Modeling Forecasting of Macro-Economic Variables of India: Before, During After Recession

Sinha, Pankaj and Gupta, Sushant and Randev, Nakul

Faculty of Management Studies, University of Delhi

7 October 2010

Modeling & Forecasting of Macro-Economic Variables of India:

Before, During & After Recession

PANKAJ SINHA, NAKUL RANDEV and SUSHANT GUPTA

Faculty of Management Studies
University of Delhi

ABSTRACT

This paper examines the state of the Indian economy pre, during and post recession by analyzing various macro economic factors such as GDP, exchange rate, inflation, capital markets and fiscal deficit. We forecast some of the major economic variables using ARIMA modeling and present a picture of the Indian economy in the coming years. The findings indicate that Indian economy is reviving after a slowdown during the period of global recession. It is forecasted that GDP, foreign investments, fiscal deficit and capital markets will rise in 2010-11. Furthermore, the rupee-dollar exchange rate will not change much during the same period.

INTRODUCTION

The beginning of the new financial year is always a good time to take stock- to look back and see where we have been, to look forward and prognosticate about future. The fiscal year 2009-10 closed on a relatively good note, amidst the pressures that emanated from the global economic crisis. Supported by simulative monetary and fiscal policies, a recovery in economic activity was visible from the second quarter of FY10. Industrial production has started rebounding; consumers who had held back on spending out of fear of job loss have begun to spend more freely as they see jobs begin to take hold. Improvement in global demand is generating a robust demand for exports while the financial markets are in better shape as evidenced by continued rally in equities. A number of forward-looking indicators are also showing a marked improvement.

But how has this picture transformed over the past 6 years, is what we try and focus on in this paper. The recession caused by the sub-prime crisis originating in the US hit many developing economies in a hard way. After having near zero interest rates and relatively high levels of unemployment, the US has started showing signs of recovery in the past 3 quarters (FY 2010-11). India has also sprung back on to the road of recovery and is trying hard to reach it's pre-recessionary levels of growth in the quickest time frame. But with the government deciding to slowly rollback the stimulus package and sops, will find it difficult to plough back soon. Faced by the horror of two digit inflation rates, the government is faced with the dilemma of continuing it spending extravaganza or practicing restraint. With this back drop we try and see how the economy has shaped from the period before recession till now and what can we look at in the next couple of years.

Subbarao (2008) in his speech at the IMF-World Bank Annual Meetings 2008 highlighted a few concerns and possible solutions. The concerns include rising food price-led inflation, a surge in capital flows, monetary transmission mechanism as it evolves from the crisis period, return to fiscal consolidation and quality of fiscal adjustment and financial stability, financial inclusion and growth. In relation to food inflation, an early exit on inflation concerns runs the risk of derailing the fragile growth, while a delayed exit may engender inflation expectations. In relation to capital inflows he raises concerns and possible impact of volatile investments on exchange rate. The paper also discusses the role of government and the ways in which the Indian government can influence parameters such as inflation. The following

research findings are on macro-economic parameters such as GDP, FII, FDI, borrowing, exchanges and interest rates. We utilized the below findings to review and build our paper on the Indian economy.

Gross domestic product or GDP, tells us the country's current aggregate production of goods and services. It is often considered the best measure of how well the economy is performing. GDP summarizes the aggregate of all economic activities in a given period of time. *Daga, Das and Maheshwari* (2004), in their paper have tried to model the GDP trend equation and determine the main sectors of the economy responsible for that particular shape. They have tried to gauge the impact of economic reforms on GDP, verify whether these do make any significant difference in the long run and hence produce a model to forecast GDP growth rate.

Globalization and financial sector reforms have increased India's growth rate and put it amongst the largest and fastest growing economies of the world. An important indicator of the financial system of any country is the country's capital market as it mobilizes saving and channels them into productive purposes. *Singh and Arora* (2010) discuss the effect of interest rates on a country's stock market by exploring data in Asian markets, such as India, China and Japan. Their study found that there exist a significant correlation between Sensex and interest rate as well as Nikkei and interest rate. However, a similar correlation was not found in China and they state various reasons ranging from politics to economic reforms to explain this result.

India now grapples with the issues and challenges for sustaining the elevated growth momentum that it has achieved. This has assumed added contemporary significance in the wake of expected moderation in global growth due to a projected slowdown in the US and some other advanced economies. *Mohan, Rakesh* (2008) argues that India's growth has been largely enabled by the availability of domestic savings, which have increased steadily over the decades. Further, the efficiency of resource use has been high with a long-term incremental capital-output ratio of around 4, which is comparable to the best in the world. While private investment and corporate growth have been major factors in the recent growth upsurge, it is important to note that this period has also been marked by a relative decline in public investment. Rakesh concludes by saying that revival of public investment, accompanied by higher public savings, would be necessary to improve and expand public services.

India has over the recent years received a surge of FII and FDI funding. FIIs have been playing a significant role in the process of capital formation and economic growth of the country. There has been a dramatic increase in net FII flows to India over the period 2003-2007. One of the main reasons for the FII flows has been an increased recognition of the long-term growth potential of Indian economy. India offers favorable demographics and has quickly established its competitive advantage in many spheres including software. Indian entrepreneurs have been quite successful in launching businesses in India. FIIs have recognized the fact and unlike other countries where FDI has gained predominance, India has seen significant growth in FII investment. It is with this backdrop that *Mishra, Das and Pradhan* (2010) study the causality of the relationship between foreign institutional investment and real economic growth of India. The study provides evidence of bi-directional causality running from net FII flows to real economic growth. This shows that the real economic growth of India both determines and determined by the volume of portfolio institutional investments in the country.

Since 1997, East Asian Financial crisis, the relationship between Foreign Direct Investment (FDI), exports and economic growth has gained importance and attention among policy makers and researchers. Due to volatility experienced in the short term capital flows, developing and less developed countries shifted their focus from attracting short term capital flows to FDI, due to its long term effects. However, the understanding of the long term impacts and benefits of FDI is not clear as FDI is not attracted uniformly to each country, which makes it difficult to identify the impact of FDI on economic growth. *Miankhel, Thangavelu and Kalirajan* (2009) have tried to study this dynamic relationship for six emerging countries including India. In the long run, they have identified GDP growth as the common factor driving growth in other variables such as Exports in the case of Pakistan and FDI in the case of India.

Keshava, S.R. (2008) analyzes the impact of FDI on growth in India, exports, GDI, FOREX and other macro variables. The paper also compares India's FDI with Chinese FDI and attempts to learn from the Chinese experience. The paper distinguishes between hard factor that affect FDI and soft factors that affect FDI. Hard factors mainly include transportation, telecommunications, energy supply, public utilities and infrastructure. Soft factors include parameters related to political regime and culture. The paper concludes that India is far behind China in becoming an attractive FDI destination as it still suffers from power shortage, poor infrastructure, security consideration and the absence of an exit policy. If India has to reach its target of attracting more FDI for its development, aggressive third generation reforms are needed along with good planning and intentions.

Another area that can have a critical effect on a country's ability to grow is borrowing. Capital inflows are critical for an emerging economy to grow, however extensive levels can increase the transaction exposure of a country and thereby cause harm in the long-run. *Virmani, Arvind* (2008) in his paper addresses the issue of increase in capital inflows into a open emerging economy, such as the current Indian economy. The paper recommends the introduction of an auctioning mechanism for the right to incur foreign debt. The auction will act as a variable tax that taxes short term flows at a higher rate and adjusts to changing environment. This mechanism will in effect correct for the negative externalities arising from cross-border debt, given the possibility of sharp reversals arising from global external developments and global shocks.

Fiscal deficit influences various parameters including growth and inflation. A study by *Sah* (2005) empirically examines the impact of fiscal deficit on the major macroeconomic variables. Variables used for the study included monthly data on gross fiscal deficit, weighted average call money rate, net FIIs investment, wholesale price index, reserve money, index of industrial production and new capital issue by non-government public limited companies. The study concluded that fiscal deficit significantly affects all macroeconomic variables. However, crowding-out of private investment is not supported by the data.

Real and financial crowding out can critically affects the rate of growth of an economy. *Chakraborty* (2006) analyzes the real and financial crowding out in India during 1970-71 to 2002-03. She concludes that a complementary relationship exists between public and private investment. The dynamics of financial crowding out is captured through the dual transmission mechanism via real rate of interest. The study reinforced previous findings in the area that there is no financial crowding out in India.

Apart from the FII, FDI, GDP and fiscal deficit, parameters such industrial production, interest rates and exchanges rates have a significant effect on a nations performance. *Garg, Agrawal, Rajesh* (2005) in their paper discuss the causal relationship between industrial production, interest rates and exchange rates in India. The study used various tests including Granger's Causality test and Vector Auto Regression technique on monthly IIP (Index of Industrial Production), exchange rate, and interest rate for the period April 1992 to March 2004. The results show that interest rate and IIP depend on the exchange rate and there is no relationship between interest rate and IIP.

These macroeconomic parameters through financial sector reforms have had a profound effect on the Indian stock market. The Indian stock market has witnessed metamorphic changes as regards to the size, structure and turnover. With more than 4700 listed companies, 2 crore shareowners and a market capitalization of `30,257,720 million (in 2005- 06) developments in Indian stock markets are now comparable to those in other mature markets. *Tripathi, Vanita* (2009) examines the relationship between various company fundamentals and equity returns in the Indian stock market in this changed regime and tests for the economic feasibility of fundamentals based investment strategies in the advent of technological up gradation. The results of her study conclude that Indian market is still not semi-strong efficient as publically available information can be used to earn extra returns.

The movement of stock indices is highly sensitive to the changes in fundamentals of the economy and to the changes in expectations about future prospects. It is assumed that domestic economic fundamentals play determining role in the performance of stock market. However, in the globally integrated economy, domestic economic variables are also subject to change due to the policies adopted and expected to be adopted by other countries or some global events. Recently, it is observed that contagion from the US sub prime crisis has played significant movement in the capital markets across the world as foreign hedge funds unwind their positions in various markets. Other burning example in India is the appreciation of currency due to higher inflow of foreign exchange. Rupee appreciation has declined stock prices of major export oriented companies. *Ahmed, Shahid* (2008) investigates the nature of the causal relationships between stock prices and the key macro economic variables (index of industrial production, exports, foreign direct investment, money supply, exchange rate, interest rate) representing real and financial sector of the Indian economy. The study indicates that stock prices in India lead economic activity except movement in interest rate which seems to lead the stock prices.

A defining characteristic of developing Asia as an economic entity is the acute intraregional heterogeneity that exists among Asian economies in terms of levels of economic development, rates of economic growth, and economic structures. A similar degree of heterogeneity is apparent in the types of exchange rate regimes officially operated by Asian central banks. For instance, China and Malaysia maintained firm US dollar (USD) pegged regimes until July 21, 2005, and Hong Kong continues to do so. Korea, Philippines, Thailand and Indonesia officially operate inflation targeting regimes with the interest rate as the monetary policy instrument. *Cavoli and Rajan* (2006) examines the degree of de facto

exchange rate flexibility for India over the last two decades. While the Reserve Bank of India (RBI) is commonly believed to target the real effective exchange rate (REER), the results in this paper indicate that the Indian rupee is predominantly influenced by the US dollar, with the euro slowly gaining in significance as well.

In order to evaluate India's performance before, during and after the economic recession, we analyze in Section 1 the performance of various macro-economic indicators from a period of 2003-09. In Section 2, we discuss the methodology used to forecast the coming years. Finally in Section 3, we try and forecast some of the major guiding parameters of India's economy and project India's growth pattern in the coming fiscal periods. Hence, through this paper we try and present a comprehensive picture of the Indian economy during the past 6 years and how may it shape up during the fiscal 2010-11.

SECTION 1 – Analysis of Economic Variables

1.1 GDP

Since 2003, the GDP growth rate had averaged around 8.4% per year till 2007-08. Economic growth decelerated in 2008-09 to 6.7 per cent. This represented a decline of 2.1 per cent from the average growth rate of 8.8 per cent in the previous five years (2003-04 to 2007-08). Significant decline in growth rate was seen in the second half of 2008-09 following the financial crisis that began in 2007 in the industrialized nations. The real turnaround came in the second quarter of 2009-10 when the economy grew by 7.9 per cent. Recovery in the global economy picked up momentum in the fourth quarter of 2009.

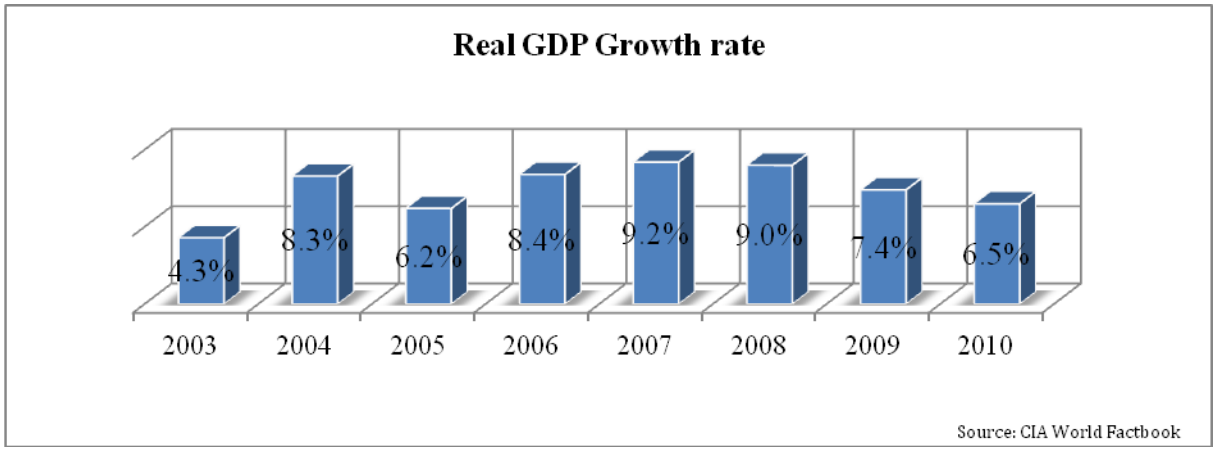


Figure 1.1: Real GDP Growth Rate

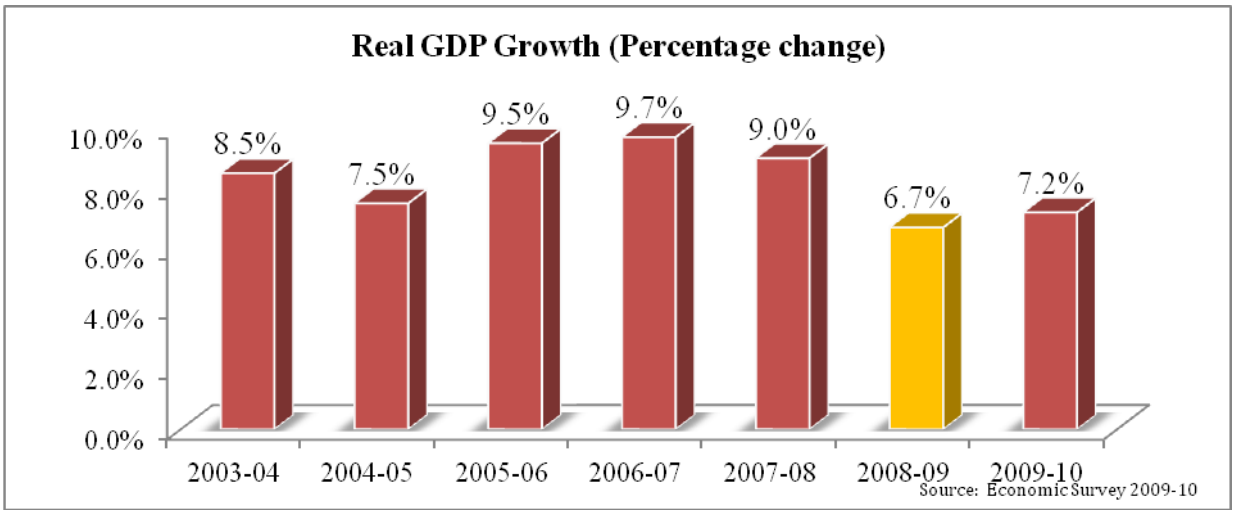


Figure 1.2: Real GDP Growth (Percentage change)

The speed of recovery, however, remains significantly divergent. The projections for global output for 2010 generally point to consolidating recovery, led by the Emerging Market Economies (EMEs). The WTO projects world trade to stage a strong recovery in 2010. The risks to the overall global macroeconomic environment have, however, increased because of large public debt in advanced economies, on the back of concerns relating to reduction in potential output, high unemployment rates, impaired financial systems and premature exit from the policy stimulus. As per the advance estimates of GDP for 2009-10, released by the Central Statistical Organization (CSO), the economy is expected to grow at 7.2 per cent in 2009-10, with the industrial and the service sectors growing at 8.2 and 8.7 per cent respectively. The professional forecasters' survey conducted in March 2010 by RBI shows overall (median) growth rate for 2010-11 at 8.2 per cent. Main driving factors include increased private consumption expenditure growth and relatively increased industrial activity in the first half and pick-up in services in the second half. The Industrial Outlook Survey conducted by the Reserve Bank shows improvement in the sentiments in the manufacturing sector, in continuation of the trend seen in the previous survey. Stronger growth impulses now coexist with significant acceleration in headline inflation in recent months. While the recovery in growth is expected to further firm up in 2010-11 over the preceding year, headline inflation could be expected to moderate over the next few months.

In the medium term it is reasonable to expect that the economy will go back to the robust growth path of around 9 per cent that it was on before the global crisis slowed it down in 2008. To begin with, there has been a revival in investment and private consumption demand, though the recovery is yet to attain the pre-2008 momentum. Second, Indian exports have recorded impressive growth in November and December 2009 and early indications of the January 2010 data on exports are also encouraging. Further, infrastructure services, including railway transport, power, telecommunications and, more recently but to a lesser extent, civil aviation, have shown a remarkable turnaround since the second quarter of 2009-10. The favorable capital market conditions with improvement in capital flows and business sentiments, as per the RBI's business expectations survey, are also encouraging. Finally, and even though it is too early to tell if this is a trend, the manufacturing sector has been showing buoyancy in recent months rarely seen before. The growth rate of the index of industrial production for December 2009—the latest month for which quick estimates are available—was a remarkable 16.8 per cent. There is also a substantial pick-up in corporate earnings and profit margins. Hence, going by simple calculations based on the above-mentioned variables, coupled with the fact that agriculture did have a set-back this year

and is only gradually getting back to the projected path, a reasonable forecast for the year 2010-11 is that the economy will improve its GDP growth by around 1 percentage point from that witnessed in 2009-10. Thus, allowing for factors beyond the reach of domestic policymakers, such as the performance of the monsoon and rate of recovery of the global economy, the Indian GDP can be expected to grow around 8.5 +/- 0.25 per cent, with a full recovery, breaching the 9 per cent mark in 2011-12.

1.2 Capital Markets

In September 2008, volatility in the S&P 500 spiked to levels not seen since the 1987 stock market crash. At the end of 2008 equity prices in the United States, as Standard & Poor's 500 index, were lower by around 39 per cent as compared with its level at end of 2007. The Indian equity markets have declined sharply during 2008, reflecting the volatility in international financial markets and foreign institutional investment outflows. With the revival of foreign institutional investors' (FIIs) interest in emerging market economies including India, the equity markets gained strength during May-July 2009. Despite the spectre of inflation and interest rate hikes looming large in 2010, foreign investors and analysts are bullish on India, betting on economic expansion, acceleration in company earnings, and revival of capital expenditure and capacity building. The movement in equity indices in the Indian capital market was in line with trends in major international equity markets, a sign of increasing integration. Against the backdrop of these trends in Indian equity markets, the regulatory measures initiated during the year were clearly in the direction of introducing greater transparency, protecting investors' interests and improving efficiency in the working of Indian equity markets, while also ensuring the soundness and stability of the Indian capital market.

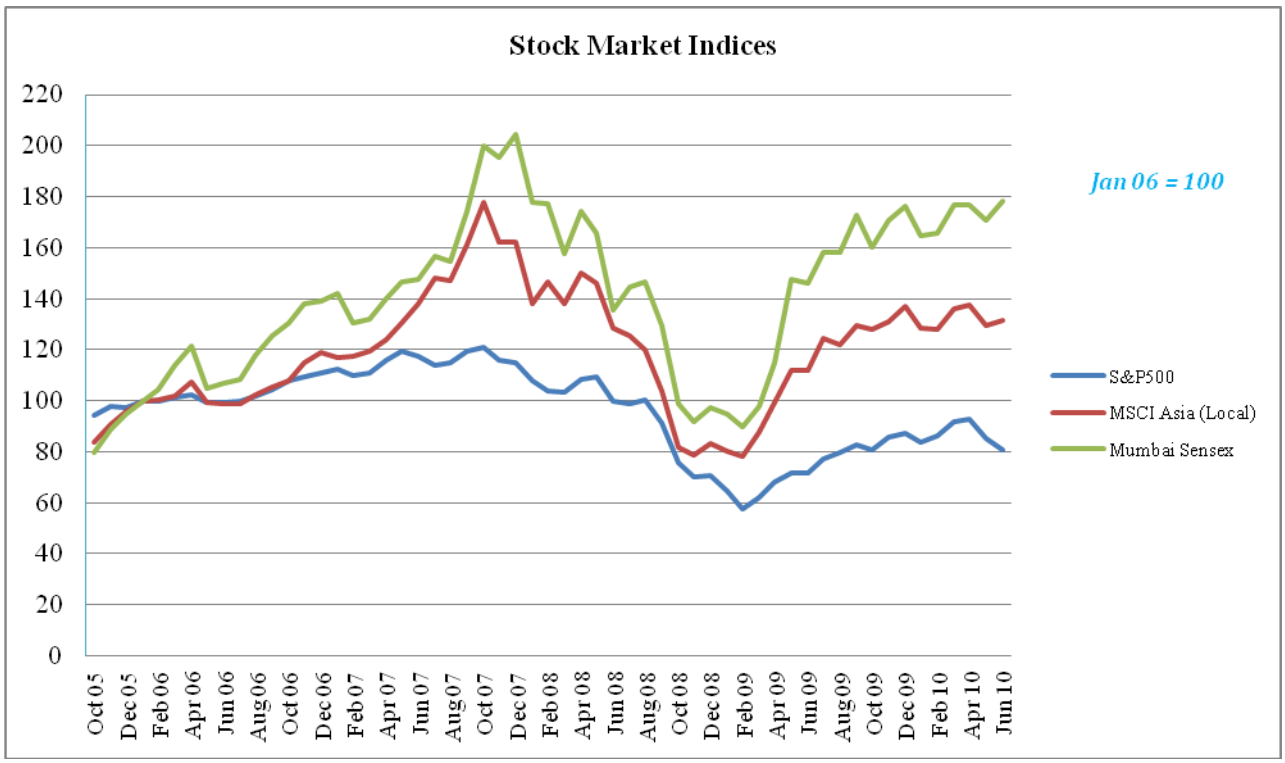


Figure 2.1: Stock Market Indices

During 2009, the Asian stock markets were on a recovery path. The cumulative change in global indices in end-December 2009 over the end- December 2003 level revealed a significant rise in these indices across countries. The Jakarta Composite index (Indonesia) registered a rise of 264.1 per cent to 2,510 at end-December 2009, while the BSE Sensex was up by 199.1 per cent to 17,465 in end-December 2009. Nikkei 225, Japan, however remained lower than its end- December 2003 level. Notwithstanding an improvement in global stock indices during the year, they were still lower than the levels reached in 2007.

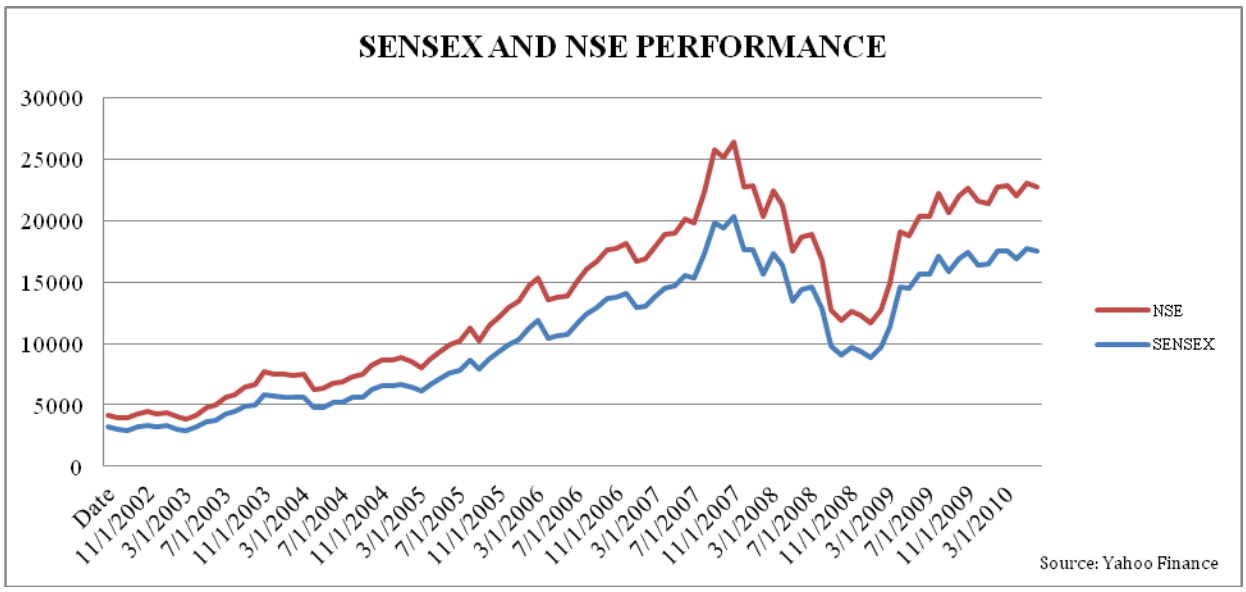


Figure 2.2: SENSEX and NSE Performance

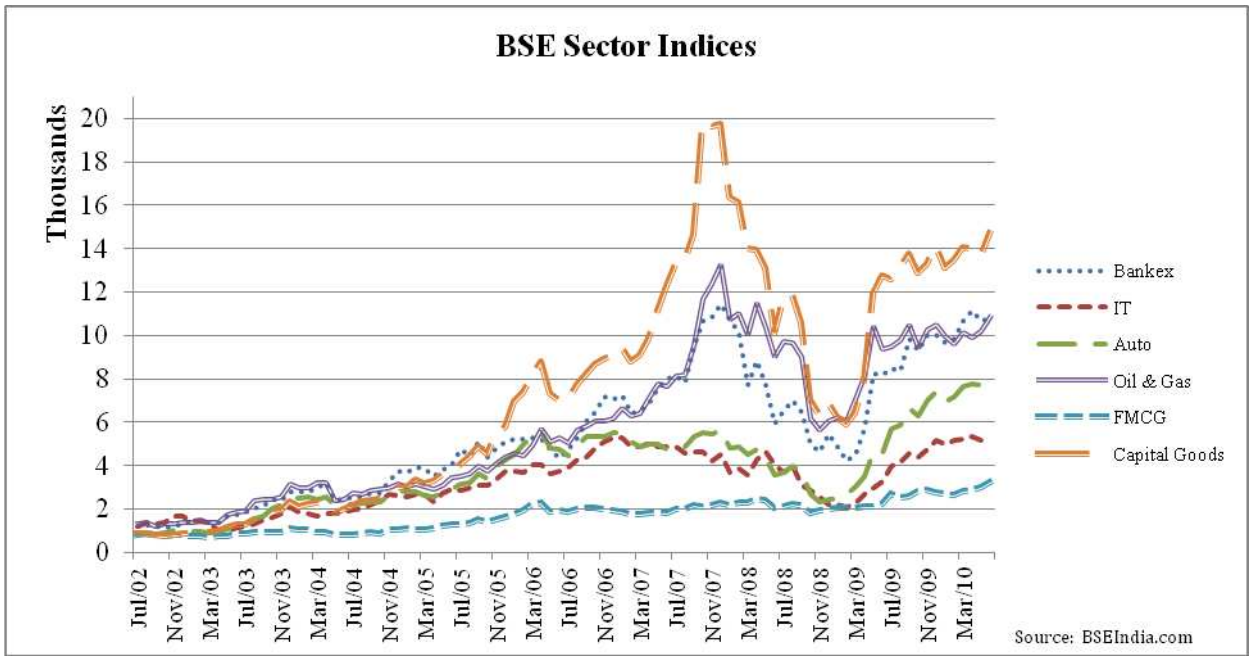


Figure 2.3: Stock Market Indices

1.3 Exchange Rates

The annual average exchange rate during 2008-09 worked out to Rs. 45.99 per US dollar compared to Rs. 40.26 per USD in 2007-08 which is the biggest annual loss for the rupee since 1991 crisis. Capital outflows during 2008 and early part of 2009 significantly weakened currencies in India. Reflecting the easing supply conditions in the market led by capital inflows, dollar exhibited declining trend during the

early half of 2009-10, on account of underlying demand conditions. In fiscal 2008-09, the rupee depreciated against major international currencies, except the pound sterling, due to deceleration in capital flows and widened trade deficit. The annual average exchange rate of the rupee in 2008-09 was Rs 45.99 per US dollar, Rs 64.98 per euro and Rs 46.22 per 100 yen, indicating depreciation by 12.5 per cent, 12.2 per cent and 23.5 per cent respectively over the annual average exchange rate during 2007-08.

However, annual average exchange rate of the rupee per pound sterling of 78.29 in 2008-09 indicated appreciation by 3.2 per cent over 2007-08. In fiscal 2009-10, with the signs of recovery and return of FII flows after March 2009, the rupee has been strengthening against the US dollar. The movement of the exchange rate in the year 2009-10 indicated that the average monthly exchange rate of the rupee against the US dollar appreciated by 9.9 per cent from Rs 51.23 per US dollar in March 2009 to Rs 46.63 per US dollar in December 2009, mainly on account of weakening of the US dollar in the international market.

Figure 3.1: Rupee V/S Dollar

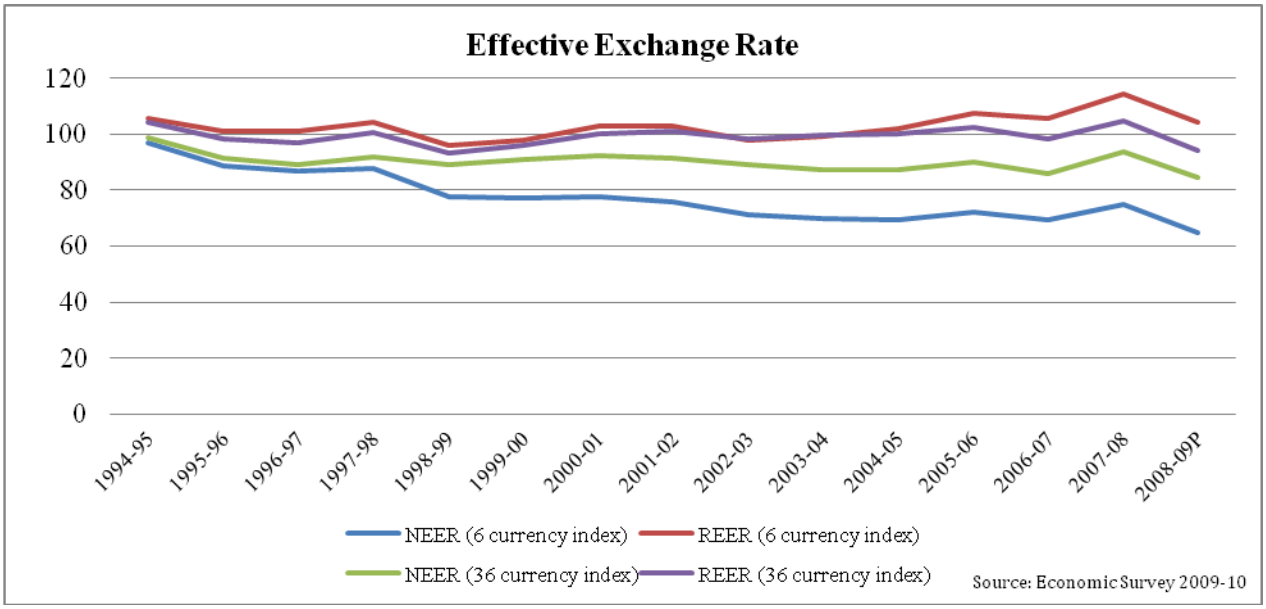


Figure 3.2: Effective Exchange Rate

The nominal effective exchange rate (NEER) and real effective exchange rate (REER) indices are used as indicators of external competitiveness of the country over a period of time. NEER is the weighted average of bilateral nominal exchange rates of the home currency in terms of foreign currencies. REER is defined as a weighted average of nominal exchange rates adjusted for home and foreign country relative price differentials. REER captures movements in cross-currency exchange rates as well as inflation differentials between India and its major trading partners. The RBI has been constructing six currency (US dollar, euro for eurozone, pound sterling, Japanese yen, Chinese renminbi and Hong Kong dollar) and 36 currency indices of NEER and REER. The rupee appreciated against the US dollar by 10.0 per cent during 2009-10 till November 2009. The rupee appreciation was, however, modest at 3.23 per cent against the six-currency trade-weighted NEER during 2009-10 (March to November 2009). The average six-currency trade-weighted REER (base:1993-94=100) increased from 98.58 in April 2009 to 104.94 in November 2009 mainly on account of appreciation of the rupee against the US dollar and increase in inflation differentials between India and its trading partners. The appreciation of the rupee against the US dollar and increase in inflation differentials between India and its trading partners during the year led to appreciation of the real exchange rate. On balance of payments basis (i.e., excluding valuation effects), the foreign exchange reserves increased by US$ 11.3 billion during April-December 2009 as against a decline of US$ 20.4 billion during April-December 2008. The valuation gain, reflecting the depreciation of the US dollar against the major international currencies, accounted for US$ 20.2 billion during April-December 2009 as compared with a valuation loss of US$ 33.4 billion during April-

December 2008. Accordingly, valuation gain during April-December 2009 accounts for 64.1 per cent of the total gross increase in foreign exchange reserves.

1.4 Investments

Gross domestic capital formation(GDCF) at current prices (adjusted for errors and omissions) increased from Rs18,65,899 crore in 2007-08 to Rs19,44,328 crore in 2008-09 and at constant (2004-05) prices, it decreased from Rs16,22,226 crore in 2007- 08 to Rs15,57,757 crore in 2008-09. The rate of gross capital formation at current prices rose from 32.7 per cent in 2004-05 to 37.7 per cent in 2007-08 before declining to 34.9 per cent in 2008-09. At sectoral level, the rate of gross capital formation or simply the investment rate has increased in both the public and private sectors. In the former it rose continuously from 7.4 per cent in 2004-05 to 9.4 per cent in 2008-09, whereas in the latter, it increased from 23.8 per cent in 2004-05 to 27.6 per cent in 2007-08 before falling to 24.9 per cent in 2008-09. Between 2007-08 and 2008-09, the investment rate for the private corporate sector declined significantly from 16.1 per cent to 12.7 per cent, whereas that of the household sector increased from 11.5 to 12.2 per cent.

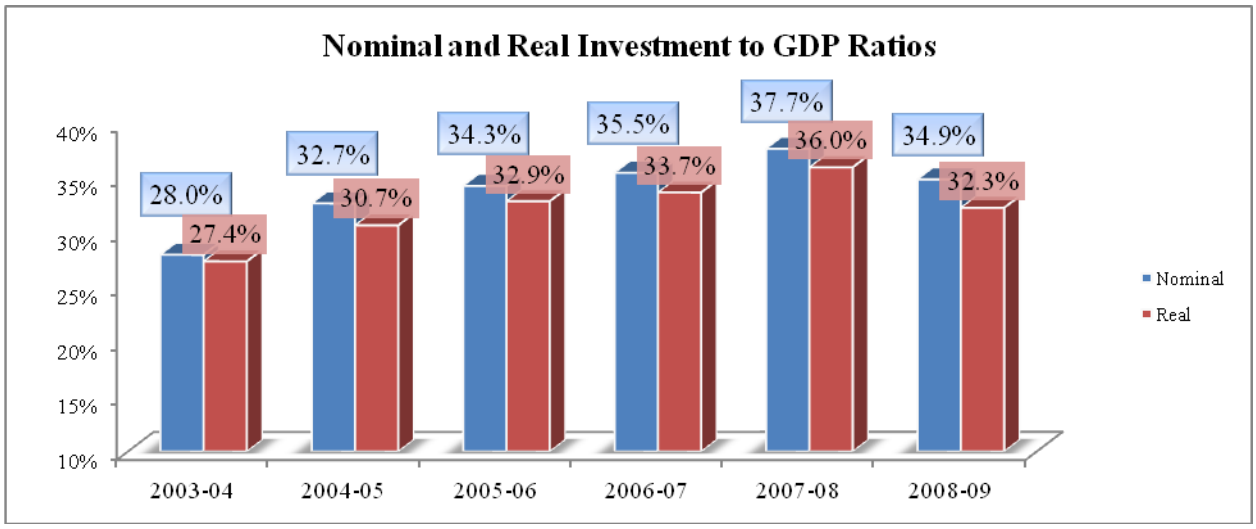


Figure 4.1: Nominal and Real Investment to GDP Ratios

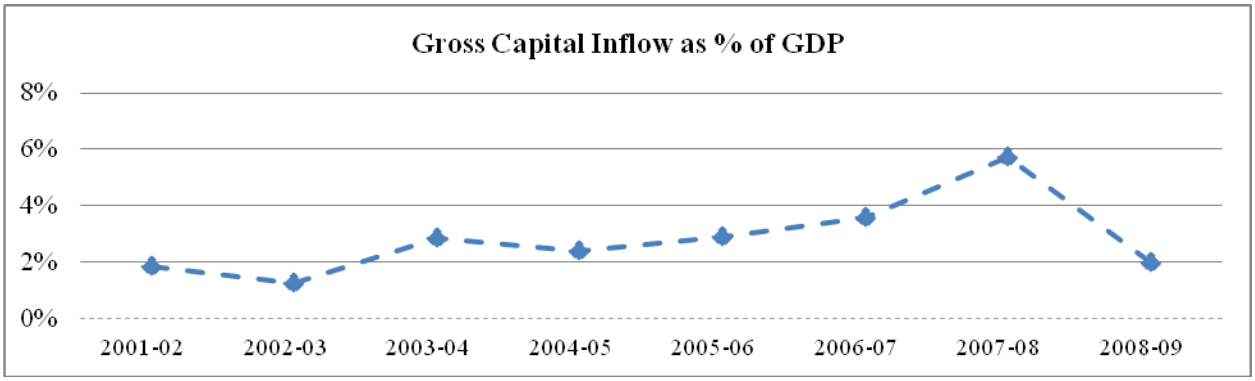


Figure 4.2: Gross capital inflow as a percentage of GDP

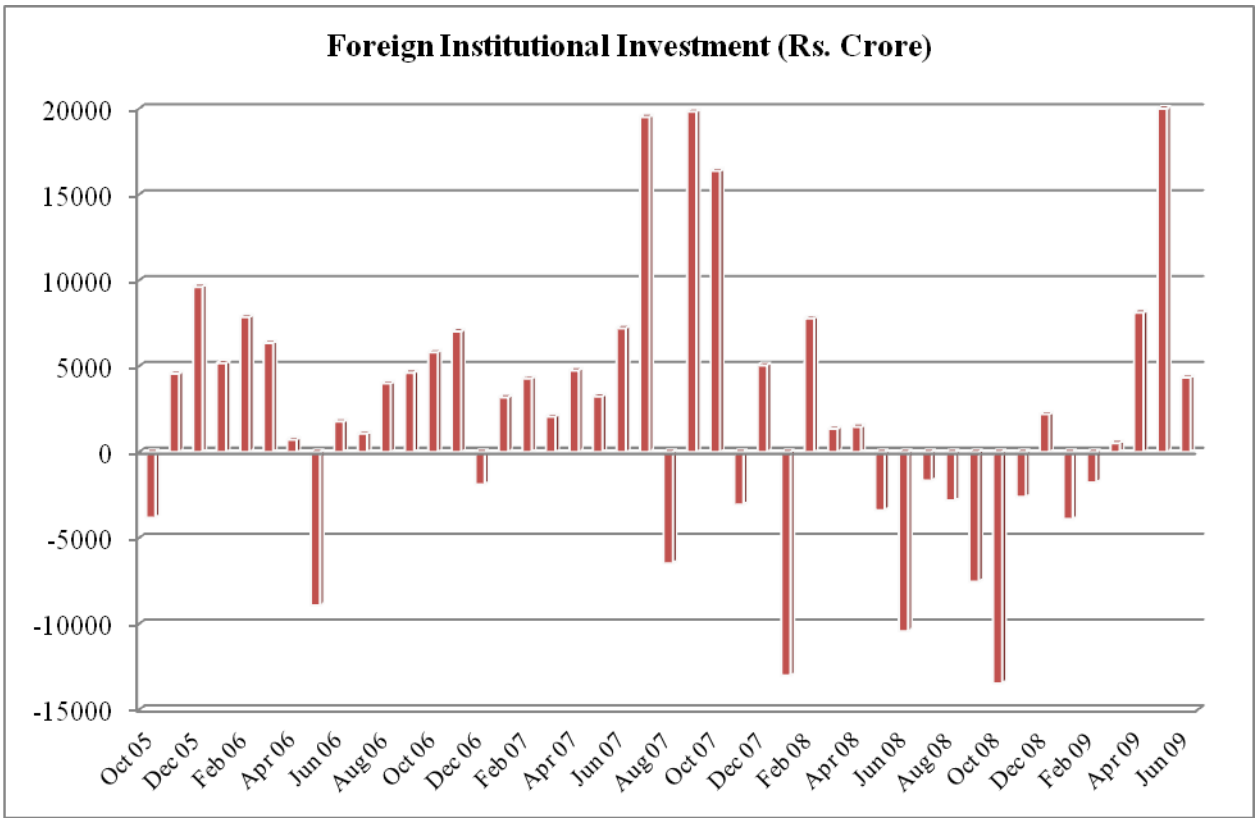


Figure 4.3: FII

The number of registered FIIs rose to 1,706 at the end of 2009 from 1,594 in 2008. The number of sub-accounts also increased to 5,331 from 4,872 during the same period. The FII in the spot market increased to Rs 83,424 crore in 2009 as compared to withdrawals of Rs 52,987 crore in 2008. Further, net investment in debt was lower at Rs 4,563 crore in 2009 as compared to Rs 11,772 crore in 2008. Total net investment by FIIs in equity and debt markets taken together, increased considerably to Rs 87,987 crore in 2009 compared to a net decline of Rs 41,216 crore in 2008

1.5 Trade

With the deepening of the global recession, the beginning of 2009-10 saw acceleration in the fall of export growth rate. The upwardly revised export figures for the first half of 2008-09 also contributed to the faster decline in the growth rate. While the export growth rate was a negative 22.3 per cent in April-November 2008-09, in November 2009, it became a positive 18.2 per cent after a 13-month period of negative growth. This significant turnaround is due to the low base figures in November 2008 (at $11.2 billion compared to $14.1 billion in October 2008 and $13.4 billion in December 2008). The export growth rate in November 2009 over October 2009 was marginally positive at 0.04 per cent. In December 2009 the recovery in export growth has continued with a positive year-on-year growth of 9.3 per cent and a growth of 10.7 per cent over the previous month.

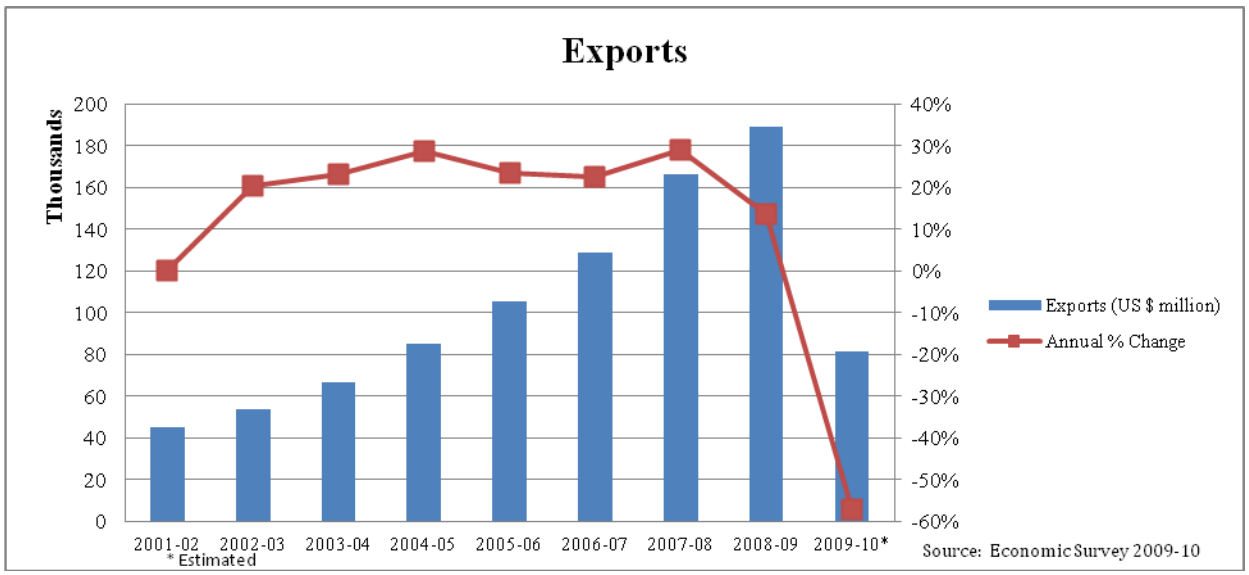


Figure 5.1: Exports

Net exports (of goods and services) contributed positively (20.4 per cent) to GDP growth in 2009-10, as against a negative contribution of around 36.2 per cent in 2008- 09. This revival in the pattern in the first three quarters of 2009-10 was on account of sharper contraction in imports than in exports, even though in absolute terms, imports continued to exceed exports, thereby yielding negative net exports. Export growth continued to be negative in Q3 of 2009-10, but the rate of contraction had declined over the preceding quarters, indicating signs of recovery in external demand

1.6 Fiscal Deficit

The fiscal expansion undertaken by the Central Government as a part of the policy response to counter the impact of the global economic slowdown in 2008-09 was continued in fiscal 2009-10. The expansion took the form of tax relief to boost demand and increased expenditure on public projects to create employment and public assets. The net result was an increase in fiscal deficit from 2.6 per cent in 2007-08 to 5.9 per cent of the revised GDP (new series) in 2008-09 (provisional) and 6.5 per cent in the budget estimates for 2009-10 (as against 6.8 per cent of the GDP on the old series, reported earlier). Thus the fiscal stimulus amounted to 3.3 per cent of the GDP in 2008-09 and 3.9 per cent in 2009-10 from the level of the fiscal deficit in 2007-08

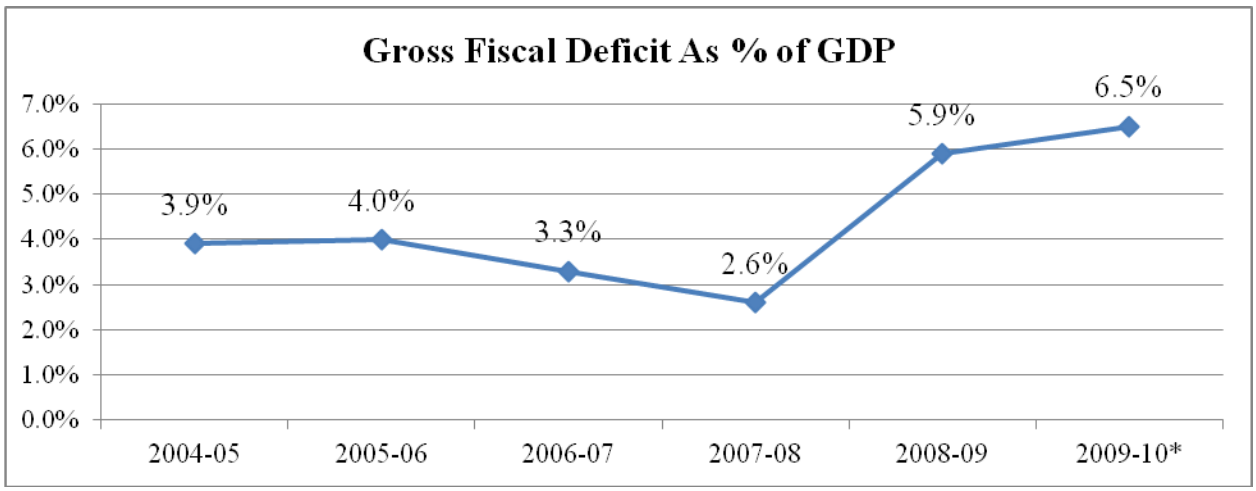
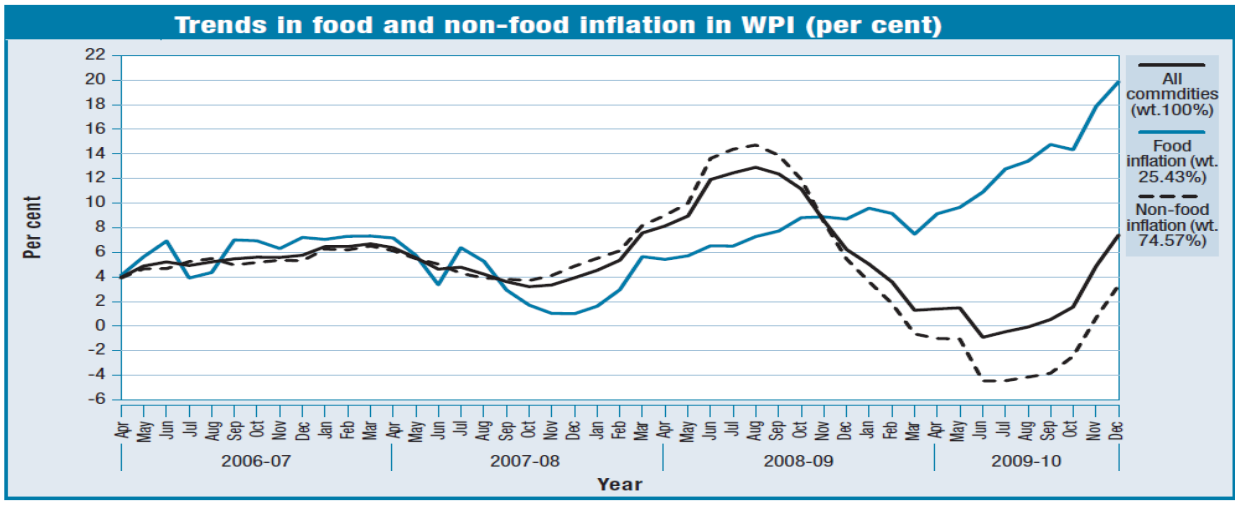


Figure 6.1: Gross Fiscal Deficit as a percentage of GDP

1.7 Inflation

A major concern during the year 2009-10, especially in the second half, was the emergence of high double-digit food inflation. On a year-on-year basis, wholesale price index (WPI) headline inflation in December 2009 was 7.3 per cent but for food items (primary and manufactured) with a combined weight of 25.4 per cent in the WPI basket, it was 19.8 per cent. Thus, unlike the first half of 2008-09 when global cost-push factors resulted in WPI inflation touching nearly 13 per cent in August 2008, with inflation in primary and manufactured products just below the overall average and that in the fuel and power group at over 17 per cent, the upsurge in prices in the second half of 2009-10 has been more

concentrated and confined to food items only. As of the week ending January 30, 2010 the inflation in primary food articles stood at 17.9 per cent, and that in fuel, power light and lubricants at 10.4 per cent.



Source: Economic Survey 2009-10

A significant part of this inflation can be explained by supply-side bottlenecks in some of the essential commodities, precipitated by the delayed and sub-normal southwest monsoons. Since December 2009, there have been signs of these high food prices, together with the gradual hardening of non-administered fuel product prices, getting transmitted to other non-food items, thus creating some concerns about higher than- anticipated generalized inflation over the next few months. The skewedness of inflation that has been observed—some sectors are facing huge inflation, some no inflation and some deflation—is rather rare in the country's history. For instance, in 1973-74 food inflation was 22.7 per cent and nonfood 36.4 per cent, in 1980-81 food inflation was 11.4 per cent and non-food 11.9 per cent, in 1986-87 food inflation was 10.2 per cent and non-food 11.4 per cent, in 1991-92 food inflation was 20.2 per cent and non-food 18.0 per cent, and there are several other years where the pattern was the same. The current inflation is of a different kind. It stands out for its lopsidedness across sectors. In 2009-10 (April- November), food inflation was 12.6 per cent and nonfood inflation minus 0.4 per cent. If we look at India's inflation history from 1971, this kind of inflation, where food inflation is above 10 per cent and non-food inflation is negative, has happened only twice before– in 1992-93 and 1996-97. And food inflation of over 10 per cent, non-food inflation negative and fuel, power, light and lubricant (FPL&L) inflation less than 10 per cent has never occurred refer Appendix VIII: Inflation).

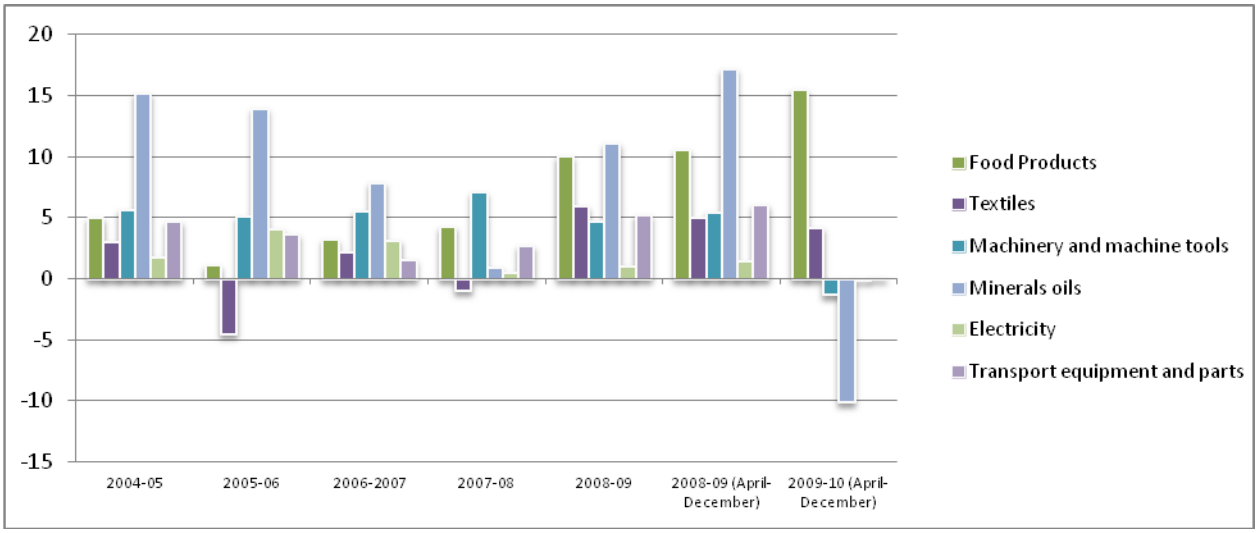


Figure 7.1: Inflation by category

Inflation can be expected to moderate over the next few months, from the peak levels seen in recent months. There are, however, upside risks to inflation. First, international commodity prices, particularly oil, have started to increase again. In several commodities, the import option for India to contain domestic inflation is limited, because of higher international prices. Second, the revival in private consumption demand and the bridging of the output gap will add to inflationary pressures. Finally, it is important to guard against the risk of hardening of inflation expectations conditioned by near double digit headline WPI inflation.

Through the decades, inflation has steadily increased from the 1950's to the 1980's. However, since the deregulation of sectors, privatization and liberalization in the early 1990's, WPI has seen as significant decrease from an average of 7.8% to an average of 5.2% from 2001-02 to 2008-2009. From this trend, we can forecast that inflation will further decrease over the course of the next decade, despite the recent downturn in the economy due to the sub-prime crisis.

1.8 Corporate Indicators

Profit after tax has performed radically over the last decade and half. In contrast, sales growth has varied between 25% and 0% over the same duration. Negative profits after tax were observed during the recession of 2001-02 and recent subprime crisis. Companies, such as TVS motors and Yes Bank have in recent months reported positive returns and thereby positive return are projected in the coming years, i.e. 2009-10.

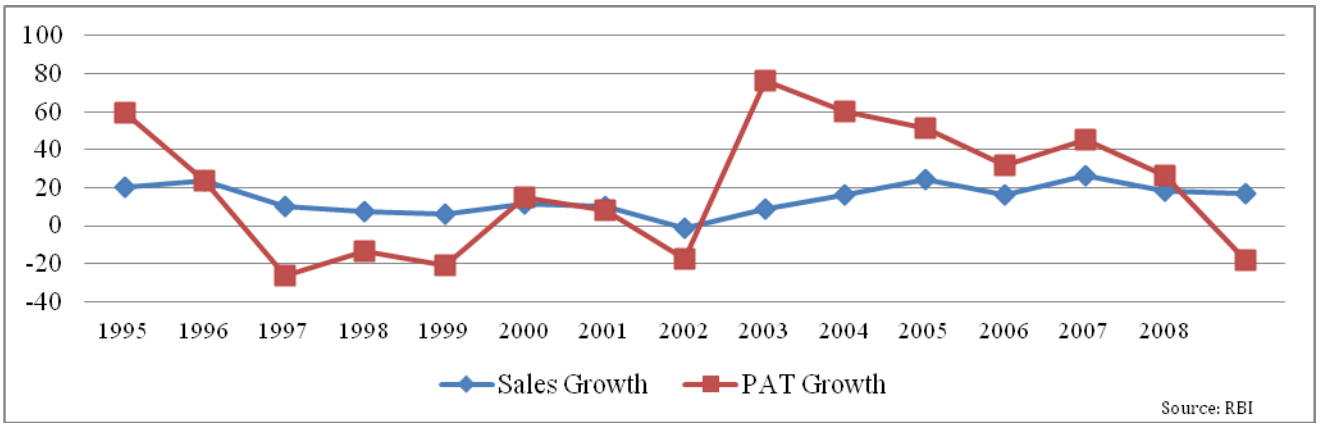


Figure 8.1: Corporate Indicators

SECTION 2 – DATA & METHODOLOGY FOR FORECASTING

The data for the following factors has been collected in the context of the Indian Economy - GDP growth rate, major stock market and sectoral indices, exchange rate, nominal and real investments, exports, fiscal deficit, corporate indicators such as sales growth and PAT, inflation, food production consumption gap, capital inflows and foreign institutional investments from various sources, including Economic Survey, Reserve Bank of India, World Bank, Securities Exchange Board of India and Foreign Exchange Dealers Association of India for the period 2003-09.

The main economic indicators that have been forecasted using ARIMA (*Auto Regressive Integrated Moving Average*) methodology are GDP, sensex, fiscal deficit and FII. These series were first checked for stationarity and then various models were fitted. Using Box-Jenkins methodology, the best model for each variable was chosen and used for forecasting.

SECTION 3 – FORECASTED RESULTS & CONCLUSIONS

3.1 Real GDP Growth Rate

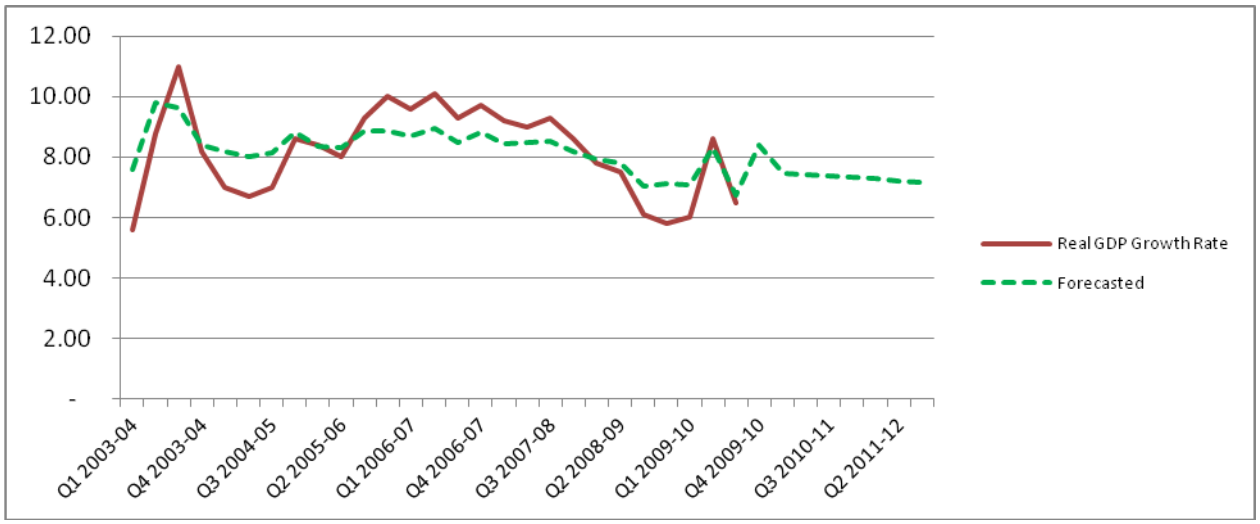


Figure 9.1: Forecasted Real GDP Growth Rate

India seems like the last man standing around in this world, with the kind of robust domestic consumption and GDP growth. The economic growth in India is for real and what is really working in India's favor is the rising domestic demand. The growth is driven by robust performance of the manufacturing sector on the back of government and consumer spending. Economic activities which showed significant growth rates in 2009-10 over the corresponding period last year were mining and quarrying (10.6 per cent), manufacturing (10.8 per cent), electricity, gas and water supply (6.5 per cent), construction (6.5 per cent), trade, hotels, transport and communications (9.3 per cent), financing, insurance, real estate and business services (9.7 per cent), community, social and personal services (5.6 per cent). India's industrial output grew by 17.6 per cent in April 2010. The manufacturing sector that accounts for 80 per cent of the index of industrial production (IIP) grew 19.4 per cent in April 2010, as against 0.4 per cent a year-ago. Capital goods production grew by 72.8 per cent against a contraction of 5.9 per cent a year ago. Consumer durables output continued to grow at a fast pace of 37 per cent, mirroring higher purchase of goods such as televisions and refrigerators. Also positive responses from the foreign investors have reflected in the gains in the capital markets and strengthened the country's position on the world economic front.

In spite of all these numbers in favor of the economy, one area where India needs to keep an eye on is the current account deficit. If you look at India's imports over exports, they are running at $150 billion negative which means that we are consuming a lot more from imports than we are able to export. Combine this with the fact that the import intensity of the economy is going up as domestic consumption is rising. And, as prices move up, it has an impact on salaries and real estate. Another big factor plaguing India's growth rate has been our execution and implementation of projects. All these will put pressure on economy's growth as a whole.

Keeping in mind these factors, we would like to believe that we can grow between 7.6% - 8.0 % for the next few quarters and thereafter India should be poised to return back to its path of sustained high growth rates of 9.0 % and above.

3.2 Exchange Rate

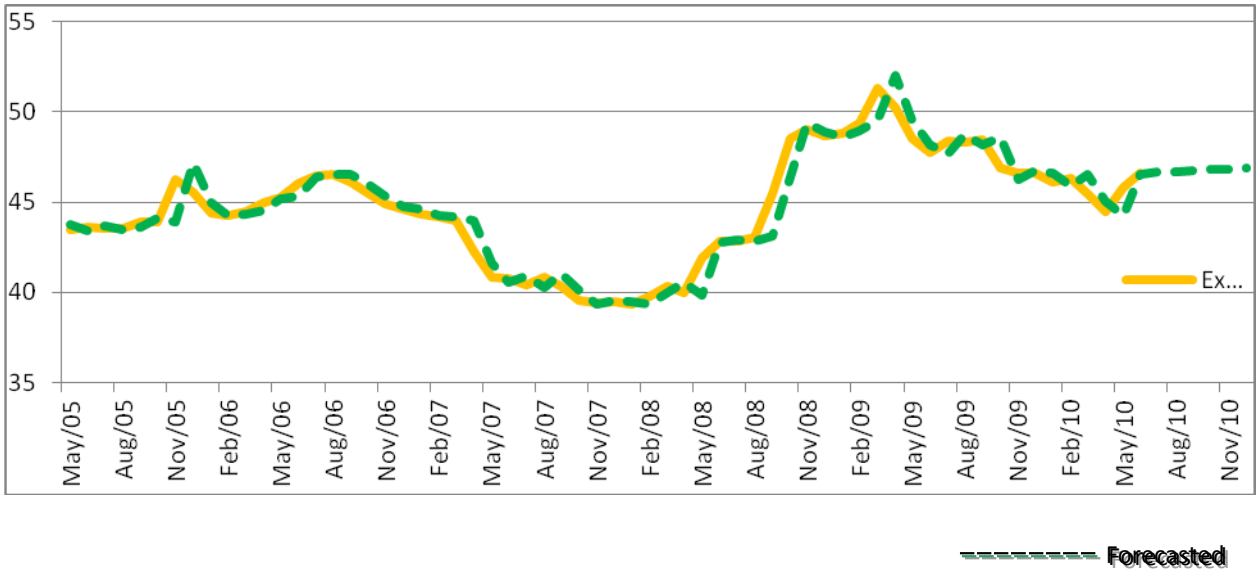


Figure 9.3: Forecasted Exchange Rate

The exchange rate is forecasted to fluctuate between 46Rs/$ to 47Rs/$ till December 2010. The rupee should fundamentally, depreciate as a result of the significant current-account deficit, which tracks trade and investment flows. India's trade deficit widened to $118.4 billion in the fiscal year ended March 31, from $88.5 billion a year ago. Further dampening the current-account deficit is the fact that India's

economy has been growing at better rates than countries in North America and Europe, leading to a reduction in exports and a stable growth imports.

However, an improving economy should bring capital inflows, which in turn should hedge the downward pressure. India's GDP is projected to grow at 7.1% in the coming year and thereby attract FDI and FII flows. An increase in demand for the currency should avoid the currency from reaching the 50Rs/$ mark.

3.3 Sensex

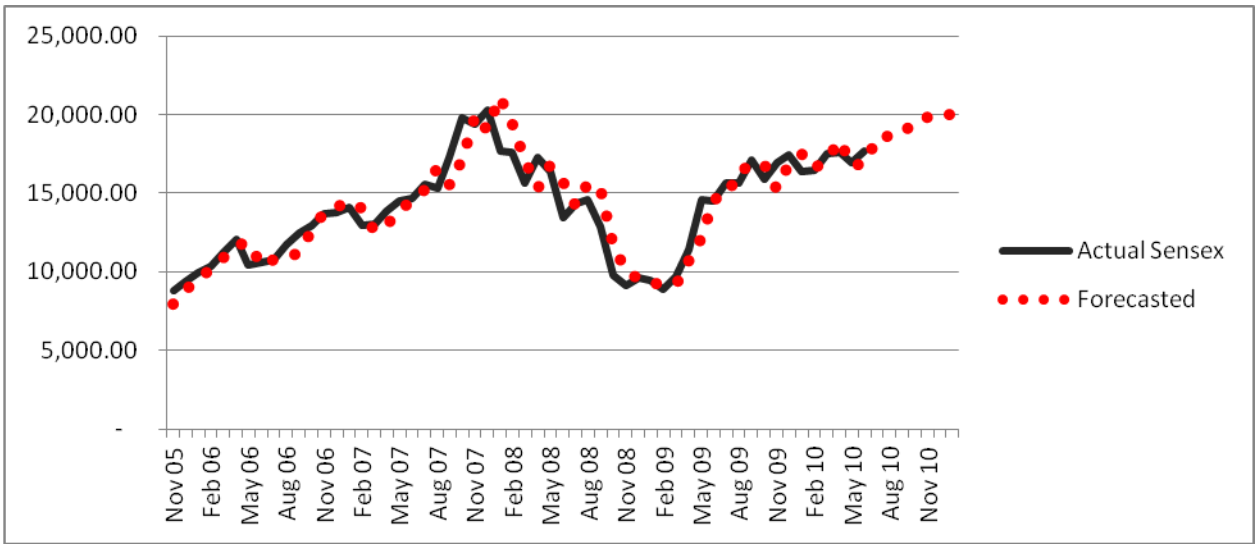


Figure 9.4: Forecasted BSE Sensex

We forecast the BSE Sensex to cross the 20,000 level by January 2011. This increase will be a result of positive macroeconomic outlooks, persistent FII inflows, and healthy corporate profits. These factors should also create an optimistic market sentiment and further the ongoing trend.

Many institutions and analysts have recently raised India's growth forecast for 2010. International Monetary Fund raised its forecast to 9.5% from 8.8% in July this year. The Prime Minister of the nation, Manmohan Singh has also recently stated that the country's economy should grow by 8.5% for the financial year ending March 31, 2011. The prime reason cited by institutions and analysts for their

optimistic projections has been favorable financial conditions in the Indian market. These forecasts are due to have a ripple effect on institutional investors and the stock market.

Furthermore, strong buying by foreign funds has further boosted market sentiments. FIIs had made 80% or $59.66 billion of the total net investments, in last seven years since 2003. The Bombay Stock Exchange (BSE), Sensex has appreciated over 400% over the course of the same period. Furthermore, FIIs have accounted almost 14% market share of the total market capitalization of the BSE. They equity shares are valued at Rs 822,497 crore in more than 1,000 Indian companies. Over the next few fiscal years, we project these investments to further increase and affect the BSE in a similar vein to that it has had since 2003.

Corporate profits released in quarter 1 and 2 this year have sustained the positive outlook and direction of the market. Bloomberg has projected 72% of India's companies to yield increased profits. These profits and outlooks have not only assisted other sectors, including, real estate in recovering from the downturn, but also attracted companies such as Volkswagen and Ford to setup operations in India.

3.4 Investments

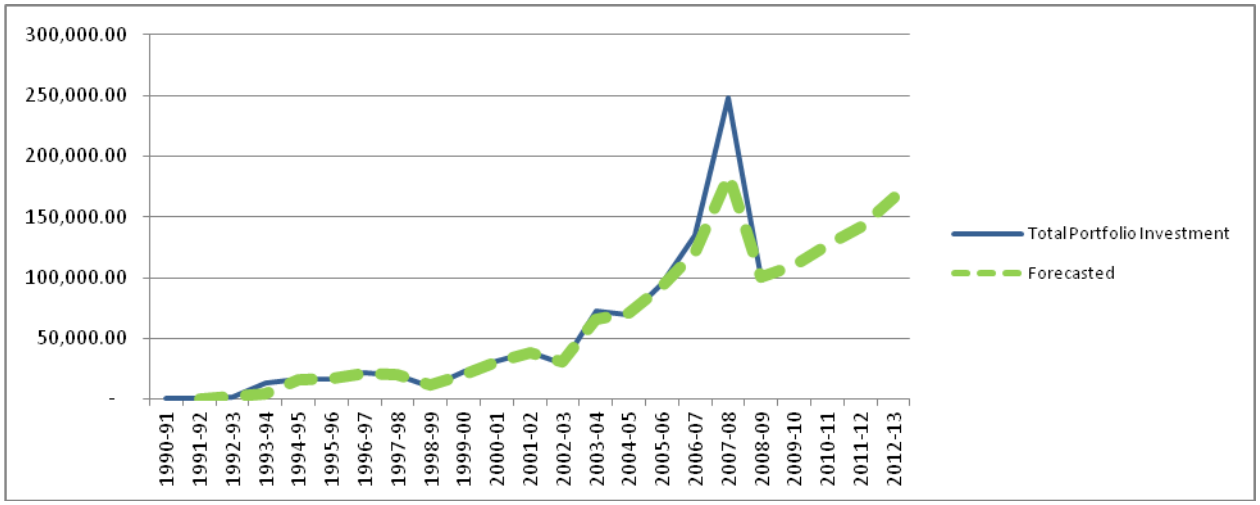


Figure 9.5: Forecasted Total Portfolio Investments

India and other emerging markets were relative to developed countries in Europe, such as Portugal, Greece and Spain less affected by the US credit crisis and were quick to recover from the aftermath of

the recession. These economies as a result, have seen significant fund inflows. In March this year, data released by SEBI showed that FII inflows in equity markets in India at $75.12 billion. This shows strong economic fundamentals of the country, as well as confidence of the foreign investors in the growth and stability of the Indian market. We forecast investments to continue to increase in the coming fiscal years to 1,65,778.86 crore rupees in 2012-13.

3.5 Fiscal Deficit

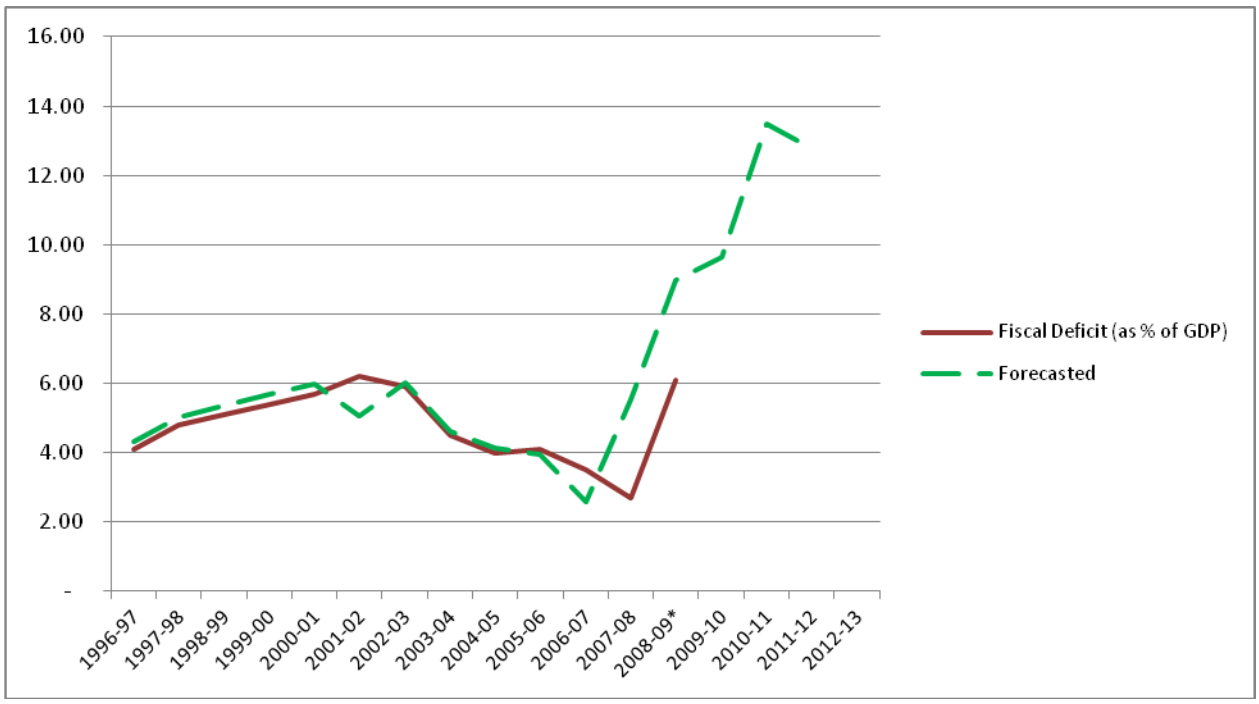


Figure 9.2: Forecasted Fiscal Deficit

Our results forecast fiscal deficit to increase to 13.5% by 2011-12. The increase will be a result of increased government spending towards infrastructure facilities and government initiatives to stimulate demand after the recession. In 2012-13, fiscal deficit as a percent of GDP is forecasted to decline from 13.5% to 12.8%.

In the first ten months of this fiscal year, India's fiscal deficit soared by 34 per cent to Rs 3.5 lakh crore against Rs 2.62 lakh crore a year ago, mainly on account of the stimulus measures taken by the government to revive the economy. These measures have included massive spending programs and easing duties in three stages from December 2008. An increase is the coming fiscal year is also in line

with the Government's budget planning as the fiscal deficit for the current fiscal is pegged at 6.9 percent, 0.1 percent higher than last year. A further increase in deficit over the next few years will be a result of an increase in spending on higher wages and unemployment benefits as well as a large increase in the government's interest burden.

CONCLUSION

Given this background, in our view, with the economy returning to normal conditions, government would lift most of the sops provided to various sectors to stimulate demand and expenditure. Any big rebound expected in the overall GDP could be dampened by the high rates of inflation persisting today. But still with the confidence in the developing economies reviving after a period of global recession, foreign investments in the country are set to rise and thus we could see rising levels of industrial production in the coming couple of years. The main elements that would support the growth in industrial production include the prospect of a rebound in investment activity, increased thrust of the government on infrastructure projects and the renewed growth of exports. We expect consumption demand to be the major contributor to GDP growth in the coming fiscal, which in turn will augment investment demand. The impetus to consumption demand will come from healthy growth in income levels as job creation gathers pace.

Adding all this up together, though the country has bounced back at a quick pace, it should still take a couple of years to become steady on its path of sustained growth.

References

Adi Khan Miankel, Shandre Mugan Thangavelu and Kaliappa Kalirajan (2009). "Foeign Direct Investment, Exports and Economic Growth in South Asia and Selected Emerging countries: A Multivariate VAR Analysis". Center for Contemporary Asian Studies. CCAS Working paper No. 23.

Chakraborty, Lekha (2008). "Fiscal Deficit, Capital Formation, and Crowding Out: Evidence From India." *University of Connecticut*. <http://ideas.repec.org/p/npf/wpaper/06-43.html>.

Garg, Deepak, Madhuri Agrawal, and Rajesh R. K. (2005). "Causal Relationships between Industrial Production, Interest Rate and Exchange Rate: Evidence on India." *Social Sciences Research Network*, Aug. 2005. <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=871744>.

Keshava, S. R. (2008). "The Effect of FDI on India and Chinese Economy: A Comparative Analysis." *Social Sciences Research Network.* <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1089964>.

Mishra, P.K., K.B.Das and B.B.Pradhan (2010). "*Foreign Institutional Investments and Real Economic Growth in India: A Causality Test.*" International Research Journal of Finance and Economics, Issue 41.

Mohan, Rakesh (2008). "Growth Record of the Indian Economy, 1950-2008: A Story of Sustained Savings and Investment." Economic and Political Weekly.

Ahmed, Shahid (2008). "*Aggregate Economic Variables and Stock Markets in India.*" International Research Journal of Finance and Economics, Issue 14.

Singh, Saurabh, and V. P. Arora (2010). "Interest Rates and Stock Movements in Three Major Asian Countries-India, China and Japan." *Social Sciences Research Network.* <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1574201>.

Subbarao, Duvvuri (2008). *"The global financial turmoil and challenges for the Indian economy"*. Bank for International Settlements. <http://www.bis.org/review/r081222a.pdf>.

Cavoli, Tony and Ramkishen S Rajan (2006). "*The extent of exchange rate flexibility in india:*

Basket pegger or closet us dollar pegger?." Working papers eSocialSciences.com (http://econpapers.repec.org/RePEc:ess:wpaper:id:424).

Ugam Raj Daga, Rituparna Das and Bhishma Maheshwari (2004). "Estimation, Analysis and Projection of India's GDP". Schoasticus, Vol. 1, No. 2.

Tripathi, Vanita (2009). "*Company Fundamentals and Equity Returns in India.*" International Research Journal of Finance and Economics, Issue 29 (2009).

Virmani, Arvind (2009). "Macro-economic Management of the Indian Economy: Capital Flows, Interest Rates, and Inflation." *Routledge*. <http://dx.doi.org/10.1080/17520840902726482>.

APPENDIX – Data Forecasting

REAL GDP GROWTH RATE

Time	Real GDP Growth Rate	Forecasted
Q1 2003-04	5.60	
Q2 2003-04	8.80	7.6029399
Q3 2003-04	11.00	9.7780004
Q4 2003-04	8.20	9.6321648
Q1 2004-05	7.00	8.4015146
Q2 2004-05	6.70	8.2035255
Q3 2004-05	7.00	8.0093611
Q4 2004-05	8.60	8.1507341
Q1 2005-06	8.40	8.8145168
Q2 2005-06	8.00	8.3507637
Q3 2005-06	9.30	8.2967594
Q4 2005-06	10.00	8.8703566
Q1 2006-07	9.60	8.8720776
Q2 2006-07	10.10	8.6782336
Q3 2006-07	9.30	8.9522241
Q4 2006-07	9.70	8.4664475
Q1 2007-08	9.20	8.8256831
Q2 2007-08	9.00	8.4187891
Q3 2007-08	9.30	8.4752233
Q4 2007-08	8.60	8.5443564
Q1 2008-09	7.80	8.1684241
Q2 2008-09	7.50	7.909361
Q3 2008-09	6.10	7.8127343
Q4 2008-09	5.80	7.0495233
Q1 2009-10	6.00	7.1083774
Q2 2009-10	8.60	7.0904939
Q3 2009-10	6.50	8.3271978
Q4 2009-10	8.60	6.7382146
Q1 2010-11		8.3954929
Q2 2010-11		7.4838922
Q3 2010-11		7.4309224
Q4 2010-11		7.3783202
Q1 2010-11		7.3260977
Q2 2011-12		7.2742448

Q3 2011-12	7.2227589
Q4 2011-12	7.1716303

FISCAL DEFICIT

Year	Gross Fiscal Deficit (as % of GDP)	Forecasted
1996-97	4.10	
1997-98	4.80	4.30343
1998-99	5.10	5.03802
1999-00	5.40	5.35276
2000-01	5.70	5.66787
2001-02	6.20	5.98295
2002-03	5.90	5.06198
2003-04	4.50	6.02176
2004-05	4.00	4.62881
2005-06	4.10	4.14387
2006-07	3.50	3.96519
2007-08	2.70	2.58241
2008-09*	6.10	5.53845
2009-10		8.95796
2010-11		9.63504
2011-12		13.4742
2012-13		12.7644

EXCHANGE RATE

Month	Rs. v/s $	Forecasted
Apr-05	43.7363	NA
May-05	43.4794	43.73101
Jun-05	43.5825	43.42522
Jul-05	43.5219	43.68765
Aug-05	43.57	43.50117
Sep-05	43.926	43.64068
Oct-05	43.9	44.08105
Nov-05	46.2425	43.87331
Dec-05	45.5663	47.20959
Jan-06	44.4019	44.96981
Feb-06	44.2931	44.22446
Mar-06	44.4485	44.36371

Apr-06	44.9675	44.5254
May-06	45.2569	45.18364
Jun-06	46.0745	45.32931
Jul-06	46.47	46.40875
Aug-06	46.529	46.53773
Sep-06	46.0881	46.56946
Oct-06	45.4881	45.94439
Nov-06	44.8781	45.35416
Dec-06	44.618	44.73645
Jan-07	44.3219	44.6157
Feb-07	44.1581	44.25127
Mar-07	43.981	44.16566
Apr-07	42.2281	43.95291
May-07	40.8275	41.59984
Jun-07	40.8006	40.5704
Jul-07	40.4138	40.93417
Aug-07	40.8105	40.25489
Sep-07	40.3344	41.07087
Oct-07	39.535	40.09127
Nov-07	39.446	39.36209
Dec-07	39.4556	39.52256
Jan-08	39.3695	39.47337
Feb-08	39.7775	39.37289
Mar-08	40.3663	39.97903
Apr-08	40	40.56107
May-08	41.918	39.82522
Jun-08	42.8356	42.77737
Jul-08	42.829	42.90215
Aug-08	43.03	42.84436
Sep-08	45.4656	43.1462
Oct-08	48.5145	46.41328
Nov-08	49.0113	49.37716
Dec-08	48.6756	48.91259
Jan-09	48.82	48.62711
Feb-09	49.3538	48.93903
Mar-09	51.295	49.55929
Apr-09	50.2095	52.01523
May-09	48.5156	49.54971
Jun-09	47.7563	48.15649
Jul-09	48.4115	47.64422
Aug-09	48.3319	48.75436

Sep-09	48.4563	48.21114
Oct-09	46.891	48.5957
Nov-09	46.5888	46.27058
Dec-09	46.6094	46.75667
Jan-10	46.0795	46.59588
Feb-10	46.3563	45.92214
Mar-10	45.453	46.56935
Apr-10	44.4706	45.06185
May-10	45.8569	44.28407
Jun-10	46.5931	46.51366
Jul-10		46.66792
Aug-10		46.71178
Sep-10		46.75564
Oct-10		46.7995
Nov-10		46.84337
Dec-10		46.88723

SENSEX

MONTH OF	Mumbai Sensex	Forecasted
Oct 05	7,892.32	
Nov 05	8,788.81	7920.0
Dec 05	9,397.93	8873.6
Jan 06	9,919.89	9630.4
Feb 06	10,370.24	10130.3
Mar 06	11,279.96	10896.2
Apr 06	12,042.56	11655.2
May 06	10,398.61	11869.0
Jun 06	10,609.25	10404.1
Jul 06	10,743.88	10763.1
Aug 06	11,699.05	10917.5
Sep 06	12,454.42	11219.1
Oct 06	12,961.90	12558.2
Nov 06	13,696.31	13788.5
Dec 06	13,786.91	14104.4
Jan 07	14,090.92	14474.6
Feb 07	12,938.09	14076.0
Mar 07	13,072.10	12599.3
Apr 07	13,872.37	13005.2
May 07	14,544.46	13979.0
Jun 07	14,650.51	14468.6
Jul 07	15,550.99	15183.5
Aug 07	15,318.60	16610.4
Sep 07	17,291.10	15524.9

Oct 07	19,837.99	17192.6
Nov 07	19,363.19	19982.3
Dec 07	20,286.99	19035.0
Jan 08	17,648.71	21120.6
Feb 08	17,578.72	19316.2
Mar 08	15,644.44	16959.8
Apr 08	17,287.31	15370.0
May 08	16,415.57	16723.2
Jun 08	13,461.60	15769.6
Jul 08	14,355.75	14199.5
Aug 08	14,564.53	15657.6
Sep 08	12,860.43	15119.3
Oct 08	9,788.06	11862.6
Nov 08	9,092.72	10028.5
Dec 08	9,647.31	9541.9
Jan 09	9,424.24	9242.0
Feb 09	8,891.61	9216.1
Mar 09	9,708.50	9266.1
Apr 09	11,403.25	10601.0
May 09	14,625.25	12062.6
Jun 09	14,493.84	14599.3
Jul 09	15,670.31	14816.9
Aug 09	15,666.64	16487.5
Sep 09	17,126.84	16630.3
Oct 09	15,896.28	16869.0
Nov 09	16,926.22	15297.5
Dec 09	17,464.81	16924.4
Jan 10	16,357.96	17516.9
Feb 10	16,429.55	16576.3
Mar 10	17,527.77	17033.9
Apr 10	17,558.71	18350.9
May 10	16,944.63	16778.5
Jun 10	17,700.90	16936.3
Jul 10		18577.3
Aug 10		18629.3
Sep 10		18754.2
Oct 10		19607.7
Nov 10		19811.1
Dec 10		19766.5
Jan 11		20043.6

INVESTMENTS

Year	Total Portfolio Investment (Rs. Crore)	Forecasted
1990-91	185.00	
1991-92	326.00	369.36
1992-93	1,713.00	2074.63
1993-94	13,026.00	4309.91
1994-95	16,133.00	15957.18
1995-96	16,364.00	16607.90
1996-97	21,773.00	21337.28
1997-98	20,014.00	20572.94
1998-99	10,101.00	11218.36
1999-00	22,450.00	20591.03
2000-01	31,015.00	30247.23
2001-02	38,874.00	38392.60
2002-03	29,105.00	30721.25
2003-04	72,139.00	65246.65
2004-05	69,042.00	70603.15
2005-06	94,981.00	92680.19
2006-07	1,35,080.00	121428.39
2007-08	2,48,017.00	183782.82
2008-09	97,863.00	100533.87
2009-10		110221.80
2010-11		127166.18
2011-12		141996.83
2012-13		165778.86