent.

7.29 In order to explore the relative impact of efficiency of finance in inducing output growth, panel regressions have been conducted taking sectoral output levels (in logarithmic form) as the dependent variable and bank credit (in logarithmic form) as the independent variable (Table 7.9).

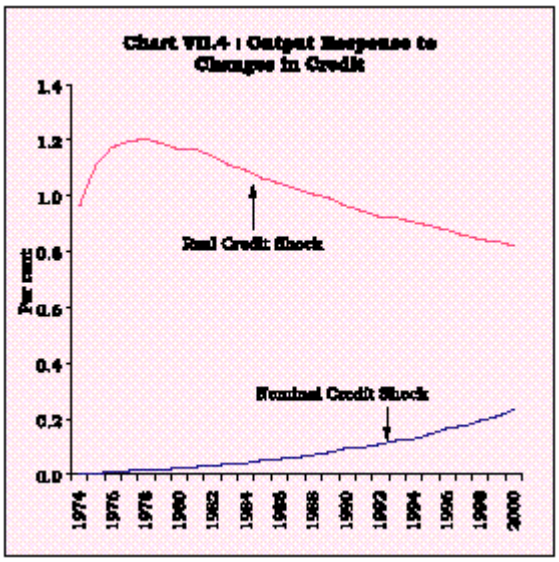
7.30 The Hausman test indicates the applicability of the random effect model as there are

industry-specific characters affecting sectoral allocation of bank credit. The panel regressions also reaffirm the positive and significant impact of bank credit on industry output. Furthermore, there had been an increase in the credit elasticity of output between the two periods. In a general sense, all the empirical results described in this section indicate that the efficiency of sectoral credit allocation in India has improved during the 1990s.

7.31 Recognising the complex interactions between financial intermediation (proxied by bank credit), sources of growth and growth, the possible impact of credit on growth could be studied in a three-equation framework, with investment, capital stock and output as endogenous variables.[2] First, investment is determined by credit flows and the lagged change in output. Second, the net fixed capital stock accumulation process is determined by investment. Finally, following the production function approach, output depends on net fixed capital stock and employment. The aggregate supply response to changes in credit is thus explained indirectly through the change in capital stock *via* the investment rate which could be modulated by altering the flow of credit.

In the absence of any standard empirical specification in the literature, the supply response is studied by using two different specifications of credit, *viz.*, annual changes in credit in nominal terms and in real terms. Investment responds positively to both the two alternative specifications of credit.

7.32 Given the relationships obtained through the regression equations between investment and capital stock on the one hand, and capital stock and growth, on the other, the extent of and the time path over which change in credit could influence growth has been simulated by giving one percentage point shock to the alternative credit variables (Chart VII.4). The output response appears to be relatively stronger and persistent when credit increases in real terms.



7.33 Recent studies have attempted to disentangle the scale and efficiency effects of financial intermediation on investment. The hypothesis is that if output is regressed on a set of variables such as credit (as a proxy of financial developement), investment and other related variables, the

coefficient of credit in the regression with investment, reflects only the efficiency effects of financial intermediation and the coefficient of credit in the regression without investment reflects both scale and efficiency effects of financial intermediation. For the period 1974-2000, GDP is first regressed on the sizes of the financial sector (proxied by average bank credit to the commercial sector) and government (proxied by gross fiscal deficit (GFD)) and investment (proxied by gross domestic capital formation). In the second stage, the investment variable is dropped from the equation. The coefficient of credit in the first equation[3] (with investment as an explanatory variable) works out to 0.8. Dropping investment from the regression[4] increases the coefficient of credit to 1.0. Thus, the efficiency effect of the financial sector works out to about 80 per cent, while the effect on volume of investment works out to about 20 per cent, which is reasonably in line with De Gregario and Guidotti (1995).

7.34 This exercise was buttressed by a switching regression model for a sequential search of break points in the intercept and the slopes of both credit and investment during this period. The empirical estimation underwent a downward shift in the intercept during 1978, indicating a dampening of the growth cycle in general[5]. This continued to persist till 1983, when a marginal upward shift in the slope of credit is noticed, implying a somewhat increased degree of credit utilisation efficiency[6] . This efficiency effect, however, appears to fade out quickly with the slope returning to insignificance in 1985 itself. The next major and significant break in the slope of credit occurs in 1990[7] . This effect is not only pronounced but also significant indicating the improved performance of the banking system during this period. It, however, appears to peter out by the mid-1990s.

7.35 Using a time series approach, the relationship between financial intermediation (proxied by commercial credit) and allocative efficiency (proxied by the investment elasticity of output) has been explored by generating investment elasticities[8] through a rolling regression. The results suggest that while the financial intermediation exhibits a significant and positive relationship with the investment elasticity, the coefficient of the government size is negative and significant, reflecting the constraint of fiscal dominance. Efficient intermediation and delivery of credit are expected to raise investment in more productive sectors by shifting resources from less productive sectors. Estimated relationships obtained for India[9] validate the crucial role of a developed financial system in the growth process.

Stock Markets

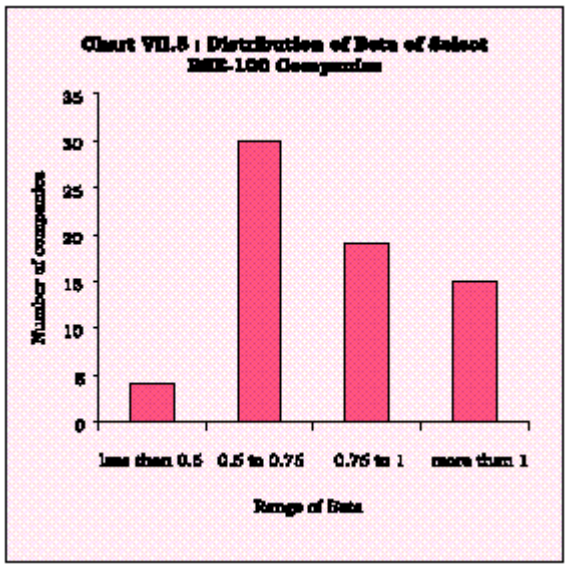
7.36 Synchronicity tests based on daily data were carried out for 68 stocks included in the BSE - 100 Index for each year from 1995-96 to 2000-01 as also for the entire period. On an average, about 70 per cent of the stocks in India move in the same direction (Table 7.10).

7.37 The percentage of stocks moving together in India is found to be more or less comparable to other emerging markets, such as, Brazil and Indonesia but lower than in China and Malaysia (Table 7.5).

7.38 The average values of R^2 for 68 select stocks in the BSE-100 Index for different periods were found to be in the range of 0.21 and 0.30, thus implying that on an average about 20 per cent of the variation in stock returns can be explained by economy-wide factors. This

performance compares poorly with developed markets but much better than many emerging markets.

7.39 The beta (b) of a stock estimates riskiness relative to the market. The b values could also be used to ascertain whether it is economy-wide or company-specific factors, which play an important role in explaining the stock returns. Of the 68 stocks, b values only in respect of 18 scrips were found to be around unity (with variations of +/- 10 per cent) (Chart VII.5). That is, risk-return perceptions are influenced by the company-specific factors as well as by the market-wide factors.



7.40 The various tests for the Indian stock markets clearly suggest that stock returns are influenced by both the company-specific and economy-wide factors. Although they compare favourably with many emerging markets, these tests show that the Indian stock market may not be allocating resources as efficiently as stock markets in advanced countries.

Table 7.10: Synchronicity Test - BSE -100 Index

(Per cent)

Variable/ Year	Percentage of stocks moving together	R^2
1	2	3
1995-96	70.6	0.21
1996-97	69.8	0.29
1997-98	69.5	0.22
1998-99	70.1	0.30
1999-2000	68.5	0.22
2000-01	68.5	0.20
1995-96 to 2000-01	69.5	0.22

Note : Relates to 68 companies included in the BSE-100 Index.

Allocative Efficiency - Banking Sector and Stock Markets

7.41 In the previous two sections, the allocative efficiency of the banking sector and stock market were measured separately. In order to draw comparative inferences, there is a need to test the allocative efficiency of both the systems using common techniques which yield quantifiable results. Step-wise regressions of output on financial intermediation and the capital market and related real variables indicate that financial intermediation turns out to be significantly positive but not the capital market. This is consistent with the stylised fact that capital markets have only recently emerged as a significant source of finance in the Indian economy (Table 7.2).

Stock Markets and Growth

7.42 Apart from playing a direct role in the growth process through mobilisation of new investment and improvement in the allocative efficiency of investment, the stock market also contributes to growth indirectly through its effects on aggregate demand. The stock market impacts aggregate demand, specifically through aggregate consumption. A rise in stock prices is expected to have an effect on consumption through the wealth effect. If the response of consumption to changes in wealth emerges relatively quickly, it could explain the aggregate relationship through what can be termed a "direct" channel. If the lags are long, the aggregate relationship between stock market wealth and consumption might be termed as "indirect", which takes place when stock prices predict changes in future income, or because of some other link (Poterba and Samwick, 1995; and Poterba 2000).

7.43 There is no clear international evidence of the alternative explanations for the aggregate relationship between consumption and stock prices. Some micro-data studies applying the Capital Asset Pricing Model (CAPM) find that the spending of stockholders is more correlated with stock market returns than that of non-stockholders which supports a direct effect (Mankiw and Zeldes, 1991; Attanasio, Banks and Tanner, 1998; Vissing-Jorgensen, 1999 and Brav, Constantinides and Geczy, 1999). The balance of evidence points, however, to a small role for direct effects. The correlation between stock prices and consumer sentiment does not vary by stock ownership (Otoo, 1999 and Starr-McCluer, 2000).

7.44 In the Indian context, there is some evidence that changes in stock prices impact consumption (Table 7.11). For the period 1980 to 2000, the evidence suggests that changes in stock prices (proxied by the BSE Sensex) cause changes in private final consumption with no evidence of reverse causation.

7.45 The wealth effect, in the Indian context, is, however, limited by the relatively small stock holdings of the household sector. The percentage of household wealth held in the form of stocks crossed 10 per cent of total household savings during the period 1989-90 to 1994-95 but worked out to below 3.0 per cent during 1999-2000. Another factor limiting the consumption effect of stock market valuations is the nature of the distribution of stockholders in India across the hierarchy of wealth holders. The distribution of stock holdings in India is skewed in the favour of the wealthy, who are less sensitive to the increases in stock prices because of lower marginal propensities to consume (SEBI-NCAER, 2000).

IV. CONCLUDING OBSERVATIONS

7.46 Which system - capital market-based or financial intermediation - is more efficient in the long run in allocating financial resources? The empirical analyses set out in the previous section does not suggest the superiority of any one system or the other in the Indian context as in the cross-country experience. The two competing systems are, in fact, in continual change. This process has helped in bringing the two models closer. In countries, such as, Japan and Germany - economies where banks play a crucial role - capital markets are becoming increasingly important. This is due, in part, to the growing volume of banking activity in the capital markets. On the other hand, in the US, banks are increasingly required to play a greater role in corporate finance.

Table 7.11: Consumption and the Capital Market - Pair-wise Granger Causality Tests

Null Hypothesis	Period	F-statistic	Probability
1	2	3	4
Changes in private final consumption does not Granger-cause changes in the BSE Sensex	1980-2000	1.14211	0.34918
Changes in the BSE Sensex does not Granger-cause Changes in private final consumption	1980-2000	3.43677	0.06336

7.47 Thus, both systems could co-exist. However, for each system to work effectively there are certain necessary conditions which need to be satisfied. It is, therefore, possible that under a given set of conditions, one system may perform relatively better and is more suitable than the other. In mature markets, with a low level of innovation and, therefore, with less uncertainty, financial intermediaries offer clear advantages over capital markets (Allen, 1993). On the other hand, in emerging industries with significant financial and technological risks a financial intermediary option will be less preferable.

7.48 On balance, it is desirable to have a diversified and balanced financial system where both financial intermediaries and financial markets play important roles in imparting greater competitiveness and efficiency to the financial system. In the present context of financial liberalisation, stock markets and banks emerge as sources of corporate finance and stock market development actually tends to increase the quantity of bank loans through improved debt-equity ratios. Thus, the coexistence of both systems is socially desirable not only because it encourages competition, but also because it reduces transaction costs within the financial system, and helps improve resource allocation within the economy.

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[1] Various issues relating to finance and growth with emphasis on market efficiency have been discussed in the *Report on Currency and Finance*, 1999-2000.

[2] (1a) GDCF = 75765 +0.9 ? GDP (-1) + 2.6 ? BCCS, R^2 = 0.91, DW = 1.68
(10.0) (2.8) (8.5)

(1b) GDCF = 25780 + 1.4 ? GDP(-1) + 3.6 ? RBCCS, R^2 = 0.81, DW = 1.71
(1.8) (3.2) (4.9)

(2) NFCS = -15106 + 0.56 GDCF, R^2 = 0.94 , DW = 1.59

(-1.6) (10.3)

(3) Log GDP =-2.5 +1.0 LogNFCS + 0.2 LogEMP-0.7 D8088, R^2 = 0.99 , DW =2.2
(-13.3) (16.6) (1.8) (-8.7)

where GDCF, GDP, NFCS are gross domestic capital formation, gross domestic product, and net fixed capital stock, at constant prices, respectively, BCCS and RBCCS nominal and real (deflated by GDP deflator) bank credit to commercial sector, EMP employment, D first difference and D the dummy for the years specified.

3 Y = 1.5 + 0.8 Credit + 0.2 I - 0.03 D, R^2= 0.99, DW = 2.2,
(2.9) (6.5) (1.6) (-0.6)
where, Y is gross domestic product at market prices, credit is average bank credit to the commercial sector, I is GDCF at market prices and D is gross fiscal deficit.

4 Y = 1.3 + 1.0 Credit - 0.01 D, R^2= 0.99, DW = 2.2
(2.4) (15.5) (-0.3)

5 Y = 4.9 - 2.9D + 0.1 I + 0.3 S_I + 0.7 Credit + 0.01S_c -0.2 FD, R^2 = 0.99, D.W = 1.4
(5.2) (-2.9) (0.4) (0.8) (2.2) (0.1) (-2.8)
where D is a dummy for changes in the intercept, $S_{i,c}$ are slopes of the Credit and I series, respectively.

6 Y = 4.6 - 3.2 D + 0.2 I -0.1S_I + 0.6 Credit + 0.4 S_C 0.01 FD, R^2= 0.99, DW = 1.1,
(9.9) (-6.1) (0.9) (-0.6) (2.6) (1.8) (-2.2)

7 Y = 3.6 - 2.9 D + 0.5 I - 0.3 S_I + 0.3 Credit + 0.5 S_C + 0.01 FD, R^2= 0.99, DW = 1.1
(12.1) (-5.8) (3.3) (-1.2) (1.8) (2.2) (0.2)

8

$\text{Loge}(I_t/I_{t-1}) = c + h\ \text{Loge}(V_t/V_{t-1}) + e_t$
where I is gross capital formation, V value added and t year. The slope estimate, h, is an elasticity.

9 h = -0.22 + 0.28 BCR - 0.99 GFDR
(-0.09) (2.24) (-3.63)
R^2 = 0.36, DW = 1.6
where BCR and GFDR are the ratios of credit and GFD to GDP, respectively.