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RESERVE BANK OF INDIA
OCCASIONAL PAPERS

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VOL. 31   NO. 3   **WINTER 2010**

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Should Monetary Policy in India Respond to Movements in Asset Prices?

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The sub-prime crisis has stimulated the debate on the need for revisiting the issue as to whether monetary policy should become more sensitive to asset price movements and respond proactively to prevent any build up of bubbles. In the India specific context, this paper provides empirical evidence on the relevance of a policy of no direct use of the interest rate instrument for stabilising asset price cycles. While the asset price channel of monetary policy transmission is clearly visible in empirical estimates, there is no evidence of monetary policy responding to asset price developments directly. Asset price changes also do not seem to influence the inflation path, suggesting why monetary policy may continue to refrain from responding directly to asset price cycles. Credit market shocks, however, explain significant part of asset price variations over medium to long-run, which though could be part of a broader comovement of variables over the business cycle, particularly real activity, credit flows and asset prices. Higher interest rates seem to cause contraction in output, credit demand as well as asset prices; hence, only the impact on asset prices should not be viewed as a good enough reason to use monetary policy for stabilising asset price cycles. Financial stability concerns from asset price bubbles could be better addressed through micro and macro-prudential measures, and the effectiveness of such measures could be enhanced when implemented in a sound macroeconomic policy environment.

I. Introduction

The price stability objective pursued by central banks is generally defined in a manner that excludes asset prices. Asset price is often viewed by central banks as another macroeconomic variable which could potentially influence the inflation path either by impacting inflation expectations, or through the wealth effect on aggregate

demand, or by altering the cost of funds. The relationship between monetary policy and asset prices has been conventionally analysed through the asset price channel of monetary policy transmission, under which asset prices respond to monetary policy changes and thereby may impact the ultimate policy goals relating to inflation and output. The pre-crisis mainstream view on why a central bank should not directly aim at containing asset price inflation was premised on certain sound arguments: (a) bubbles are hard to differentiate from genuine bull runs and central banks have no comparative advantage over the markets to come to any credible conclusion on the fundamental value of assets, (b) monetary policy instruments could be ineffective in preventing asset bubbles, particularly speculative bubbles, as the magnitude of the increase in interest rates would have to be large enough to be able to prick a bubble, which in turn would entail large loss of output, and (c) central banks have no mandate on asset prices. As a result, the pre-crisis emphasis in monetary policy strategies was to manage the impact of asset price developments on inflation and growth, either in a forward looking manner by anticipating the impact on inflation outlook, or by reacting to the impact on output and inflation after a bubble bursts.

The emerging perception after the global crisis is that central banks can contribute to preventing the build up of asset bubbles by: (a) avoiding credit bubbles, persistent excess liquidity conditions and build up of leveraged positions in asset markets, and (b) using counter cyclical prudential regulation in terms of norms for provisioning and risk weights for capital requirement, limiting the maximum exposure of banks to sensitive assets and prescribing margin requirements (*viz.,* loan to value ratio). While the former falls in the domain of monetary policy, the latter belongs to the purview of financial regulation. The focus of this paper is on what monetary policy *per se* could do about asset price inflation, rather than whether a central bank could use instruments other than the interest rate to stabilise asset price cycles. Against this background, Section II of the paper presents the academic debate on the role of monetary policy in relation to asset prices, with a review of literature that reflects the pre-crisis consensus view as

well as the lack of consensus after the global crisis. The issue of whether monetary policy should be assigned any role relating to asset prices in India has been evaluated through various empirical tests in Section III, notwithstanding data limitations in conducting empirical research involving housing asset prices in India. Concluding observations are outlined in Section IV.

II.   Monetary Policy and Asset Prices - The Debate

Monetary policy actions could get transmitted through changes in financial prices (*e.g.*, interest rates, exchange rates and asset prices) and financial quantities (*e.g.,* money supply and credit aggregates), which in turn may influence the ultimate goal variables, namely inflation and output. The reverse causation may also be significant since monetary policy actions are often based on feedbacks received from the lead indicators of macro-financial conditions given that monetary policy has to be forward looking due to long and variable lags.

In this expected bi-directional causality in the interactions between monetary policy and asset prices, clarity on the role of monetary policy with respect to asset prices becomes important. In the first type of causation running from monetary policy action, asset prices may change, but the objective of policy change could be to attain the ultimate goals relating to inflation or output or both. Any asset price changes that may take place in this process would be just coincidental, not intentional. Once monetary policy actions intentionally start targeting asset prices it could necessarily involve sacrifice of growth and inflation objectives. That is because the magnitude of the increase in interest rate would have to be large enough to effectively pop an asset price bubble. If that happens, output could contract and deflation fears could creep in. Thus, all the objectives of monetary policy, *i.e.,* not only those relating to output and inflation, but also financial stability could get sacrificed in that process.

The second type of causation, which could be seen in terms of an interest rate policy rule function, largely remains hypothetical, since

following the pre-crisis consensus, no direct feedback from asset prices seems to have triggered any change in policy interest rates of any major central bank. Asset prices may only indirectly condition an interest rate action, through the impact on output and inflation, for which the wealth and income effects of asset price changes would have to be significant.

After the global crisis, those who proposed a "lean against the wind" role for monetary policy, seem to suggest a place for asset prices directly in the interest rate policy rule function. Since credit bubbles and excessive leverage could be the driving forces behind asset price bubbles, either asset prices directly or credit and leverage as lead indicators of asset prices would then have to find explicit place in the monetary policy reaction function. This is premised on two broad arguments: (i) Given the endogenous money supply process, in which money and credit growth may be largely demand driven, central banks could change the credit conditions or discourage excessive leverage only by changing interest rates. Use of macro-prudential measures or sector specific credit/prudential policies could attain the goal, but these are not monetary policy measures. Hence, any role for monetary policy should be seen only through the interest rate rule, where interest rate would respond directly to asset price trends; (ii) Taking a view on asset price bubble or credit bubble should not be difficult for a central bank, since they in any case take views on 'potential output' and 'threshold inflation' for changing their policy interest rates, and such estimates are not free of errors. Only the extent of error in judgement could be higher for asset prices or credit bubbles, compared to errors in estimating potential output and threshold inflation. Moreover, if central banks can use macro-prudential regulation, they have to take a view on the extent of misalignment in asset prices, to be able to alter the risk weights for capital adequacy purpose or assign specific provisioning requirements in proportion to the extent of risk expected from exposures to asset price volatility. Thus, the pre-crisis presumption that asset bubbles are hard to identify might have helped central banks to avoid any use of interest rate instrument in pursuit of asset price objective, but given the

overwhelming emerging support for use of macro-prudential regulation to promote systemic financial stability, specific views would have to be taken by central banks on asset prices. The dominant remaining argument against the use of interest rate instrument, then, would have to be based on the bluntness of the instrument, which can limit the asset prices from growing into a bubble only at the expense of sacrificing output and inflation objectives.

Thus, for use of macro-prudential regulation, a central bank may have to necessarily take a view on asset prices, but this assessment need not feed into decisions on changes in policy interest rates. A central bank empowered with the instrument of macro-prudential regulation may start "leaning against the wind" but in pursuing this objective, the interest rate instrument may still have no role to play. Thus, the pre-crisis consensus may still be relevant after the global crisis, even though convincing counter arguments have been advanced, some of which are mentioned in the review of literature.

II.1 A Review of the Literature

Theoretical and empirical research appears divided after the global crisis on the issue of role of monetary policy relating to asset price developments. A rich body of literature prior to the global crisis seemed to support the argument that a monetary policy approach, which responds primarily to the inflation and aggregate demand outlook rather than directly trying to prick the bubble is likely to yield better macroeconomic outcomes (Bernanke, Gertler and Gilchrist, 1999; Bernanke and Gertler, 2001; Gruen, Plumb and Stone, 2005). The pre-crisis consensus reflected the famous Greenspan orthodoxy on asset price build-up that argues that it is hard to identify bubbles *ex ante* and central banks may not have better information than markets to influence asset prices.[1] Further, even if a bubble can be identified *ex ante*, using

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[1]   Bernanke and Gertler (2001) argued that central banks should disregard asset prices in their policy formulation. They found little, if any, additional gains from allowing an independent response of central bank policy to the level of asset prices.

the interest rate is ineffective in bursting a bubble.[2] Similarly, monetary policy response to tackle an asset boom can interfere with the role of asset prices in allocating resources, particularly if there is uncertainty with regard to the presence and nature of a bubble. The asset bubbles are broadly explained as asset prices rising above the level warranted by economic fundamentals, as measured by the discounted stream of expected future cash flows that will accrue to the owner of the asset.[3] The difficulties in identifying asset price bubbles arise mainly from two factors: first, private agents' subjective expectations are a key determinant of asset prices, particularly in the short run, posing difficulties in disentangling the purely psychological component from the objective valuation of the asset; second, asset bubbles often arise from overreactions to news about fundamentals.[4]

Given the difficulties in identifying asset price bubbles, the best course for monetary policy could be to cushion the adverse impact once a bubble bursts (Bean, 2003; Bernanke and Gertler, 1999, 2001; Blinder and Reis, 2005; Bordo et al., 2002, 2003; Bordo and Wheelock, 2004, Filardo, 2004; Greenspan, 2002; Roubini, 2006). For equity prices to be a useful monetary policy indicator, a credible relationship between changes in monetary policy and changes in equity prices as

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[2]   Mishkin (2008) viewed that since it is difficult to identify asset price bubbles with certainty, any monetary policy response to misidentified bubbles may hamper the growth process.

[3]   Key features of asset prices that are associated with bubbles could be best analysed in the framework of forward looking general equilibrium models with the assumptions of rational behaviour and infinite horizons. Thus, the rational bubbles reflect expectations of rising prices that can lead to self-fulfilling equilibrium outcomes, with the following expectational restriction (Filardo, 2004): $E_t\Omega_{t+1} = \lambda\Omega_t$, $\lambda>1$. The rational asset bubble tends to develop without link to fundamentals since the holders of speculative asset experiencing bubbles are also guided by the expectation of persistent rise in the price of that asset. Such bubbles are identified as generating significant persistent overvaluation or undervaluation of asset prices due to excessive reaction to fundamentals (Froot and Obsfeld, 1991).

[4]   The difficulties involved are extracting information from a constellation of asset prices, which would require disentangling risk premia from expectation component, identifying relevant state variables that enter the asset pricing and determining the functional form of the pricing relationship (Hordahl and Packer, 2007).

well as between changes in equity prices and changes in inflation should be established (Saxton, 2003). Empirical investigations, however, do not seem to offer a reliable relationship between changes in monetary policy and equity prices. Mishkin and White (2002) argued that most fluctuations in stock prices occur for reasons not associated with monetary policy, but rather reflect real fundamentals or animal spirits. The loose link between monetary policy and stock prices, therefore, implies the limited ability of central banks to control stock prices. Similarly, there does not seem to be a reliable positive empirical relationship between changes in equity prices and changes in general price levels (Filardo, 2000; Goodhart and Hofmann, 2000; Stock and Watson, 2001; Tatom, 2002). Moreover, the consumption and investment sensitivity to the wealth effect of equity and housing prices, despite their growing share in the household wealth and the economy, may be relatively weak (Gramlich, 2001; Kuttner and Mosser, 2002; Ludvigson, Steindel and Lettau, 2002).

After the global crisis, influential opinions have supported the need for making central banks more sensitive to asset price developments in the conduct of their monetary policies, even though justifications for the relevance of the pre-crisis approach also continue to be significant. There was a "lean against the wind" perspective even before the global crisis, which argued that central banks should explicitly respond to perceived asset price bubbles, even if that involves short run deviations of monetary policy from the path conditioned by the inflation-growth objectives (Bordo and Jeane, 2002; Borio and Lowe, 2002; Cecchetti et al., 2000; Crockett, 2001; Detken and Smets, 2004; Filardo, 2000; Roubini, 2006). It was also observed that monetary policy could distinguish the bubble component from the fundamental component in asset prices and that the optimal monetary policy could react to the bubble rather than the fundamental component of asset prices (Rudebusch, 2005).[5]

The pre-crisis perception of the best practice in monetary policy framework as the one characterised by a single target (*i.e.*, price stability)

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[5]   At the same time, it is viewed that mere escalation of asset price may be an insufficient indicator of asset price bubbles.

and a single instrument (*i.e.*, short-term policy interest rate) has generally been questioned on the ground that a less inflation-centric and more asset price sensitive monetary policy could possibly have been more appropriate as a crisis preventive mechanism. Even though sustained easy monetary conditions have been highlighted as a causative factor behind asset price bubbles, empirical estimates suggest that the stance of monetary policy has not generally been a good leading indicator of future busts in asset prices. It is argued that a loose monetary policy was not the main, systematic cause of the boom and consequent bust (IMF, 2009).

One of the key arguments in the debate on the dynamics between monetary policy and asset prices has been that monetary policy should respond to asset prices only to the extent of their impact on growth, employment and inflation, which are the core objectives of monetary policy (Kohn, 2008). This requires an understanding of how asset prices influence inflation and economic activity. Some have argued that the impact of asset prices on aggregate demand and inflation should fall within the domain of monetary policy. But this perspective is not new, and was known to central banks even before the crisis. Another area that has been argued to fall in the domain of monetary policy is the asset price bubble that may be fuelled by excessive credit growth. The feedback loop between credit growth and asset price growth could potentially pose challenges to the inflation and growth objectives of central banks. Hence, it is argued that monetary policy should respond to asset price bubbles that are propagated by excessive credit expansion in the economy (Blinder, 2008). Another argument is that asset price bubbles can have serious adverse macroeconomic consequences and therefore, it is preferable to try to eliminate the source of macroeconomic instability directly by adopting a policy of leaning against the wind. Since central banks are generally held responsible for financial stability even without any explicit mandate, they should monitor asset prices and try to prevent the emergence of bubbles (that invariably lead to financial crashes).[6] Interest rate could be an effective tool in preventing bubbles (Orphanides, 2010; Papademos, 2009). Pavasuthipaisit (2010)

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[6]   Excessively accommodative monetary policy may not be immediately reflected in consumer prices given the existence of nominal rigidities in the economy, and hence may be first visible in asset price increases.

even found empirical support for leaning against the wind through direct use of the interest rate instrument.[7] Strauss-Kahn (2011), on the contrary, stressed "...in my view, it is far from obvious that such (asset price) variables should enter the primary target (*i.e.,* the interest rate rule) of monetary policy".

From a pragmatic policy perspective, however, it is still largely ambiguous as to how monetary policy could respond to asset prices directly, even if it is presumed that it must in some way. Trichet (2009) noted that "…central banks should not target, nor react mechanically to asset prices. Judgement is necessary in addressing asset price dynamics within an overall framework geared to price stability." Donald Kohn (2008) viewed that "…I am not convinced that the events of the past few years and the current crisis demonstrate that central banks should switch to trying to check speculative activity through tighter monetary policy whenever they perceive a bubble forming…the case for extra action still remains questionable." There is also a lack of political mandate for central banks to control asset prices. With no instrument to successfully target asset prices, by pricking a bubble, a central bank can also create macroeconomic instability and ruin its credibility (Issing, 2009). Whether any specific mandate on asset prices for central banks could undermine central bank independence is an issue which has not been examined very seriously as yet, but the risk to independence cannot be ruled out, given that there will be some interest groups that may benefit from asset price inflation, whether genuine or speculative.

Given the inherent practical limitations of monetary policy in dealing with asset prices, other policies that could be effective in ensuring financial stability include regulatory policies and the fiscal policy.[8] The regulatory policy instruments to deal with asset bubbles

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[7]   Pavasuthipaisit (2010) stressed that "... prior to and during the subprime mortgage crisis of 2007, it would have been optimal for the Federal Reserve to increase the weight of asset prices in its rate-setting decision."

[8]   Importantly, in case of housing market, given the transmission lags, interest rate increases are unlikely to be effective in the short run, therefore, special regulatory measures could be more effective (Savoir and Bangui, 2006).

may comprise limits on the credit exposure to real estate and stock markets, enhancement of relative risk weights/provisioning for bank lending, monitoring of banks' investment in asset markets through special purpose vehicles, counter-cyclical loan to value limits, caps on leverage, and tighter eligibility and collateral requirements on loans for investment in particular assets. Fiscal policy can also work as a countercyclical tool to influence asset price movements through countercyclical public expenditure plans and also suitable adjustment of taxes/tax exemptions that could influence asset prices. Changes in tax incentives to real estate sector or investments in financial instruments such as mutual funds and equity over long-term that alters effective return on such instruments may help in containing excessive asset price growth. Use of transaction tax on assets where there may be excessive speculation, including Tobin-type taxes when speculative foreign capital inflows are perceived to lead to destabilising growth in asset prices, has also been advocated.[9] As marginal changes in interest rates cannot have much influence on asset prices, particularly when the expected returns on stock/housing assets significantly exceed the cost of borrowed funds, sector specific prudential policies could be more appropriate.

III. Monetary Policy and Asset Price Dynamics in India

The empirical assessment for India focuses on the interactions between monetary policy and housing and stock prices. Equity and housing prices have the tendency to be procyclical in nature, as high growth phases are generally associated with an underpricing of risk (Barsky and DeLong, 1993). Four specific issues are examined empirically here: (a) whether asset prices exhibit any causal influence on the interest rates, which would then be relevant to explain whether monetary policy has responded directly to asset prices in India; (b) whether asset price changes significantly alter the inflation path – this could be important to examine the relevance of an indirect role for monetary policy, given the extent to which current asset price trends

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[9]   The literature, however, highlights that the long run effectiveness of such transactions taxes is limited. Even in the short run, the effectiveness of such measures could be circumvented.

may alter the inflation outlook; (c) whether interest rate changes lead to expected changes in stock prices alone or also give rise to changes in output and credit demand, which would be important to examine the potential adverse effects of a hypothetical direct use of monetary policy to deal with asset price inflation; and (d) whether the relationship between interest rate changes and asset prices could be ambiguous because of the presence of other common factors which may exhibit strong co-movement with both interest rate and asset prices.

III.1 Monetary Policy and Asset Price Cycles

With the short-term interest rate emerging as the predominant instrument of monetary policy, the interest rate channel of transmission has received significant research focus, even though both asset price and exchange rate channels have become increasingly relevant. A Granger causality analysis of movement in interest rates and changes in stock prices in India for the period 1994:4 to 2010:6 reveals that while interest rate movements cause changes in stock prices, the reverse causation does not hold (Table 1). This seems to suggest that monetary policy does not respond to stock prices, though stock prices respond to monetary policy shocks.

The literature also highlights the possible presence of feedback loops between asset price bubbles and excessive growth in bank credit.[10] Unlike stocks, real estate, *i.e.*, both residential and commercial,

Table 1: Causal relationship between interest rate and changes in stock prices

Null Hypothesis	F-Statistic	Prob.
Yield on 91-day TBs do not Granger cause change in stock prices	3.51	0.03
Change in stock prices do not Granger cause yield on 91-day TBs	1.93	0.15
Yield on 10-year government bonds do not Granger cause change in stock prices	3.56	0.03
Change in stock prices do not Granger cause yield on 10-year government bonds	0.49	0.61

[10]   Bank-lending channel is particularly relevant for developing and emerging markets, given their underdeveloped financial markets where interest rates may not move to clear markets.

may have a significant credit component. It is often viewed that if asset bubbles are fuelled by expansion in bank credit, then monetary policy should have a role to "lean against the wind". In this case also, credit growth may be an endogenous process, and unless a central bank has at its disposal the authority to directly alter the flow of credit to a specific sector, it may have to resort to the interest rate instrument. The policy of using a macroeconomic tool such as interest rate to address the problem specific to a sector may not be appropriate, as it may have adverse consequences for other sectors. In India, thus, the Reserve Bank has used in the past its sector specific prudential credit policy measures. Hence, if credit is seen as a causative factor behind build up of asset prices, prudential regulatory policies can limit the credit flow and discourage banks' excessive exposure to specific assets/sectors. The relationship between credit cycles and asset price cycles (in terms of movement in stock prices) in India has been examined with a view to understand the nature of causal relationship. Stock price cycles exhibit a synchronised movement with credit cycles, although the lead and lag relationship between them changes over different phases of the cycle (Chart 1). This seems to support the view that stock price movements are correlated with credit expansion. This empirical pattern, however, does not suggest that stock market activities are financed by bank credit, as it could be possible that a

Chart 1: Credit cycles and stock price movements
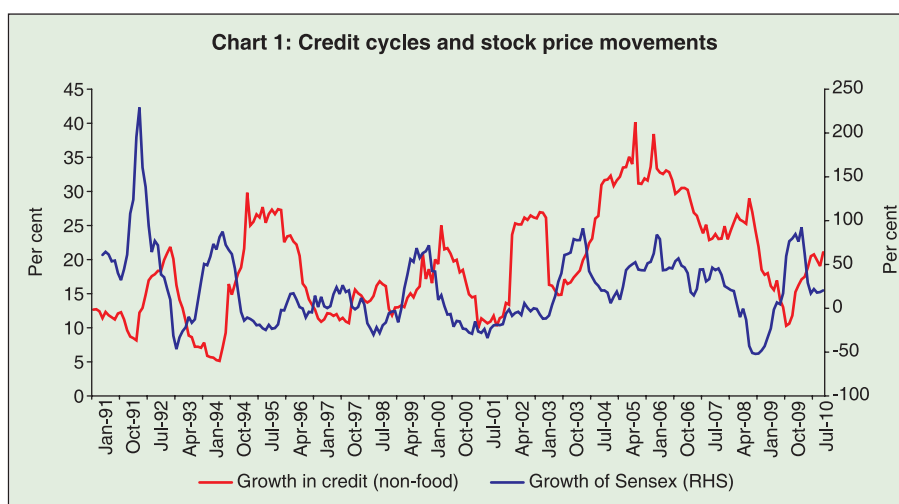
credit boom coincides with the upswing phase of a business cycle, which in turn drives up stock prices.

The Granger causality test between bank credit growth and changes in asset prices in India for the period 1996:Q1 to 2010:Q1 provides evidence of significant bi-directional causal relationship between them, as presented in Table 2. This implies that both credit and asset price booms reinforce each other – which is the typical feedback loop between credit and asset prices. This two-way causation could emanate from the fact that credit growth may directly finance purchases of stocks (which is limited in India) or indirectly push up asset prices by financing real estate activities, enhancing thereby the prospects of future earnings. As the value of stocks increases, the capacity to borrow against the shares as collateral also increases. This, however, is possible only to a limited extent in India given the prudential regulations.

III.2 Monetary Policy and Housing Price Dynamics

Housing wealth is considered to be an important component of the total household wealth and is regarded critical to explaining the demand behaviour in the advanced economies during business cycles. Realisation of the asset appreciation through refinancing of mortgage makes the demand impact particularly strong, unlike in India where such refinancing of mortgage is mostly absent. As supply of housing is relatively inelastic in the short run, demand pressures may lead to disproportionate increase in prices. Further, speculative demand in a situation of inelastic short run supply may lead to build up of bubbles. An important link from monetary policy to asset prices is through the interest rate, which can influence the cost of mortgage debt and the

Table 2: Causal relationship between changes in bank credit to private sector and changes in stock prices in India

Null Hypothesis:	F-Statistic	Prob.
Changes in bank credit to private sector do not Granger cause changes in stock prices	5.83	0.003
Changes in stock prices do not Granger cause changes in credit to private sector	7.03	0.001

demand for housing credit.[11] The changes in interest rates also signal possible changes in valuation of assets. Monetary policy is considered to influence the long-term cost of borrowing, which is relevant for the debt-financed housing demand. A tightening of interest rates may raise the cost of borrowing for households to finance such contractual debt and hence may lead to a decline in demand, which in turn could lead to a downward pressure on prices.

Given the lack of data on housing wealth in India and the absence of a reasonable time series data even on housing prices, the house price behaviour has to be studied using a number of proxy indicators.[12] Stamp duties and registration fees collected by the State governments could shed some light on the house price behaviour in India because these should move in tandem with house price.[13] As evident from Chart 2, the movement of stock prices and revenues from stamp duties and registration fees on housing tend to follow a systematic relationship; together they seem to suggest a broad underlying common asset price cycle with occasional deviations across asset class. The recent cycle in asset prices in India is evident from the inverted U-shape pattern for the period 2003 to 2010.

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[11] In advanced economies such as Japan, property prices were historically significantly responsive to real interest rate changes.

[12] Housing wealth data for India are not available. On housing prices, which could trace the changes in the housing wealth, time series data are not available. The National Housing Bank (NHB) provides data on NHB Residential Index starting from 2008 but these data have two limitations: first, the data are available with only half-yearly frequency and come with a significant time lag, second, the indices are provided only for a number of major cities and an all India index is not computed. The Reserve Bank of India has also started compiling house price index. However, the index is available only since the second quarter of 2003 and is compiled only for Mumbai, which has been extended to a few more cities since 2009. Thus, there is a lack of time series data on an aggregate housing price index for India.

[13] It could be argued that registration fees may not reflect the true movement in house price as the actual market value of the house could be understated with a view to partly avoid the stamp duties and registration fees. For empirical analysis, given the data constraints, one could assume that the extent of under reporting of the market value of the residential properties for registration purposes has a systematic pattern over time and thus, could still capture the broad trends in residential property prices.

Chart 2: Movements in stock prices and revenues from duties on housing in India

Growth of stamp duty and registration fees of the State Governments
Average growth of Sensex (right scale)
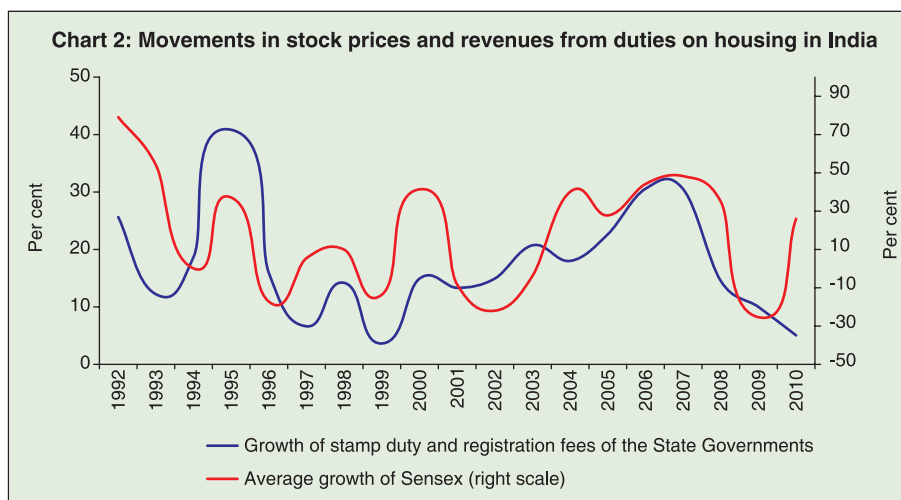
Equity prices of the real estate firms listed in the stock exchanges also provide some information about the price behaviour in the housing sector. The stock prices of the realty sector attained a peak at the end of 2007 and there was a substantial collapse following the financial market shocks from the global financial crisis (Chart 3a). Although the broader index of stock prices (BSE Sensex) returned closer to the pre-crisis level, the realty stock prices tend to remain sluggish. This recent behaviour of the realty sector stock price index seems to lag behind the extent of increase seen in the National Housing Bank's Residex and RBI's housing prices index (Chart 3b).

Chart 3: Movements in housing and stock prices in India

a: Price movements in realty sector in India

Realty Sector Index   BSE Sensex - 30 (right scale)

b: Movements in Mumbai House Price Index
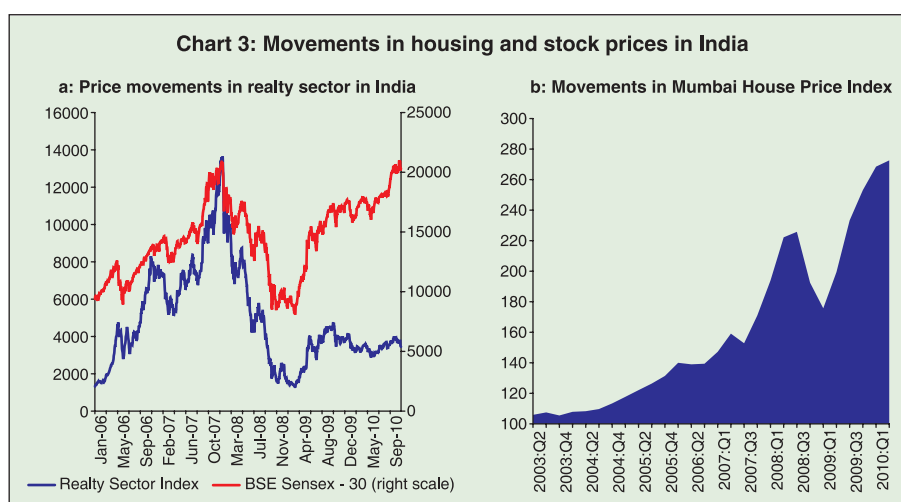
Growth in bank credit to the construction sector (proxy for real estate) in India exhibited a clear cyclical pattern during the period 2000-01 to 2009-10 (Chart 4). Reflecting the house price boom, growth in bank credit to the construction sector was significantly above the overall growth of bank credit to industry. It may, however, be mentioned that as a part of prudential regulations in India, bank credit to sectors such as real estate and stock markets is regulated in relation to expansion in the banks' overall asset portfolio. Secondly, the banks' credit exposures to real estate and stock markets attract higher capital requirements.[14] In respect of residential housing, however, credit is given preferential treatment in terms its classification as a priority sector loan and lower risk weight for capital requirements.

Chart 4: Bank credit to construction sector in India

Share of construction sector in total industry credit(RHS)

Growth in gross bank credit to construction sector ——— Growth in gross bank credit to industry

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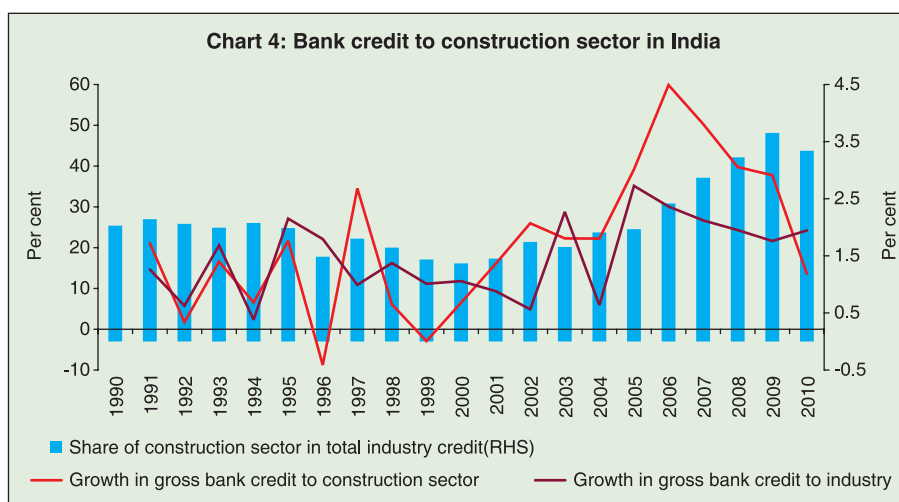
[14]   Risk weight on banks' exposure to the commercial real estate and capital market were increased from 100 per cent to 125 per cent in July 2005. Given the continued rapid expansion in credit to the commercial real estate sector, the risk weight on exposure to this sector was increased to 150 per cent in May 2006. The general provisioning requirement on standard advances in specific sectors, *i.e.,* personal loans, loans and advances qualifying as capital market exposures, residential housing loans beyond ₹ 20 lakh and commercial real estate loans was also increased from 0.4 per cent to one per cent in April 2006 and further to two per cent on January 31, 2007. These norms were relaxed to deal with the slowdown in growth that resulted due to the global financial crisis. In November 2010, these norms were tightened again in response to rising asset prices.

Table 3: Causal relationship between housing loans and interest rates

Null Hypothesis	F-Statistic	Prob
TB91 does not Granger cause dLBC_hsg	3.01	0.06
dLBC_hsg does not Granger cause TB91	0.40	0.67
10yGsec does not Granger cause dLBC_hsg	2.93	0.00
dLBC_hsg does not Granger cause 10yGsec	0.48	0.90

In a situation where housing asset values tend to witness a secular growth, banks may have an incentive to expand credit to residential housing segment where credit risks are perceived to be relatively low since such loans are backed by collaterals whose values are expected to rise in future.

Another important dimension of the role of monetary policy in affecting house prices is the impact of interest rates on the demand for bank credit by the housing sector, which in turn, affects house prices with a lag. The Granger causality test for the period 2002:4 to 2010:6 suggests that short-term interest rates (TB91) Granger cause changes in bank credit to the housing sector (dLBC_hsg) (Table 3). A significant unidirectional causality is also observed from long-term interest rates (10yGsec) to the demand for credit to housing sector, though with longer lags.

The Granger causality analysis between house prices for the period 2003:Q2 to 2010:Q2, proxied by housing prices for the Mumbai city (dLHPI), stock prices (dLSENSEX_SA) and short-term interest rates measured by the weighted average call money rates (RCALL) provides some insights about the asset price dynamics (Table 4). Interest rate changes seem to Granger cause changes in house prices. This finding may be relevant from the viewpoint of effectiveness of monetary policy

Table 4: Causal relationship between house prices, stock prices and short-term interest rate

Null Hypothesis:	F-Statistic	Prob.
dLSENSEX_SA does not Granger cause dLHPI	0.62	0.55
dLHPI does not Granger cause dLSENSEX_SA	7.66	0.00
RCALL does not Granger cause dLHPI	3.31	0.05
dLHPI does not Granger cause RCALL	0.41	0.67

in influencing house prices in India.[15] While asset prices may respond to changes in interest rates, the policy interest rates would have changed in response to assessment about the growth and inflation outlook. Constructing a counterfactual to study the impact of monetary policy changes on asset prices, thus, could be extremely difficult. This is primarily the reason as to why the Reserve Bank has abstained from using interest rate instrument with the sole aim of influencing asset prices. Although Joshi (2006) found that housing prices in India are much more sensitive to interest rate changes than to credit supply, the findings were based on a relatively short sample.

III.3 Empirical Results from SVAR Model

III.3.1 Model and Data Sources

To examine the dynamic interactions among the macroeconomic variables and asset prices, a structural vector auto regression (SVAR) model was estimated. The standard structural system can be considered of the following linear and stochastic dynamic form:

$$A_0 y_t = B(L)y_{t-i} + \varepsilon_t \ \ with \ i = 1,\ldots\ldots\ldots n \tag{1}$$

The Gibbs sampling technique (with standard Minnesota priors) was applied to the VAR model, which is particularly useful to estimate models where the sample period in not adequately long. The following theoretically plausible restrictions are imposed on the structure of the model to identify various structural shocks.

$$\begin{bmatrix} e_y \\ e_p \\ e_r \\ e_c \\ e_s \\ e_x \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ \alpha21 & 1 & 0 & 0 & 0 & 0 \\ 0 & \alpha32 & 1 & 0 & 0 & \alpha36 \\ \alpha41 & \alpha42 & \alpha43 & 1 & 0 & 0 \\ \alpha51 & \alpha52 & \alpha53 & \alpha54 & 1 & 0 \\ \alpha61 & \alpha62 & \alpha63 & \alpha64 & \alpha65 & 1 \end{bmatrix} = \begin{bmatrix} \varepsilon_y \\ \varepsilon_p \\ \varepsilon_r \\ \varepsilon_c \\ \varepsilon_s \\ \varepsilon_x \end{bmatrix}$$

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[15]   Weighted average call money rates represent the best measure of the stance of monetary policy in India as the central bank aims to guide money market interest rate within the policy rate corridor. In the subsequent analysis call money rate has, therefore, been taken to represent the monetary policy stance.

The model has the standard assumption that real income shocks are most exogenous and are not instantaneously affected by other macroeconomic aggregates in the model; therefore, all coefficients in the matrix are restricted to zero. Price behaviour is impacted by the aggregate demand shocks contemporaneously but not by other shocks. The monetary policy reaction function has the restriction that monetary policy does not contemporaneously respond to output shocks. This restriction is based on the argument that often the information on output is available to monetary authorities with a time lag. The reaction function, however, assumes contemporaneous reaction of monetary policy to price changes and exchange rate movements. Exchange rate enters the monetary policy reaction function as central bank also attempts to minimise excessive volatility in foreign exchange market – an emerging market phenomenon. An important dimension of the asset price dynamics captured in this model is the feedback between bank credit and asset prices. Credit demand is contemporaneously affected by the real income shocks, supply shocks and monetary policy shocks.

Asset prices, measured in terms of stock market prices, are contemporaneously affected by the fundamental as well as the non-fundamental factors, except the exchange rate. Asset price is contemporaneously affected by credit shocks in the model as the underlying dynamics is that most asset price bubbles are associated with excessive credit growth. The standard practice in the VAR literature on monetary policy and exchange rate interaction is to place the exchange rate last in the ordering while the exchange rate is allowed to react simultaneously to all shocks. The exchange rate can react instantaneously to all shocks, even though the presence of nominal rigidities may lead to only gradual pass-through of exchange rate shocks to macroeconomic variables. This should provide enough restriction to identify the system, thereby allowing for the use of the non-recursive decomposition.

The following variables were used in the model: real income (GDP at constant prices), price level (Wholesale price index), real interest rate (call money rates minus GDP deflator), real bank credit (stock of non-food bank credit deflated by GDP deflator), real stock

prices (BSE Sensex deflated by GDP deflator, to account for the wealth effect arising from asset price inflation net of headline inflation), and real exchange rate (6-currency REER index).[16] The data were sourced from the Handbook of Statistics on Indian Economy of the Reserve Bank of India. The sample used for estimation was 1996:Q2 to 20010:Q2 with seasonally adjusted data for output, goods prices, bank credit and stock prices.

III.3.2 Empirical Estimates

The model is uniquely identified and the shocks are orthogonal (uncorrelated). Although some variables appear to be non-stationary, the VAR model is estimated in levels following Sims *et al*. (1990) who argue that a VAR model in levels may incur some loss in estimators' efficiency but not the consistency. The objective of estimating a VAR model in levels is to examine the underlying relationship among variables. The optimal lag length based on various criteria (*viz.*, LR test statistic, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion) appeared to be three quarters.

The estimated structural VAR model explains various channels through which asset prices may be influenced, which are presented in Chart 5. Aggregate demand shocks (*i.e.*, an increase in aggregate demand) lead to an increase in stock prices in the short run and the impact fizzles out in the medium to long run. Favourable aggregate demand shocks signal an improvement in the fundamentals of the economy and raise expectations of the future earnings growth in the stock market. An adverse supply shock that causes sudden changes in

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[16]   Robustness checks can be undertaken in terms of choice of variables, *i. e.*, using a broad based equity market index such as BSE 500 in place of the narrower benchmark index, *i.e.*, BSE Sensex used in the model. Data on the broader index is, however, available only since 1999 as against data on BSE Sensex which are available for a longer period and could be empirically modelled consistent with the quarterly GDP data which are available since 1996. Moreover, the correlation coefficient between the two indices for the period since 1999 at 0.99 suggests that the empirical findings may be indifferent to the choice of equity price index.

Chart 5: Impulse responses of stock prices to various shocks
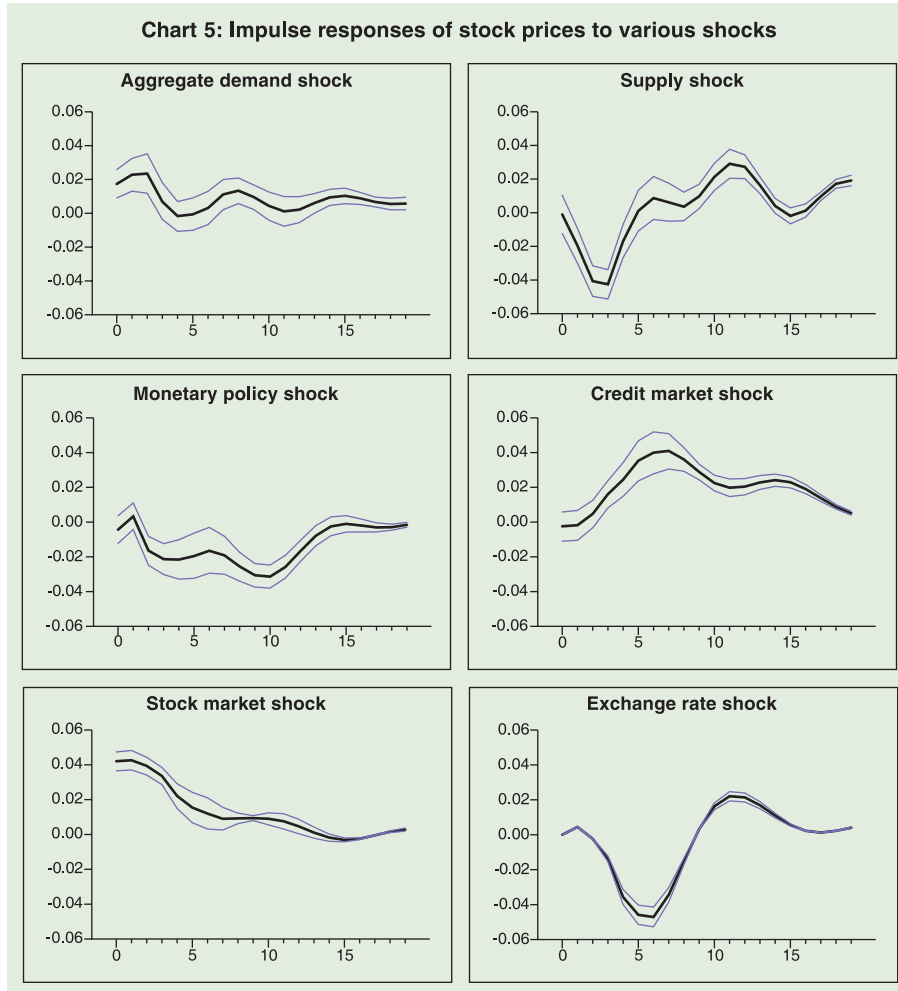
relative prices, leads to significant moderation in stock prices in the short to medium run. The asset price channel of monetary policy is found to be strong. A monetary policy shock causes significant fluctuations in equity prices. Since monetary policy works with variable lags, impulse response functions exhibit that monetary policy tightening leads to a slow but significant moderation in stock price changes over the medium to long run. The life cycle hypothesis of consumption suggests that when stock prices decrease, consumers' wealth also decreases and they spend less on consumption. Given this, monetary policy could affect demand through the asset price channel.

In India, however, on an average only about 6 per cent of total financial assets of households are held in the form of equity.

An important issue of concern to policy makers is how asset price shocks propagate to the rest of the economy and with what lags they impact various macroeconomic aggregates. The estimated structural VAR model exhibits that stock price shocks affect output with some lags over the medium-term, though with no significant long run impact (Appendix 1). The impact on output could be through the typical wealth effect and balance sheet channels that cause changes in consumption and investment decisions. An adverse output shock, which may be the result of negative shock to asset prices, triggers an expansionary monetary policy response in terms of lower interest rate in the short run. This corroborates the indirect role of monetary policy relative to asset prices, *i.e.*, through the impact on output. Asset price shocks do not seem to have a significant direct impact on the price level. Shocks from stock prices explain only marginal fluctuations in the overall price level over medium to long run. This suggests no need for even indirect monetary policy response to asset price developments, unlike the impact observed through output.

Stock price shocks also do not seem to lead to any noticeable changes in interest rates in the short run. It suggests that monetary policy does not respond to asset prices. This could also be because of the muted impact of stock price shocks on inflation. Favourable stock price shocks tend to cause increase in the demand for bank credit with lags over the medium-term. In fact, by the end of eight quarters, stock price shocks explain about 10 per cent of the fluctuations in real demand for credit. The most significant impact of stock price shocks is on the real exchange rate, which possibly works through capital flows. Higher stock prices change the return differentials for foreign investors, making investment in the Indian markets more attractive, which in turn lead to higher inflows and hence appreciation of the real exchange rate in the short run. This effect, however, moderates over medium to long run.

The above findings suggest that though the direct impact of asset price shocks on goods prices is not significant, they may still be of

interest to the central bank from the standpoint of their impact on credit demand, output and exchange rate. Thus, monetary policy may respond to asset prices only indirectly, for which, however, clearer identification of the influence of asset price changes on inflation, growth or exchange rate would be important. Asset prices appearing to be sensitive to monetary policy changes do not provide a strong case for deploying monetary policy to counter asset price movements. Relying on the asset price channel to achieve the ultimate policy goals of growth and price stability could be too risky a proposition to be ventured. Thus, interest rate channel should remain the prime focus of monetary policy, even if asset prices may respond to changes in monetary policy, which in turn may influence the ultimate goal variables that the monetary policy aims to achieve. Asset prices as such should not become an intermediate objective of monetary policy.

The response of stock prices to credit market shocks validates the presumed role of credit expansion in contributing to the asset price bubbles.[17] A comparative assessment of the impulse response functions reveals that monetary policy tightening leads to a moderation in credit demand over the medium-term, given the usual lags in the impact of monetary policy (Appendix 1). The tightening of policy interest rates also impacts stock prices, as financing the leverage in the markets turns costlier.[18] The impulse responses exhibit that a positive shock to bank credit causes significant increase in equity prices over medium to long run. The credit market shock at the same time causes significant variations in real output. Thus, the asset price dynamics become complicated as the positive credit shocks lead to simultaneous increase in both output and asset prices. From the perspective of a monetary

[17]   Variations in bank credit are an important channel of monetary policy transmission mechanism even for central banks that rely on interest rates to convey their policy stance. Modulations in policy interest rates by the central bank influence credit market conditions, which reinforce the effects of the traditional interest rate channel of monetary transmission.

[18]   The impact of credit channel on asset prices can also work through changes in market perception. As credit conditions are tightened, the perception about the overheating of the economy may get strengthened and accordingly the stock prices may decline.

policy response, it becomes difficult to segregate the part of asset price increase that may be caused by improvement in fundamentals from the one led by speculative credit flows to asset markets.

The stock market shock, measured in terms of lagged impact of the stock prices, could reflect composite impact of backward-looking investor behaviour, overreaction by agents to news about the fundamentals, impact of sudden surges in portfolio inflows and the herd behaviour/animal spirits. These shocks are most dominant in causing fluctuations in stock prices in the short run but their impact peters-off at a rapid pace.[19] Another important channel through which asset prices are impacted is the exchange rate channel. A positive shock to real exchange rate, signifying the adverse external competitiveness shock, results in significant moderation in stock prices with a lag, consistent with lags involved in exchange rate transmission to macroeconomic aggregates. The impact, however, does not seem to be persistent.

The results of decomposition of fluctuations in stock prices caused by various macroeconomic shocks are presented in Table 5. Although the asset price shock explains the predominant part of variations in stock prices in the short run, it is the credit demand shock that explains the largest proportion of variations in asset prices over the medium to long run. The aggregate demand and supply shocks tend to have short to medium-term impact on stock prices. The variance decomposition analysis of fluctuations in credit demand also reveals that aggregate demand shocks explain significant variation in real credit demand, which in turn, might be impacting on the stock price movements given the causal relationship between bank credit and stock prices (Appendix 2). The real exchange rate shock appears significant over the medium to long run in explaining fluctuations in stock prices in India. The role of exchange rate in affecting asset prices could emanate from changes in relative attractiveness of returns

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[19]   We deliberately refrained from including portfolio inflows in the model to segregate their impact from the residual shocks due to constraint of a parsimonious model. Given the quarterly time series, introduction of additional variables in the model could significantly undermine the efficiency of the parameters.

Table 5: Decomposition of fluctuations caused in stock prices

(Per cent)

Quarters	Demand shock	Supply shock	Monetary policy shock	Credit market shock	Asset price shock	Exchange rate shock
1	14.1	0.0	1.1	0.5	84.3	0.0
4	10.4	26.9	6.4	2.1	52.4	1.8
8	6.1	13.3	8.4	18.8	27.0	26.5
12	7.3	13.4	14.9	21.5	20.6	22.2
16	7.4	14.3	14.1	23.8	18.4	22.0
20	7.7	15.3	13.6	24.4	17.8	21.2

on foreign capital in the stock markets in the short run due to nominal appreciation of the rupee, and a loss of overall external competitiveness over the medium to long run, which may adversely affect the growth outlook and hence dampen stock prices.

The contributions of various shocks to asset price movements in India could be gleaned from the historical decomposition of the fluctuations in stock prices. It is evident from Chart 6 that booms in stock prices since the mid-2000s were, on an average, dominated by real credit and stock market shocks. The stock market residual shocks capture the composite impact of a host of factors including the news about fundamentals and sudden changes in the market sentiments driven by foreign institutional investors as well as the unanticipated

Chart 6: Historical decomposition of fluctuations in real stock prices explained by various macroeconomic shocks
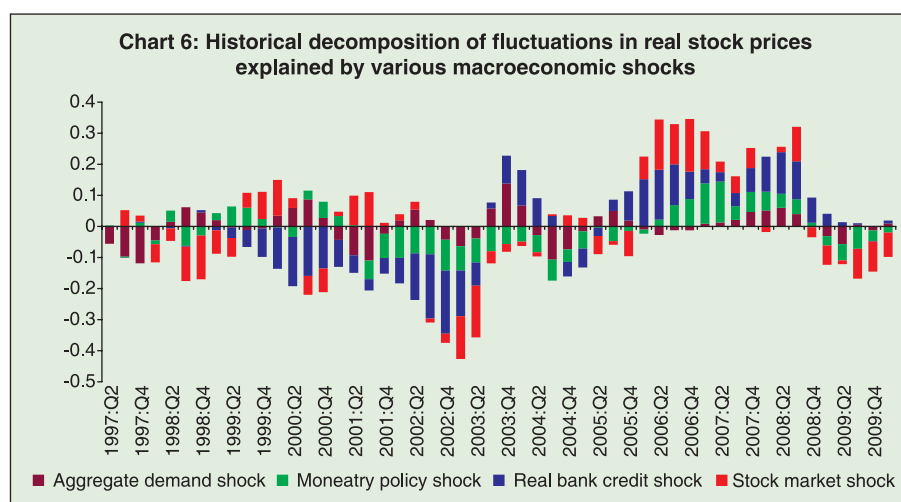
domestic shocks. Although the contribution of monetary policy shocks during the early phase of the recent asset cycle boom appeared to be significant, it tapered-off subsequently.

IV. Conclusion

In the post-global crisis period there has been an increasing emphasis on the need to explore the scope of monetary policy in responding directly to asset price developments for promoting financial stability. This renewed interest in the role of monetary policy in stabilising asset price cycles has compelled policy makers to have a re-look at the pre-crisis consensus that seemed to favour a hands-off approach to asset prices and to manage the consequences of both booms and busts in asset price cycles. The extensive debate after the global crisis does not seem to suggest that the pre-crisis consensus was blatantly fallacious. Alternative instruments at the disposal of a central bank, namely micro and macro-prudential tools, could be superior relative to the interest rate instrument, both in terms of effectiveness and minimising the overall costs to the economy. Monetary policy as a macroeconomic policy tool can ensure an environment in which prudential regulation could become somewhat more effective.

In India, despite the limited risks from asset price cycles to macro-financial conditions relative to the advanced economies, much greater reference to asset prices is being made in the context of monetary policy. The concern relating to surges in capital flows fuelling asset prices has also provided another dimension to the debate on the dynamics between capital flows, asset prices and monetary policy. The Reserve Bank has used in the past both micro and macro-prudential measures to limit the risks to financial stability from asset price cycles. It, however, has justifiably refrained from using policy interest rates with the specific intention of influencing asset prices. This paper provides empirical evidence to explain the appropriateness of such an approach and highlights that the same approach may have to continue. Expected impact of asset price trends on inflation and

output, however, needs to be assessed regularly so that the scope for indirect response of monetary policy to asset price shocks could be integrated to the monetary policy framework. The monetary policy itself, which already caters to multiple objectives, should not be assigned any explicit direct role in stabilising asset prices. In this context, any policy that aims at limiting the overall pace of credit growth may have to be driven by developments such as either economic overheating or persistent high inflation, but not the perception of an asset price bubble. Similarly, if an accommodative monetary policy stance has to be sustained for a prolonged period in response to an economic slowdown or a recession, the fear of such a stance leading to asset price inflation should not trigger hasty tightening of monetary policy. For the purpose of clarity, sector specific limits on the flow of credit to asset price sensitive sectors, or even caps on direct and indirect exposure of the banking system to asset price cycles should be seen purely as prudential measures, which are different from monetary policy measures.

The empirical analysis for India exhibits that while interest rate changes cause changes in stock prices, the reverse causality does not hold. This seems to suggest that monetary policy in India does not respond to asset prices, but the asset price channel of monetary policy transmission exits. Evidence of a significant bi-directional causal relationship between credit growth and asset price trends does not provide any unambiguous result about the role of credit in asset price bubbles. This is so because of the role of a common factor; *i.e.* strong GDP growth coinciding with high credit growth, and the former driving the asset prices up.

Regarding housing assets, given the absence of a reasonably long time series data on house prices, this paper used a number of proxy variables. The movement in stock prices and collection of "stamp duties and registration fees" relating to housing tend to follow a systematic relationship, indicating the possibility of a broad-based asset price cycle. The housing credit demand in India appears to be sensitive to interest rate movements, which though does not validate

an explicit role for monetary policy in influencing housing prices. This is because the impulse response functions reveal that monetary policy tightening leads to a moderation in credit demand over the medium-term, given the usual lags in the impact of monetary policy, which in turn gives rise to lower real output. Thus, any asset price objective attempted to be achieved through monetary policy actions may involve sacrifice of growth. Given the possibility of an adverse feedback loop, where falling asset prices and contraction in output could intensify in a spiral, direct use of monetary policy must be avoided. Moreover, asset price dynamics could be difficult to decipher for meaningful use in the conduct of monetary policy. For example, an increase in the flow of credit in the VAR model seems to lead to increase in both output and asset prices. It could be, however, particularly difficult to segregate the part of asset prices increase that might have been caused by improvement in fundamentals from the part led by speculative credit flows to asset markets. This ambiguity suggests why countercyclical regulatory policies to counter asset price bubbles could be more appropriate relative to direct use of monetary policy.

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Appendix 1: Impulse response of macroeconomic variables to various shocks
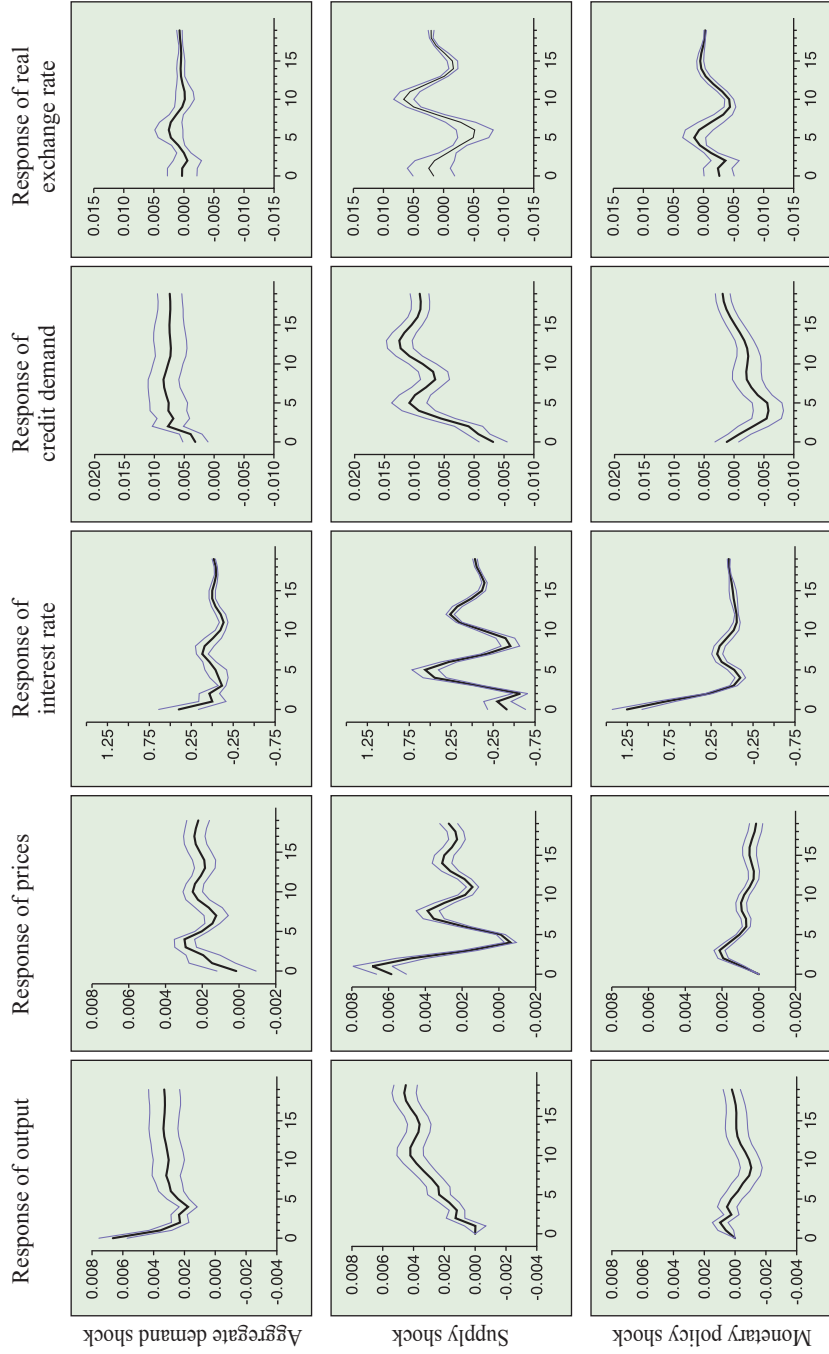
Appendix 1: Impulse response of macroeconomic variables to various shocks (*Concld.*)
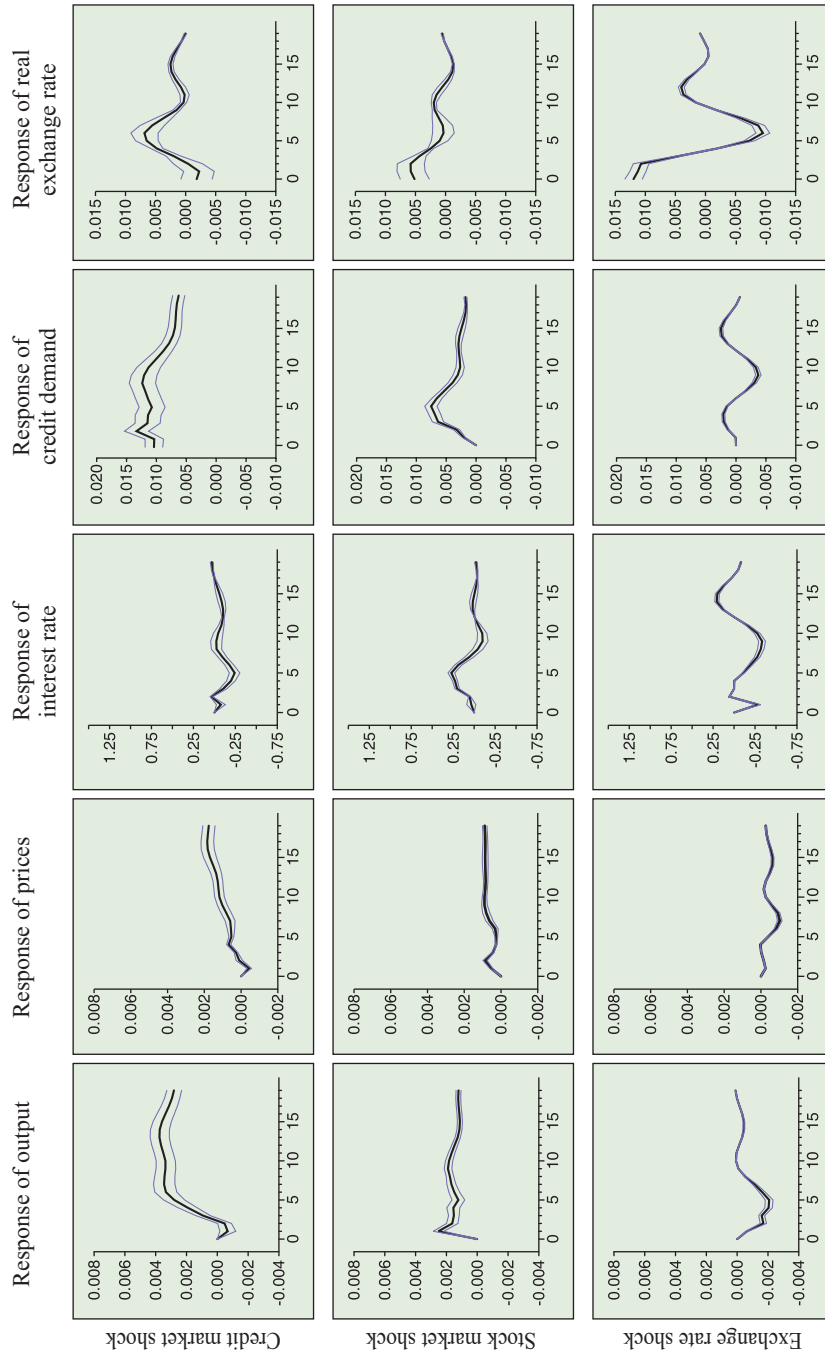
**Appendix 2: Decomposition of fluctuations caused in
various macroeconomic variables**

(Per cent)

Quarters	Demand shock	Supply shock	Monetary policy shock	Credit market shock	Asset price shock	Exchange rate shock
Aggregate output						
1	100.0	0.0	0.0	0.0	0.0	0.0
4	71.3	3.4	1.6	1.9	14.3	7.5
8	46.5	12.2	1.1	18.6	11.2	10.3
12	38.5	22.4	1.5	22.4	9.7	5.5
16	36.0	25.5	1.1	25.6	7.9	3.9
20	34.5	30.0	0.8	24.8	6.9	3.0
Price level						
1	1.2	98.8	0.0	0.0	0.0	0.0
4	9.5	81.4	7.7	0.2	1.1	0.1
8	14.8	72.6	9.0	1.0	1.3	1.3
12	19.2	66.0	7.9	2.8	2.4	1.6
16	21.3	62.1	6.4	5.4	3.0	1.7
20	24.1	57.4	5.4	8.2	3.4	1.6
Real short-term interest rate						
1	0.0	10.4	89.6	0.0	0.0	0.0
4	2.5	19.0	73.6	0.6	1.5	2.8
8	1.9	27.9	56.0	3.8	5.2	5.2
12	2.1	31.1	47.7	3.4	4.8	11.0
16	2.1	31.6	45.5	3.8	4.6	12.4
20	2.2	31.8	44.9	3.8	4.6	12.7
Real bank credit						
1	5.0	8.2	1.2	85.6	0.0	0.0
4	20.1	5.1	5.4	61.8	7.0	0.8
8	23.1	16.8	5.9	43.2	10.4	0.7
12	24.2	18.4	4.5	43.2	8.0	1.6
16	24.6	25.3	3.6	38.1	6.8	1.6
20	25.4	27.5	3.3	36.1	6.2	1.5
Real exchange rate						
1	0.7	1.8	3.8	2.0	14.2	77.5
4	0.5	2.3	4.9	2.2	19.4	70.7
8	1.2	7.3	3.2	14.4	11.7	62.2
12	2.0	13.4	7.1	12.8	10.3	54.5
16	1.9	13.7	7.0	13.3	10.1	54.1
20	2.1	14.1	6.9	13.6	10.0	53.3

Exports and Economic Growth: An Examination of ELG Hypothesis for India

Narayan Chandra Pradhan*

Empirical verification of export-led growth (ELG) hypothesis by applying various time series techniques reveals both short- and long-run relationship between export growth and output growth. The research question that has been addressed in the study is: whether openness has impact on growth, and if so, then in what direction? Bivariate Granger causality test suggests that the direction of causality runs from export growth to GDP growth. This fact implies that one can use exports to better predict the GDP than simply by the past history of GDP. The aim is to substantiate the importance of exports in the growth process of Indian economy after its opening up to the world economy.

I. Introduction

Economists across the board have agreed with the opinion that the process of economic growth is an extremely complex phenomenon. It depends on many variables, such as, capital accumulation (both physical and human), international trade, price condition, political situation, income distribution, and even more on geographical factors. Export-led growth (ELG) hypothesis postulates that export expansion is one of the prime determinants of economic growth. The overall growth of countries can be generated not only by increasing the amounts of labour and capital within the economy as the classical economists postulates, but also by expanding exports to wider markets. According to the proponents of ELG hypothesis, exports can perform the function of an 'engine of growth'. The association between exports and economic growth is often attributed to the positive externalities for the

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domestic economy arising from participation in world markets, for instance, from the re-allocation of existing resources, economies of scale and various labour-specialisation effects (Bhagwati, 1978; Krueger, 1978).

The term ELG hypothesis is seldom explicitly defined in economic literature. However, it is clear that most authors have in mind some notion of a *multiplier* effect, whereby, an initial favourable shock in the export sector sets in motion forces leading to additional economic growth. Kindleberger (1962) defines trade as a *leading sector* when 'exports rise would lead to an incentive for the establishment and expansion of other peripheral activities'. Meier (1976) explained that the export sector acts 'as a key *propulsive* sector, propelling the rest of the economy forward'. In keeping with the spirit of these definitions, the criterion adopted here for 'strong export-led growth' (SELG) is that expansion in the export sector should stimulate aggregate capital accumulation. This is the natural criterion in that with a larger capital stock the increase in steady-state growth is greater than the direct gain conferred by the terms of trade improvement or resource discovery. An increase in the steady-state capital stock is a necessary but not sufficient condition for growth to be higher in the long run. If it can be established that steady-state growth increases despite a decline in the aggregate capital stock, the outcome will be labelled as 'weak export-led growth' (WELG). Finally, when capital decumulation is severe enough to lower steady-state growth, the outcome will be characterised as 'export-led fizzle' (ELF).

In fact, during the 1990s a new series of empirical studies has been conducted on a number of divergent lines of research methodologies, time periods and countries. A key aspect of the earlier studies is related to both the analytical and the econometrics technique used. Earlier studies could have been misleading in the sense that they advocated export expansion in an indiscriminate way (Feder, 1982). In fact, the evidence available is inconclusive and this situation explains to some extent why this debate still exists in the economic literature. Added to this debate is the question of whether strong economic performance is 'export-led' or 'growth-driven'. This question is important because the

determination of the causal pattern between export and economic growth has important implications for policy-makers' decision about the appropriate growth and development strategies.

Although, most studies focus on the causal link between exports and output growth in industrialised countries (Marin, 1992; Serletis, 1992; Henriques and Sadorsky, 1996), some researchers have examined the export-led growth hypothesis with emphasis on developing countries (Michaely, 1977; Balassa, 1978). Using data from selected industrialised countries, Marin (1992) examines the causal link between exports and productivity and finds that the export-led growth (ELG) hypothesis cannot be rejected for Germany, Japan, the United Kingdom, and the United States. Henriques and Sadorsky (1996) similarly focused on the export and output growth relationship for Canada using three variables (GDP, exports, and terms of trade). They employ a multivariate cointegration estimation methodology that accounted for potential feedback and simultaneity effects between these three variables. In contrast to Serletis's (1992) earlier result, Henriques and Sadorsky (1996) find that 'changes in GDP precede changes in exports'.

The lack of consistent causal pattern between exports and output growth in earlier studies may be due to one or more of the following issues. The causal models in those studies may be mis-specified because of: (i) the omission of an important variable, such as, capital and foreign output growth; (ii) the traditional Granger causality F-test in a regression context may not be valid if the variables in the system are cointegrated, since the test statistic does not have a standard distribution (Toda and Philips, 1993); and (iii) temporal aggregation issues from the use of annual time series may yield erroneous causation results (Bahmani-Oskooee and Alse, 1993).

Consequently, the purpose of this article is to examine the nexus between export growth and economic growth and test the ELG hypothesis for Indian economy. The analysis has three distinctive features differentiated from earlier empirical studies: (i) the study has gone beyond the traditional neo-classical theory of production

function by estimating an augmented Cobb-Douglas functional form, which includes exports using annual data for the period 1970-71 to 2009-10. This study also includes services exports to that of merchandise one, as earlier studies generally based upon; (ii) the analysis carried out by focussing on a single country – India, instead of cross-country comparison; (iii) the study has examined empirically the long-run relationship, using procedures like unit root tests, stationarity, cointegration, Granger causality and vector autoregresion (VAR). Thus, the aim is to substantiate the importance of exports in the 'growth process of Indian economy' after its opening up to the world economy.

II.   Literature Survey

II.1   Literature on ELG Hypothesis

For the last two decades, there has been massive resumption of economic growth literature triggered by the 'endogenous growth theory', which has led to the propagation of models that stress the importance of trade in achieving a sustainable rate of economic growth. These models have focused on different variables, such as, degree of openness, real exchange rate, tariffs, terms of trade and export performance, to verify the hypothesis that open economies grow more rapidly than the closed ones (Edwards, 1998). Although, most models emphasised the nexus between trade and growth, they stressed that trade is only one of the variables that enter the growth equation. However, the advocates of the ELG hypothesis have stated that trade, in fact, was the main engine of growth in Southeast Asia. They argue that, for instance, Hong Kong, Taiwan, Singapore and South Korea, the so-called *Four Tigers*, have been successful in achieving high and sustained rates of economic growth since the early 1960s because of their free-market and the outward-oriented economies (World Bank, 1993). The literature concerning the relationship between trade and growth is also the consequence of the many changes that have taken place in the fields of development economics and international trade policy.

Although, a substantial part of the earlier studies found evidence of a correlation between exports and growth which was used to support the ELG hypothesis, this tends to hold only for cross-sectional studies. In fact, the recent evidence on time series, which makes extensive use of cointegration techniques, casts doubts on the positive effects of exports on growth in the long-run, and is thus not as conclusive as it was previously thought.

Among earlier major empirical studies, Emery (1967), Syron and Walsh (1968), Heller and Porter (1978), Bhagwati (1978) and Krueger (1978) can be mentioned. These studies explained economic growth in terms of export expansion alone in a two-variable framework. That is, they used bi-variate correlation - the Spearman's rank correlation test - in cross-country format to illustrate the superior effects of the ELG hypothesis (Lussier, 1993). A second group of researchers, which includes Balassa (1978), Tyler (1981), Feder (1982), Kavoussi (1984), Ram (1985, 1987) and Moschos (1989) studied the relationship between export and output performance within a neo-classical framework. In most of these studies exports were included in an *ad hoc* manner in the production function, together with labour and capital. They claimed that by including exports they were taking into consideration a broad measure of externalities and productivity gains generated by this sector which stimulated the domestic economy. The majority of these investigations aimed at analysing developing countries by using ordinary least squares (OLS) on cross-section data and used their results to demonstrate the advantages of the export promotion strategy in comparison with the import substitution policy.

For most of the country-specific studies, both industrialised and developing, the empirical investigations found no long-run relationship between exports and economic growth; rather, the studies suggest that it arises only from a positive short-term relationship between export expansion and growth of gross domestic product (GDP). The studies of industrialised nations have analysed the cases of Canada, France, Germany, the United Kingdom, the United States and Switzerland, among others. In only a few cases have the empirical results confirmed

that export expansion was a key element in the economic success of those countries (Kugler, 1991; Afxentiou and Serletis, 1991; Henriques and Sadorsky, 1996). Even more surprising is the finding in relation to Japan, which states that internal forces were the handmaidens of the great Japanese economic success in the twentieth century, including the post-war period, and not trade as many have claimed in the recent past (Boltho, 1996).

The most recent time series investigations concerning developing countries that have used the econometric methodology of cointegration have not been able to establish unequivocally that a robust relationship between these variables indeed exists in the long term, namely that the variables are cointegrated (Islam, 1998). While some have been able to find a long-run relationship, many others have rejected the ELG hypothesis *i.e.,* that export expansion causes growth in the long run. In fact, in most studies the results suggest that this arises owing to a simple short-term relationship, a feature that is not surprising, if we take into account the fact that the studies that have concentrated their attention on industrialised nations have also been unable to find a robust relationship between these variables (Kugler, 1991).

Berg and Schmidt (1994) found cointegration in 11 of the 16 Latin American Countries analysed. In fact, in the case of Costa Rica they were able to verify the existence of a long-term relationship. Although the result seems to endorse in general the export-led hypothesis, they seem to deviate from those recently reported by the empirical literature (Rodrik, 1999). However, a possible justification of the positive results obtained in the investigation conducted by Berg and Schmidt (1994) is that these researchers employed population and investment as proxies for the appropriate aggregate inputs, i.e. labour force and capital stock. Although they have been widely used in many cross-section growth studies as well as time series analysis (Al-Yousif, 1997), many researchers have had serious doubts about them and have thus expressed their suspicion regarding studies that have tested the export promotion hypothesis by using, for instance, the investment-output ratio, i.e. gross domestic investment (GDI)/gross domestic product (GDP), as opposed to capital stock or population instead of labour force.

Though, there are numerous facets to the trade-growth nexus, most of the literature has concentrated on disturbances connected with the export sector. The ELG hypothesis has frequently been invoked to explain differences in development patterns among developing countries. The trade theorists have also examined the growing concern over the potentially adverse effects of a booming natural resource based export sector termed as *Dutch Disease phenomenon*. The literature on this special aspect focus on the impact of a rise in export revenues from an inelastically supplied, resource intensive product that uses little capital or labour and is not consumed domestically - and tends to make de-industrialisation, not aggregate growth, its principal concern (Buffie, 1992).

Despite the sizeable literature generated by the ELG hypothesis, little is known about how various export shocks might affect the economic growth. The numerous case studies done by development economists and economic historians are full of suggestive ideas but do not point to any firm conclusions. Country experiences have varied widely and in the absence of any explicit theoretical framework linking export shocks and the main determinants of economic growth. It is, thus, difficult to judge whether export sector expansion has stimulated growth, retarded growth, or merely accompanied growth or contraction in the rest of the economy (Kindleberger, 1961; Kravis, 1970; Meier, 1976).

There have been studies on the existence of a threshold effect as well (Kavoussi, 1984; Moschos, 1989). These studies have been supplemented by causality tests (Jung and Marshall, 1985). The econometric methods employed in these analyses have been significantly influenced by the work of Granger (1969), Engle and Granger (1987), and Johansen and Juselius (1990), among others. The studies such as Jung and Marshall (1985), Afxentiou and Serletis (1991), and Dodaro (1993) have cast some doubt on the validity of the ELG hypothesis. Others such as Serletis (1992), Henrique and Sadorsky (1996), Bahmani-Oskooee and Alse (1993), and Nidugala (2001) provide fairly robust evidence in favour of the ELG hypothesis. Most of the time series studies employ the Granger method, while

only a few studies combine Granger's test with the Akaike's Information Criterion (AIC) to determine the optimal lag length in the Granger causality test. The latter approach removes the ambiguity involved in the arbitrary choice of lag lengths.

The idea that export growth is one of the major determinants of output growth - ELG hypothesis - is a recurrent one. Export growth may affect output growth through positive externalities on non-exports, through the creation of more efficient management styles, improved production techniques, increased scale economies, improved allocative efficiency, and better ability to generate dynamic comparative advantage. If there are incentives to increase investment and improve technology, this would imply a productivity differential in favour of the export sector. It is thus argued that an expansion of exports, even at the cost of other sectors, will have a net positive effect on the rest of the economy (Balassa, 1978). It may also ease the foreign exchange constraint. There could also be positive spillover effects on the rest of the economy. These factors, notwithstanding, the empirical evidence for the ELG hypothesis is mixed.

II.2 ELG Hypothesis: Studies on India

There is fair amount of literature on ELG hypothesis pertaining to Indian economy. Majority of the empirical studies found lack of causality between export and economic growth in both directions. Jung and Marshall (1985) and Dodaro (1993) reported an insignificant F-statistic for real export growth to real income growth as well as in other way round, although the sign is positive in both cases. Similarly, Dhawan and Biswal (1999) investigate the ELG hypothesis using a vector autoregressive (VAR) model by considering the relationship between real GDP, real exports and terms of trade during 1961-1993. They employ a multivariate framework using Johansen's cointegration procedure and find a long-run equilibrium relationship between these three variables and the causal relationship flows from the growth in GDP and terms of trade to the growth in exports. However, they conclude that the causality from exports to GDP appears to be a short-run phenomenon. In a similar framework,

Asafu-Adjaye *et al*. (1999) consider three variables: exports, real output and imports for the period 1960-1994. They do not find any evidence of the existence of a causal relationship between these variables in case of India and no support for the ELG hypothesis, which is not too surprising given India's economic history and trade policies. Anwer and Sampath (2001) also find evidence against the ELG hypothesis for India.

Mallick (1996), using annual data for the period 1950-92 and employing Engle-Granger cointegration cum error-correction procedure, finds a strong cointegration between income and exports, and that the direction of causality runs from income growth to export growth (i.e., growth-led exports). While the Granger-causality tests, in his study, are sensitive to the lag length chosen and do not show consistent causal flow from income growth to export growth, the results of the error-correction model show that causation runs from income growth to export growth (as the error-correction term is significant) irrespective of the lag length chosen. This seems to suggest that the causality found by Mallick (1996) is a long-term phenomenon.

Nidugala (2001) finds evidence in support of the ELG hypothesis, particularly in the 1980s. His study reveals that growth of manufactured exports had a significant positive relationship with GDP growth, while the growth of primary exports had no such influence. Ghatak and Price (1997) test the ELG hypothesis for India during 1960-1992, using 'GDP net of exports' as regressor, along with exports and imports as additional variables. Their results indicate that real export growth Granger-caused by non-export real GDP growth over the period 1960-1992. Their cointegration tests confirm the long-run nature of this relationship. However, imports do not appear to be important in those studies.

Chandra (2002), on the other hand, finds that export growth and GDP growth are interlocked in a two-way relationship as opposed to Mallick (1996). Chandra also finds that real exports and real GDP are not cointegrated in lndia, implying that there is no

long-run relationship between them. Sinha (1996) envisaged the relationship between openness and economic growth in India, wherein, two types of analysis were performed. First, long run relationship between GDP and openness was studied. Secondly, tests were performed to find the causal relationship between GDP and openness. The result of the Granger causality test shows that there is a two-way causality between the growth of GDP and openness. Thus, a reduction in trade barriers is likely to promote economic growth i.e., the results of the study show that openness contribute to growth of GDP which implies that both exports and imports contribute to economic growth in the long run.

Marjit and Raychaudhari (1997) have analysed the implications of specific trade policies on exports and gross domestic products. They assumed that all the domestic demand will be catered by domestic production which leads to a decline in exports to some extent. In case of India, GDP granger causes export growth (yearly data for 1951 to 1994), but not vice versa according to their results. The volume of imports was hypothesised to be an increasing function of the real GDP and foreign exchange reserves and decreasing function of the relative price notion. A dummy variable was also introduced to account for the introduction of economic reforms. The study found that a growth in exports volume was due to growth in real income. The ordinary least square results of the study indicate that income elasticity of exports (with respect to world real income) is higher than the income elasticity of imports.

Sharma and Panagiotidis (2004) re-examines the sources of growth for the period 1971-2001 based upon Feder's (1982) model to investigate empirical relationship between export growth and GDP growth (the export led growth hypothesis). They investigate the following hypotheses: (i) whether exports, imports and GDP are cointegrated using the Johansen approach and Breitung's non-parametric cointegration test, (ii) whether export growth Granger causes GDP growth, and (iii) whether export growth Granger causes investment. They fail to find support for the hypothesis that exports Granger cause GDP, using two measures for GDP (GDP *with* exports

and GDP *without* exports). The same also holds for the relationship between exports and investment.

From the review of empirical literature on exports and growth, it is clear that the exports do not necessarily cause growth. The results reported are clearly sensitive to the variables employed, theoretical approach used and even on the econometric methodology employed. For example, cross-section studies are more likely to corroborate a positive relationship between exports and growth, while the results of time series studies depend substantially on the countries analysed, the period chosen and the econometric methods used. In addition, since cross-section studies can obscure particularities of developing countries, especially, those that are low-income countries, the correct strategy to follow from an empirical point of view is to address the issue in a single country framework, using as much as possible the recent developments in time series analysis.

III. Empirical Analysis and Results

III.1 Data, Source and Explanations

The data set consists of observation on India's export of goods and services, real GDP, gross domestic capital formation, real effective exchange rate, and the world GDP. It may be mentioned that, there are two basic sources for data on India's exports. One set is compiled by the Directorate General of Commercial Intelligence and Statistics (DGCI&S), Ministry of Commerce and Industry, Government of India and the other set is compiled by the Reserve Bank of India (RBI). The DGCI&S compiles information on real transactions, reporting quantities/volumes of exports as well as export earnings in Rupee terms. Merchandise exports are decomposed into headings compatible with the ITC (HS)[1] Standard Industrial Classification (SIC) codes. Thus, merchandise exports are disaggregated by SIC categories and

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[1]   International Trade Classification (Harmonised System) is an extended version of the International classification system called 'Harmonised Commodity Description and Coding System' evolved by World Custom Organisation previously known as Customs Cooperation Council.

by destination (i.e. according to commodity and country classification). The RBI export data (both goods and services) is compiled by aggregating the economy-wide financial transactions related to exports, as reported by exporting firms. Exporters and financial intermediaries have to provide this information to RBI on the basis of statutory provision. DGCI&S data has been used frequently in the trade analysis as the case of merchandise data is concerned. RBI's data based on Balance of Payments (BoP) basis has been used relatively less frequently. As the current study is concerned with services exports as well, it is decided to use the RBI's data sets for our analysis. Accordingly, the data used in this exercise has been obtained from the 'Handbook of Statistics on the Indian Economy 2009-10' (HBSIE). The data for the current empirical analysis pertaining to the period 1970-71 to 2009-10 compiled from HBSIE, partly owing to ease of availability at this end, and partly for using exports of both goods and services.

The time series data on real GDP and gross domestic capital formation (GDCF) are obtained from the 'Central Statistical Organisation' of the Government of India (Base Year: 1999-2000), the same is also published in HBSIE for the period 1970-71 to 2009-10. The time series data on real effective exchange rate (REER) are calculated from the RBI's HBSIE based on splicing methodology. It may be mentioned that the data on REER up to 1992 are based on official exchange rates and data from 1993 onwards are based on Foreign Exchange Dealers' Association of India (FEDAI) indicative rates. REER indices are recalculated from April 1993 onwards using the new wholesale price index (Base: 1993-94=100). A new 6-currency REER series (Trade-based weights) has been introduced with effect from December 2005.

The data set is annual and covers the period 1970-71 (financial year data represented by 1970 in econometric analysis) to 2009-10 (similarly represented by 2009). The data description and their specifications in empirical analysis are as follows:

(1) RGDP: Real GDP (GDP at factor cost at constant prices; Base: 1999-2000).

(2) EXGD: Exports of Goods (Merchandise exports on BoP basis)

(3) EXGS: Exports of Goods and Services (clubbing of Merchandise exports and Non-factor services receipts, both on BoP basis).

(4) GDCF: Gross Domestic Capital Formation at constant prices (Base: 1999-2000).

(5) REER: Real Effective Exchange Rate (Index).

(6) WGDP: World GDP (in value).

All the above series are subjected to logarithmic transformations. The prefix 'L' stands for the natural logarithm of the respective time series, 'R' stands for the residuals of the respective regression, and 'D' denotes differencing of the respective time series. It is appropriate to mention that, all econometric exercises are carried out by using *EViews*.

III.2 Tests of Unit Root and Stationarity

Before proceeding to the test the ELG hypothesis, it is appropriate that all the series be tested for stationarity or the 'same statistical property' - means the series have to be differenced or de-trended by the same number of times to render them stationary. The traditional approach of first differencing disregards potentially important equilibrium relationships among the levels of the series to which the hypotheses of economic theory usually apply (Engle and Granger, 1987).

The early and pioneering work on testing for a unit root in time series was done by Dickey and Fuller (Fuller, 1976; Dickey and Fuller, 1979). The basic objective of the test is to examine the null hypothesis that $\phi = 1$ in

$$y_t = \phi y_{t-1} + u_t \qquad (1)$$

Thus the hypotheses of interest are 'H$_0$: series contains a unit root' *versus* 'H$_1$: series is stationary'. In practice, the following regression is employed for ease of computation and interpretation

$$\Delta y_t = \psi y_{t-1} + u_t \qquad (2)$$

so that a test of $\phi =1$ is equivalent to a test of $\psi= 0$ (since $\phi - 1 = \psi$).

Dickey-Fuller (DF) tests can be conducted allowing for an intercept, or an intercept and deterministic trend, or neither in the test regression. The model for the unit root test in each case is

$$y_t = \phi y_{t-1} + \mu + \lambda t + u_t \qquad (3)$$

The tests can also be written, by subtracting y_{t-1} from each side of the equation, as

$$\Delta y_t = \psi y_{t-1} + \mu + \lambda t + u_t \qquad (4)$$

In another paper, Dickey Fuller provided a set of additional test statistics and their critical values for joint tests of significance of the lagged *y*, and the constant and trend terms. The test statistics for the original DF tests are defined as

$$\textit{test statistic} = \frac{\widehat{\psi}}{\widehat{SE(\widehat{\psi})}} \qquad (5)$$

The test statistics do not follow the usual *t*-distribution under the null hypothesis, since the null hypothesis is one of non-stationarity, but rather they follow a non-standard distribution.

The null hypothesis of a unit root is rejected in favour of the stationary alternative in each case *if the test statistics is more negative than the critical value*. Accordingly, Time series univariate properties were examined using two unit root tests: augmented Dickey and Fuller (1979) and Phillip and Perron (1988) tests. The PP tests are similar to ADF tests, but they incorporate an automatic correction to the DF procedure to allow for autocorrelated residuals. The tests often give

the same conclusions as, and suffer from most of the same important limitations as, the ADF tests.

Table 1 summarises the results for unit root tests on levels and in first differences (at 'maximum lags 2' with 'trend and intercept' included in the test equation) of the data. For the ADF tests, the lag length is based on the Akaike Information Criterion (AIC), while for the PP test bandwidth selection is based on Newey-West. It is evidenced from the test statistics that all the time series are $I(1)$. Under the classical hypothesis testing framework, the null hypothesis is never

Table 1: Unit Root Tests (1970-71 to 2009-10)

Series	Type	Test-Statistics	T-critical at 1%	T-critical at 5%	T-critical at 10%	Result
LRGDP	ADF	-0.8588	-4.2268	-3.5366	-3.2003	Don't Reject Null Hypothesis
	PP	-1.3544	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
D(LRGDP,1)	ADF	-7.6665	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
	PP	-9.0778	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
LEXGD	ADF	-2.3257	-4.2268	-3.5366	-3.2003	Don't Reject Null Hypothesis
	PP	-1.656	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
D(LEXGD,1)	ADF	-3.7838	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
	PP	-3.7838	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
LEXGS	ADF	-2.1216	-4.2268	-3.5366	-3.2003	Don't Reject Null Hypothesis
	PP	-1.2826	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
D(LEXGS,1)	ADF	-3.3545	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
	PP	-3.3991	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
LGDCF	ADF	-1.241	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
	PP	-1.1021	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
D(LGDCF,1)	ADF	-7.1698	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
	PP	-8.9766	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
LREER	ADF	-1.0933	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
	PP	-1.2592	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
D(LREER,1)	ADF	-5.302	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
	PP	-5.302	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
LWGDP	ADF	-1.0834	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
	PP	-1.3023	-4.2191	-3.5331	-3.1983	Don't Reject Null Hypothesis
D(LWGDP,1)	ADF	-5.2068	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis
	PP	-5.2068	-4.2268	-3.5366	-3.2003	Reject Null Hypothesis

accepted, it is simply stated that it is either 'rejected' or 'not rejected'. This means that a failure to reject the null hypothesis could occur either because the null was correct, or because there is insufficient information in the sample to enable rejection (Brooks, 2008).

The most important criticism that has been levelled at *unit root tests* is that their power is low if the process is stationary but with a root close to the non-stationary boundary. Stationarity tests have stationarity under the null hypothesis, thus reversing the null and alternatives under the Dickey-Fuller approach. Thus under stationary tests, the data will appear stationary by default if there is little information in the sample. One such stationarity test proposed by Kwaitkowski, Phillips, Schmidt, and Shin (1992), in short, the KPSS test on the *levels series* presented in Table 2. We have now observed that the test statistics exceeds the critical value even at 1% level, so that the null hypothesis of a *stationary series* is strongly rejected. The results of these tests can be compared with the ADF/PP procedure to see if the same conclusion is obtained. The joint use of unit root tests and stationarity is known as *confirmatory data analysis*. The null and alternative hypotheses under each testing approach are as follows:

ADF/PP	KPSS
$H_0: y_t \sim I(1)$	$H_0: y_t \sim I(0)$
$H_1: y_t \sim I(0)$	$H_1: y_t \sim I(1)$

There are four possible outcomes:

(1) Reject H_0 and   Do not reject H_0

(2) Do not Reject H_0 and   Reject H_0

(3) Reject H_0 and   Reject H_0

(4) Do not Reject H_0 and   Do not Reject H_0

For the conclusion to be robust, the results should fall under outcomes (1) or (2) above.

Table 2: KPSS Stationarity Tests (1970-71 to 2009-10)

Series	Test-statistics	T-critical at 1%	T-critical at 5%	T-critical at 10%	Result
LRGDP	0.7595	0.7390	0.4630	0.3470	Reject Null Hypothesis
LEXGD	0.7701	0.7390	0.4630	0.3470	Reject Null Hypothesis
LEXGS	0.7660	0.7390	0.4630	0.3470	Reject Null Hypothesis
LGDCF	0.7563	0.7390	0.4630	0.3470	Reject Null Hypothesis
LREER	0.6908	0.7390	0.4630	0.3470	Reject Null Hypothesis
LWGDP	0.6752	0.7390	0.4630	0.3470	Reject Null Hypothesis

By conducting tests under both types of the null hypotheses, the results are much more robust than if just one of the tests is used, provided of course that the results of the two tests are compatible. In all cases, both the tests confirm the same conclusion – all the variables under examination are having property $I(1)$. The results of the unit root tests performed corroborate previous findings in the empirical literature, i.e. as with most macroeconomic series, the variables under consideration in this study appear to be non-stationary and trended in levels. Only their first differences are stationary.

Consequently, the next section of the empirical study investigates whether the series under scrutiny are cointegrated, so that a well-defined linear relationship exists among them in the long run. Thus, we proceed to test for cointegration between the variables on levels using several tests, all of which are based on the 'null hypothesis of no cointegration'.

III.3 Tests of Cointegration (Engle-Granger Approach)

In most cases, if two variables that are $I(1)$ are linearly combined, then the combination will also be $I(1)$. Most generally, if variables with differing orders of integration are combined, the combination will have an order of integration equal to the largest. This linear combination of $I(1)$ variables will itself be $I(1)$, but it would obviously be desirable to obtain residuals that are $I(0)$, so that the variables are *cointegrated*.

According to Engle and Granger (1987), a set of variables is defined as cointegrated, if a linear combination of them is stationary.

Many time series are non-stationary but 'move together' over time – that is, there exist some influences on the series (for example, market forces), which imply that the two series are bound by some relationship in the long run. A cointegrating relationship may also be seen as a long term or equilibrium phenomenon, since it is possible that cointegrating variables may deviate from their relationship in the short run, but their association would return in the long run. An interesting question is: whether a potentially cointegrating regression should be estimated using the levels of the variables or the logarithms of the levels of the variables. Hendry and Juselius (2000) noted that, if a set of series is cointegrated in levels, they will also be cointegrated in log levels. It is common to run a regression of the log of the series rather than on the levels; the main reason for using logarithms is that differences of the logs are growth rates, whereas this is not true for the levels.

In the main case under scrutiny (Screenshots 1A and 1B): the ELG hypothesis represented by cointegration sub-tests are able to find evidence in favour of long run relationship between real GDP and exports independently of other variables in case of the Indian

Screenshot 1A: ADF Test Result

"Null Hypothesis: R-LRGDP-*LEXGD* has a unit root" Exogenous: Constant Lag Length: 3 (Automatic based on AIC, MAXLAG=3)		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.8336	0.0639
Test critical values:	1% level	-3.6329	
	5% level	-2.9484	
	10% level	-2.6129	
*MacKinnon (1996) one-sided p-values.			

Screenshot 1B: ADF Test Result

"Null Hypothesis: R-LRGDP-*LEXGS* has a unit root" Exogenous: Constant Lag Length: 3 (Automatic based on AIC, MAXLAG=3)		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.6676	0.0890
Test critical values:	1% level	-3.6156	
	5% level	-2.9412	
	10% level	-2.6091	
*MacKinnon (1996) one-sided p-values.			

economy. When variables are cointegrated, the OLS estimates from the cointegrating regression will be super consistent, implying that the estimates approach their true parameters at a faster rate than if the variables were stationary and not cointegrated (Gujarati, 2003). The presence of a cointegrating relationship forms the basis of error correction specification. One can treat error term as equilibrium error.

III.4 Equilibrium Correction or Error Correction Model

The error correction mechanism (ECM) was first used by Sargan (1984) and later popularised by Engle and Granger (1987). An important theorem known as *Granger Representation Theorem* states that if two variables Y and X are cointegrated, then the relationship between the two can be expressed as ECM. The error correction model takes the following form of equation:

$$\Delta y_t = \beta_1 \Delta x_t + \beta_2(y_{t-1} - \gamma x_{t-1}) + u_t \tag{6}$$

In equation (6), $(y_{t-1} - \gamma x_{t-1})$ is known as the *error correction term*. Provided that y_t and x_t are cointegrated with cointegrating coefficient γ, then $(y_{t-1} - \gamma x_{t-1})$ will be $I(0)$ even though the constituents are $I(1)$. It is thus valid to use OLS and standard procedures for statistical inference on (6). The error correction term $(y_{t-1} - \gamma x_{t-1})$ appears with a 'lag'. γ define the long run relationship between x and y, while β_1 describes the short-run relationship between changes in x and changes in y. Broadly, β_2 describes the speed of adjustment back to equilibrium, and its strict definition is that it measures the proportion of last period's equilibrium error that is corrected for.

In both cases (Screenshots 2A and 2B), the coefficients of the error correction term have the desired sign (negative). About 17 per cent of disequilibrium is corrected every year in case of cointegration between 'exports of goods' and GDP and about 14 per cent disequilibrium corrected every year in case of 'exports of goods and services' and GDP. The significance of the error correction term at 5% level confirms that exports and GDP are cointegrated in the long run and error correction takes place in the short run.

Screenshot 2A: Result of Error Correction Model

Dependent Variable: DLRGDP Sample (adjusted): 1971-72 to 2009-10 No. of observations: 39 after adjustments			
Variable	**Coefficient**	**t-Statistic**	**Prob.**
DLEXGD	0.3155	7.1211	0.0000
R-LRGDP-*LEXGD*(-1)	-0.1739	-2.6035	0.0133
R-squared: -0.6237 S.E. of regression: 0.0391 Durbin-Watson stat: 1.8183			

Screenshot 2B: Result of Error Correction Model

Dependent Variable: DLRGDP Sample (adjusted): 1971-72 to 2009-10 No. of observations: 39 after adjustments			
Variable	**Coefficient**	**t-Statistic**	**Prob.**
DLEXGS	0.3096	7.6026	0.0000
R-LRGDP-*LEXGS*(-1)	-0.1443	-2.3524	0.0242
R-squared: -0.505251 S.E. of regression: 0.037637 Durbin-Watson stat: 1.797727			

One of the major drawbacks of Engle-Granger approach is that it can estimate only up to one cointegrating relationship between the variables. But in other situations, if there are more variables, there could potentially be more than one linearly independent cointegrating relationship. Thus it is appropriate to examine the issue of cointegration within the Johansen's VAR framework.

III.5 Johansen Cointegrating Systems based on VAR

The Johansen procedure is a multiple equation method that permits the identification of the cointegration space, which enables the testing of how many cointegration relationships exist. LRGDP, LEXGS, LGDCF, LREER and LWGDP are tested under Johansen's technique and results displayed in Screenshots 3A and 3B.

The trace test in Screenshot 3B indicates that the test statistics of 124.02 considerably exceeds the critical value 69.82 and so the null of

Screenshot 3A: Johansen Cointegration Test Result

Sample (adjusted): 1974-75 to 2009-10
No. of observations: 35 after adjustments
Trend assumption: Linear deterministic trend
Series: LRGDP *LEXGD* LGDCF LREER LWGDP
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.748950	107.3184	69.81889	0.0000
At most 1 *	0.497694	58.94472	47.85613	0.0033
At most 2 *	0.433178	34.84559	29.79707	0.0120
At most 3	0.331463	14.97573	15.49471	0.0597
At most 4	0.024900	0.882533	3.841466	0.3475

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.748950	48.37365	33.87687	0.0005
At most 1*	0.497694	24.09913	27.58434	0.1313
At most 2*	0.433178	19.86985	21.13162	0.0743
At most 3	0.331463	14.09320	14.26460	0.0532
At most 4	0.024900	0.882533	3.841466	0.3475

Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

no cointegrating vectors is rejected. This continues, until we do not reject the null hypothesis of at most 2 cointegrating vectors at the 5% level. The *max* test also confirms this result.

Suppose, we want to test the hypothesis that the LREER and LWGDP do not appear in the cointegrating equation. We could test this by specifying the restriction that their parameters are zero. In this case there are two restrictions, so that the test statistics follows a Chi-square distribution with 2 degrees of freedom. The *p*-value for the test is 0.0004, so the restrictions are not supported by the data and

Screenshot 3B: Johansen Cointegration Test Result

| Sample (adjusted): 1974-75 to 2008-09 |
| No. of observations: 35 after adjustments |
| Trend assumption: Linear deterministic trend |
| Series: LRGDP*LEXGS* LGDCF LREER LWGDP |
| Lags interval (in first differences): 1 to 3 |

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.8019	124.0243	69.8189	0.0000
At most 1 *	0.5780	67.3487	47.8561	0.0003
At most 2 *	0.4833	37.1484	29.7971	0.0059
At most 3	0.3028	14.0348	15.4947	0.0820
At most 4	0.0393	1.40617	3.8415	0.2357

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.8019	56.6756	33.8769	0.0000
At most 1 *	0.5780	30.2003	27.5843	0.0225
At most 2 *	0.4833	23.1136	21.1316	0.0260
At most 3	0.3029	12.6287	14.2646	0.0892
At most 4	0.0394	1.4062	3.8415	0.2357

 Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

we could conclude that the cointegrating relationship must also include the LREER and LWGDP (Screenshots 4A and 4B).

The result thus demonstrate that the considered variables are cointegrated in that there is a long-run equilibrium relationship among them (these series cannot move too far away from each other or they cannot move independently of each other). The fact that the variables are cointegrated implies that there is some adjustment process in the short run, preventing the errors in the long run relationship from becoming larger and larger.

Screenshot 4A: Vector Error Correction Estimates

Sample (adjusted): 1974-75 to 2009-10	
No. of observations: 35 after adjustments	
Cointegration Restrictions: B(1,4)=0, B(1,5)=0	
Convergence achieved after 10 iterations.	
Not all cointegrating vectors are identified	
LR test for binding restrictions (rank = 1):	
Chi-square(2): 16.80826	
Probability: 0.000224	

CointegratingEq:	**CointEq1**
LRGDP(-1)	2.293244
LEXGD(-1)	6.076050
LGDCF(-1)	-12.08954
LREER(-1)	0.000000
LWGDP(-1)	0.000000
C	59.60599

Screenshot 4B: Vector Error Correction Estimates

Sample (adjusted): 1974-75 to 2009-10	
No. of observations: 36 after adjustments	
Cointegration Restrictions: B(1,4)=0, B(1,5)=0	
Convergence achieved after 10 iterations.	
Not all cointegrating vectors are identified	
LR test for binding restrictions (rank = 1):	
Chi-square(2): 15.55530	
Probability: 0.000419	

CointegratingEq:	**CointEq1**
LRGDP(-1)	5.992756
LEXGS(-1)	5.299681
LGDCF(-1)	-14.34167
LREER(-1)	0.000000
LWGDP(-1)	0.000000
C	42.55284

III.6 Granger Causality Test: Empirical Finding

The Null Hypothesis (Ho) in each case is: *the variable under consideration does not Granger cause the other variable*.

The result in Tables 3A and 3B suggests that the direction of causality is from export growth to GDP growth; since the estimated

Table 3A: Granger Causality between DLRGDP and *DLEXGD*

Direction of Causality	No. of Lags	F-Statistic	Probability	Decision Regarding Ho
Exports $\rightarrow$ GDP	1	6.95666	0.01250	Rejected
GDP $\rightarrow$ Exports	1	0.69292	0.41098	Not Rejected
Exports $\rightarrow$ GDP	2	3.62001	0.03864	Rejected
GDP $\rightarrow$ Exports	2	1.69715	0.19979	Not Rejected
Exports $\rightarrow$ GDP	3	3.34858	0.03308	Rejected
GDP $\rightarrow$ Exports	3	1.80044	0.17001	Not Rejected
Exports $\rightarrow$ GDP	4	3.33842	0.02542	Rejected
GDP $\rightarrow$ Exports	4	0.88408	0.48770	Not Rejected
Exports $\rightarrow$ GDP	5	2.39229	0.07073	Rejected
GDP $\rightarrow$ Exports	5	0.81603	0.55113	Not Rejected
Exports $\rightarrow$ GDP	6	1.87782	0.13730	Not Rejected
GDP $\rightarrow$ Exports	6	1.07856	0.40961	Not Rejected

Note: Variables are in Δlogs.

Table 3B: Causality between DLRGDP and *DLEXGS*

Direction of Causality	No. of Lags	F-Statistic	Probability	Decision Regarding Ho
Exports $\rightarrow$ GDP	1	8.58354	0.00602	Rejected
GDP $\rightarrow$ Exports	1	0.10059	0.75306	Not Rejected
Exports $\rightarrow$ GDP	2	5.14572	0.01176	Rejected
GDP $\rightarrow$ Exports	2	0.63338	0.53753	Not Rejected
Exports $\rightarrow$ GDP	3	4.06956	0.01614	Rejected
GDP $\rightarrow$ Exports	3	0.70741	0.55568	Not Rejected
Exports $\rightarrow$ GDP	4	4.13654	0.01045	Rejected
GDP $\rightarrow$ Exports	4	0.32326	0.85968	Not Rejected
Exports $\rightarrow$ GDP	5	3.31053	0.02225	Rejected
GDP $\rightarrow$ Exports	5	0.40970	0.83686	Not Rejected
Exports $\rightarrow$ GDP	6	2.75318	0.04251	Rejected
GDP $\rightarrow$ Exports	6	0.78254	0.59400	Not Rejected

Note: Variables are in Δlogs.

F-statistics is significant, at the 5% level up to 4 lags, at the 10% level at lag 5. On the other hand, there is no "reverse causation" from GDP growth to export growth, since the F-statistics is statistically insignificant. It can be assessed that, at lag 6, there is no statistically discernible relationship between the two variables. This reinforces the point made earlier that the outcome of the Granger causality test is sensitive to the number of lags introduced in the model. In the next

Table, we have presented the Granger causality between GDP and Exports of Goods and services. This indicates that one can use exports to better predict the GDP than simply by the past history of GDP.

III.7 Block Exogeneity/Granger Causality in VAR: Empirical Estimates

The first step in the construction of any VAR model, once the variables that will enter the VAR have been decided, will be to determine the appropriate lag length. This can be achieved in a variety of ways, but one of the easiest is to employ a multivariate information criterion (Screenshot 5). EViews presents the values of various information criteria and other methods for determining the lag order. In this case, the Schwartz criteria select a zero order as optimal, while Akaike's and Hannan-Quinn criterion chooses VAR(5).

Following the lag order selection criteria, I have tested Granger causality/Block Exogeneity in VAR framework. The result indicates lead-lag relationship between exports and GDP and Granger causality is significant at 5% level from exports of Goods and Services to GDP; 'significant at 10% from exports to GDCF' but no causality in the

Screenshot 5: VAR Lag Order Selection Criteria

Endogenous variables: DLRGDP, DLEXGS, DLGDCF, DLREER, DLWGDP
Exogenous variables: Constant
Sample: 1970-71 to 2009-10
Included observations: 34

Lag	LogL	LR	FPE	AIC	SC	HQ
0	232.4803	NA	7.08e-13	-13.78668	-13.55994*	-13.71039
1	268.5359	59.00008*	3.70e-13	-14.45672	-13.09626	-13.99897
2	289.1497	27.48505	5.40e-13	-14.19089	-11.69671	-13.35167
3	311.7413	23.27616	8.53e-13	-14.04492	-10.41703	-12.82425
4	361.5677	36.23744	3.86e-13	-15.54956	-10.78794	-13.94742
5	421.2525	25.32083	2.39e-13*	-17.65167*	-11.75634	-15.66807*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

opposite direction (Screenshot 6). The result can be interpreted as movements in the exports of goods and services appear to lead that of GDP in case of Indian economy.

Screenshot 6: VAR Granger Causality/Block Exogeneity Wald Tests

Sample period: 1970-71 to 2009-10 Included observations: 37			
Dependent variable: DLRGDP			
Excluded	Chi-sq	df	Prob.
DLEXGS	6.571840	2	0.0374
DLGDCF	1.930558	2	0.3809
DLREER	1.145787	2	0.5639
DLWGDP	0.570733	2	0.7517
All	13.05493	8	0.1100
Dependent variable: DLEXGS			
DLRGDP	4.335449	2	0.1144
DLGDCF	1.992873	2	0.3692
DLREER	0.243723	2	0.8853
DLWGDP	5.318795	2	0.0700
All	10.36116	8	0.2406
Dependent variable: DLGDCF			
DLRGDP	4.388943	2	0.1114
DLEXGS	4.610782	2	0.0997
DLREER	2.158529	2	0.3398
DLWGDP	0.090009	2	0.9560
All	9.672450	8	0.2888
Dependent variable: DLREER			
DLRGDP	0.850660	2	0.6536
DLEXGS	0.993505	2	0.6085
DLGDCF	2.986425	2	0.2246
DLWGDP	1.981283	2	0.3713
All	6.374739	8	0.6053
Dependent variable: DLWGDP			
DLRGDP	10.70434	2	0.0047
DLEXGS	3.213572	2	0.2005
DLGDCF	1.462160	2	0.4814
DLREER	2.041921	2	0.3602
All	25.79547	8	0.0011

IV. Concluding Observations

Application of stationarity/unit root tests, *viz*., ADF, PP and KPSS, confirms that all the variables are non-stationary at log levels and there is existence of unit root in the series used in the study. In other words, all the macroeconomic variables used in this study are *I*(1) in log levels and become stationary after first differencing their log levels. Subsequent residual-based cointegration test on log levels between exports and GDP confirms their long run relationship. This result sets the stage for application of error correction model in bi-variate as well as multivariate frameworks. The bivariate error correction model indicates that, in short run, if the GDP is above its equilibrium value, it will start falling in the next period to correct the equilibrium error. The coefficient of error correction term decides how quickly the equilibrium is restored. About 17 per cent of disequilibrium is corrected every year in case of exports of goods and GDP; and about 14 per cent disequilibrium is corrected every year in case of 'goods and services' and GDP. The significance of the error correction term at 5% level suggesting the robust relationship between export growth and growth of real GDP. This reinforces the nexus between export and GDP growth in both short and long run.

The test of cointegrating relationship among a set of chosen variables in Johansen's procedure: the *trace test* indicates the null of no cointegrating vectors is rejected. This continues, until we do not reject the null hypothesis of at most 2 cointegrating vectors at the 5% level. The *max* test also confirms this result. In the subsequent specification of restriction under Vector Error Correction Model (VECM) in VAR, we dropped LREER and LWGDP to test the hypothesis that these two variables do not appear in the cointegrating equation. The *p*-value for the test is 0.0004 indicates that the restrictions are not supported by the data and we could conclude that the cointegrating relationship must also include the LREER and LWGDP. The result thus demonstrate that the considered variables are cointegrated in that there is a long-run equilibrium relationship among them (these series cannot move too far away from each other or they cannot move independently of each other). The fact that the variables

are cointegrated implies that there is some adjustment process in the short run, preventing the errors in the long run relationship from becoming larger and larger.

The test of Granger causality suggests that the direction of causality from export growth to GDP growth; since the estimated F-statistics is significant, at the 5% level up to 4 lags, at the 10% level at lag 5. On the other hand, there is no "reverse causation" from GDP growth to export growth, since the F-statistics is statistically insignificant. It can be assessed that, at lag 6, there is no statistically discernible relationship between the two variables. This indicates that one can use exports to better predict the GDP than simply by the past history of GDP. Granger causality/Block Exogeneity in VAR framework indicates lead-lag relationship between exports and GDP and the result can be interpreted as movements in the exports of goods and services appear to lead that of GDP in case of Indian economy.

The conclusion supporting the validity of the ELG hypothesis is similar to results of Serletis (1992) in case of Canada and for other industrial countries as in Marin (1992). However, the caveat is that, import side of openness has not taken into consideration. Given the recent success of software exports from India along with the *focus area approach* to both merchandise and services exports including its diversification, the finding is plausible and consistent with prior expectation that increasing exports stimulate economic growth.

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Determinants of Private Corporate Sector Investment in India

Ramesh Jangili and Sharad Kumar*

This paper analyses the trends in corporate finance in India, and uses a panel data model for empirically identifying the factors which influence corporate investment decisions, during the period 2000-01 to 2008-09. The findings revealed that firm level factors such as firm size, dividend payout ratio, effective cost of borrowing, cash flow ratio and growth in value of production are significant in determining corporate investment decisions. At macro level, capital market developments and real effective exchange rate are significant in influencing corporate investment decisions, whereas, inflation and non-food credit growth are not significant in predicting corporate investment decisions. The results of the study generally support existing literature on the impact of macroeconomic variables and certain firm level factors on corporate investment decisions. The main value of this paper is to consider broad based approach to analysing the determinants of corporate investment decisions from emerging market context.

Introduction

Corporate investment refers to the amount of capital spent on increasing the total assets of a firm. New investment in a firm consists of addition to its existing assets for the purpose of producing more output. These investments could be financed either by internal sources of funds, such as, accumulated profits in the form of various reserves, depreciation provision, etc., or by external sources of funds, such as, borrowed capital, fresh capital raised, etc. At micro level, private corporate behaviour is characterized by three main decisions, namely,

investment, financing and profit allocation. Firms have scarce resources that must be allocated among competing uses. Hence firms in the private corporate sector must decide the way in which they should allocate resources and the manner in which it would be wise for them to invest. The private corporate sector should provide the framework for its constituent firms to make the above decisions wisely. Accordingly, the investment decision of a firm is defined to include not only those investments that create revenues and profit, but also those that save money by reducing expenditure.

Investment decisions though mainly taken at the Board level, these have been influenced by financial performance, financing pattern and economic conditions prevailing in the country and also the global developments to some extent. In the past few years there has been an increasing interest in the role that firm specific factors play in corporate investment decisions along with the economic conditions. This interest stems from the effect that financial performance of the corporate sector had on shaping the most recent economic cycle. Recent theoretical developments have also shown that cash flows and the structure of a firm's balance sheet may have an important influence on investment decisions.

The potential link between investment and financial performance implies that some of the changes in the performance indicators of the private corporate sector in the past decade could have altered the dynamics of the investment cycle in India. Establishing a link between cash flows, leverage and investment may also provide insights into the way in which monetary policy and cyclical factors more generally influence the corporate sector. If cash flows are an important determinant of investment, changes in monetary policy (by changing some interest rates) will influence investment of indebted firms through a cash flow effect as well as through altering the rate at which the returns to investment are discounted. If this is the case, the higher leverage of the corporate sector implies, other things being equal, that monetary policy may have a larger impact on investment than in the past. Moreover, it implies that changes in monetary policy may not be transmitted evenly across the corporate sector. The cash flows of highly geared firms will be more sensitive to changes in interest rates than cash flows of firms with lower leverage.

Ascertaining a link between investment and financial conditions imply that changes in the structure of corporate balance sheets would significantly alter the dynamics of the investment in India. Smaller firms are generally considered to be more sensitive to changes in financial conditions. External funding tends to be relatively more expensive for them because providers of finance have less information about their creditworthiness. Smaller firms also have limited access to securities or equity markets and are thus more reliant on intermediated funding as a source of external finance. Cash flows are a significant source of funding for them. Economic shocks that alter cash flows or change the lending behaviour of intermediaries are thus likely to have a more significant influence on the investment decisions of smaller firms.

This paper intends to explore the linkage between financial factors and investment in a sample of non-Government non-financial Indian firms spanning the period 2000-01 to 2008-09. First, it will attempt to see if these factors are important generally. Next, it will consider whether the importance varies across firms depending on their financial structure, size or dividend payout policies. The paper finds evidence that financial factors do have a significant influence on investment. Investment is positively related to cash flows and the stock of financial assets and negatively related to leverage. Moreover, it appears that investment of firms with higher leverage and smaller firms are more sensitive to financial factors than that of other firms. This implies that they could be more sensitive to economic conditions and changes in monetary policy than other firms.

The specific aspects of behavior that are analysed in this study are determinants of investment by firms in the private corporate sector in India. Decisions regarding external finance, the role of demand, financial factors and macro economic conditions are considered in the analysis. The rest of the paper is organized as follows: In section 2, the literature on investment behavior of the private corporate sector is reviewed. Section 3 analyses trends in corporate finance, Section 4 deals with choice of the Model, Section 5 empirically analyses the interest rate and its impact on investment and profits. Section 6 handles description of data and construction of variables, Section 7 provides

the empirical analysis and Section 8 draws the conclusions of the entire analysis.

2. Literature Review

Modigliani and Miller (1958) assumed that firms' financing and real investment decisions are taken independent of each other. Moreover, this theory says that the investment of a firm should be based only on those factors that will increase the profitability, cash flow or net worth of a firm and there is no relationship between financial markets and corporate real investment decisions. However, this proposition will be valid only if the perfect market assumptions underlying the analysis are satisfied. Corporate finance theory suggests that market imperfections such as underdeveloped financial system may constrain firms' ability to fund investments and will invariably affect firms' investment decisions. The theory indicates that the development of financial markets and instruments result in a reduction in transaction and information costs, influencing saving rates and investment decisions.

Fazzari et al (1988) had argued that firms facing financing constraints should exhibit high investment-to-cash flow sensitivities, reflecting the wedge between costs of external and internal funds which is consistent with Myers and Majluf (1984). But Kaplan and Zingales (1997) contradicted the findings of Fazzari et al (1988). They rather suggested that corporate investment decisions of the least financially constrained firms are the most sensitive to the availability of cash flow (see also Cleary1999). Recently, Cleary et al (2007) documented that, capital expenditure exhibits a U-shape with respect to the availability of internal funds. In the Indian context, Rajakumar (2005) verified empirically the relationship between corporate financing and investment behaviour for the period 1988-89 to 1998-99. To understand the implications of financing practices on investment behaviour, the firms were segregated according to their mode of financing, equity and debt. It was found at the aggregate level that the higher the debt, the greater the investment. They also found that debt financing was better than equity financing.

Denizer et al (2000) have indicated that risk management and information processing by banks might be particularly important in reducing investment volatility. Acemoglu and Zilibotti (1997) noted the role that diversification plays in reducing risk when they linked financial market development to volatility. They concluded that as financial market development helps in wealth creation, diversification becomes possible, investment increases and investment risk and volatility is reduced. Aghion et al (2000) confirmed that, volatility is most likely to occur in open economies with intermediate levels of financial development.

At the macro level, considerable research has focused on investigating the relationship between macroeconomic development and corporate investment decisions largely because of global financial integration. Nucci and Pozzolo (2001) found significant relationship between exchange rates and investment for Italian manufacturing firms. Ferris and Makhija (1988) examined the effect of inflation on the capital investment for the US firms and found that, given various provisions of the US tax code, the effect of inflation on capital investment over the period 1962-1981 has varied with the response and circumstances of the firm. Adelegan and Ariyo (2008) investigated the impact of capital market imperfections on corporate investment behavior using panel data for Nigerian manufacturing firms from 1984 to 2000 and found that financial factors have a significant effect on the investment behavior.

3. Trends in Corporate Finance

There are various sources from which firms can mobilize funds. The relative share of each source in total sources of funds reveals the importance attached to a particular source of funds and thus determines the financing pattern. The structure of corporate financing has been examined using Reserve Bank of India's (RBI) study of finances of public limited companies, which provides valuable information on various sources of funds. It follows a broad classification of internal (own) and external (other than own) sources. Internal sources comprise use of paid-up capital, reserves and surplus, and provisions. And,

external sources include fresh issue of capital, capital receipts, borrowings, trade dues and other current liabilities and miscellaneous non-current liabilities.

Using the broad classification of sources of funds into internal and external, and comparing their constituents' share in total sources of funds is presented in Table 1. It may be seen from Table 1 that internal sources of funds contributed on an average a little more than one third of total sources of funds during 1980s and 1990s. Though, firms relied more on internal source of finance during 2000-01 to 2004-05, their reliance on external finance has been increasing since 2005-06. During 2008-09, external sources contributed more than two-thirds of total sources of funds.

Looking at the disaggregated data on various internal sources of funds, it is seen that provisions constituted the major component of internal funds till 2004-05 and reserves and surplus constituted the major component thereafter. A further disaggregated analysis showed

Table 1: Trends in Corporate Finance

(Per cent)

SOURCES OF FUNDS	1980s	1990s	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
INTERNAL SOURCES	33.1	35.6	40.3	59.6	65.3	64.9	53.5	55.5	42.6	35.9	35.5	31.6
A. Paid-up capital	2.1	1.1	0.5	0.7	0.4	-1.7	0.4	0.8	3.7	0.8	0.4	0.1
B. Reserves and Surplus	7.2	12.4	9.1	10.5	-18.8	10.3	20.0	26.6	23.2	24.8	23.1	21.3
C. Provisions	23.7	22.2	30.7	48.4	83.8	56.3	33.1	28.1	15.7	10.3	12.1	10.2
EXTERNAL SOURCES	66.9	64.4	59.7	40.4	34.7	35.1	46.5	44.5	57.4	64.1	64.5	68.4
D. Paid-up capital	5.5	16.0	21.9	10.3	10.5	6.2	8.6	10.5	15.1	11.8	17.7	14.1
E. Capital receipts	0.3	0.3	0.5	0.7	1.1	0.4	0.7	0.3	0.2	0.1	0.1	0.2
F. Borrowings	37.4	31.7	20.1	10.7	8.8	1.4	17.0	15.3	25.5	32.4	27.6	36.3
(a) From banks	12.6	9.6	8.4	6.9	21.5	27.7	21.4	15.2	24.3	22.4	20.7	23.4
G. Trade dues and other current liabilities	23.7	16.4	17.3	18.7	14.3	27.1	20.3	18.5	16.5	19.9	19.1	17.7
H. Miscellaneous non-current liabilities	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

that bulk of provisions was contributed by depreciation provision resulting from various fiscal incentives provided to improve investment climate in the country. The decline in the share of provisions largely accounted for the overall decline in internal sources from the year 2005-06. At the same time, reserves and surplus has sharply increased its shares to 23.2 per cent of total funds from 10.3 per cent during 2002-03. This, however, could not arrest the declining importance of internal sources of funds.

The rise in the share of external funds in total funds is largely due to borrowings in the 1980s, and borrowings along with fresh issues of capital in the 1990s. Borrowing is, however, the major component of external sources in the 1980s and 1990s. During early 2000s, the reliance on borrowings showed drastically declining trend by registering its share in total funds to 1.4 per cent in 2003, however, the same started increasing significantly thereafter. Borrowings contributed more than one-third of total sources of funds during 2008-09.

While the above analysis has shown a shift in the pattern of financing from external to internal and then to external, what ultimately matters to a firm is the proportion of owned (equity) to borrowed capital (debt) or the capital structure.

4. Choice of the Model

A review of literature related to theories of investment highlights four main strands of thoughts, namely, accelerator theory of investment behaviour, neoclassical theory of investment behaviour, Q-theory of investment behaviour and liquidity theory of investment behaviour. They have been briefly discussed below.

The accelerator theory states that firms have a desired level of capital stock and undertake investment to achieve this level. This theory maintains that firms adjust their capital stock in response to demand so that investment has a direct relationship with output. In essence, investment is proportional to output so that the rate of expected output becomes the prime determinant of investment behaviour in this model.

The basic idea of the neoclassical theory of investment behavior relates to the cost function, which tells how cost affects the stock of capital and how the rental cost of capital affects total investment in the private corporate sector.

According to the Q-theory of investment behavior, the stock market plays a significant role in determining the behavior of private corporate sector. The market valuation is the going market price for exchanging existing assets, whereas the book value is the replacement cost or reproduction cost indicating prices in the market for newly produced assets. The excess of market valuation over replacement cost encourages investment, that is, investment will be undertaken if market value is greater than book value. This model assumes the existence of a perfect capital market.

The liquidity theory of investment behaviour on the other hand is based on the assumption that there are imperfections in the capital market arising mainly due to asymmetric information between firms and suppliers of funds. This creates a wedge between cost of external and internal financing so that external financing becomes a constraint on the firms' investment. To smoothen this, the firms take recourse to internal liquidity. Under this, the firms limit their investment activities to availability of internal funds. The outcome as predicted by this model is that, under capital market imperfection, the firms' investment behaviour becomes sensitive to internal liquidity [Fazzari et al (1988)].

5. Interest rate and its impact on Investment and Profits

The weighted average lending rate of scheduled commercial banks (published in the Statistical Tables Relating to Banks in India) can be considered as the cost of borrowing from banks, the most prevalent mode of raising debt (referred to as bank lending rate in future). Another measure considered was the effective borrowing cost of select companies from all sources (measured as interest payments as a percentage of average outstanding borrowing during the year). These rates since 2001-02 are presented in Table 2.

Table 2: Effective Borrowing Cost vis-à-vis Bank Lending Rate

(Per cent)

		2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Weighted Average Lending Rate of Scheduled Commercial Banks*		13.7	13.3	13.2	12.6	12.0	11.9	12.3	11.1
Effective Borrowing cost of corporates@	All companies	11.1	9.6	8.2	7.6	6.7	6.5	6.1	6.8
	PUC 50 crore and above	10.4	8.8	7.8	7.4	6.3	6.2	5.3	6.0
	PUC 10 crore and above but less than 50 crore	12.4	11.0	9.0	7.6	7.2	7.0	7.6	8.3
	PUC less than 10 crore	13.9	12.0	10.2	8.8	8.2	8.0	8.4	9.9

Source: * Statistical Tables Relating to Banks in India.
@ Based on the data of 897 common companies from 2001-02 to 2008-09

The effective borrowing cost of select companies declined continuously from 11.1 per cent in 2001-02 to 6.1 per cent in 2007-08 before rising marginally to 6.8 per cent in 2008-09. The bank lending rate remained always higher than the effective borrowing cost, but still declined continuously over the period though at a moderate pace. This may be an indication that corporates have got access to funds at cheaper rates from non-bank sources within India and also from abroad during the above period. The analysis is based on both bank lending rate and effective borrowing cost. It may also be observed that effective borrowing cost of small companies, though lower than the bank lending rate, is significantly higher than those of the medium and large companies.

5.1 Interest Rate and Investment

Gross fixed capital formation of select companies and nominal interest rates are presented in Chart 1(also in Table 3). It may be observed from the chart that both bank lending rate and effective borrowing cost are inversely related to the gross fixed capital formation of 897 common companies. The correlation coefficients between bank lending rate and gross fixed capital formation (-0.80) and that between effective borrowing cost and gross fixed capital formation (-0.77) also suggest that there is a strong negative relationship between interest rate and the investment. Thus, it may be concluded that the lower

Chart 1: Investment *vis-à-vis* Nominal interest rate
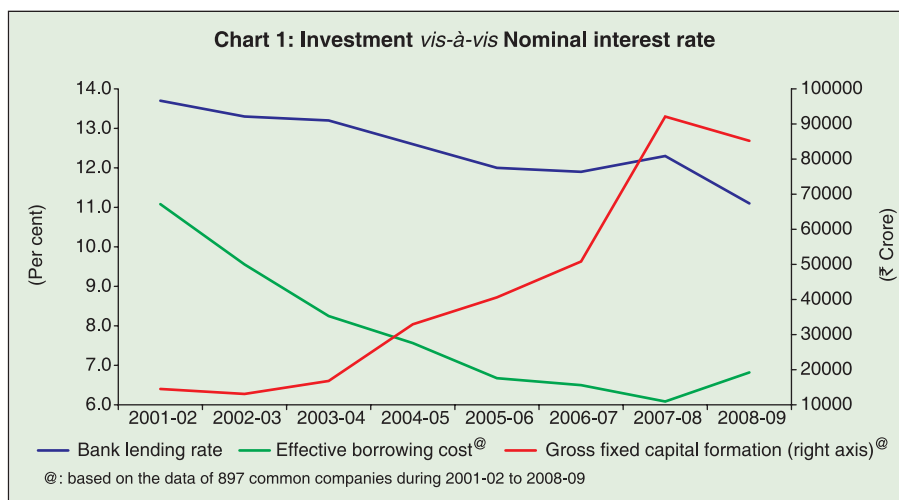
interest rate regime in the past decade has helped in higher fixed capital formation in the corporate sector.

5.2 Interest Rate and Profits

The effect of lower interest rates on profitability of the selected common companies is presented in Table 3 and Chart 2. It may be

Table 3: Nominal Interest Rate and Select Financial Indicators of the Common Companies

(Per cent)

Year	Bank Lending Rate	Based on the data of 897 common companies						
		Effective Borrowing cost	Return on Equity*	Gross profit to total net assets	Gross profit to sales	Interest expenses to total expendi-ture	Profits After Tax (₹ Crore)	Gross fixed capital formation (₹ Crore)
2001-02	13.7	11.1	6.9	8.3	11.3	5.8	8147	14518
2002-03	13.3	9.6	10.5	8.9	11.9	4.6	13122	13097
2003-04	13.2	8.2	14.0	10.0	12.8	3.7	19655	16796
2004-05	12.6	7.6	17.8	11.5	13.6	2.9	30212	32940
2005-06	12.0	6.7	17.4	11.1	13.4	2.5	37338	40614
2006-07	11.9	6.5	18.4	12.2	14.7	2.4	51339	50827
2007-08	12.3	6.1	19.3	12.4	16.0	2.3	67508	92113
2008-09	11.1	6.8	13.4	9.6	12.9	2.7	56396	85203

* Profits after tax as a percentage of net worth.

Chart 2: Profits *vis-à-vis* Nominal interest rate
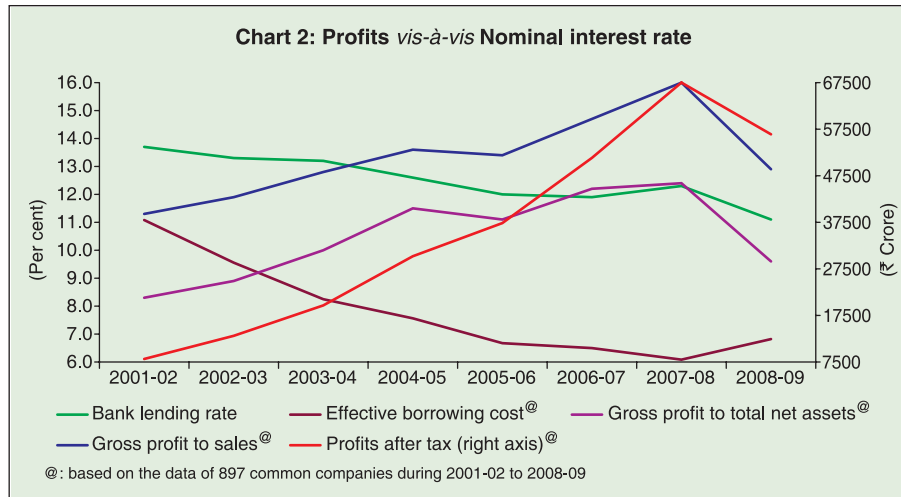
observed that two most commonly used measures of profitability viz, gross profit margin (measured as ratio of gross profit to sales) and return on assets (measured as gross profit to total net assets) are negatively related with the bank lending rate as well as effective borrowing cost. The correlation coefficient between bank lending rate and profit after tax (-0.84) and between effective borrowing cost and profit after tax (-0.89) also suggest that there is a strong negative relationhip between interest rate and the profits. It may be seen that the ratio of interest expenses to total expenditure have steadily declined over the years from 5.8 per cent in 2001-02 to 2.7 per cent in 2008-09. Relevant data for various size classes according to Paid-up capital (PUC) are also given in the Annex.

6. Data and Variables Construction

6.1 Data

The data set used in this study is firm-level data, for the period 2000-01 to 2008-09, from Company Finances Studies of the Reserve Bank of India (RBI). The RBI collects annual data from audited annual accounts of private sector companies operating in India. From the standpoint of coverage, the RBI collects data on nearly 3000

companies, representing approximately 30 per cent in terms of the population paid-up capital. The sample under study is a balanced panel on 897 firms for which a continuous data set exists over the sample period. In aggregate, we have 8073 observations. Firms which operate in the financial sector are not included in this analysis since their balance sheets have a different structure from those of the non-financial companies. Further, the analysis is restricted to public limited companies only, as private limited companies are not required to disclose profit and loss account to the public.

6.2 Variables construction

In line with the existing empirical research, the level of *investment* is considered as endogenous variable. Investment is normalized by the level of gross fixed assets to account for differences across firms. Therefore it is measured as the ratio of gross fixed investment of a firm during the year to the gross fixed assets at the beginning of the year.

Firm size is measured by the natural logarithm of total assets. Total assets were divided by 1,00,000 before the logarithm transformation. A priori, we expect that larger firms should have better access to external capital sources and hence have flexibility in timing their investments resulting into positive relationship with financial performance.

Dividend payout ratio, which is measured as the dividends paid as a percentage of profits after tax, can be used as the proxy for the severity of external financing constraints (Fazzari et al., 1998). The underlying argument is that the dividend payout ratio is a good indicator of whether a firm has surplus internal funds. Thus, firms with low dividend payouts are identified as being financially constrained. Previous empirical research findings suggest that investment is higher in financially constrained firms, whereas, financially unconstrained firms display a lower investment.

Growth in Value of Production (VOP), which is measured as the percentage change in VOP over the previous year, is considered as a measure of accelerator. According to the accelerator theory of investment behavior, change in VOP is a demand side factor that plays an important role in determining private corporate investment. The theory was introduced essentially to explain variations in investment over the business cycle. The principle of acceleration states that if demand for consumer goods increases, there will be an increase in the demand for production, and the demand for capital and machinery and hence a positive relationship is expected.

Cost of borrowing is measured as the ratio of interest payments to total outstanding borrowings of the firm. The investments can be funded through either equity or debt. Depending on the market condition, especially that relating to interest rate, firms may undertake new investments when the interest rates are lower. On the other hand, firms may defer their investment proposals when the interest rates are higher.

Modigliani and Miller (1958) argued that the investment of a firm should be based only on those factors that will increase the profitability, cash flow or net worth of a firm. This proposition will be valid only if the perfect market assumptions underlying their analysis are satisfied. One of the main issues in corporate finance is whether financial leverage has any effects on investment decisions. This proposition will be tested empirically, by considering leverage ratio as one of the explanatory variable. *Debt to asset ratio* has been used to test the Modigliani and Miller proposition. Higher levels of debt result in an increased probability of financial distress and the demand for higher returns by potential suppliers of funds. Hence a negative relationship is expected, if exists.

Cash flow measured as the total earnings before extraordinary items, interest and depreciation. Cash flow of firms is an important determinant for growth opportunities. If firms have enough cash inflows it can be utilized in investment activities. It also provides

evidence that investment is related to the availability of internal funds. Cash flow may be termed as the amount of money in excess of that needed to finance all positive net present value projects. The purpose of allocating money to projects is to generate a cash flow in the future, significantly greater than the amount invested. That is the objective of investment to create shareholders wealth. In order to eliminate any size effect, the measure was normalized by the book value of assets.

Besides the endogenous variables discussed above, a number of exogenous variables (macro economic factors) also influence the investment decisions of the firms. Thus, the macro-economic variables like Real effective exchange rate (REER), Inflation, Non-food credit growth and Capital market developments have also been taken into consideration in the model. *Monetary policy transmission* could take place either by interest rate channel or by credit channel. To measure the effect by interest rate channel, effective cost of borrowing is used in the model, and to measure the effect by credit channel *non-food credit growth rate* is considered.

6.3 Trends and Basic statistical properties

The trends of these variables at aggregate level are presented in Table 4. It may be observed that the investment ratio is increased from 7.2 per cent in 2001-02 to 22.7 per cent in 2007-08 and then moderated

Table 4: Trends at the aggregate level

(Per cent)

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Investment ratio	7.2	5.9	7.1	13.0	14.1	14.4	22.7	17.1
Firm size	1.1	1.1	1.3	1.4	1.6	1.8	2.0	2.2
Dividend payout ratio	55.0	38.4	37.1	27.0	30.2	23.9	23.7	24.8
Debt to asset ratio	25.6	22.5	21.4	19.3	18.3	18.7	17.1	16.3
Effective cost of borrowings	11.0	9.5	8.0	7.3	6.2	5.8	5.5	6.0
Growth in value of production	-4.2	11.0	13.9	26.9	18.4	25.9	17.0	16.1
Cash flow ratio	4.2	4.8	6.2	7.7	7.6	9.0	9.6	6.9

to 17.1 per cent in 2008-09. Firm size steadily increased over time from 1.1 in 2001-02 to 2.2 in 2008-09. Dividend payout ratio, though higher in 2001-02, was steadily decreased and stood at 24.8 per cent in 2008-09. Debt to asset ratio observed to be decreasing over the study period. Effective cost of borrowings was declined to 5.5 per cent in 2007-08 from 11.0 per cent in 2001-02 before it inches up to 6.0 per cent in 2008-09.

The basic statistical properties of the variables used in the model are presented in Table 5. The mean value of the investment ratio is increased from 7.1 per cent in 2001-02 to 17.5 per cent in 2006-07 and then moderated to 12.3 per cent in 2008-09. Average firm size steadily increased over time from 1.94 in 2001-02 to 2.67 in 2008-09. Average debt to asset ratio, though increased steeply up to 25.3 per cent in 2002-03, it was stabilized around 15 per cent in recent years. Cash flow ratio steadily increased from 2.16 per cent in 2001-02 to 6.23 per cent in 2007-08 before it droped to 4.75 per cent in 2008-09.

Table 5: Statistical Properties of the Variables

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Investment ratio	7.10 (0.20)	7.41 (0.35)	8.69 (0.21)	10.99 (0.30)	14.21 (0.37)	17.47 (0.52)	14.47 (0.26)	12.27 (0.27)
Firm size	1.94 (1.64)	1.97 (1.65)	2.04 (1.67)	2.14 (1.71)	2.28 (1.75)	2.45 (1.80)	2.60 (1.86)	2.67 (1.90)
Dividend payout ratio	19.14 (2.09)	18.04 (0.32)	20.60 (0.46)	16.71 (1.30)	16.22 (1.13)	17.28 (0.58)	13.78 (5.11)	68.54 (15.26)
Debt to asset ratio	19.01 (0.43)	25.26 (2.59)	16.10 (0.21)	15.93 (0.20)	15.81 (0.19)	15.82 (0.21)	14.49 (0.17)	14.63 (0.17)
Effective cost of borrowings	29.95 (2.87)	24.20 (2.08)	165.34 (43.66)	19.40 (1.67)	12.73 (0.57)	17.39 (1.73)	16.47 (1.40)	62.07 (10.21)
Growth in value of production	5.55 (0.41)	11.52 (0.35)	23.87 (1.68)	25.32 (0.56)	19.90 (0.85)	28.39 (0.84)	21.68 (0.59)	18.73 (1.56)
Cash flow ratio	2.16 (0.10)	2.74 (0.09)	3.30 (0.13)	4.32 (0.14)	5.60 (0.12)	6.20 (0.14)	6.23 (0.14)	4.75 (0.16)

Note: Mean values are presented in the table along with standard deviation in parenthesis.

7. Empirical Analysis

7.1 Model

The literature review suggests that various firm specific factors and macro-economic conditions in the country may influence the corporate investment decisions. A linear relationship between corporate investment decisions and its determinants is assumed. Therefore, a model of the following form is estimated:

$$INVR_{it} = \sum_{k=1}^{K} \beta_k X_{kit} + \mu_i + \varepsilon_{it}$$

Where, INVR = investment ratio, firms are represented by subscript i=1,2,…,n and time by t=1,2,…,T.

K represents the number of explanatory variables.

X's represents the explanatory variables.

μ_i = firm specific effects,

and ε_{it} = disturbance term having the properties, $E(\varepsilon_{it}) = 0$ and $Var(\varepsilon_{it}) = \sigma^2$.

7.2 Estimation

Panel-data models are usually estimated using either fixed or random effects techniques. These two techniques have been developed to handle the systematic tendency of individual specific components to be higher for some units than for others - the random effects estimator is used if the individual specific component is assumed to be random with respect to the explanatory variables. The fixed effects estimator is used if the individual specific component is not independent with respect to the explanatory variables.

Hausman (1978) provides a test for discriminating between the fixed effects and random effects estimators. The test is based on comparing the difference between the two estimates of the coefficient vectors, where the random effects estimator is efficient and consistent

under the null hypothesis and inconsistent under the alternative hypothesis, and the fixed effects estimator is consistent under both the null and the alternative hypothesis. If the null hypothesis is true, the difference between the estimators should be close to zero. The calculation of the test statistic (distributed χ^2) requires the computation of the covariance matrix of b1 - b2. In the limit the covariance matrix simplifies to Var(b1) - Var(b2), where b1 is the fixed effects estimator. The computed Hausman statistic in our model is 11.58 indicated that the null hypothesis could not be rejected at the 5 per cent level of significance. Hence, random effects model has been used in our empirical analysis.

7.3 Empirical results

Table 6 reports the regression results displaying the marginal contribution (coefficients) of the independent variable to investment decisions. The strengths of the relationship between the dependent and explanatory variables are also reported in the form P-values. It may be observed that investment decisions are positively associated with firm size, leverage ratio, cash flow ratio and growth in value of production, whereas, negatively associated with dividend payout ratio and effective cost of borrowings, as expected.

Table 6: Results of the panel regression model

	Coefficient	Robust Standard Error	P-Value
Firm size	0.028109	0.002650	0.000
Dividend payout ratio	-0.000280	0.000058	0.000
Debt to asset ratio	0.002518	0.002338	0.281
Effective cost of borrowings	-0.000112	0.000035	0.001
Cash flow ratio	0.211257	0.052787	0.000
Growth in value of production	0.018448	0.008405	0.028
Real effective exchange rate	-0.004002	0.001923	0.037
Inflation	-0.452320	0.433567	0.297
Non-food credit growth	0.087583	0.059282	0.140
Capital market development	0.100268	0.022185	0.000
Constant	0.376435	0.192029	0.050

Size variable positively influences current investment and it is statistically significant. The results portray that, the larger the firm, the more investment it will make in fixed assets. Statistically significant relationship could not be found between financial leverage (measured by debt to asset ratio) and investment decisions. Negative relationship has been observed between dividend payout ratio and investment decisions and is statistically significant. Effective cost of borrowing is negatively related with investment decisions and is statistically significant. Cash flow ratio has significant positive relationship with investment decisions.

Real Effective Exchange Rate (REER) negatively influences the corporate investment decisions and is statistically significant at 5 per cent level. There is a negative and statistically insignificant relationship between inflation and corporate investment decisions. Non-food credit growth used as proxy for monetary policy action, though positively influences the corporate investment decision; it is statistically significant only at 15 per cent level. Capital market development positively influence corporate investment decisions and is statistically significant at 1 per cent level.

It is empirically evident that firm size, dividend payout ratio, effective cost of borrowing, cash flow ratio and growth in value of production are the major determinants of corporate investment decisions at firm level during the period 2000-01 to 2008-09. Capital market development and real effective exchange rate also can influence the firm's investment decisions.

8. Summary and Conclusions

In this study the determinants of private corporate investment in India have been studied using a panel regression model. Firm level data covering the period from 2000-01 to 2008-09 of public limited companies, which contribute to the major proportion of corporate investment in India have been used. Corporate investment is the amount of capital spent on increasing its assets. Therefore it could be financed by either internal sources of funds or external sources of

funds. Higher level of investment is desirable for nation's economic growth as fresh investment could produce additional output and is able to generate employment. Corporate investment decisions, generally taken at the Board level, however, these were influenced by the firm specific factors, such as financial position of the firm and macro economic conditions of the economy.

It was evident from the data on sources of finance that Indian firms depended more on the external finance during 1980s and 1990s. Though Indian firms depended more on internal finance in the early 2000s but external finance was dominant since 2006 and is accounted for 68 per cent in 2009. This increased dependence on external finance was evidenced in the form borrowings raised by the firms. On the other hand, internal accruals and provisions were declining in the internal sources of finance.

The effective borrowing cost of the select companies declined continuously from 11.1 per cent in early 2000s to 6.8 per cent in 2008-09. Further, it was observed that bank lending rate is always higher than the effective borrowing cost, which indicates that corporates have got access to cheaper funds from non-bank sources within India and abroad. The analysis also revealed that smaller companies' effective borrowing cost is higher than that of the larger companies, however, it is lower than the bank lending rate. Corporate investment is negatively related with the lending rate of banks.

Model used has two alternative specifications depending upon their error structure, fixed effects model or random effects model. The Hausman specification test is the classical test to know whether the fixed or random effects model should be used. The results of the test suggested that random effects model is consistent and efficient for our data, hence the random effects model has been used.

The empirical results of the panel regression model showed that firm size, debt to asset ratio, cash flow ratio and growth in value of production are positively associated, whereas, dividend payout ratio and effective cost of borrowing are negatively associated with

investment of the firm. Real effective exchange rate (REER) and inflation at the macro level are negatively related with the corporate investment and non food credit growth and capital market developments are positively related. Further, it is evident from the empirical results that appreciation in the real effective exchange rate will pull down the investment activity of the corporates, whereas, capital market developments will boost the corporate investment. Firm specific factors such as firm size, dividend payout ratio, effective cost of borrowing, cash flow ratio and growth in value of production appear to be the major determinants of corporate investment decisions during the period 2000-01 to 2008-09.

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Annex

(Per cent)

	Effective Borrowing cost	Return on Equity	Gross profit to total net assets	Gross profit to sales	Interest expenses to total expenditure	Profits After Tax (₹ Crore)	Gross fixed capital formation (₹ Crore)
PUC less than 10 crore (459 companies)							
2001-02	13.9	2.6	6.1	6.3	5.0	202	724
2002-03	12.0	5.0	6.8	6.9	4.3	393	859
2003-04	10.2	12.5	8.3	8.0	3.5	1079	1221
2004-05	8.8	17.4	9.7	8.9	2.8	1759	1620
2005-06	8.2	17.7	10.7	9.7	2.5	2131	2266
2006-07	8.0	18.2	11.0	10.4	2.3	2839	3001
2007-08	8.4	19.6	10.7	10.7	2.5	3678	3900
2008-09	9.9	12.2	10.1	10.1	3.2	2570	3163
PUC 10 crore and above but less than 50 crore (332 companies)							
2001-02	12.4	5.7	7.7	9.1	5.3	1560	2575
2002-03	11.0	8.5	8.5	9.8	4.4	2438	2342
2003-04	9.0	12.8	9.4	10.1	3.2	4092	3710
2004-05	7.6	15.2	10.5	10.6	2.5	5555	5901
2005-06	7.2	17.2	10.9	12.0	2.4	7828	10920
2006-07	7.0	18.9	12.0	13.2	2.5	10845	16942
2007-08	7.6	17.3	11.4	13.6	2.8	12943	19444
2008-09	8.3	12.6	9.7	11.6	3.3	10442	19345
PUC 50 crore and above (106 companies)							
2001-02	10.4	7.7	8.7	13.1	6.2	6385	11219
2002-03	8.8	11.7	9.3	13.5	4.8	10291	9896
2003-04	7.8	14.6	10.4	14.7	4.0	14484	11865
2004-05	7.4	18.6	12.0	15.4	3.1	22898	25418
2005-06	6.3	17.4	11.2	14.5	2.5	27378	27428
2006-07	6.2	18.3	12.4	15.9	2.3	37655	30884
2007-08	5.3	19.8	12.9	17.6	2.1	50887	68769
2008-09	6.0	13.7	9.5	13.7	2.5	43383	62695

Inclusive Growth and its Regional Dimension

P. K. Nayak, Sadhan Kumar Chattopadhyay, Arun Vishnu Kumar and V. Dhanya[*]

Indian economy is elevated to a high growth path triggered mainly by macroeconomic reforms and expansion of economic activities across the sectors. However, there are some serious concerns about a number of imbalances in the growth scenario – inter-sectoral, inter-regional and inter-state. These imbalances have definitely a serious impact on the goal of "inclusive growth" as envisaged in the Eleventh Five Year Plan. The study reveals that still poverty ratio is very high in the economy despite high growth. There is no significant increase in employment in the unorganised sector of the economy. The study shows that while the contribution of the agriculture sector in the real GDP has declined fairly fast, the share of the employment in the agriculture sector has not declined to that extent. As a result, the average productivity in this sector has remained very low as compared to other developing countries. Since a large section of the population continues to be dependent on the agriculture sector, directly or indirectly, this has serious implications for 'inclusiveness' of the growth dynamics. The study has emphasised the role of finance in growth and attempted to analyse the regional dimension of financial inclusion, although in a limited sense, in terms of state-wise and sector-wise allocation of credit over the years. It was observed that the distribution of bank credit across sectors and regions is not equitable. Given the level of potential output, Indian economy is well poised to achieve an impressive growth in near future. The strength and resilience of the Indian economy were well tested while weathering the global turbulence of recent time. The paper arrives at the conclusion that furtherance of macroeconomic reforms, harnessing synergistic links among the sectors and availing of opportunities provided by the forces of globalization and intensive use of technology can enable us to achieve higher level of inclusive growth. Sustainable inclusive growth presupposes inclusive governance through empowerment, grassroot participation and increased public accountability.

Introduction

Inclusive growth has become a buzzword across the globe. Inclusiveness – a concept that encompasses equity, equality of

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opportunity, and protection in market and employment transitions – is an essential ingredient of any successful growth strategy (Commission on Growth and Development, World Bank, 2008). The Commission of Growth and Development (2008) considers systematic inequality of opportunity as "toxic" as it will derail the growth process through political channels or conflict.

Indian economy has been registering a steady growth in the recent years. However, poverty continues to be a major concern. While some level of growth is obviously a necessary condition for sustained poverty reduction, there is an increasingly unanimous view that growth by itself is not a sufficient condition for eradicating poverty (Ali and Son, 2007). Growth can marginalise the poor sections and increase inequality. High and rising levels of inequality can hinder poverty reduction, which in turn, can slowdown the growth process. One important indication of inadequate inclusion in India is that poverty reduction has been muted in the last decade even with rising growth. The poverty rate has declined by less than 1 per cent per annum over the past decade, markedly below trends in neighboring countries such as Nepal and Bangladesh where both average income levels and growth are lower (World Bank, 2007).

The importance of inclusive growth is well acknowledged among the policy makers. The approach paper of 11th Five Year Plan adopted in December 2006 describes the need for inclusive growth in its discussion. The approach plan points out that the growth oriented policies should be combined with policies ensuring broad based per capita income growth, benefiting all sections of the population, especially those who have thus far remained deprived.

While the need for inclusive growth is stressed, it is to be seen, whether it is the inadequate growth of certain sectors like agriculture or the inability of certain groups like SC/STs to form part of the growth process or the lack of both physical and financial infrastructure that pull back the particular regions/sections from enjoying the economic growth. It is possible that a combination of all these factors is preventing certain sections/areas to be out of the growth process. In

that case it is necessary to know the major determinants that pull down inclusive growth. The inter linkages between different development indicators and growth in the context of various regions and sections needs to be analysed to understand the nuances of India's growth process. In this context, a study on regional perspectives of inclusive growth is of utmost importance.

With this backdrop, the paper is organized as follows. Section II deals with the concept of inclusive growth. Section III analyses the inter-state growth performance. Here we look into the growth of Net State Domestic Product and per capita income from 1980-81 onwards. We also examine the sectoral contributions of economic growth across different states. Section IV discusses socio-economic inclusiveness as well as the poverty and unemployment which help in understanding the inclusiveness of our growth processes vis-à-vis select developing countries. Section V deals with relationship between finance and growth. It also highlights state-wise, sector-wise allocation of credit over the years. Section VI concludes the paper.

Section II: Concept of Inclusive Growth

Inclusive growth implies participation in the process of growth and also sharing of benefit from growth. Thus inclusive growth is both an outcome and a process. On the one hand, it ensures that everyone can participate in the growth process, both in terms of decision-making for organizing the growth progression as well as in participating in the growth itself. On the other hand, it makes sure that everyone shares equitably the benefits of growth. In fact, participation without benefit sharing will make growth unjust and sharing benefits without participation will make it a welfare outcome.

In view of the above, inclusive growth can be observed from long-term perspective as the focus is on productive employment rather than on direct income redistribution, as a means of increasing income for excluded groups. Under the absolute definition, growth is considered to be pro-poor as long as poor benefit in absolute terms, as reflected in some agreed measure of poverty (Ravallion and Chen,

2003). In contrast, in the relative definition, growth is pro-poor if and only if the incomes of poor people grow faster than those of the population as a whole, i.e., inequality declines. However, while absolute pro-poor growth can be the result of direct income redistribution schemes, for growth to be inclusive, productivity must be improved and new employment opportunities created, so that the excluded section forms part of the growth process. In short, inclusive growth is about raising the pace of growth and enlarging the size of the economy, while leveling the playing field for investment and increasing productive employment opportunities.

The concept of inclusive growth has gained wide importance in several countries including India (Bolt, 2004). The Approach Paper of the Eleventh Five Year Plan provides "an opportunity to restructure policies to achieve a new vision based on faster, more broad-based and inclusive growth. It is designed to reduce poverty and focus on bringing the various divides that continue to fragment our society" (GOI, 2006: 1). In fact, Indian economy has come a long way from so called "Hindu Rate of growth" economy to high growth economy and is compared with China in many respects. In the last five years (2005-06 to 2009-10) the growth rate has averaged at 8.6 per cent making India as one of the fastest growing economies in the World. Of course, transition to high growth is an impressive achievement, but growth is not the only measure of development. Our ultimate goal is to achieve broad based improvement in the living standards of all our people. Rapid growth is essential for this outcome because it provides the basis for expanding incomes and employment and also provides the resources needed to finance programmes for social upliftment. However, it is not sufficient by itself. It is to ensure that its benefits, in terms of income and employment, are percolated down to all the sections of the society, including the poor and weaker sections. For this to happen, the growth must be inclusive in the broadest sense. It must be spread across all states and not just limited to some. It must generate sufficient volumes of high quality employment to provide the means for uplifting large numbers of our population from the low income and low quality occupations in which too many of them have

been traditionally locked. It is argued that "rapid, sustained and inclusive growth will take place when large numbers of people move from low-productivity jobs to high-productivity ones. The less effective the growth process is in creating jobs, both in terms of numbers and quality, the greater the political threat and, consequently, the less sustainable the growth process itself" (Gokarn, 2010). Various indicators have raised concerns that India's growth is not inclusive or its benefits are not widely shared. One, the agriculture sector has been growing at a rate of 2-3 per cent per annum which has led to a fall in its share in the total income. With the level of employment in the agriculture sector remaining more or less constant, the slow growth in income means that the productivity in the agriculture sector has remained low. Regardless of the magnitude of increase and the differential across the two sectors, the stark fact is that average labour productivity outside agriculture is about 5 times that in agriculture (Gokarn, 2010). Two, the poverty impact of growth has been muted: poverty declined from 36 per cent in 1993/94 to 28 per cent in 2004/05, a 0.8 percentage point reduction per annum compared to 1.6 per cent poverty reduction per annum in our neighbouring countries, viz., Bangladesh and Nepal (World Bank, 2007). It is observed that close to 300 million still live in deep poverty at less than a dollar a day. Three, growth rates were generally lower in the poorer states during the 1980s and 1990s[1]. Four, employment is dominated by informal sector jobs. Five, it is observed that public services are weak in the poorer regions. Six, female labour force participation rates have remained low despite rising education levels among women due to absence of opportunities. Seven, there exists significant wage discrimination among casual laborers, women get about half the wages of men. Less than one third of this gap can be explained by conventional factors such as skills, location, industry, etc. Eight, although SC groups have made progress, large sections of SC and ST groups are agricultural workers, the poorest earners. Finally, access to finance has been low in rural areas, 87 per cent of the poorest

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[1]   However, in the current period (2000 to 2009), some of these States, viz., Uttaranchal, Orissa, Nagaland, Jharkhand, Tripura, Sikim, and Chattisgarh have performed better with more than 8 per cent growth rates.

households surveyed (marginal farmers) do not have access to credit, the rich pay a relatively low rate of interest (33 per cent), the poor pay rates of 104 per cent and get only 8 per cent of the credit (World Bank, 2007). Growth has diverged across regions, leaving behind the large populous states of North, Central and North-East India. Growth has not been creating enough good jobs that provide stable earnings for households to climb and stay out of poverty.

Section III: Economic Growth – Spatial and Temporal Analysis

III.1: Overall Growth

During the three decades period from the early 1950s to 1980s, the Indian economy was witnessing so-called "Hindu" rate of growth and the major concern was accelerated growth apart from ensuring equity. During that time, although inequality was a major problem, it was not as prominent as in the recent phase of accelerated growth. With the growth in GDP, the issue of rural-urban divide, regional divides and rich-poor divide became evident, which brought "inclusive growth" on high priority. The Indian economy has been growing at a faster rate in recent decades than it did earlier (Table 1 and Chart 1).

Table 1: Average Rate of Growth of Real GDP in India

Period	Growth (per cent)
1900-2008	3.16
1950-2008	4.79
1980-2008	6.08
1990-2008	6.39
2000-2008	7.19
11th Plan Period (2007-12)	
2007-08	9.2
2008-09	6.7
2009-10	7.2

Source: Bose and Chattopadhyay (2010) upto 2008 and CSO, Govt. of India for the rest of the information

Chart 1: Annual Growth rates of the Major Sectors
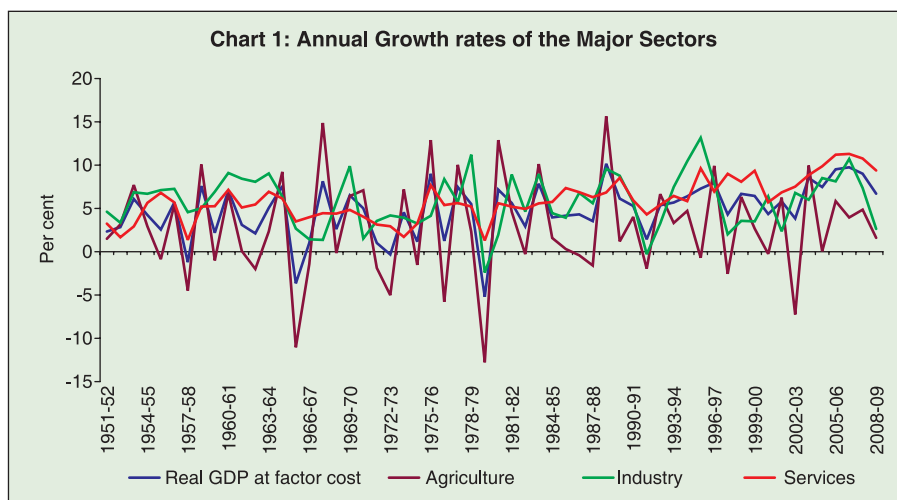
Sector wise performance

While the growth rate of the Indian economy has been increasing in recent times, one phenomenon which was observed was that the growth performance of the three major sectors of the economy, namely, agriculture, industry and services, has been diverse. The growth in the agriculture sector has been the most volatile and also the least among the three sectors most of the times. While the growth in the industrial sector has remained more or less constant, growth rate in the services sector has risen sharply (Chart 1).

The consequence of the diverse growth rate in the three sectors has resulted in a structural change in the contribution of the sectors in the total GDP. The share of the agriculture sector in the overall GDP has declined more or less consistently since independence from 55.3 per cent in 1950-51 to 17.0 per cent in 2008-09. The share of the industrial sector has increased from 10.6 per cent in 1950-51 to about 19.0 per cent in 2008-09. The share of the services sector has nearly doubled from 34.1 per cent in 1950-51 to 64.5 per cent in 2008-09 (Chart 2).

Since a large section of the population continues to be dependent on the agriculture sector, directly or indirectly, this has serious implications for 'inclusiveness'.

Chart 2: Share of Sectors in the Real GDP
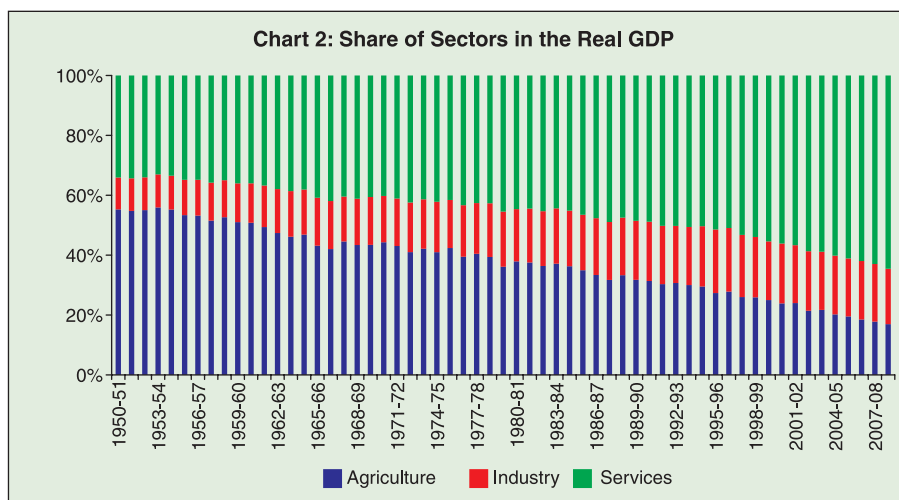
Potential Output[2]

The Indian economy grew at about 9.0 per cent during 2003-08, which decelerated to 7.0 per cent during 2008-10. Although a part of the gap is due to cyclical factor, different estimation methods suggest that the potential output growth would be around 8.0 per cent during the post-crisis period and 8.5 per cent during the pre-crisis period[3]. It is argued that the loss in potential output could be due to a slowdown of investment in various sectors, more specifically in the agriculture sector. In fact, the public investment in agriculture in real terms has witnessed steady decline from the Sixth Five Year Plan to the Tenth

Table 2: Plan-wise investment in Agriculture

See RBI Annual Report 2009-10	Investment (₹ crore)
Sixth Plan (1980-85)	64012
Seventh Plan (1985-90)	52108
Eighth Plan (1992-97)	45565
Ninth Plan (1997-2002)	42226
Tenth Plan (2002-2007)	67260
Eleventh Plan (2007-2012)	-

Source: Economic Survey, 2010, Government of India.

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[2]   Potential Output is defined as the maximum level of output that an economy can sustain without creating macroeconomic imbalances.

[3]   See RBI Annual Report, 2009-10

Plan. Trends in public investment in agriculture and allied sectors reveal that it has consistently declined in real terms (at 1999-2000 prices) from ₹ 64,012 crore in Sixth Plan to ₹ 42,226 crore during the Ninth Plan. However, during the Tenth Plan this has increased in absolute terms to ₹ 67,260 crore. It can also be observed that the public investment has gone down over the year, while private investment remained stagnant (Table 3). The gross capital formation (GCF) in agriculture and allied sectors as a proportion of total GDP stood at 2.66 per cent in 2004-05 and improved to 3.34 per cent in 2008-09. Similarly, GCF in agriculture and allied sectors relative to GDP in this sector has also shown an improvement from 14.07 per cent in 2004-05 to 21.31 per cent in 2008-09.

Table 3: Public and Private Investment in Agriculture & Allied Sector at 2004-05 Prices

	Investment in agriculture & allied sector (₹ crore)			Share in total investment (per cent)	
	Total	**Public**	**Private**	**Public**	**Private**
2004-05	78848	16183	62665	20.5	79.5
2005-06	93121	19909	73211	21.4	78.6
2006-07	94400	22978	71422	24.3	75.7
2007-08	110006	23039	86967	20.9	79.1
2008-09	138597	24452	114145	17.6	82.4

Source: Central Statistics Office, GoI.

Declining investment in the agriculture sector had a direct bearing on the productivity of foodgrains in the country. As can be observed from Chart 3, although average yield/hectare (productivity) of foodgrains in India has increased over the years, the productivity is low compared to many other developing countries. The productivity of foodgrains has increased from 522 kg/hectare in 1950-51 to 1854 in 2007-08. While in 1979-80 the yield per hectare was 876 kg/hectare, it became 1380 kg/hectare in 1990. However, productivity growth remained stagnant at a very low level throughout the period. Various studies have been done on the agriculture sector and its associated issues. More recent, among these, studies is done by Mishra (2007) which states that 'poor agriculture income and absence of non-farm

Chart 3: Yield/Hectare of foodgrain
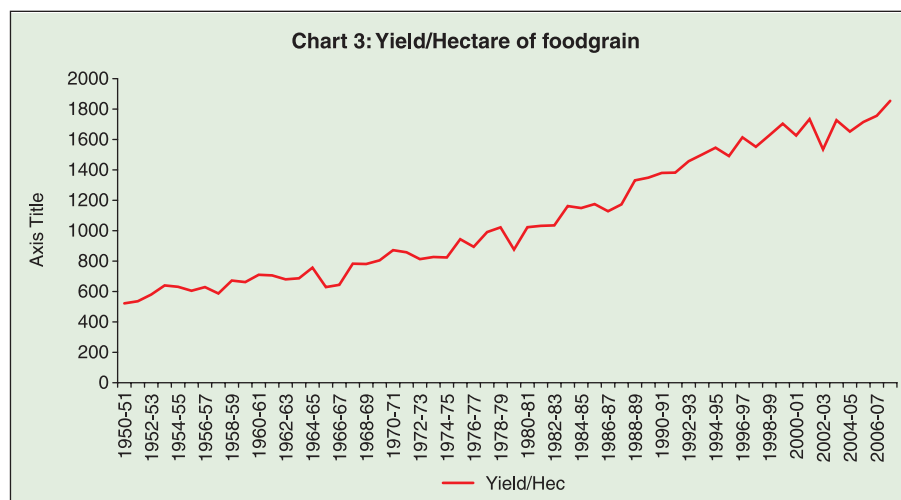
avenues of income is indicative of the larger malaise in the rural economy of India'. One of the manifestations of this has been the increasing incidence of farmers' suicide in various parts of the country, especially Maharashtra, Andhra Pradesh, etc.

As per the World Bank database, in respect of cereal productivity, India remained far below even China, Indonesia, Thailand and Sri Lanka (Table 4).

Table 4: Cereal Productivity (Kg/hectare)

Country	1980	1985	1990	1995	2000	2005	2006	2007	2008
Brazil	1575.7	1827.7	1755	2513.1	2660.6	2882.5	3210.5	3553.1	3828.8
China	2948.7	3827.7	4322.7	4663.7	4756.3	5225.5	5313.3	5315.3	5535.3
Egypt	4094.4	4539.1	5702.9	5903.7	7280	7569.2	7541	7562.2	7506.4
Indonesia	2865.6	3513.3	3800.2	3842.7	4026.3	4311.3	4365.8	4464.7	4694.2
Poland	2336.8	2893.5	3283.7	3022.3	2534.7	3233	2598.2	3249.5	3217.2
Russia	NA	NA	NA	1223.5	1563.3	1860.1	1894.4	1994.9	2388.1
Sri Lanka	2501	2960.5	2965	3052.6	3338.1	3467.1	3619.4	3821.6	3659.8
Thailand	1911	2125.4	2009	2507.4	2719.1	3001.5	2963	3043.7	3013.7
Turkey	1855.1	1931	2214.1	2037.8	2311	2624.2	2661.9	2381.4	2601.2
Vietnam	2016.1	2691.7	3072.9	3569.9	4112.3	4726.1	4749.7	4833.6	5064.2
India	**1350**	**1592.2**	**1891.2**	**2111.7**	**2293.5**	**2411.5**	**2455.6**	**2618.6**	**2647.2**

Source: World Bank website: http://data.worldbank.org/data-catalog

In short, the analysis at the all-India level shows that agricultural sector has lagged behind the growth process. Productivity in agricultural sector is low not only compared with other sectors, but also when compared to the agricultural productivity in other developing countries. In the next section we examine the inclusiveness of growth across the states in India.

III. 2 Inter-state Comparisons of Growth Performance

With regard to inter-state comparison of growth performance, it can be observed from the Table 5 that there is a wide disparity in growth performance in the three time periods (viz. 1980-81 to 1989-90, 1990-91 to 1999-2000 and 2000-01 to 2008-09), though the disparity has come down in the last period[4]. Among the three time periods taken, nineties witnessed higher disparity as revealed from the coefficient of variation (CV) at 32.4 per cent. The CV has increased from 27.2 per cent during the eighties to 32.4 per cent in the nineties. However, there was a decline in disparity during the last period where the CV came down to 21.2 per cent.

Not only has the disparity in growth came down during 2000s, the period (i.e., 2000-01 to 2008-09) also witnessed high growth rates across the states. All states, with the exception of Madhya Pradesh, recorded growth of more than 5.0 per cent and 12 states recorded growth of above 8.0 per cent. This is further evident that the average growth rate of 7.3 per cent was registered by all states during 2000-01 to 2008-09 compared to 4.9 per cent and 5.3 per cent, recorded during the first two periods respectively. Further, certain states like Kerala, Uttaranchal, Orissa and Nagaland showed significant improvements during 2000-09.

Thus, the NSDP figures show that the years since 2000 witnessed better inclusive growth than the previous periods. However, it is quite premature to presume that the latter years indicate inclusive growth as the NSDP figures hide the distributive effect of growth. To probe

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[4] The estimates of semi-log model for the three time periods taken are significant for all states (Annex Table 1). Accordingly, the compound growth rates are calculated for the states which are given in Annex Table 2.

Table 5: State-wise, Period-wise Compound Growth Rate of NSDP

States	1980-81 to 1989-90		1990-91 to 1999-00		2000-01 to 2008-09	
	Growth rate	Rank	Growth rate	Rank	Growth rate	Rank
Gujarat	4.8	12	8.0	2	10.6	1
Haryana	6.3	3	4.7	17	9.5	2
Goa	5.2	9	8.4	1	8.9	3
Uttaranchal	--	--	2.6	24	8.9	4
Kerala	2.6	22	5.9	12	8.5	5
Orissa	4.8	14	4.0	22	8.4	6
Nagaland	7.5	2	5.6	13	8.4	7
Jharkhand	--	--	6.5	8	8.4	8
Maharashtra	5.6	5	6.9	5	8.4	9
Tripura	5.0	10	7.3	3	8.3	10
Sikkim	NA	NA	6.3	10	8.1	11
Chattisgarh	--	--	2.5	25	8.1	12
Tamil Nadu	5.0	11	6.4	9	7.4	13
Andhra	5.3	7	5.3	16	7.2	14
Bihar	4.7	16	2.0	27	7.2	15
Karnataka	5.3	8	7.1	4	7.2	16
Himachal Pradesh	4.5	18	6.2	11	6.9	17
Rajashthan	5.9	4	6.5	7	6.5	18
West Bengal	4.6	17	6.9	6	6.3	19
Arunachal Pradesh	8.1	1	4.6	20	5.9	20
Meghalya	4.4	19	5.5	15	5.8	21
Manipur	4.8	13	4.7	18	5.8	22
Uttar Pradesh	4.8	15	3.6	23	5.4	23
Jammu &Kashmir	2.0	23	4.7	19	5.3	24
Assam	3.3	21	2.2	26	5.3	25
Punjab	5.4	6	4.4	21	5.1	26
Madhya Pradesh	3.6	20	5.6	14	4.5	27

Note: NA: Not Available; -- Not Applicable
Source: Authors' own Calculation by using semi-logarithmic trend.

further into the details, we look into the per capita NSDP figures which give a better indicator of standard of living compared to the state average growth. Here again, it is noted that per capita income (PCI)

Chart 4: Per capita NSDP (₹) : Average of 5 years (2004-05 to 2008-09)

State	Per capita NSDP
Bihar	8155
Uttar Pradesh	11387
Madhya Pradesh	12695
Jharkhnad	14334
Assam	15011
Manipur	15223
Orissa	15702
Jammu & Kashmir	16477
Chhattisgarh	16823
Nagaland	17135
Rajasthan	17320
Mizoram	19395
Meghalaya	20263
Arunachal Pradesh	20407
Tripura	21387
West Bengal	21901
Uttaranchal	22030
Sikkim	22265
Andhra Pradesh	23836
Karnataka	23912
Tamil Nadu	27390
Gujarat	28630
Himachal Pradesh	29035
Punjab	30281
Kerala	30428
Maharashtra	31285
Haryana	36339
Goa	53462

also has limited value in examining inclusive growth as it gives little revelation on the distribution of income across the population.

Chart 4 gives the distribution of Per capita income across states. It shows that there is a wide disparity across States with Bihar at the lowest and Goa at the top position. The CV is as high as 41.0 per cent.

We further examine the inequality across the States in respect of per capita NSDP across the time periods. Annex Table 2 provides the estimates of semi-log function. For Jammu Kashmir (1980-81 to 1989-90), Bihar and Uttaranchal for 1990-91 to 1999-00 and Nagaland for 1990-91 to 1999-00 and 2000-01 to 2008-09, the figures came insignificant. The growth rates for the rest of the states are given in Table 6.

Compared to NSDP, the disparity is higher in the case of per capita income. However, similar to NSDP, the 1990s witnessed higher disparity which came down in 2000s. The CV increased from 48.0 per cent during the eighties to 53.5 per cent in the nineties before coming down to 32.9 per cent during the last period.

Though the inequality in terms of growth rates have come down in 2000s, inequality measured by Gini coefficient of the level variables, have shown an increase over the period. Gini coefficient has increased

Table 6: State-wise, Period-wise Compound Growth Rate of Per Capita NSDP

States	1980-81 to 1989-90		1990-91 to 1999-00		2000-01 to 2008-09	
	Growth rate	Rank	Growth rate	Rank	Growth rate	Rank
Gujarat	2.8	12	6.0	2	9.1	1
Orissa	2.9	11	2.4	17	8.2	2
Kerala	1.1	21	4.8	7	8.0	3
Chattisgarh	-	-	0.9	23	7.8	4
Haryana	3.7	2	2.2	19	7.3	5
Andhra Pradesh	3.0	10	3.8	12	7.0	6
Uttaranchal	-	-	0.0	-	7.0	7
Goa	3.6	3	6.8	1	6.9	8
Maharashtra	3.2	8	4.7	8	6.8	9
Sikkim	NA	-	3.4	14	6.6	10
Jharkhand	-	-	4.7	9	6.6	11
Karnataka	3.2	9	5.4	4	6.6	12
Tamil Nadu	3.5	6	5.3	5	6.5	13
Bihar	2.5	14	0.0	-	5.9	14
Tripura	2.0	18	5.4	3	5.8	15
Rajashthan	3.2	7	4.0	11	5.8	16
Meghalya	1.4	19	2.8	15	5.7	17
West Bengal	2.3	16	5.1	6	5.4	18
Himachal Pradesh	2.7	13	4.4	10	5.2	19
Arunachal Pradesh	4.8	1	2.1	20	5.1	20
Manipur	2.1	17	2.3	18	4.0	21
Jammu &Kashmir	0.0	-	2.0	21	3.7	22
Assam	1.1	22	0.3	25	3.4	23
UP	2.4	15	1.3	22	3.4	24
Punjab	3.5	4	2.5	16	3.3	25
Madhya Pradesh	1.2	20	3.4	13	2.6	26
Nagaland	3.5	5	0.0	-	0.0	-

Notes: NA denotes Note Available
Source: Authors' own Calculation by using semi-logarithmic trend.

from 0.164 in 1980-81 to 0.245 in 2007-08 (Chart 5). Gini coefficient has been calculated for 22 states omitting Chattisgarh, Jharkhand, Uttaranchal, Mizoram, Sikkim and Nagaland due to non-availability of continuous data series[5].

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[5]   The Gini coefficient is calculated using Deaton's formula:

$$G = \frac{N+1}{N-1} - \frac{2}{N(N-1)u} \left(\sum_{i=1}^{n} PiXi \right)$$

Chart 5: Gini Coefficeint of state per capita NSDP
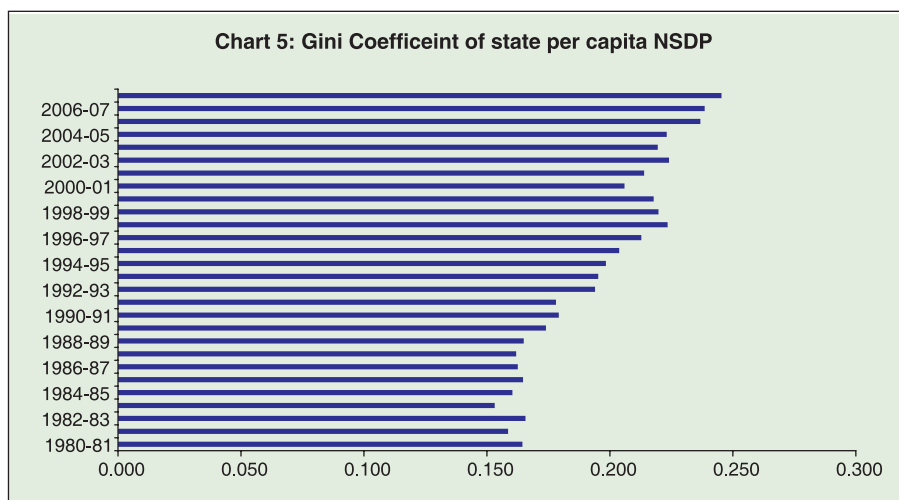
In general, growth rates of states have improved in the last time period with the exception of Madhya Pradesh and Punjab. Both the states showed dismal performance in case of NSDP and Per capita income. On the other hand, Kerala and Orissa showed significant improvement in the last decade, with Kerala registering tremendous improvement both in the growth and level of income. Orissa, which ranked 17 in terms of PCI growth during the nineties, improved its position to the second. However, in terms of the level of PCI, it is still low at ₹ 15,702.

From the perspective of inclusive growth, an analysis of growth performance of states is not enough. It calls for a more detailed analysis of various sectors of the economy and various sections of population. As a first step, we look into the sectoral shares and growth in each state.

Table 7 provides the share of each sector in NSDP across the three time periods. In all the states, the share of primary sector has declined over the time period considered and tertiary sector showing an increase in share and secondary sector registering marginal or no increase[6]. However, Maharashtra which is often hailed as industrial

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[6]   We have followed the CSO allocation of sectors and accordingly construction is included in the secondary sector.

Table 7: Shares of each sector in NSDP across states *(Contd.)*

	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
	ANDHRA Pradesh			**ARUNACHAL PRADESH**		
1980-81 to 1989-90	48.7	13.3	38.0	50.9	16.7	32.4
1990-91 to 1999-00	37.1	18.0	44.9	42.2	19.7	38.1
2000-01 to 2008-09	30.6	18.4	51.0	28.6	28.0	43.4
	ASSAM			**BIHAR**		
1980-81 to 1989-90	49.0	15.6	35.4	50.3	9.4	40.3
1990-91 to 1999-00	44.3	13.7	42.0	41.6	9.6	48.8
2000-01 to 2008-09	34.4	14.5	51.1	32.5	12.6	54.9
	CHATTISGARH			**GOA**		
1980-81 to 1989-90	–	–	–	32.9	22.5	44.6
1990-91 to 1999-00	40.5	21.5	38.0	20.7	27.9	51.4
2000-01 to 2008-09	35.6	22.5	41.9	13.3	36.0	50.6
	GUJARAT			**HARYANA**		
1980-81 to 1989-90	40.4	25.8	33.8	46.1	24.3	29.6
1990-91 to 1999-00	29.1	32.0	38.8	39.4	26.3	34.4
2000-01 to 2008-09	20.8	33.2	46.0	25.8	26.6	47.6
	HIMACHAL			**JAMMU KASHMIR**		
1980-81 to 1989-90	47.1	21.6	31.3	38.7	25.6	35.8
1990-91 to 1999-00	34.8	31.1	34.2	33.3	25.4	41.2
2000-01 to 2008-09	24.9	37.2	37.9	31.9	21.5	46.6
	JHARKAND			**KARNATAKA**		
1980-81 to 1989-90	–	–	–	45.2	20.1	34.7
1990-91 to 1999-00	29.8	31.1	39.1	36.1	22.0	41.9
2000-01 to 2008-09	27.1	29.8	43.2	22.0	24.3	53.6
	KERALA			**MADHYA PRADESH**		
1980-81 to 1989-90	31.0	20.1	48.9	45.9	12.0	42.2
1990-91 to 1999-00	26.5	21.4	52.1	38.9	14.7	46.4
2000-01 to 2008-09	17.0	22.1	60.9	30.6	18.2	51.2
	MAHARASHTRA			**MANIPUR**		
1980-81 to 1989-90	25.7	30.4	43.9	39.6	19.9	40.5
1990-91 to 1999-00	20.1	29.1	50.7	32.4	19.6	48.0
2000-01 to 2008-09	16.3	23.6	60.1	28.1	26.8	45.2

Table 7: Shares of each sector in NSDP across states (Concld.)

	MEGHALAYA			MIZORAM		
1980-81 to 1989-90	39.1	12.4	48.5			
1990-91 to 1999-00	31.2	12.9	55.9	24.2	14.1	61.6
2000-01 to 2008-09	30.6	17.3	52.1	18.3	17.6	64.2
	NAGALAND			ORISSA		
1980-81 to 1989-90	24.6	6.8	68.5	52.5	15.6	32.0
1990-91 to 1999-00	23.9	16.1	60.1	41.9	16.8	41.4
2000-01 to 2008-09	34.5	14.1	51.4	32.8	16.9	50.3
	PUNJAB			RAJASTHAN		
1980-81 to 1989-90	46.5	15.7	37.8	47.6	16.7	35.7
1990-91 to 1999-00	43.6	19.6	36.8	41.0	19.2	39.8
2000-01 to 2008-09	36.0	21.5	42.6	32.8	22.6	44.6
	SIKKIM			TAMIL Nadu		
1980-81 to 1989-90	–	–	–	26.1	30.3	43.6
1990-91 to 1999-00	31.3	18.5	50.2	22.2	28.6	49.2
2000-01 to 2008-09	21.0	26.1	52.9	14.3	26.5	59.2
	TRIPURA			UTTAR PRADESH		
1980-81 to 1989-90	51.2	9.7	39.1	44.2	17.8	38.0
1990-91 to 1999-00	37.3	9.6	53.1	38.3	19.8	41.9
2000-01 to 2008-09	26.4	20.6	53.0	33.4	21.4	45.2
	UTTARAKHAND			WEST BENGAL		
1980-81 to 1989-90	–	–	–	40.0	15.6	44.4
1990-91 to 1999-00	30.3	18.8	51.0	37.6	14.8	47.6
2000-01 to 2008-09	23.5	28.4	48.2	28.0	16.1	55.9

Source: Central Statistics Office, Government of India.

capital of India, witnessed a decline in the share of secondary sector and witnessed an increase in tertiary sector. In all the states, tertiary sector occupies the major share of NSDP which conforms with the earlier studies showing India's difference in development path with the general East Asian growth path (Bhattacharya and Mitra, 1990; Bhattacharya and Sakthivel, 2004).

However, in terms of growth rates, secondary sector registered highest growth rate in most of the states during the period 2000-01 to

2008-09 as is revealed from Table 8. On the other hand, tertiary sector which registered high growth during the nineties witnessed a slowdown or marginal growth in most of the states during the last period.

Table 8: Sector-wise Growth Rates of NSDP across States *(Contd.)*

	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
	ANDHRA PRADESH			ARUNACHAL PRADESH		
1980-81 to 1989-90	2.0	7.1	7.6	8.8	6.6	7.4
1990-91 to 1999-00	2.8	7.0	9.2	0.6	6.8	9.2
2000-01 to 2008-09	6.0	9.8	6.1	2.4	12.4	6.1
	ASSAM			BIHAR		
1980-81 to 1989-90	2.7	1.2	0.9	2.8	7.9	5.8
1990-91 to 1999-00	2.9	3.6	0.7	NS	NS	4.8
2000-01 to 2008-09	4.1	7.6	7.2	2.5	17.7	8.7
	GOA			GUJARAT		
1980-81 to 1989-90	NS	5.6	7.2	NS	8.1	7.3
1990-91 to 1999-00	2.7	8.7	10.1	4.0	9.4	9.2
2000-01 to 2008-09	6.3	7.5	10.5	10.6	13.6	9.5
	HARYANA			HIMACHAL		
1980-81 to 1989-90	3.9	9.7	7.2	1.6	6.7	5.9
1990-91 to 1999-00	1.8	5.2	7.7	0.8	11.2	7.6
2000-01 to 2008-09	3.6	10.2	12.1	1.4	9.7	7.8
	JAMMU KASHMIR			KARNATAKA		
1980-81 to 1989-90	NS	5.6	3.4	2.7	6.7	7.1
1990-91 to 1999-00	4.1	NS	6.2	4.5	6.8	9.4
2000-01 to 2008-09	3.1	8.6	5.1	1.7	10.9	9.3
	KERALA			MADHYA PRADESH		
1980-81 to 1989-90	1.3	2.2	3.6	1.7	4.6	5.2
1990-91 to 1999-00	2.0	6.7	8.5	3.6	8.8	5.9
2000-01 to 2008-09	0.8	12.4	9.9	5.3	4.1	4.3
	MAHARASHTRA			MANIPUR		
1980-81 to 1989-90	3.1	6.0	6.4	2.0	7.0	7.0
1990-91 to 1999-00	4.5	6.0	8.3	2.8	2.5	5.9
2000-01 to 2008-09	5.1	7.7	9.2	2.2	13.6	4.4

Table 8: Sector-wise Growth Rates of NSDP across States *(Concld.)*

	MEGHALAYA			NAGALAND		
1980-81 to 1989-90	1.4	0.7	6.5	5.5	18.2	8.5
1990-91 to 1999-00	4.4	8.0	5.8	6.1	10.6	4.9
2000-01 to 2008-09	5.8	13.2	5.8	7.6	9.7	4.5
	ORISSA			PUNJAB		
1980-81 to 1989-90	3.0	7.1	6.3	5.3	7.2	4.0
1990-91 to 1999-00	2.9	NS	6.3	2.4	6.7	5.8
2000-01 to 2008-09	5.6	14.7	10.1	2.5	8.3	5.8
	RAJASTHAN			TAMIL NADU		
1980-81 to 1989-90	3.4	7.1	8.9	3.5	2.8	2.3
1990-91 to 1999-00	3.9	9.4	8.0	4.1	5.3	7.7
2000-01 to 2008-09	6.1	9.1	8.4	6.2	9.0	8.6
	TRIPURA			UTTAR PRADESH		
1980-81 to 1989-90	2.5	NS	8.5	2.5	8.3	5.8
1990-91 to 1999-00	3.0	11.2	8.8	2.6	3.7	4.3
2000-01 to 2008-09	6.0	7.1	7.7	2.1	10.1	5.7
	WEST BENGAL					
1980-81 to 1989-90	5.8	3.0	4.4			
1990-91 to 1999-00	5.0	6.2	8.6			
2000-01 to 2008-09	2.3	8.8	8.1			

Note: NS denotes Not Significant
Source: Central Statistics Office, Government of India

The analysis in this section revealed that the growth process was mostly driven by the growth in the services sector. Further, the inequality in growth has come down in the time period since 2000, though the inequality remains at high level. Further, there was a change in growth performance in the last decade with many underperformers moving up and top performers coming down which is reflected in the declining inequality. In the next section, we look into the socio-economic inclusiveness of the growth process.

IV: Socio-Economic Inclusiveness

While discussing inclusive growth, a major factor to be examined is the socio-economic inclusiveness of the people. Inclusive growth being a long term process necessarily emanates from the inclusive nature of socio-economic development across regions and people. But, considering the time constraint, we are limiting our analysis of socio-economic inclusiveness to certain indicators which we feel is able to reveal the social development of the country. We start the analysis by looking into the poverty and unemployment figures over the years. As far as possible, we have tried to compare India's position with other developing countries

The ultimate objective of planned development is to ensure human well-being through sustained improvement in the quality of life of the people, particularly the poor and the vulnerable segments of population. The development of human resources contributes to sustained growth and productive employment. Development strategy therefore needs to continuously strive for broad-based improvement in standards of living. High growth is essential to generate resources for social spending. However, the benefits of growth should be shared equitably among all sections of society. This is the main logic behind emphasizing the concept of inclusive growth as has been pursued in the Eleventh Five Year Plan.

As per the UNDP Human Development Report 2009 (HRD 2009), India ranked 134 out of 182 countries of the world placing it at the same rank as in 2006 (the Human Development Index (HDI) for India in 2007 was 0.612).[7] However, the HDI value of India has increased gradually from 0.427 in 1980 to 0.556 in 2000 and went up to 0.612 in 2007, but it is still in the medium Human Development category with even countries like China, Sri Lanka and Indonesia having better ranking (Table 9). In fact, India lags behind in various

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7   HDI is based on three indicators, viz., GDP per capita (PPP US $), life expectancy at birth, and education as measured by adult literacy rate and gross enrolment ratio (combined for primary, secondary and tertiary education)

social indicators of development. There is a huge gap between India and developed world and even many developing countries in respect of health and education, which needs to be bridged at a faster pace. According to HDR, life expectancy at birth in India was 63.4 years in 2007 as against 80.5 years in Norway, 81.4 years in Australia, 74.0 years in Sri Lanka and 72.9 years in China. Adult literacy rate (aged 15 and above) in 1999-2007 was 66.0 per cent in India as against near 100 per cent in China and 92.0 per cent in Indonesia. In the case of combined gross enrolment ratio in education also India was much below the level achieved by some other comparable countries, like China, Norway, and Thailand etc.

Table 9: Human Development Index

Country	1980	1985	1990	1995	2000	2005	2006	2007
Poland	…	…	0.806	0.823	0.853	0.871	0.876	0.880
Brazil	0.685	0.694	0.710	0.734	0.790	0.805	0.808	0.813
Russia	…	…	0.821	0.777	…	0.804	0.811	0.817
Turkey	0.628	0.674	0.705	0.73	0.758	0.796	0.802	0.806
Thailand	0.658	0.684	0.706	0.727	0.753	0.777	0.78	0.783
China	0.533	0.556	0.608	0.657	0.719	0.756	0.763	0.772
Sri Lanka	0.649	0.670	0.683	0.696	0.729	0.752	0.755	0.759
Indonesia	0.522	0.562	0.624	0.658	0.673	0.723	0.729	0.734
Vietnam	…	0.561	0.599	0.647	0.69	0.715	0.720	0.725
Egypt	0.496	0.552	0.58	0.631	0.665	0.696	0.700	0.703
India	**0.427**	**0.453**	**0.489**	**0.511**	**0.556**	**0.596**	**0.604**	**0.612**

Source: Human Development Report, 2009

Poverty

Poverty is a major issue in the emerging economies, though its intensity varies across countries as reflected in the World Bank's data on the poverty head count ratio at $1.25 a day (PPP). South Asia continues to have a significant amount of poor people, mainly due to the high poverty ratios in India and Bangladesh (Table 10). It is observed that compared to India, China has made significant progress in reducing poverty in the last 15 years.

Table 10: Poverty headcount ratio at $1.25 a day (PPP)
(% of population)

Country	1990	2005	
Argentina	n.a.	3.4	(2006)
Bangladesh	n.a.	49.6	
Brazil	15.5	5.2	(2007)
Chile	4.4	2.0	(2006)
China	60.2	15.9	
East Asia & Pacific	54.7	16.8	
India	**n.a.**	**41.6**	
Indonesia	n.a.	29.4	(2007)
Pakistan	n.a.	22.6	
South Asia	51.7	40.3	

Source: World Bank website.

As per the official estimates, the incidence of poverty has declined over the years though it remains still at a very high level. The percentage of the population below the official poverty line has come down from 36 per cent in 1993–94 to 28 per cent in 2004–05 (Table 11). However, not only is the rate still high, but also the rate of decline in poverty has not accelerated along with the growth in GDP, and the incidence of poverty among certain marginalized groups, for example the poverty rate of the STs, has hardly declined. Moreover, the absolute number of poor people below poverty line has declined only marginally from 320 million in 1993–94 to 302 million in 2004–05. This performance is all the more disappointing since the poverty line on which the estimate of the poor is based is the same as it was in 1973–74 when per capita incomes were much lower. If we take the World Bank measurement of poverty about 41.6 per cent (as per PPP) of population is below poverty line, which is much higher than the official national poverty ratio of about 28 per cent.

Table 11: Trends in Poverty in India

Year	Poverty (head count index) percentage			Number of poor (million)
	Rural	**Urban**	**Total**	
1973-74	56	49	55	321
1983	46	41	45	323
1993-94	37	32	36	320
2004-05	28	26	28	302

Source: Mahendra S. Dev (2007).

It can further be stated that around 80.0 per cent of the poor are from rural areas. Poverty is mostly concentrated in few states, viz, Bihar, Uttar Pradesh and Madhya Pradesh, Orissa, Chattisgarh and Jharkhand (Annex Table 3). Poverty is concentrated among agricultural labourers, casual workers, Scheduled Castes and Scheduled Tribes.

There are concerns of inequality also in the country. During the last four decades there is hardly any decrease in inequality in the country. It may be observed from Table 12 that while there is a marginal decrease in inequality in the rural area, it has increased in the

Table 12: Gini Coefficient for Per Capita Consumption Expenditure

	1973-74		1977-78		1983		1993-94		1999-2000		2004-05 (URP)*		2004-05 (MRP)*	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
India	**0.28**	**0.30**	**0.34**	**0.34**	**0.30**	**0.33**	**0.28**	**0.34**	**0.26**	**0.34**	**0.30**	**0.37**	**0.25**	**0.35**
Andhra Pradesh	0.29	0.29	0.30	0.32	0.29	0.31	0.29	0.32	0.24	0.31	0.29	0.37	0.24	0.34
Assam	0.20	0.30	0.18	0.32	0.19	0.25	0.18	0.29	0.20	0.31	0.19	0.32	0.17	0.30
Bihar	0.27	0.26	0.26	0.30	0.26	0.30	0.22	0.31	0.21	0.32	0.20	0.33	0.17	0.31
Jharkhand	–	–	–	–	–	–	–	–	–	–	0.22	0.35	0.20	0.33
Gujarat	0.23	0.25	0.29	0.31	0.25	0.26	0.24	0.29	0.23	0.29	0.27	0.31	0.25	0.32
Haryana	0.29	0.31	0.29	0.31	0.27	0.30	0.30	0.28	0.24	0.29	0.32	0.36	0.31	0.36
Himachal Pradesh	0.24	0.27	0.26	0.30	0.27	0.31	0.28	0.43	0.23	0.30	0.30	0.32	0.26	0.26
Jammu & Kashmir	0.22	0.22	0.22	0.33	0.22	0.24	0.23	0.28	0.17	0.22	0.24	0.24	0.20	0.24
Karnataka	0.28	0.29	0.32	0.34	0.30	0.33	0.27	0.32	0.24	0.32	0.26	0.36	0.23	0.36
Kerala	0.31	0.37	0.35	0.36	0.33	0.37	0.29	0.34	0.27	0.32	0.34	0.40	0.29	0.35
Madhya Pradesh	0.29	0.27	0.33	0.38	0.29	0.29	0.28	0.33	0.24	0.32	0.27	0.39	0.24	0.37
Chhatisgarh	–	–	–	–	–	–	–	–	–	–	0.29	0.43	0.24	0.35
Maharashtra	0.26	0.33	0.46	0.36	0.28	0.33	0.30	0.35	0.26	0.35	0.31	0.37	0.27	0.35
Orissa	0.26	0.34	0.30	0.32	0.27	0.29	0.24	0.30	0.24	0.29	0.28	0.35	0.25	0.33
Punjab	0.27	0.29	0.30	0.38	0.28	0.32	0.26	0.28	0.24	0.29	0.28	0.39	0.26	0.32
Rajasthan	0.28	0.29	0.46	0.30	0.34	0.30	0.26	0.29	0.21	0.28	0.25	0.37	0.20	0.30
Tamil Nadu	0.27	0.31	0.32	0.33	0.32	0.35	0.31	0.34	0.28	0.38	0.32	0.36	0.26	0.34
Uttar Pradesh	0.24	0.29	0.30	0.33	0.29	0.31	0.28	0.32	0.25	0.33	0.29	0.37	0.23	0.34
Uttaranchal	–	–	–	–	–	–	–	–	–	–	0.28	0.32	0.22	0.30
West Bengal	0.30	0.32	0.29	0.32	0.28	0.33	0.25	0.33	0.22	0.34	0.27	0.38	0.24	0.36
Delhi	0.15	0.35	0.29	0.33	0.29	0.33	0.24	0.21	0.29	0.34	0.26	0.33	0.24	0.32

Note: URP - Uniform Reference Period; MRP - Mixed Reference Period.   – : Not available.
Source: Planning Commission, Government of India.

urban area. A state-wise breakup of Gini coefficients, including a division between rural and urban households, gives similar picture. Most of the States have shown some increase in urban inequality during the same period, but none of the states displayed any increase in consumption inequality over the period 1973-74 to 2004-05.

Employment and Unemployment Situation

Nature and extent of employment is crucial for poverty reduction and inclusive growth. It can be observed from Table 13 that although employment in the industrial and services sector has increased in 2004 in comparison to 1961, agriculture still remains the major sector which continues to employ the largest segment of the population.

Table 13: Sector-wise Employment
(per cent)

Sector	1961	2004
Agriculture	75.9	56.4
Industry	11.7	18.2
Tertiary	12.4	25.4
Total	**100**	**100**

Source: Mahendra S. Dev (2007)

Employment growth in the organized sector, both public and private combined, has declined during the period 1994 and 2007. This has happened due to the decline of employment in the public organized sector. Employment in the organized sector grew at 1.20 per cent per annum during 1983-94, but declined to (-) 0.03 per cent per annum during 1994-2007 (Table 14). However, the decline in employment during the later period was mainly due to a decline in employment in

Table 14: Rate of Growth of employment in organized Sector

(per cent per annum)

Sector	1983-94	1994-2007
Public Sector	1.53	-0.57
Private Sector	0.44	1.30
Total Organized	1.20	-0.03

Source: Economic Survey, 2009-10, Government of India.

the public sector establishments from 1.53 per cent in the earlier period to (-) 0.57 per cent in the later period, whereas the private sector showed moderate growth of 1.30 per cent per annum.

According to NSSO data, compared to 1999-2000, during 2004-05, the unemployment rate in terms of the usual status remained almost the same in rural and urban areas for males, though it has increased by around 2 percentage points for females. As can be observed from Table 15, overall unemployment rates are not too high. However, urban unemployment rates are higher than the rural rates. The unemployment rates according to current daily status (CDS) approach are higher than the rates obtained according to 'usual status' approach and 'weekly status' approach, thereby indicating a high degree of intermittent unemployment. The unemployment rate, measured through the usual status is very low in the rural areas.

Table 15: Unemployment rates in India according to usual status, current weekly status and current daily status during 1972-73 to 2004-05

Year (round)	Male			Female		
	Usual Status	CWS	CDS	Usual Status	CWS	CDS
Rural						
1972-73 (27th round)	1.2	3.0	6.8	0.5	5.5	11.2
1977-78 (32nd round)	2.2	3.6	7.1	5.5	4.1	9.2
1983 (38th round)	2.1	3.7	7.5	1.4	4.3	9.0
1987-88 (43rd round)	2.8	4.2	4.6	3.5	4.4	6.7
1993-94 (50th round)	2.0	3.1	5.6	1.3	2.9	5.6
1999-2000 (55th round)	2.1	3.9	7.2	1.5	3.7	7.0
2004-05 (61st round)	2.1	3.8	8.0	3.1	4.2	8.7
Urban						
1972-73 (27th round)	4.8	6.0	8.0	6.0	9.2	13.7
1977-78 (32nd round)	6.5	7.1	9.4	17.8	10.9	14.5
1983 (38th round)	5.9	6.7	9.2	6.9	7.5	11.0
1987-88 (43rd round)	6.1	6.6	8.8	8.5	9.2	12.0
1993-94 (50th round)	5.4	5.2	6.7	8.3	7.9	10.4
1999-2000 (55th round)	4.8	5.6	7.3	7.1	7.3	9.4
2004-05 (61st round)	4.4	5.2	7.5	9.1	9.0	11.6

Note: CWS: Current weekly status, CDS: Current daily status.
Source: NSSO, 61st round.

Rural Population

A significant proportion of the Indian population continues to live in the rural areas, though the share has been declining over the years (Table 16). The share of rural population in India is more or less same with that in other South Asian countries. It is interesting to observe that China's share of rural population, which was almost similar to that of India in early 90s, had declined much faster. With a significant proportion of the rural population engaged in the agricultural sector, the agricultural value added per worker continues to be low.

Table 16: Share of Rural Population: India and select Countries
(% of total population)

Country	Rural population (% of total population)		Agriculture value added per worker (constant 2000 US$)	
	1990	2008	1990	2008
Afghanistan	81.7	76.0	-	-
Argentina	13.0	8.0	6,701.7	11,793.1
Bangladesh	80.2	72.9	250.6	417.6
Brazil	25.2	14.4	1,625.4	3,857.9
Chile	16.7	11.6	3,453.3	6,486.9
China	72.6	56.9	262.8	504.2
India	**74.5**	**70.5**	**362.1**	**478.0**
Indonesia	69.4	48.5	511.9	704.9
Korea, Dem. Rep.	41.6	37.3	-	-
Korea, Rep.	26.2	18.5	5,338.1	17,703.5
Least developed countries: UN classification	79.0	71.4	242.1	297.0
Low income	77.3	71.3	242.0	324.1
Malaysia	50.2	29.6	385.0	-
Pakistan	69.4	63.8	738.5	892.0
Philippines	51.2	35.1	910.9	1,211.3
South Africa	48.0	39.3	2,290.1	3,838.6
South Asia	75.1	70.5	371.6	499.1
Sri Lanka	82.8	84.9	678.4	902.7
World	57.1	50.1	793.6	878.2

Source: World Bank website, World Development Indicators, 2010.

Rural Health

India has made significant strides in terms of availability of improved water source in the rural areas (Table 17). It is comparable with many countries across the world. However, in terms of inclusive growth on the provision of improved rural sanitation, our achievement has been low.

Gender Disparity

Another important indicator of inclusive growth is the trend in gender disparity. India has made significant strides in terms of reducing the gender disparities as reflected in various indicators. For instance, the female life expectancy at birth, the female literacy levels and the share of women employed in the non-agricultural sector have improved

Table 17: Availability of Improved Water Source and Sanitation in Rural Areas
(as % of rural population with access)

Country	Improved Water Source		Improved Rural Sanitation	
	1990	2006	1995	2006
Afghanistan		17.0	29.0	25.0
Argentina	72.0	80.0	59.0	83.0
Bangladesh	76.0	78.0	21.0	32.0
Brazil	54.0	58.0	37.0	37.0
Chile	49.0	72.0	58.0	74.0
China	55.0	81.0	48.0	59.0
India	**65.0**	**86.0**	**8.0**	**18.0**
Indonesia	63.0	71.0	40.0	37.0
Korea, Dem. Rep.	n.a.	100.0	60.0	n.a.
Least developed countries: UN classification	**45.3**	**55.1**	**17.8**	**27.3**
Low income	**45.2**	**59.7**	**23.4**	**33.3**
Malaysia	96.0	96.0	n.a.	93.0
Pakistan	81.0	87.0	22.0	40.0
Philippines	75.0	88.0	55.0	72.0
South Africa	62.0	82.0	46.0	49.0
South Asia	67.7	83.8	12.2	23.0
Sri Lanka	62.0	79.0	74.0	86.0
World	62.0	77.5	37.3	44.2

Source: World Bank website, World Development Indicators, 2010.

since 1990. In comparison with select countries, it is observed that we are still lagging behind. Even within South Asia, achievements by Sri Lanka are much better than India (Table 18).

Table 18: Gender Disparity

Country	Life expectancy at birth, female (years)		Literacy rate, adult female (% of females ages 15 and above)		Share of women employed in the nonagricultural sector (% of total nonagricultural employment)		
	1990	**2008**	**2008**		**1990**	**2007**	
Afghanistan	41.2	43.9	n.a.		17.8	n.a.	
Argentina	75.2	79.2	97.7		37.1	45.0	(2006)
Bangladesh	54.8	67.2	49.8			20.1	(2006)
Brazil	70.1	76.2	90.2	(2007)	35.1	n.a.	
Chile	76.7	81.7	98.7		34.7	37.4	
China	69.5	74.9	90.5		37.8	n.a.	
India	**58.5**	**65.2**	**50.8**	**(2007)**	**12.7**	**18.1**	**(2005)**
Indonesia	63.3	72.8	88.8	(2007)	29.2	30.6	
Korea, Dem. Rep.	73.7	69.3	n.a		40.7	n.a.	
Korea, Rep.	75.5	83.3	n.a		38.1	42.1	
Least developed countries: UN classification	51.8	58.1	54.4		n.a.	n.a.	
Low income	55.6	60.3	63.0		n.a.	n.a.	
Malaysia	72.3	76.8	89.8		n.a.	39.0	
Pakistan	60.9	66.9	40.0		7.7	13.2	
Philippines	67.5	74.1	93.9		40.3	42.3	
South Africa	65.2	53.1	88.1		n.a.	43.9	
South Asia	58.2	65.4	50.1		12.6	n.a.	
Sri Lanka	72.9	78.0	89.1		n.a.	31.0	
World	67.1	71.1	76.3		34.4	n.a.	

Source: World Bank website, World Development Indicators, accessed on August 23, 2010.

Literacy

The male female literacy and literacy gap during the last two censuses across states are given in Table 19. Though the literacy gap across states has visibly come down over the decade, in many states and union territories, it is more than the national average. Literacy gap is highest among the North Indian statets with the exception of Punjab, Himachal Pradesh and Chandigarh. However, for Punjab, the low literacy gap is more to do with the low literacy rates which itself is a

worrisome phenomenon considering that Punjab ranks fifth in terms of per capita NSDP.

Table 19: Male-female Literacy Gap in India

States /UT	Literacy Rate 1991 census		Literacy Gap	Literacy Rate 2001 census		Literacy Gap
	Male	**Female**		**Male**	**Female**	
Rajasthan	55.0	20.4	34.6	75.7	43.9	31.9
D &N Haveli	53.6	27.0	26.6	71.2	40.2	31.0
Jharkhand	55.8	25.5	30.3	67.3	38.9	28.4
Uttar Pradesh	54.8	24.4	30.5	68.8	42.2	26.6
Bihar	51.4	22.0	29.4	59.7	33.1	26.6
Madhya Pradesh	58.5	29.4	29.2	76.1	50.3	25.8
Chhattisgarh	58.1	27.5	30.6	77.4	51.9	25.5
Orissa	63.1	34.7	28.4	75.4	50.5	24.8
Uttarakhand	72.8	41.6	31.2	83.3	59.6	23.7
Jammu & Kashmir	N.A	N.A	N.A	66.6	43.0	23.6
Haryana	69.1	40.5	28.6	78.5	55.7	22.8
Gujarat	73.4	48.9	24.5	79.7	57.8	21.9
Daman & Diu	82.7	59.4	23.3	86.8	65.6	21.2
Arunachal Pradesh	51.5	29.7	21.8	63.8	43.5	20.3
Andhra Pradesh	55.1	32.7	22.4	70.3	50.4	19.9
Manipur	71.6	47.6	24.0	80.3	60.5	19.8
Karnataka	67.3	44.3	22.9	76.1	56.9	19.2
Maharashtra	76.6	52.3	24.2	86.0	67.0	18.9
Tamil Nadu	73.8	51.3	22.4	82.4	64.4	18.0
Himachal Pradesh	75.4	52.3	23.2	85.4	67.4	17.9
West Bengal	67.8	46.6	21.3	77.0	59.6	17.4
Assam	61.9	43.0	18.8	71.3	54.6	16.7
Tripura	70.6	49.7	20.9	81.0	64.9	16.1
Sikkim	65.7	46.8	18.9	76.0	60.4	15.6
Puducherry	83.7	65.6	18.1	88.6	73.9	14.7
Goa	83.6	67.1	16.6	88.4	75.4	13.1
Delhi	82.0	67.0	15.0	87.3	74.7	12.6
Lakshadweep	90.2	72.9	17.3	92.5	80.5	12.1
Punjab	65.7	50.4	15.3	75.2	63.4	11.9
A&N Islands	79.0	65.5	13.5	86.3	75.2	11.1
Nagaland	67.6	54.8	12.9	71.2	61.5	9.7
Chandigargh	82.0	72.3	9.7	86.1	76.5	9.7
Kerala	93.6	86.2	7.5	94.2	87.7	6.5
Meghalaya	53.1	44.9	8.3	65.4	59.6	5.8
Mizoram	85.6	78.6	7.0	90.7	86.8	4.0
INDIA	**64.1**	**39.3**	**24.9**	**75.3**	**53.7**	**21.6**

Source: Selected Socio Economic Statistics, India, CSO

In the case of infant mortality rates, the disparity is very high (Table 20). It ranges from 10 in Goa to 70 in Madhya Pradesh.

Table 20: State-wise Infant Mortality Rates (per 1000)

States/Union Territories	1961			2007			2008		
	Male	Female	Person	Male	Female	Person	Male	Female	Person
Goa	60	56	57	11	13	13	10	11	10
Kerala	55	48	52	14	10	13	10	13	12
Manipur	31	33	32	13	9	12	13	15	14
Puducherry	77	68	73	31	22	25	22	27	25
Nagaland	76	58	68	18	29	21	23	29	26
Chandigarh	53	53	53	25	28	27	27	29	28
Andaman	78	66	77	38	23	34	29	32	31
Lakshadweep	124	88	118	25	23	24	29	34	31
Tamil	89	82	86	38	31	35	30	33	31
Daman & Diu	60	56	57	29	23	27	26	37	31
Arunachal Pradesh	141	111	126	41	15	37	30	34	32
Maharashtra	96	89	92	41	24	34	33	33	33
Sikkim	105	87	96	36	20	34	34	32	33
Tripura	106	116	111	40	32	39	34	35	34
Dadra	102	93	98	38	18	34	33	35	34
Delhi	66	70	67	41	35	36	34	37	35
West	103	57	95	39	29	37	34	37	35
Mizoram	73	65	69	27	16	23	37	38	37
Punjab	74	79	77	47	35	43	39	43	41
Himachal Pradesh	101	89	92	49	25	47	43	45	44
Uttarakhand	–	–	–	52	25	48	44	45	44
Karnataka	87	74	81	52	35	47	44	46	45
Jharkhand	–	–	–	51	31	48	45	48	46
Jammu Kashmir	78	78	78	53	38	51	48	51	49
Gujarat	81	84	84	60	36	52	49	51	50
Andhra Pradesh	100	82	91	60	37	54	51	54	52
Haryana	87	119	94	60	44	55	51	57	54
Bihar	95	94	94	59	44	58	53	58	56
Chhatisgarh	–	–	–	61	49	59	57	58	57
Meghalaya	81	76	79	57	46	56	58	58	58
Rajasthan	114	114	114	72	40	65	60	65	63
Assam	na	na	na	68	41	66	62	65	64
Uttar Pradesh	131	128	130	72	51	69	64	70	67
Orissa	119	111	115	73	52	71	68	70	69
Madhya Pradesh	158	140	150	77	50	72	68	72	70
India	**122**	**108**	**115**	**61**	**37**	**55**	**52**	**55**	**53**

Source: Economic Survey 2009-10.

Another aspect of looking into the development of the region is the provision of basic facilities. Table 21 provides the data on the percentage of population with housing amenities. While there is significant improvement in the availability of electricity, there is huge difference in rural urban. While only 8 per cent of urban population is not having electricity, the share is 44 per cent in the case of rural areas.

Table 21: Percentage of population living with Housing Amenities (Lighting)

	1999-2000		2005-06	
	R	**U**	**R**	**U**
No lighting	0.5	0.3	0.5	0.2
Kerosene	50.6	10.3	42.2	7.2
Other oil	0.2	0.1	0.2	0.1
Gas	0.1	0.1	0.1	0.1
Candle	0.1	0.0	0.2	0.3
Electricity	48.4	89.1	56.3	92
Other	0.1	0.1	0.5	0.1
Not recorded	0.0	0.0	0.0	0.0
All	100	100	100	100

R Rural; U: Urban
Source: Selected Socio Economic Statistics, India, CSO

The above indicators provided significant facts on differences in the socio-economic conditions across regions. However, it is possible that within regions, certain groups are marginalized. This was evident when we looked into the poverty ratio across different class of population. In the following Tables we looked into the entitlement to different population groups (Tables 22 and 23).

In rural India, among the social groups, the proportion of households possessing land less than 0.001 hectares, during 2004-05, was the highest for ST households (nearly 4 per cent). The corresponding proportion for SC households was about 3 per cent and for OBC and *others* category of households around 2 per cent each. The survey results also show that the proportion of households possessing land of size 4.01 hectares or more was maximum for *other* category of households (6 per cent), followed by the OBC (4 per cent), ST (about 3 per cent) and SC households (1 per cent).

Table 22 : Per 1000 distribution of households of different social groups by size of land possessed (Rural India)

size class of land posessed (hectares)	ST	SC	OBC	Other	all	ST	SC	OBC	Other	ST	SC	Other	all
	61st round (2004-05)					55th round (1999-00)				50th round (1993-94)			
0	36 (3.6)	27 (2.7)	16 (1.6)	20 (2.0)	22 (2.2)	72 (7.2)	100 (10.0)	65 (6.5)	58 (5.8)	133 (13.3)	181 (18.1)	112 (11.2)	129 (12.9)
0.001-0.40	428 (42.8)	722 (72.2)	544 (54.4)	505 (50.5)	561 (56.1)	391 (39.1)	650 (65.0)	500 (50.0)	463 (46.3)	299 (29.9)	536 (53.6)	379 (37.9)	404 (40.4)
0.41-1.00	239 (23.9)	147 (14.7)	195 (19.5)	185 (18.5)	187 (18.7)	243 (24.3)	147 (14.7)	202 (20.2)	191 (19.1)	214 (21.4)	149 (14.9)	195 (19.5)	187 (18.7)
1.01-2.00	163 (16.3)	67 (6.7)	128 (12.8)	134 (13.4)	120 (12.0)	165 (16.5)	65 (6.5)	120 (12.0)	128 (12.8)	187 (18.7)	80 (8.0)	151 (15.1)	140 (14.0)
2.01-4.00	106 (10.6)	27 (2.7)	76 (7.6)	99 (9.9)	75 (7.5)	99 (9.9)	28 (2.8)	75 (7.5)	93 (9.3)	119 (11.9)	39 (3.9)	99 (9.9)	88 (8.8)
4.01 & above	29 (2.9)	10 (1.0)	40 (4.0)	57 (5.7)	36 (3.6)	30 (3.0)	11 (1.1)	38 (3.8)	67 (6.7)	48 (4.8)	15 (1.5)	64 (6.4)	52 (5.2)
All	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)	1000 (100.0)

Note: 1. The households with size class of land possessed '0.000' hectares comprise households which possessed land less than 0.001 hectares as well as households which reported no information on land possessed.

2. Figures in parenthesis refer to percentage share to total.

3. All includes not reported also.

Source: Employment and Unemployment Situation Among Social Groups in India, 50, 55 and 61st Round.

In the case of Monthly Per capita Consumption Expenditure (MPCE) also, the SC/ST communities are marginalized (Table 23). In rural India, proportion of households in each of the five lower MPCE classes (i.e., less than ₹ 410) was higher among the STs (49 per cent), SCs (40 per cent) and OBCs (30 per cent) than among the *others* (20 per cent) social group. Between STs and SCs, proportions of households in the lowest two MPCE classes were higher among STs (15 per cent) than among the SCs (8 per cent), and these households spent only ₹ 270 or less per month. The proportion of households in the highest MPCE class (i.e. those who spent ₹ 1155 or more per month) was higher among *others* category of households (12 per cent) than among the OBCs (5 per cent), SCs (3 per cent) or STs (2 per cent).

Table 23: Per 1000 distribution of households by household monthly per capita consumer expenditure for each social group

Monthly per-capita consumer expenditure (₹)	*Rural*					Monthly per-capita consumer expenditure (₹)	*Urban*				
	ST	SC	OBC	Others	all		ST	SC	OBC	Others	all
less than 235	91 (9.1)	35 (3.5)	20 (2.0)	12 (1.2)	29 (2.9)	less than 335	81 (8.1)	70 (7.0)	34 (3.4)	16 (1.6)	33 (3.3)
235-270	62 (6.2)	43 (4.3)	24 (2.4)	16 (1.6)	30 (3.0)	335-395	54 (5.4)	58 (5.8)	42 (4.2)	15 (1.5)	32 (3.2)
270-320	113 (11.3)	94 (9.4)	70 (7.0)	37 (3.7)	71 (7.1)	395-485	84 (8.4)	120 (12.0)	88 (8.8)	46 (4.6)	73 (7.3)
320-365	117 (11.7)	115 (11.5)	89 (8.9)	60 (6.0)	90 (9.0)	485-580	122 (12.2)	131 (13.1)	116 (11.6)	63 (6.3)	93 (9.3)
365-410	108 (10.8)	113 (11.3)	95 (9.5)	71 (7.1)	94 (9.4)	580-675	84 (8.4)	131 (13.1)	120 (12.0)	69 (6.9)	97 (9.7)
410-455	92 (9.2)	108 (10.8)	95 (9.5)	73 (7.3)	92 (9.2)	675-790	75 (7.5)	110 (11.0)	107 (10.7)	78 (7.8)	93 (9.3)
455-510	94 (9.4)	112 (11.2)	113 (11.3)	92 (9.2)	106 (10.6)	790-930	85 (8.5)	109 (10.9)	109 (10.9)	90 (9.0)	99 (9.9)
510-580	93 (9.3)	114 (11.4)	121 (12.1)	122 (12.2)	117 (11.7)	930-1100	113 (11.3)	78 (7.8)	98 (9.8)	102 (10.2)	97 (9.7)
580-690	97 (9.7)	107 (10.7)	135 (13.5)	142 (14.2)	127 (12.7)	1100-1380	135 (13.5)	82 (8.2)	104 (10.4)	127 (12.7)	113 (11.3)
690-890	82 (8.2)	93 (9.3)	122 (12.2)	153 (15.3)	119 (11.9)	1380-1880	92 (9.2)	70 (7.0)	96 (9.6)	157 (15.7)	121 (12.1)
890-1155	30 (3.0)	37 (3.7)	63 (6.3)	108 (10.8)	65 (6.5)	1880-2540	43 (4.3)	28 (2.8)	49 (4.9)	112 (11.2)	75 (7.5)
1155 & above	19 (1.9)	27 (2.7)	53 (5.3)	115 (11.5)	60 (6.0)	2540 & above	33 (3.3)	14 (1.4)	34 (3.4)	126 (12.6)	74 (7.4)
all classes	1000	1000	1000	1000	1000	all classes	1000	1000	1000	1000	1000

Note: Figures in parenthesis refers to percentage share to total.
Source: Employment and Unemployment Situation among Social Groups in India, NSSO 61st Round.

In urban India too, proportion of households in each of the five lower MPCE classes (i.e. less than ₹ 675) was higher among SCs, STs and OBCs than among the other categories of households. About 51 per cent of the SCs of urban India spent less than ₹ 675 per month during 2004-05; the corresponding percentages being 43, 40 and 21 for the STs, OBCs and the others, respectively. The proportion of households in the lowest MPCE class (i.e. those spending less than

₹ 335 per month) was higher among the STs (8 per cent) than that among SCs (7 per cent). The proportion of urban households spending ₹ 2540 or more per month was higher among other (13 per cent) categories of households than among the OBCs or STs (3 per cent each) or SCs (1 per cent).

The analysis in this section has shown that India's achievement in terms of various social indicators are not that commendable compared to that of the growth in GDP. India lags behind many developing countries in terms of povery and other social indicators. There are sections of population that remains marginalized irrespective of the high growth. Urban Inequality in terms of consumption expenditure have increased in almost all states, while rural inequality has come down in most of the states.

So far, we have examined the various facets of inclusive growth by looking into the various indicators of economic and social development. A major pre-requisite of economic development is finance. Access to finance and awareness on the availability of finance can play a major role in promoting economic growth. In the next section we look into the interplay between institutional finance and economic growth.

Section V: Institutional Finance and Growth

There is a general consensus among economists that financial development spurs economic growth. Theoretically, financial development creates enabling conditions for growth through either a supply-leading (financial development spurs growth) or a demand-following (growth generates demand for financial products) channel. A large body of empirical research supports the view that development of the financial system contributes to economic growth (Rajan and Zingales, 2003). Empirical evidence consistently emphasizes the nexus between finance and growth, though direction of causality is debatable. At the cross-country level, evidence indicates that various measures of financial development (including assets of the financial intermediaries, liquid liabilities of financial institutions, domestic credit to private sector, stock and bond market capitalization) are robustly and positively

related to economic growth (King and Levine, 1993; Levine and Zervos, 1998). Other studies establish a positive relationship between financial development and industrial growth (Rajan and Zingales, 1998). Even the recent endogenous growth literature, building on 'learning by doing' processes, assigns a special role to finance (Aghion and Hewitt, 1998 and 2005).

For any productive activity, capital investment is vital and capital investment is possible only when finance is available. The endogenous growth literature stresses the importance of financial development for economic growth as many important services are provided by a country's financial system. Thus, as part of our inclusive growth study it is useful to examine if there is finance-growth nexus in our economy. Before the nationalization of banks in 1969, most of the needy sectors, viz, agriculture, small scale sector and other productive sectors were deprived of the institutional finance. Major sections of the population under these sectors were under the clutches of the money lenders. So in a way they were mostly excluded from the growth process of the economy because of their indebtedness. Now, after 60 years of Independence of our country, although banking sector has developed to a great extent, it is worth examining whether formal finance did play any role in our growth process. At this stage, it is important to examine the relationship between finance and growth at the aggregated level[8].

The Model

Empirical work on causality between financial development and economic growth is sparse, owing to a lack of sufficiently long time series data for developing countries. Jung (1986) was among the first to test for causality by applying a Granger-causality procedure. He used annual data on per capital GNP and two measures of financial development: the ratio of currency to M_1 and the ratio of M_2 to GDP, for 56 developed and developing countries. However, his results were inconclusive because

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[8]   Ideally it should have been an analysis at the disaggregated level using panel data framework, but due to time constraint and non-availability of data at the disaggregated level we have done the exercise at the aggregated level.

they varied according to the financial development indicator used and the development level of the various countries. For example, using the currency ratio as a measure for financial development, Granger causality from financial development to economic growth in LDCs was more frequently observed than the reverse and an opposite conclusion was obtained for the developed countries. However, when the M_2/GDP ratio was used, causality from financial development to economic growth was as frequently observed as causality from economic growth to financial development both in LDCs and developed countries. Jung's test was conducted in a levels vector autoregression (VAR) framework without testing for stationarity of the data. As data are very likely to be nonstationary, Jung's findings are debatable (Granger and Newbold, 1974). In a frequently-cited paper, Demetriades and Hussein (1996) tested for cointegration among variables and used an error correction model for 16 countries to test for a possible long-run causal relationship between financial development and economic growth. Their findings showed little evidence to support the view that finance leads economic growth.

In the present paper, we examine the causal relationship between financial and economic development from a time-series perspective for India. For this, we apply the most current econometric techniques, in particular testing causality applying cointegration tests and error correction models after pre-testing for unit roots in all variables and choosing the optimal lag order in our VAR system. These tests are essential for attaining the proper inferences. We use three different measures of financial development and relatively long annual time series data. We also include a third variable, namely the share of fixed investment in GDP, in the system. This allows us to test channels through which financial development and investment are explaining changes in the growth rate of per capita GDP beyond the sample period.

Measurement and Data Sources

Financial Development Indicators

Financial development is usually defined as a process that marks improvements in quantity, and efficiency of financial intermediary

services. This process involves the interaction of many activities and institutions. Consequently, it cannot be captured by a single measure. In this study we employ three commonly used measures of financial development for the sake of testing the robustness of our findings.

The first, M_3Y, represents the ratio of money stock, M_3, to nominal GDP. M_3Y has been used as a standard measure of financial development in numerous studies (Gelb, 1989, world Bank, 1989; King and Levine, 1993a, b; Calderon and Liu 2003). According to Demetriades and Hussein (1996), this indicator accords well with McKinnon's outside money model where the accumulation of lumpy money balances is necessary before self-financed investment can take place. However, it conflicts somewhat with the debt-intermediation approach developed by Gurley and Shaw (1995) and the endogenous growth literature, because a large part of the broad money stock in developing countries is currency held outside banks. As such, an increase in the M_3/GDP ratio may reflect an extensive use of currency rather than an increase in bank deposits, and for this reason this measure is less indicative of the degree of financial intermediation by banking institutions. Financial intermediaries serve two main functions: to provide liquidity services and saving opportunities, the latter being relevant for promoting investment and consequently growth. For this reason, Demetriades and Hussein (1996) proposed to subtract currency outside banks from M_3 and to take the ratio of M_3 minus currency to GDP as a proxy for financial development. On this basis, we chose QMY, the ratio of M_3 minus currency to GDP, to serve as our second measure of financial development.

Our third measure of financial development is PRIVY, the ratio of bank credit to the private sector to nominal GDP. This indicator is frequently used to provide direct information about the allocation of financial assets. A ratio of M_3 (including or excluding currency) to GDP may increase as a result of an increase in private financial saving. On the other hand, with high reserve requirements, credit to the private sector which eventually is responsible for the quantity and quality of investment and therefore to economic growth, may not increase. Therefore, an increase in this ratio does not necessarily

mean an increase in productive investments. Rather, the private credit GDP ratio can be a better estimate of the proportion of domestic assets allocated to productive activity in the private sector. Figure 6 shows that M_3Y had increased tremendously starting 1979 to reach around 90 per cent in 2008. However, the high M_3Y rate does not necessarily imply a larger pool of resources for the private sector and therefore is not a good indicator of financial development, in contradiction, to PRIVY. Two explanations for this behavior were given by Roe (1998). The first is the possibility that the dominating state-owned banks did not have a profit maximizing goal. The second is that banks preferred to serve the interest of their non-private clients, and offered loans to public enterprises even at the expense of their profitability. The latter is most evidently related to the quantity and efficiency of investment and hence to economic growth (Gregorio and Guidotti, 1995). PRIVY has been used extensively in numerous works (King and Levine, 1993a, b, Gregorio and Guidotti, 1995, Levine and Zeroves, 1993, Demetriades and Hussein, 1996, Beck et al, 2000 among others), with different definitions of the stock of private credit depending on the institutions supplying the credit.

Other Variables

Following standard practice, we use real GDP per capita, GDPPC, as our measure for economic development (see Gelb, 1989, Roubini and Sala-i-Martin, 1992, King and Levine, 1993a,b Demetriades and Hussein, 1996). In addition to the per capita real GDP and the financial development indicator, we introduced a third variable in our VAR system, the share of investment in GDP, IY. This variable is considered to be one of the few economic variables with a robust correlation of economic growth regardless of the information set (Levine and Renelt, 1992). Including the investment variable in our regressions enables us to identify the channels through which financial development causes economic growth. If financial development causes economic development, given the investment variable, then this causality supports the endogenous growth theories that finance affects economic growth mainly through the enhancement of investment efficiency. Furthermore, we can then test if financial

Chart 6: Financial Development Indicators: India (1950-2008)
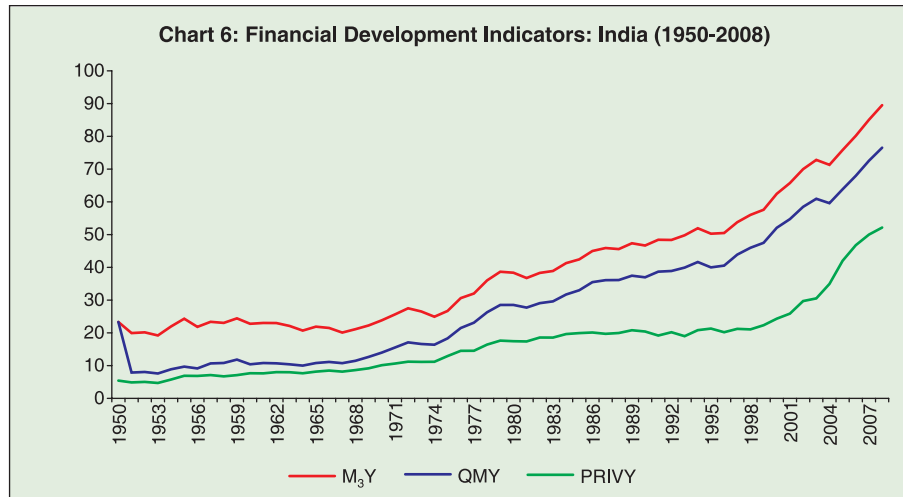
development causes economic growth through an increase of investment resources. We can examine this supposition indirectly by testing the causality between financial development indicators and investment on the one hand and between investment and economic growth on the other. All the variables in our data set are expressed in natural logarithms.

Data Sources

We used the following data resources: All data have been obtained from the Handbook of Statistics on Indian Economy published by the Reserve Bank of India. Our sample covers the period 1950-2008; the choice of this period is governed by data availability.

The Econometric methodology

Standard Granger Causality (SGC)

According to Granger's (1969) approach, a variable Y is caused by a variable X if Y can be predicted better from past values of both Y and X than from past values of Y alone. For a simple bivariate model, we can test if X is Granger-causing Y by estimating Equation (1) and then test the null hypothesis in equation (2) by using the standard Wald test.

$$Y_t = \mu + \sum_{j=1}^{p} \gamma_{11j} Y_{t-j} + \sum_{j=1}^{p} \gamma_{12j} X_{t-j} + u_t$$

$$H_0: \gamma_{12j} = 0 \; for \; j = 1, \ldots, p \qquad (1)$$

$$H_1: \gamma_{12j} \neq 0 \; for \; at \; least \; one \; j, \qquad (2)$$

where, μ is a constant and u_t is a white noise process. Variable X is said to Granger cause variable Y if we reject the null hypothesis (2), where γ_{12} is the vector of the coefficients of the lagged values of the variable X. Similarly, we can test if Y causes X by replacing Y for X and vice versa in Equation (1).

However, before conducting causality tests, we have examined whether the series is stationary. The series $\{X_t\}$ will be integrated of order d, that is, $X_t \sim I(d)$, if it is stationary after differencing it d times. A series that is I(0) is stationary. To test for unit roots in our variable, we use Augmented Dickey Fuller (ADF) test.

The next step is to test for cointegration if the variables are nonstationary in their level. Generally, a set of variables is said to be cointegrated if a linear combination of the individual series, which are I(d), is stationary. Intuitively, if $X_t \sim I(d)$ and $Y_t \sim I(d)$, a regression is run, such as:

$$Y_t = \beta X_t + \varepsilon_t \qquad (3)$$

If the residuals, ε_t, are I(0), then X_t and Y_t are cointegrated. We use Johansen's (1988) approach, which allows us to estimate and test for the presence of multiple cointegrated relationships, r, in a single-step procedure. A class of models embodies the notion of correction has been developed and is referred as the Error Correction Model (ECM). In general, an ECM derived from the Johansen test can be expressed as:

$$\Delta Y_t = \mu_y + \alpha_y ECT_{t-1} + \sum_{k=1}^{p} \beta_{yx,k} \Delta X_{t-k} + \sum_{k=1}^{p} \beta_{yy,k} \Delta Y_{t-k} + \sum_{k=1}^{p} \beta_{yz,k} \Delta Z_{t-k} + \varepsilon_{yt} \quad (4)$$

$$\Delta X_t = \mu_x + \alpha_x ECT_{t-1} + \sum_{k=1}^{p} \beta_{xx,k} \Delta X_{t-k} + \sum_{k=1}^{p} \beta_{xy,k} \Delta Y_{t-k} + \sum_{k=1}^{p} \beta_{xz,k} \Delta Z_{t-k} + \varepsilon_{xt} \quad (5)$$

$$\Delta Z_t = \mu_z + \alpha_z ECT_{t-1} + \sum_{k=1}^{p} \beta_{zx,k} \Delta X_{t-k} + \sum_{k=1}^{p} \beta_{zy,k} \Delta Y_{t-k} + \sum_{k=1}^{p} \beta_{zz,k} \Delta Z_{t-k} + \varepsilon_{zt} \quad (6)$$

where ECT_{t-1} is the error correction term lagged one period, Z is a third endogenous variable in the system, and $\beta_{ij,\,k}$ describes the effect of the k-th lagged value of variable j on the current value of variable; i,j = Y, X, Z. The ε_{it} are mutually uncorrelated white noise residuals.

Granger causality from variable j to variable i in the presence of cointegration is evaluated by testing the null hypothesis that $\beta_{ij,k} = \alpha_i = 0$ for all k in the equation where i is the dependent variable, using the standard F test. By rejecting the null, we conclude that variable j Granger-causes variable i. These tests differ from standard causality tests in that they include error correction terms (ECT_{t-1}) that account for the existence of cointegration among the variables. At least one variable in Equations (4) to (6) should move to bring the relation back into equilibrium if there is a true economic relation, and therefore at least one of the coefficients of the error correction terms has to be significantly different from zero (Granger, 1988).

Empirical Results

Granger Causality Results

The first of our empirical work was to determine the degree of integration of each variable. The ADF test results for the levels and first differences are reported in Table 24. The results show that all the

Table 24: ADF Unit Root Test Results

Variable	ADF with trend and intercept			
	Levels		First differences	
	ADF	k*	ADF	k*
LGDPPC	-3.403	0	-6.827***	0
LPRIVATE	-1.183	0	-6.922***	0
LM$_3$Y	-2.643	0	-7.976***	0
LQMY	-1.969	1	-19.601***	0
LIY	-3.836	0	-7.884***	0

LGDPPC, LPRIVATE, LM$_3$Y, LQMY and LIY are the natural logarithms of real per capita GDP, share of credit to private sector in GDP, share of M$_3$ in GDP, share of M$_3$ minus currency outside of banking in GDP, and the share of gross fixed capital formation in GDP, respectively.

K* the optimal lag lengths chosen by Schwarz selection criterion with maximum of 9 lags.

*, **, and *** indicate significance at the 10% , 5% and 1% levels, respectively.

variables are nonstationary i.e. I(1) in their levels, but stationary in their first differences.[9]

The second step was to test for a cointegration relationship among the relevant variables. The results of Johansen's maximum eigenvalue test (λ_{max}) support the existence of a unique long run relation between per capita GDP, the investment ratio and financial development under the various measures of the latter. In all cases, we reject the null hypothesis of a no-cointegration relationship at least at the 5% level (Table 25). It is also observed from Granger causality test that the null hypothesis

Table 25: Johansen Cointegration Test Results

Variables	λ_{max}			P*	r*
	r = 0	r = 1	r = 2		
LGDPPC, LIY, LPRIVATE	29.809***	11.979	3.041	1	1
LGDPPC, LIY, LM$_3$Y	37.175***	10.289	2.333	1	1
LGDPPC, LIY, LQMY	37.860***	10.606	1.927	1	1

*; **; *** indicate significance at the 10%, 5% and 1% levels, respectively.
λ_{max} is the maximum eigen value statistic.
p* represents the optimal lag length based on AIC from the unrestricted VAR model.
r* is the number of co-integration vectors based on Johansen's method.

Table 26: Results of Granger Causality Tests (Direct)

	Null Hypothesis	
Financial Development Indicator	Financial Development does not Granger cause income growth	
	F-Statistic	**Prob**
LPRIVATE	6.63***	0.003
LM$_3$	9.69***	.0003
LMQ	7.89***	0.001

Panel B

	Null Hypothesis	
Financial Development Indicator	Income growth does not Granger cause financial development	
	F-Statistic	**Prob**
LPRIVATE	1.49	0.235
LM$_3$	3.90**	0.0264
LMQ	1.49	0.236

***: significant at 1% level of significance; **: significant at 5% level of significance

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[9]   Using Phillips-Perron test we obtained similar results.

Table 27: Results of Granger Causality Tests (Indirect)

	Null Hypothesis	
Financial Development Indicator	**Financial Development does not Granger cause fixed capital formation share in GDP**	
	F-Statistic	**Prob**
LPRIVATE	6.63***	0.003
LM$_3$	9.69***	.0003
LMQ	7.89***	0.001

Panel B

	Null Hypothesis	
Financial Development Indicator	**Fixed capital formation share in GDP does not Granger cause income growth given the financial indicator below**	
	F-Statistic	**Prob**
LPRIVATE	1.49	0.235
LM$_3$	3.90**	0.0264
LMQ	1.49	0.236

*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

of finance does not lead to economic growth is rejected at 1% level of significance. It also confirms that financial development leads to capital formation.

In a nutshell, we have examined the causal relationship between measures of financial development and real GDP per capita in India over the past five decades. It is found that the null hypothesis of no causality from financial development to economic growth was significantly rejected in all the cases. The causality is mostly unidirectional since the other direction of causality from economic growth to financial development was not observed. Thus our results support our hypothesis that institutional finance leads to economic growth in our economy. One of the leading proponents of this theory is Joseph Schumpeter (1912) who stated that well-functioning banks spur technological innovation by identifying and funding those entrepreneurs with the best chances of successfully implementing innovative products and production processes.

Thus, the causality tests provide some preliminary evidence that financial development leads to growth. But how strong are these

relationships? What is the pattern of the response from one year to the next? These questions can be answered within the framework of impulse response analysis and analysis of variance decomposition of the forecast errors, which we have also dealt with in this section.

We first report the results which demonstrate how the forecast error variance of our focus variables can be broken down into components that can be attributed to each of the variables in the VAR. It can be observed from Table 28 that credit (LPRIVY) explains 63.5 per cent of the forecast error variance of GDP (LGPDPC) and it becomes the most important variable affecting economic growth whereas gross fixed capital formation (LIY) as the second one explaining 18.4 per cent of forecast error variance of GDP. It is also observed that LGDPPC explains 13.2 per cent of its forecast error variance. The fact that GDP growth is explained by its past values suggests that current period economic growth influences future growth trends or that the phenomenon is due to a "lag effect" in the business cycle.

Table 28 also shows that both credit to private sector and fixed capital formation appear to have strong lagged effects and are, to a larger extent, explained by their own past values (around 67 per cent in case of credit and 60 per cent in case of fixed capital formation). It is interesting to note that economic growth explains more than 46 per cent of the forecast error variance of M_3 which appears to be quite logical.

However, the fact that credit to private sector contributes more than gross fixed capital formation to GDP growth in India implies that its primary source of growth is extensive use credit in the private sector.

Table 28: Variance Decomposition Percentage of 20-year Error Variance

Variance decomposition of	After 20 years, % of Decomposition due to				
	LGDPPC	**LIY**	**LM$_3$Y**	**LPRIVY**	**LQMY**
LGDPPC	13.2	18.4	0.9	63.5	4.1
LIY	9.1	60.0	1.3	27.4	2.2
LM$_3$Y	46.2	8.2	15.5	24.8	5.3
LPRIVY	18.6	5.5	3.9	67.1	5.0
LQMY	13.7	3.0	16.7	53.9	12.8

To investigate further the impact of credit on GDP growth as compared to other variables, we then have used impulse response function to trace the time paths of GDP in response to one-unit shock to the variables such as three different financial indicators and gross fixed capital formation. A graphical illustration of an impulse response function can provide an intuitive insight into dynamic relationships because it shows the response of a variable to a "shock" in itself or another variable over time. For example, it allows us to examine how GDP growth responds over time to a "shock" in credit and compare it with the effects on other variables.

Chart 7 depicts the time paths of the responses of GDP growth to "shocks" in financial indicators and gross fixed capital formation. It can be observed that all the financial indicators have a positive impact on economic growth. However, the response of GDP to a shock in credit has a longer and stronger effect than other variables and series is not convergent even after 20 years. On the other hand, impacts of other financial indicators (viz., LM_3 and LQMY) on growth are smaller and "die out" quickly from the 3rd year. However, in this case also it is found that gross fixed capital formation has second largest impact on economic growth and the effect is longer as well.

Therefore, we can argue that financial development does promote economic growth in India. It can also be argued that the innovations in bank credit were the most important source of the variance of forecast errors for economic growth. Similarly, economic growth was not found to have greater impacts on investments (LIY) (LGDPPC explaining 9.1 per cent of forecast error variance on LIY) than bank credit, LPRIVY (LPRIVY explains 27.4 per cent of LIY). This suggests that economic growth have a greater influence on availability funds than investment behavior.

It may also be observed that GDPPC also affects financial development indicators. Table 28 shows that LGDPPC explains about 18.6 per cent of forecast error variance of bank credit, 46.2 of forecast error variance of LM_3 and 13.7 per cent of forecast error variance of LQMY. Therefore, the above findings suggest that there is a bi-directional

causality between GDP growth and financial development. In other words, the empirical evidence provided in this study has supported the view in the literature that financial development and economic growth exhibit a two-way causality and hence is against the so-called "finance-led" growth hypothesis. However, it is also clear that the impact of credit on GDP is stronger than the reverse situation as suggested by the above impulse response function analysis.

Distribution of Credit across Sectors and Regions

In this section, we have discussed the distribution of formal credit across sectors and regions, given the importance of formal credit. It is necessary to examine now whether allocation of finance is equitable across regions and sectors. This is because nature of distribution of credit has a direct bearing on economic growth, which in turn can impact on poverty and inequality.

Chart 7: Impulse Responses
Response to Cholesky One S.D. Innovations ± 2 S.E.
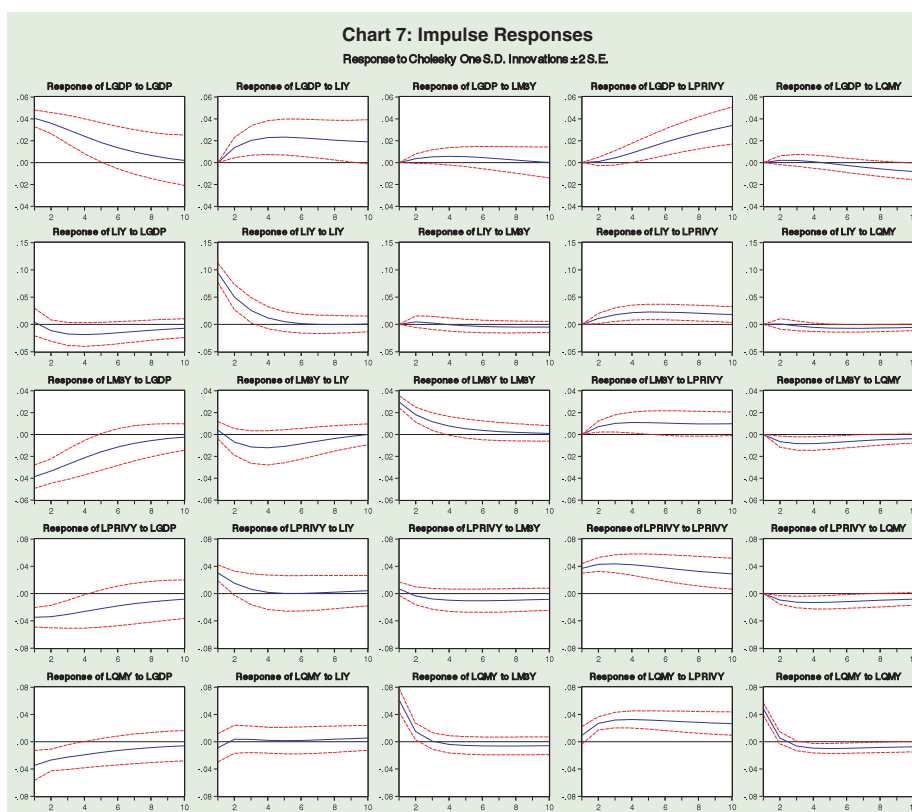
Thus, in this section we have examined the distribution of credit across various sectors and regions of the country. It can be noticed from Table 29 that there has been a gradual decrease in share of agriculture credit over the years. The share had gone down from 14.8 per cent 1980 to 9.9 per cent in 2005, though it had gone up to 11.3 per cent in 2008. The share of industrial credit had also gone down from 48.0 per cent in 1980 to 38.4 per cent in 2008. However, the share of credit to services has gone up substantially from 37.2 per cent in 1980 to 50.4 per cent in 2005, although it has gone down marginally to 50.2 per cent in 2008.

Sector-wise region-wise allocation of credit as provided in Table 30, indicates that there has been a decline in credit to agriculture and industrial sectors across all the regions over the period 1980-2008. However, the share of credit to services sector has increased substantially in all the regions during the period 1980-2008. This change in the distribution of credit is in alignment with the growth pattern of the economy showing significant contributions from the services sector. But, if we consider from the point of sector-wise dependency of population, it means agriculture getting marginalized. The shares of agriculture in the northern region decreased marginally while in the southern region it decreased substantially by around 10 percentage points. The share of agriculture credit in the Western Region has remained below 10 per cent throughout the three-decade period. Further, the share of agriculture credit to the Eastern Region went down by around 3.0 percentage points.

Table 29: Sector-wise allocation of credit
(Percentage to total)

Sector	1980	1985	1990	1995	2000	2005	2008
Agriculture	14.8	16.9	15.0	11.3	9.9	10.8	11.3
Industry	48.0	42.0	47.6	48.0	46.5	38.8	38.4
Service Sector	37.2	41.1	37.5	40.7	43.6	50.4	50.2
Total Bank Credit	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Basic Statistical Returns, Reserve Bank of India (various issues).

Table 30: Sector-wise Region-wise allocation of credit

	Northern Region	Southern Region	Western Region	Eastern Region
1980				
Agriculture	24.8	22.2	8.7	13.5
Industry	39.3	44.0	62.7	59.4
Service Sector	35.9	33.8	28.7	27.1
Total Bank Credit	100.0	100.0	100.0	100.0
1985				
Agriculture	26.6	55.1	7.8	14.4
Industry	37.0	21.2	43.1	51.7
Service Sector	36.3	23.8	49.0	33.9
Total Bank Credit	100.0	100.0	100.0	100.0
1990				
Agriculture	23.8	19.6	7.6	13.4
Industry	40.7	43.3	55.7	50.2
Service Sector	35.5	37.0	36.8	36.4
Total Bank Credit	100.0	100.0	100.0	100.0
1995				
Agriculture	19.3	15.7	5.3	12.0
Industry	42.3	42.2	55.2	47.6
Service Sector	38.4	42.1	39.4	40.3
Total Bank Credit	100.0	100.0	100.0	100.0
2000				
Agriculture	19.9	13.9	4.7	8.5
Industry	39.9	39.9	54.5	45.4
Service Sector	40.3	46.2	40.8	46.0
Total Bank Credit	100.0	100.0	100.0	100.0
2005				
Agriculture	21.6	13.6	8.6	8.6
Industry	30.4	33.9	74.0	36.0
Service Sector	48.0	52.5	17.3	55.3
Total Bank Credit	100.0	100.0	100.0	100.0
2008				
Agriculture	22.3	12.5	6.2	10.6
Industry	32.1	32.9	45.0	37.1
Service Sector	45.6	54.6	48.8	52.2
Total Bank Credit	100.0	100.0	100.0	100.0

Source: Basic Statistical Returns, Reserve Bank of India (various issues)

Access to bank finances can also be gauged from the credit-deposit ratio which has been provided in Table 31. It can be observed from the Table that there is wide disparity in CD ratio across the

Table 31: Region-wise, State-wise Credit-Deposit Ratio

Region/State/	1980-(JUNE)	1985-(JUNE)	1990	1995	2000	2005	2009
Northern Region	**76.1**	**63.7**	**54.8**	**48.6**	**51.1**	**59.5**	**68.5**
Haryana	66.1	67.6	61.2	45.5	42.4	51.4	61.5
Himachal Pradesh	28.6	44.0	38.6	26.0	23.8	36.3	38.5
Jammu & bKashmir	31.5	42.8	31.8	28.6	33.5	46.7	46.3
Punjab	38.6	44.6	45.5	41.4	39.4	50.1	65.5
Rajasthan	65.9	70.5	62.2	47.7	46.7	68.7	80.2
North-Eastern Region	**35.6**	**48.9**	**51.7**	**35.6**	**28.1**	**35.0**	**35.8**
Arunachal Pradesh	6.2	21.5	20.1	12.4	15.7	22.0	24.8
Assam	40.6	53.3	55.5	38.7	32.0	35.3	38.3
Manipur	25.1	70.5	69.9	58.2	37.4	42.4	38.7
Meghalaya	14.1	26.5	24.6	17.0	16.3	43.6	27.6
Mizoram	6.0	22.8	34.2	16.5	23.3	47.8	58.7
Nagaland	23.7	39.6	42.6	37.8	15.3	22.9	30.7
Tripura	51.3	72.9	72.2	47.5	25.7	28.6	29.8
Eastern Region	**56.1**	**52.0**	**52.6**	**47.1**	**37.0**	**45.5**	**48.9**
Bihar	41.8	41.7	40.0	32.5	22.5	27.7	27.3
Jharkhand	-	-	-	-	-	29.6	32.0
Orissa	61.1	92.8	81.3	54.5	41.5	61.8	50.8
West Bengal	60.9	51.9	54.9	53.9	45.5	52.3	60.8
Central Region	**45.7**	**52.7**	**52.8**	**39.0**	**33.9**	**40.8**	**44.8**
Chhattisgarh	-	-	-	-	-	43.6	53.3
Madhya Pradesh	52.0	62.6	68.6	49.6	49.1	43.6	57.4
Uttar Pradesh	43.5	49.2	47.0	35.1	28.2	37.9	42.1
Uttarakhand	-	-	-	-	-	24.3	25.6
Western Region	**70.5**	**79.9**	**74.0**	**63.2**	**75.4**	**83.5**	**85.2**
Gujrat	51.8	54.7	61.3	46.6	49.0	46.5	63.2
Maharashtra	79.2	90.8	79.7	69.5	86.4	94.9	90.8
Southern Region	**77.6**	**84.4**	**87.4**	**69.4**	**66.2**	**78.1**	**88.4**
Andhra Pradesh	71.5	78.3	87.1	73.0	64.2	74.8	97.6
Karnataka	77.8	86.7	91.0	65.8	63.3	73.8	76.6
Kerala	67.5	68.5	64.0	44.8	41.5	54.6	60.4
Tamil Nadu	88.0	98.6	99.4	86.7	88.6	101.2	108.9

Source: Statistical Tables Relating to Banks in India, Reserve Bank of India (various issues)

regions and states. The ratio remains above 80 per cent in the Southern and Western Regions during 2009, which has increased from above 75 per cent in 1985. On the other hand, the situation is not encouraging in the Northern Region where the CD ratio has become 68.5 per cent in 2009, gone down from 76.1 per cent in 1980. The condition is much worse in the Eastern, North-Eastern and Central Regions. While the CD ratio in the N-E Region and Central Region remained constant at 36 per cent and 45 per cent, respectively during the three decade period, it has gone down significantly from 56.1 per cent in 1980 to 48.9 per cent in 2009 in the Eastern Region.

Financial Inclusion

A developed financial system broadens access to funds; conversely, in an underdeveloped financial system, access to funds is limited and people are constrained by the availability of their funds and have to resort to high cost informal sources such as money lenders. Lower the availability of funds and higher their cost, fewer would be the economic activities that can be financed and hence lower the resulting economic growth (Rakesh Mohan, 2006)[10].

Financial inclusion can be defined as delivery of banking services at an affordable cost to the vast sections of disadvantaged and low-income groups. In the case of credit, the proper definition of the financially excluded would include households who are denied credit in spite of their demand. Although credit is the major component, financial inclusion covers various other services such as savings, insurance, payments and remittance facilities by the formal financial system to those who tend to be excluded.

Credit to farmer households is one of the important elements of financial inclusion. As per the results of the All-India Debt and Investment Survey (AIDIS), the share of non-institutional sources of credit in total credit for cultivator households had declined sharply

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10   Mohan, Rakesh (2006): ''Economic Growth, Financial Deepening and Financial Inclusion'', Presented at the Annual Bankers' Conference at Hyderabad, November 2006.

from about 93 per cent in 1951 to about 31 per cent in 1991, with the share of money lenders having declined from 69.7 per cent to 17.5 per cent. In 2002, however, the share of money lenders had again increased to 27 per cent, while that of non-institutional sources rose to 39 per cent (Table 32).

Coincidentally, it is also a fact that there has been a slowdown in the rate of agricultural growth during the last decade and it is particularly striking in respect of foodgrain production. Banks have been mainly focusing on crop loans since the period of green revolution. There is, therefore, reason to believe that financial exclusion may have actually increased in the rural areas.

It can be observed from Table 33 that the share of direct accounts with a credit limit of less than ₹ 25000 in total direct accounts declined from 93.4 per cent in 1980 to 35.8 per cent in 2008. The decline in share is observed across all the sectors.

It can also be observed from Table 34 that there is an inverse proportional relation between size class distribution of land and non-indebtedness. In other words, minimum size class had the lowest inclusion.

Table 32: Relative Share of Borrowing of Cultivator Households@

(per cent)

Sources of Credit	1951	1961	1971	1981	1991	2002$
Non-institutional	92.7	81.3	68.3	36.8	30.6	38.9
of which:						
Money Lenders	69.7	49.2	36.1	16.1	17.5	26.8
Institutional	7.3	18.7	31.7	63.2	66.3	61.1
of which:						
Co-operative societies, etc.	3.3	2.6	22	29.8	30	30.2
Commercial banks	0.9	0.6	2.4	28.8	35.2	26.3
Unspecified	-	-	-	-	-	-
Total	100	100	100	100	100	100

@: Borrowing refers to outstanding cash dues.
$: AIDIS, NSSO, 59th Round, 2003.
Source: All India Debt and Investment Surveys.

Table 33: Percentage of Small Borrowal Account (₹ 25,000 and less) to Total No. of Accounts

Occupation	1980	1990	2000	2008
Agriculture	96.7	97.3	85.4	51.4
Industry	56.9	83.4	69.4	34.4
Transport Operators	68.6	81.4	48.2	14.6
Professional & other services	96.5	91.6	76.5	22.0
Personal loans	-	-	59.6	22.7
Trade	86.3	96.0	77.1	44.0
Finance	94.4	91.6	60.0	29.7
All others	97.7	99.5	50.3	40.0
Total	93.4	95.0	72.2	35.8

Note: For 1980, the small borrowal account is defined as ₹ 10, 000 and less.
Source: Basic Statistical Returns, Reserve Bank of India (various issues)

Table 34: Distribution of size-class wise indebtedness of Farmers Households - 2002

Size Class	Number			Per cent		
	Included	Excluded	Total	Included	Excluded	Total
Upto 0.40 ha	135820	169641	305471	44.5	55.5	100.0
0.41 to 1.00 ha	129211	154399	283610	45.6	54.4	100.0
1.01 to 2.00 ha	81920	78680	160600	51.0	49.0	100.0
Upto 2.00	346951	402720	749671	46.3	53.7	100.0
2.01 to 4.00 ha	54409	39095	93504	58.2	41.8	100.0
4.01 and above	32882	17447	50329	65.3	34.7	100.0
Above 2.00 ha	37291	56542	143833	60.7	39.3	100.0
All sizes	434242	459262	893504	48.6	51.4	100.0

Source: Situational Assessment Survey of Farmers (59th Round NSSO).

Role of Self-Help Groups

The RBI recognized the problem of financial exclusion in the Annual Policy Statement in 2005 and since then several initiatives have been initiated in order to promote financial inclusion especially in the groups of pensioners, self-employed and those employed in the unorganized sector. Some of these include "no frills" account, a simplified general purpose credit card (GCC), introduction of pilot project for 100 per cent financial inclusion, etc. On the other hand, NABARD has also taken several steps in this direction. The self-help group (SHG) – bank linkage programme of NABARD is an innovative programme. It started as a pilot programme in 1992. At present India

has around 22 lakh SHGs under this programme (Dev, 2006), comprising more than three crore poor households who are accessing credit through commercial and cooperative banks. Every year six lakh SHGs are added. The programme is now spread across the country. Following the success of SHG-linkage programme as also the Bangladesh Gramin Bank model, many of the NGOs have taken to financial intermediation by adopting innovative delivery approaches. Following the RBI guideline in 2000, commercial banks including the RRBs are providing funds through micro-finance institutions for lending to poor clients. In fact, MFIs have been playing an important role in substituting moneylenders and reducing burden on formal financial institutions.

With the objective of ensuring greater financial inclusion and increasing the outreach of the banking sector, banks have been allowed to use the services of NGOs, self-help groups, MFIs and other civil society organizations as intermediaries in providing financial and banking services through the use of business facilitator and correspondent models. Provisions for this kind of financial intermediation have opened up new and diverse avenues to address the issue of financial inclusion by banks. SHG linkage programme has already been successful in South India, viz., Kudumbasree programme in Kerala and Velugu in Andhra Pradesh. This has not only been successful in India, it is also popular and successful in countries like Bangladesh, Thailand, Mexico and Brazil.

Postal Savings and Remittance

Apart from the banking system, the post offices in India also provide the services of maintaining deposits and remittances. The Indian Postal Service with 155,516 post offices at end-March 2005 is the most widely spread post office system in the world. The numbers of post offices were more than twice the number of bank branches in the country with a large presence in remote areas. A post office in India, on an average, served 7,046 persons at end-March 2005. Indian post offices offer various types of small savings schemes and also provide other banking and financial services. Small savings schemes

include deposits of various maturities and public provident funds. Other financial services include money order, international remittance, mutual fund and postal life insurance. The number of savings bank accounts with the post offices, which provide cheque facility, was 60.3 million, *i.e.*, about 19 per cent of the savings accounts with banks (about 320 million). The amount of savings deposits per account in post offices was around ₹ 2,500 at end-March 2005 as compared with around ₹ 15,000 with banks. This was because post offices largely cater to the banking needs of the low income groups. Apart from the savings bank accounts, post offices also offer several other financial products.

Insurance Services

In most countries, a large segment of the population does not have access to formal insurance services. Micro-insurance services in a number of countries have begun to expand only in recent years. The Insurance Regulatory and Development Authority (IRDA) has been actively encouraging insurance services for low-income households. In 2002, the IRDA established rural and social sector targets for insurance companies. All insurers entering the business after the start of the IRDA Act, 1999 are required to comply with the obligations towards the rural and social sectors in a phased manner. In India, the total number of life insurance policies (individual single premium) was about 3.41 million in November 2007 (IRDA, 2008). This implies that there are only around 3.1 policies per thousand persons. The insurance penetration (insurance premium as percentage of GDP) in India was relatively higher as compared with several emerging market economies, but significantly lower than that in advanced economies.

Section VI: Conclusion and Policy Prescriptions

The study found that bank finance has been playing a major role in our growth process. The empirical findings of the study suggest that there is a bi-directional causality between GDP growth and financial development. In other words, the study has supported the view in the literature that financial development and economic growth exhibit a

two-way causality and hence is against the so-called "finance-led" growth hypothesis. However, the impulse response function analysis undertaken by the study suggests that the impact of credit on GDP is stronger than the reverse situation.

In the post-reform period, the Indian economy is elevated to high growth path triggered mainly by the expansion of economic activities across the sectors. However, there are some serious concerns about a number of imbalances in the growth scenario – inter-sectoral, inter-regional and inter-state. These imbalances have definitely a serious impact on the goal of "inclusive growth" as envisaged in the Eleventh Five Year Plan. The study reveals that still poverty ratio is very high in the economy. There is no significant increase in employment in the unorganised sector of the economy. The study also shows that while the contribution of the agriculture sector in the real GDP has declined fairly fast, the share of the employment in the agriculture sector has not declined to that extent. As a result, the average productivity in this sector has remained very low. Since a large section of the population continues to be dependent on the agriculture sector, directly or indirectly, this has serious implications for 'inclusiveness'.

Inclusive growth implies delivering social justice to all, particularly the disadvantaged groups. One aspect of social justice is that all programmes that provide generalised access to essential services such as health, education, clean drinking water, sanitation etc. should be implemented in a way that ensures that disadvantaged groups get full access to these services. Further, designing and implementing schemes specifically targeted to these groups will go a long way in achieving inclusive growth. This may need an innovative approach of Public Private Partnership in providing basic needs to these groups.

In this context, innovations are needed in products and services which reduce costs, economise on energy and serve the needs of the common man in an affordable manner. Innovations are also needed in processes and delivery mechanisms, especially in government delivery mechanisms which need to be redesigned so that they can

deliver outcomes commensurate with the considerable resources they now absorb.

In India, there is dominance of unorganized sectors such as, agriculture, small and micro enterprises, weavers, artisans, craftsmen, etc., which provide bulk of employment. This has been highlighted by the National Commission for Enterprises in the Unorganised Sector. In view of the predominance of informal-sector workers in the workforce, there is an urgent need for expansion in the scope and coverage of social security schemes for these unorganized workers so that they are assured of a minimum level of social protection and ensure their contribution for growth. Further, rapid growth can promote the inclusiveness agenda if the growth is associated with faster growth in agriculture, rural infrastructure and greater absorption of labour in manufacturing. The latter requires a special thrust in the MSME area. Inclusiveness will also be promoted by various ongoing social sector oriented programmes aimed specifically at the weaker section of the society. However, a much greater effort is needed to improve the implementation of social sector programmes in the field. These programmes receive assistance from the Central Government but they are implemented by State agencies. Much greater devolution of power to Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs), together with effective participation by the local community is needed to achieve better oversight and accountability. Progress in governance agenda is critical to achieve the goal of inclusiveness and should be given high priority by State Governments.

Financial institutions are to play crucial role in the overall scheme of inclusive growth. The nexus between finance and growth is well established and thus financial inclusion has taken a central stage in the recent times. Innovation of different financial products and process that increases the accessibility of common man to the financial institution can be considered as *sine qua non* of inclusive growth. Further, the financial institutions can play an important role in the inclusive growth strategy in promoting innovations by providing capital through various stages of product development. Infrastructure constraints have been considered as a binding constraint on growth.

The promotion of infrastructure especially, in rural areas can be a catalyst of inclusive growth through better delivery of social services to the common man. Financial institution should play a crucial role in infrastructure financing specially in rural areas.

In the globalised world order there has been interplay among macroeconomic reforms, globalization and technology, which can propel growth towards high trajectory. However, the synergetic links among the sectors can be reaped for achieving inclusive growth. Inclusive governance and inclusive growth go hand in hand. Empowerment and participation of people through further activation of Panchayati Raj Institutions and Urban Local Bodies can enable to achieve inclusive governance and public accountability, thus ensuring demand driven inclusive growth.

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Annexure: 1

Inter-state Comparisons of Growth Performance

Data Source and Methodology

NSDP and Per capita NSDP figures are taken from Central Statistics Office web site and RBI Handbook of Statistics on Indian Economy. For Maharashtra and Gujarat, latest figures were taken from the respective Government sites.

Data pertains to the period 1980-81 to 2008-09. Since the series follows three base year; 1980-81, 1993-94 and 1999-00, the first two series is spliced to arrive at a general data series with base year 1999-00. A simple splicing method is used to arrive at combined series.

For comparing economic performance across states, we have looked into the decadal annual compounded growth rates of NSDP and Percapita NSDP. The annual compounded rate of growth has been worked out by applying the semi-log model with respect to time (t). Accordingly, the following regression is run:

Log (NSDP) = a + bt, where b represents instantaneous rate of growth. The compounded growth rate (r) is further arrived by applying the following equation

r = ((antilog of b)-1)*100

Annex Tables

Annex Table 1:
Estimated Semi-log equation for NSDP of Indian States at different time period *(Contd.)*

States	1980-81 to 1989-90			1990-91 to 1999-00			2000-01 to 2008-09		
	intercept	Slope	R2	Intercept	Slope	R2	Intercept	Slope	R2
Andhra pradesh	10.5732 (216.00)	0.051527 (6.54)	0.842526	10.6341 (195.00)	0.051378 (14.80)	0.964858	10.2498 (104.00)	0.069682 (17.40)	0.98067
Arunachal Pradesh	5.95267 (313.0)	0.078142 (25.5)	0.987864	6.45698 (63.9)	0.044635 (7.0)	0.858208	6.2195 (34.7)	0.056907 (7.8)	0.910578
Assam	9.80228 (419.0)	0.032034 (8.5)	0.900289	9.94893 (410.0)	0.021723 (14.1)	0.961399	9.30635 (252.0)	0.051242 (34.8)	0.994261
Bihar	10.0908 (378.0)	0.046374 (10.8)	0.9355	10.2884 (76.0)	0.019716 (2.3)	0.397433	9.31499 (34.3)	0.069664 (6.5)	0.856186
Chattisgarh	–	–	–	9.59694 (173.0)	0.025136 (7.7)	0.922899	8.39508 (84.8)	0.077911 (19.8)	0.982403
Goa	7.21694 (133.0)	0.051007 (5.8)	0.808614	6.99611 (75.5)	0.080526 (13.7)	0.959159	6.72813 (52.6)	0.085471 (16.4)	0.978276
Gujarat	10.3199 (173.0)	0.047291 (4.9)	0.750582	9.97502 (78.9)	0.076888 (9.6)	0.919983	9.22783 (112.0)	0.101023 (30.7)	0.992622
Haryana	9.64176 (277.0)	0.060772 (10.8)	0.936346	9.82092 (195.0)	0.04606 (14.4)	0.962882	8.89974 (122.0)	0.091099 (31.3)	0.992915
Himachal	8.34033 (192.00)	0.044418 (6.35)	0.834337	8.18222 (158.00)	0.060239 (18.30)	0.976722	8.0766 (149.00)	0.066539 (30.30)	0.99351
Jammu &Kashmir	8.86246 298	0.019422 4.05	0.671891	8.6028 569	0.045464 47.4	0.996446	8.4406 162	0.051243 24.3	0.989902
Jharkhand	–	–	–	9.08807 (33.7)	0.062992 (4.0)	0.761319	8.474 (86.6)	0.080331 (20.6)	0.983812
Karnataka	10.2283 (492.00)	0.05135 (15.30)	0.967014	10.0295 (219.00)	0.068452 (23.60)	0.985817	9.91112 (82.20)	0.0692 (14.40)	0.96744
Kerala	10.1217 (321.00)	0.025487 (5.02)	0.758699	9.88953 (210.00)	0.056972 (19.00)	0.978393	9.29938 (95.50)	0.081749 (20.70)	0.986144
Maharashtra	11.0159 (333.0)	0.054251 (10.2)	0.928298	10.9624 (188.0)	0.066653 (18.0)	0.975856	10.5308 (123.0)	0.080261 (23.6)	0.987564
Manipur	7.01064 (644.0)	0.047103 (26.9)	0.989028	7.01452 (87.0)	0.045519 (8.9)	0.908185	6.73351 (68.9)	0.056317 (14.2)	0.971041
Meghalya	7.00259 (310.0)	0.042617 (11.7)	0.944976	6.93646 (76.3)	0.054009 (9.4)	0.91647	6.94765 (188.0)	0.056485 (37.7)	0.995793
Madhya Pradesh	10.2291 (351.0)	0.035133 (7.5)	0.875074	10.0585 (143.0)	0.054592 (12.3)	0.949548	10.1629 (88.4)	0.044431 (9.5)	0.937805
Nagaland	6.59308 (198.0)	0.07199 (13.4)	0.957531	6.82925 (79.7)	0.054845 (10.1)	0.927216	6.34915 (65.2)	0.080624 (19.5)	0.989596
Orissa	9.79262 (220.0)	0.046831 (6.5)	0.84239	9.73912 (142.0)	0.039493 (9.1)	0.911492	8.80232 (78.7)	0.080665 (18.1)	0.97913

Annex Table 1:
Estimated Semi-log equation for NSDP of Indian States at different time period *(Concld.)*

States	1980-81 to 1989-90			1990-91 to 1999-00			2000-01 to 2008-09		
	intercept	Slope	R2	Intercept	Slope	R2	Intercept	Slope	R2
Punjab	10.0537 (815.0)	0.052986 (26.7)	0.988873	10.1411 (536.0)	0.043407 (36.2)	0.993927	9.97336 (116.0)	0.049419 (14.5)	0.967785
Rajashthan	9.99689 (160.0)	0.057704 (5.7)	0.804137	9.97146 (88.7)	0.06322 (8.9)	0.907635	9.85198 (48.1)	0.062781 (7.7)	0.89451
Sikkim	–	–	–	5.42528 (82.0)	0.061551 (15.9)	0.980684	5.05634 (307.0)	0.078219 (117.0)	0.999562
Tamil Nadu	10.5695 (410.00)	0.048758 (11.70)	0.945066	10.463 260	0.062159 24.3	0.986675	10.158 (55.20)	0.071245 (9.73)	0.931188
Tripura	7.15459 (161.0)	0.049262 (6.9)	0.856056	6.96475 (92.7)	0.070253 (14.7)	0.964515	6.82108 (83.6)	0.079646 (23.5)	0.991025
Uttar Pradesh	11.1236 (578.0)	0.046774 (15.1)	0.966067	11.2542 (228.0)	0.034893 (11.1)	0.939536	10.8457 (142.0)	0.052339 (17.3)	0.977068
Uttaranchal	–	–	–	8.84264 (105.00)	0.025213 (5.10)	0.838858	7.63292 89	0.084926 23.9	0.991294
West Bengal	10.6529 (614.0)	0.044855 (16.0)	0.969848	10.4036 (462.0)	0.066381 (46.5)	0.99631	10.4801 (174.0)	0.061152 (25.0)	0.990478

Annex Table 2:
Estimated Semi-log equation for PCNSDP of Indian States at
different time period *(Contd.)*

States	1980-81 to 1989-90			1990-91 to 1999-00			2000-01 to 2008-09		
	intercept	Slope	R²	Intercept	Slope	R²	Intercept	Slope	R²
TN	9.00002	0.034036	0.88376	8.85386	0.051634	0.981065	8.50118	0.063054	0.911973
	(332.00)	(7.80)		(221.00)	(20.40)		(45.70)	(8.52)	
Kerala	9.21375	0.011366	0.384004	8.93477	0.047132	0.972616	8.24323	0.076731	0.987155
	(292.00)	(2.23)		(203.00)	(16.90)		(99.10)	(23.20)	
Andhra	8.91582	0.029837	0.641826	8.88983	0.036896	0.92826	8.24781	0.06757	0.97113
	(182.00)	(3.79)		(156.00)	(10.20)		(74.50)	(15.30)	
Karnataka	8.93651	0.031308	0.907094	8.70271	0.052415	0.972982	8.35978	0.063469	0.94099
	(407.00)	(8.84)		(179.00)	(17.00)		(55.40)	(10.60)	
J&K	**9.39111**	**-0.005986**	**0.162299**	9.1328	0.020043	0.97962	8.74666	0.036251	0.973206
	(315.00)	**-1.24**		(567.00)	(19.60)		(145.00)	(14.80)	
Himachal	9.21781	0.026372	0.626634	9.04662	0.042588	0.951929	8.9132	0.050299	0.990956
	(206.00)	(3.66)		(170.00)	(12.60)		(195.00)	(27.70)	
Uttaranchal	–	–	–	**9.39742**	**0.006909**	**0.285687**	8.17035	0.067477	0.99337
				(112.00)	**(1.41)**		156	32.4	
Punjab	9.56424	0.034333	0.975848	9.64995	0.024495	0.981121	9.45257	0.032041	0.930127
	(807.0)	(18.0)		(510.0)	(20.4)		(113.0)	(9.7)	
Haryana	9.41124	0.036497	0.840523	9.59058	0.022061	0.866616	8.59649	0.070312	0.989486
	(270.0)	(6.5)		(199.0)	(7.2)		(125.0)	(25.7)	
UP	8.78877	0.023727	0.874486	8.91188	0.013273	0.716346	8.44767	0.033036	0.939464
	(446.0)	(7.5)		(191.0)	(4.5)		(106.0)	(10.4)	
Rajashthan	8.79248	0.031674	0.54617	8.7571	0.039338	0.799405	8.24669	0.056017	0.853686
	(139.0)	(3.1)		(79.7)	(5.7)		(37.4)	(6.4)	
MP	8.91503	0.011613	0.439717	8.71951	0.033045	0.871289	8.76638	0.025645	0.827397
	(310.0)	(2.5)		(123.0)	(7.4)		(74.5)	(5.4)	
Chattisgarh	–	–	–	9.20242	0.008878	0.603248	7.71054	0.074686	0.963087
				(167.0)	(2.8)		(55.5)	(13.5)	
Gujarat	9.11397	0.0273	0.498463	8.76067	0.058569	0.865608	7.89998	0.087235	0.993791
	(152.0)	(2.8)		(68.1)	(7.2)		(121.0)	(33.0)	
Goa	9.54376	0.035442	0.657214	9.32495	0.065341	0.936154	9.09767	0.067127	0.935977
	(170.0)	(3.9)		(98.1)	(10.8)		(51.6)	(9.4)	
Maharashtra	9.20526	0.031594	0.821982	9.12126	0.04639	0.951133	8.57375	0.06556	0.97871
	(285.0)	(6.1)		(156.0)	(12.5)		(93.3)	(17.9)	
Bihar	8.46617	0.025009	0.8122	**8.7004**	**-0.004**	**0.033325**	7.44796	0.057535	0.75299
	(321.0)	(5.9)		**(65.8)**	**(-0.5)**		(23.8)	(4.6)	
Jharkhand	–	–	–	8.47029	0.045862	0.632175	7.82624	0.064193	0.972903
				(31.6)	(2.9)		(76.9)	(15.9)	
Orissa	8.85749	0.028816	0.670428	8.77366	0.023596	0.785458	7.51945	0.078879	0.967961
	(200.0)	(4.0)		(128.0)	(5.4)		(55.2)	(14.5)	

Annex Table 2:
Estimated Semi-log equation for PCNSDP of Indian States at
different time period *(Concld.)*

States	1980-81 to 1989-90			1990-91 to 1999-00			2000-01 to 2008-09		
	intercept	Slope	R²	Intercept	Slope	R²	Intercept	Slope	R²
West Bengal	8.98146 (516.0)	0.023097 (8.2)	0.894323	8.67193 (348.0)	0.049493 (31.3)	0.991886	8.5843 (130.0)	0.052152 (19.9)	0.982582
Arunachal Pradesh	8.7475 (453.0)	0.046875 (15.1)	0.965959	9.16177 (94.1)	0.020874 (3.4)	0.588061	8.56625 (61.3)	0.050063 (9.0)	0.920527
Assam	9.24938 (385.0)	0.010899 (2.8)	0.49811	9.35591 (527.0)	0.003058 (2.7)	0.480132	8.7036 (257.0)	0.03382 (25.1)	0.988998
Meghalya	9.05597 (448.0)	0.014292 (4.4)	0.706725	8.96752 (96.7)	0.027257 (4.6)	0.728313	8.40909 (115.0)	0.055695 (19.1)	0.98117
Tripura	8.77992 (201.0)	0.020009 (2.8)	0.501878	8.44203 (94.5)	0.052895 (9.3)	0.915865	8.4698 (73.5)	0.056538 (12.1)	0.960433
Manipur	8.99699 (862.0)	0.021184 (12.6)	0.951964	8.96394 (109.0)	0.023028 (4.4)	0.708844	8.56957 (113.0)	0.039074 (12.9)	0.959795
Nagaland	9.18135 (263.0)	0.034124 (6.1)	0.821393	**9.45135 (84.9)**	**0.010186 (1.4)**	**0.206276**	**9.4809 (68.1)**	**0.010627 (1.8)**	**0.403184**
Sikkim	–	–	–	8.96817 (136.0)	0.032978 (8.5)	0.935847	8.2704 (317.0)	0.064281 (61.9)	0.998177

Annex Table 3:
Poverty Rates Across States (%)

State/UT	1973-74	1977-78	1983-84	1987-88	1993-94	1999-2000	2004-05
Andhra Pradesh	48.9	39.3	28.9	25.9	22.2	15.8	15.8
Arunachal Pradesh	51.9	58.3	40.9	36.2	39.4	33.5	17.6
Assam	51.2	57.2	40.8	36.2	40.9	36.1	19.7
Bihar	61.9	61.6	62.2	52.1	55.0	42.6	41.4
Goa	44.3	37.2	18.9	24.5	14.9	14.4	13.8
Gujarat	48.2	41.2	32.8	31.5	24.2	14.1	16.8
Haryana	35.4	29.6	21.4	16.6	25.1	8.7	14.0
Himachal	26.4	32.5	16.4	15.5	28.4	7.6	10.0
Jammu	40.8	39.0	24.2	23.8	25.2	3.5	5.4
Karnataka	54.5	48.8	38.2	37.5	33.2	20.0	25.0
Kerala	58.8	52.2	40.4	31.8	25.4	12.7	15.0
Madhya Pradesh	61.8	61.8	49.8	43.1	42.5	37.4	38.3
Maharashtra	53.2	55.9	43.4	40.4	36.9	25.0	30.7
Manipur	50.0	53.7	37.0	31.4	33.8	28.5	17.3
Meghalaya	50.2	55.2	38.8	33.9	37.9	33.9	18.5
Mizoram	50.3	54.4	36.0	27.5	25.7	19.5	12.6
Nagaland	50.8	56.0	39.3	34.4	37.9	32.7	19.0
Orissa	66.2	70.1	65.3	55.6	48.6	47.2	46.4
Punjab	28.2	19.3	16.2	13.2	11.8	6.2	8.4
Rajasthan	46.1	37.4	34.5	35.2	27.4	15.3	22.1
Sikkim	50.9	55.9	39.7	36.1	41.4	36.6	20.1
Tamil Nadu	54.9	54.8	51.7	43.4	35.0	21.1	22.5
Tripura	51.0	56.9	40.0	35.2	39.0	34.4	18.9
Uttar Pradesh	57.1	49.1	47.1	41.5	40.9	31.2	32.8
West Bengal	63.4	60.5	54.9	44.7	35.7	27.0	24.7
A&N Islands	55.6	55.4	52.1	43.9	34.5	21.0	22.6
Chandigarh	28.0	27.3	23.8	14.7	11.4	5.8	7.1
D&N Haveli	46.6	37.2	15.7	67.1	50.8	17.1	33.2
Delhi	49.6	33.2	26.2	12.4	14.7	8.2	–
Daman & Diu	–	–	–	–	15.8	4.4	10.5
Lakshdweep	59.7	52.8	42.4	35.0	25.0	15.6	16.0
Pondicherry	53.8	53.3	50.1	41.5	37.4	21.7	22.4
All India	54.9	51.3	44.5	38.9	36.0	26.1	27.5

Asia and the Global Economic Crisis: Challenges in a Financially Integrated World by John Malcolm Dowling and Pradumna Bickram Rana, Palgrave-Macmillan, 2010. £ 65, pp 271

"....An important lesson from the Asian Financial Crisis was that in order to manage financial globalization, policy actions was required at the national, regional, and global levels. But V-shaped recovery resulted in complacency and reform measures were quickly forgotten. This partially set the backdrop for the present global economic crisis…...."

Berry Deskar

This book authored by two experts on Asian affairs, takes the policy actions implemented by countries to manage financial globalization and identifies the remaining agenda to be finishing in order to avoid reoccurrence of such crisis. Drawing upon the rich set of data and references, this book provides a timely account of the impact of the global recession on Asian economies, the way by which policy makers were facing. It describes origin of Global Economic Crisis (GEC) in the US and deals with the responses of the US and Europe and moves on quickly to focus on its spread to Asia and especially on Asia's reaction/policy responses to it. The authors have examined the current GEC in the perspective of the Asian region, reviewing how different regions of Asia were affected, and identifies the challenges that Asia faces in a financially integrated world. Further, it analyses the impacts of the policy responses adopted and the persisting challenges in rebalancing the global economy, the next steps in regional economic integration in Asia, and issues related to reform of the international financial architecture. It discusses Asian and global initiatives for rebounding growth, highlights the impact of the crisis on poverty and the millennium development goals, and provides a detailed analysis of individual country responses and prospects. As the world emerges from the crisis, the authors assess what has been achieved so far, where Asia stands at the beginning of the new decade and what more needs to be done to successfully manage financial globalization in the future.

The book covers the topic in twelve chapters starting with chapter 1. Introduction, 2. The Crisis and How it Unfolded in Industrial Countries, 3. Transmission to Developing Countries in Asia, 4. Policy Responses – Asia, 5. Impacts of the Global Crisis on Asia and Outlook, 6. Policy Responses – Asia, 7. Where we Stand at the Beginning of 2010, 8. Asian and Global Initiatives for Rebalancing the Global Economy, 9. Impact of Crisis on Poverty and MDGs, 10. Individual Country Analysis and Prospects, 11. Economic Integration in Asia: Trends and Policies and 12. Reform on International Financial Architecture: Progress and Remaining Agenda.

With the financial globalization, large inflow and sudden reversal of private capital flow has increased. In such a crisis domestic investors also liquidate their assets. Since 1990s, there have been 10 episode of capital account crisis across the world. The lesson learned from the capital account crises that have occurred around the world so far in terms of managing the resolving and in trying to prevent a similar crisis from occurring in future in Asia. Cross border operation of many financial institutions had been contagion effect for GEC and requires coordination at global level as well as multilateral actions. The present crisis has triggered the debate over tighten policy regulations and G20 leaders are getting consensus to develop globally accepted set of policy regulations to improve the quality and quantity of bank capital to implemented by 2012. As the idea of World Finance Organization (WFO) is emerging to meet international standards for supervision and regulation for financial market of member countries mandatorily at global level, the idea of establishment of Asian Financial Stability Board (AFSB) at regional level is also getting leveraged to be responsible for both micro-prudential as well as macro-prudential supervision apart from promoting financial stability in the region by developing and implementing early warning system (EWS) of banking crises and focusing on long-term financial market development and integration issues in the region.

The book is well thought-out in 12 chapters and focuses on anatomy of the crisis in the US and subsequently spread to the other

industrial countries and Asia. Analysis of the genesis of the crisis from several different perspectives is duly narrated in chapter 2 and finds that accommodative monetary policy of the Federal Reserve caused fall in prime lending rate from around 9 per cent in 2001 to 6 per cent by 2004 as the federal funds rate came down from 6 per cent in early 2001 to an all time low of 1 per cent by mid-2003. Lower interest rates and aggressive lending caused bubble in the housing market and development of the subprime mortgage market which resulted in a tripling of average home valued in less than a decade and en enormous windfall in wealth for home owners. The role of leverage, the lack of appropriate supervision of mortgage lenders and the role of derivatives, particularly mortgage securities are identified. Book has tried to dig out what went wrong and finds that animal spirit to create more assets with more opaque risk profiles and increasing their financial leverage, changes in policy regulations or no regulations such as repeal of the Glass-Steagall Act which allowed commercial banks to enter the investment banking business and take more risks, changes in structure of housing market causing to boom in housing sector and variable rate mortgage became more common and qualifying income requirement were ignored or fudged and misplaced belief in the riskiness of assets and the skill of rating agencies. The chapter, further, analyses the spread of the crisis to the industrial countries. Particular reference is made to the inter-linkages between banks and other financial institutions in the US and Europe that contributed to the contagion of the crisis.

Chapter 3 gives an account of the spread of the crisis to Asia through various channels. There were four major ways in which financial stress was transmitted. The first was investment by investor banks and mortgage companies in what would come to be known as 'toxic' assets that emanated from the subprime mortgage crisis in the US and UK. The riskiness of the these assets increased and their prices fell when the mortgage bubble burst in the US and Asian holding these assets were adversely affected. Second, foreign direct investment and portfolio investment follows into developing

countries are also adversely affected. Third, as the global crisis deepened the demand for Asian Exports also began to fall and there were impacts on foreign exchange markets. The fourth channel was through remittances flows from Asian working in industrial countries to their families back home. The developing economies of Asia were most affected by a decline in demand for its exports as well as withdrawal of funds from equity market, creating stress throughout the region. In order to come out of the recession much will depend upon the shape and duration of the recession and recovery in the US.

The chapter 4 discusses the stimulus measures that were undertaken by the US to deal with financial crisis and economic recession, which includes tax incentives for businesses, income tax rebates for lower and middle-income group. As the crisis deepened, in September 2008, the US Treasury put Freddie Mac and Fannie Mae in conservatorship. It was assumed initially that monetary policy would not play much of a role in mitigating the crisis as interest rates were already low and monetary policy was relaxed. But Federal Reserve started buying assets and thereby injecting money into the system. Further, the chapter duly discusses the size and timing of fiscal monetary stimulus measures. Conventional monetary easing including interest rates and reserve requirements as well as other quantitative easing measures are discussed. Fiscal stimulus including tax and spending measures are delineated including the size, time and scope of these measures in industrial countries is discussed.

The thorough impact on Asia and its responses to the crises are discussed in chapter 5 and chapter 6. The former chapter develops taxonomy for analyzing economic developments in the Asian region. Several country groups are developed based on country size, level of development and degree of globalization. The three large economies of China, India and Indonesia are one group. Another group comprises richer countries of Southeast Asia and East Asia. The poorer countries that are less integrated in the global economy are grouped together and a final group comprises three countries in southeast Asia that are sandwiched between the   other richer

countries in East Asia and poor countries in south Asia. In Chapter 6, differences in responses for different countries are review and size of fiscal stimulus as a percentage of GDP is compared. Monetary stimulus measures were designed to provide liquidity to the economy and also to stimulate investment. Accordingly, most Asian countries have implemented measures to relax monetary policy and encourage bank lending. Monetary policy stance of various Asian countries are also reviewed as was additional details of forecast for domestic demand, government budgets, current account, capital flows, unemployment and remittance flows.

A snapshot of the region as of early 2010 is provided in Chapter 7 including perspectives on the length of the recession, comparison with other recessions in Asia and the outlook for 2010. The recovery path of Asian countries through 2009 and early 2010 has been consistent with projections made by various international agencies. Loss of income resulting from the recession is estimated and these losses are compared with losses sustained during Asian Financial Crisis. Further analysis of poverty and unemployment are discussed in detail.

Suggestions for Asian and global initiatives to rebalance the global economy are discussed in Chapter 8. A return to the status quo of high saving and export-led growth by Asian economies combined with large US current account deficit and low saving rates is not plausible. Focus is given on two aspects of rebalancing the global economy. First, it explore the possibilities of coordinating fiscal stimulus measures in order to facilitate the unwinding of asset positions and the adjustment of international borrowing and lending and second, it explores how developing countries with large surpluses reduce their saving rates while increasing domestic consumptions, which is an important step to follow the policy coordination measures to develop a coordinated stimulus.

Chapter 9 examines the expected impact of the crisis on poverty in Asian economies. Reference is made to the Asian financial crisis and estimates of the impact on the Millennium Development Goals.

The analysis of poverty and growth in 2009 and 2010 is discussed in chapter 10 where individual country experiences and measures are discussed in more depth. Poverty and unemployment are discussed with in more depth. Poverty and unemployment are discussed within a framework of expected macroeconomic and international trade developments. Only the countries of the region which are expected to have significant poverty impacts are discussed. This leaves out the richer countries in East Asia.

The Asian Financial Crisis had ignited Asia's interest in promoting regional economic integration. Chapter 11 argues in the context of economic integration in Asia and says that the global economic crisis has further strengthened the case for Asian regionalism. It prescribes list of suggestions for trade integration, financial integration, macroeconomic policy coordination, economic review and policy dialogue and regional financing arrangement. It also discusses the various efforts that have been made and indentifies the next steps in the region's economic integration.

Chapter 12 discusses rehabilitation efforts that are being made for crisis prevention, resolution and management. As Asian Financial crisis was triggered by capital account factors associated with financial globalization. The policy measures suggested by IMF in managing Asian Financial Crisis were not appropriate. With the V-shaped recovery, complacency had set in and the reform measures were quickly forgotten and progress was, however, limited because of the region's V-shaped recovery. It cautions that failure to reform the international architecture could sow the seeds of the next crisis in the future. It sets a list of prescription for crisis prevention such as standards and codes, data transparency, financial system soundness and surveillance and capital account deregulation. However, in order to manage crisis, it suggests new financing instruments and credit lines, IMF conditionality, private sector involvement and reforms of IMF governance. The book finds it too early to fully assess the impact of the post-GEC efforts under the auspices of G-20 but says there is once again the possibility that the faster than expected

recovery from GEC could lead to compliancy. If so, vulnerability to future crises would remain. But authors are optimistic that it will not happen this time around as the process is now being led by the G20 and developing countries are important stakeholders in this process.

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