
INFLATION AND ECONOMIC GROWTH OF INDIA

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ABSTRACT

Most of the people from the general public to professional economists use the term “inflation” pretty casually. It is increasingly applied to any rise in prices, and even Economists use it interchangeably with the rise in the cost of living. Inflation is measured based on the consumption of basket of goods and ability to hedge asset of the people across the income level.

This paper seeks to examine the relationship between inflation and GDP growth in India. The empirical evidence is obtained from the reports of the Reserve Bank of India.

The result shows that there is a long run negative relationship between inflation and GDP growth in India. Inflation is damaging than helpful to growth. (There results have important policy implications.) This paper is an attempt to put the Indian Growth and Inflation story of the last 60 years in perspective. In this paper the known determinants of growth and inflation were examined in detail. In this paper particular emphasis is given to the developments over the last 28 years, a period during which the GDP growth rate has averaged 6.2% per annum, a full 2.6% points above the average growth during the previous 30 years.

Growth during the first period was much slower than the global average, while parts of the second period growth (2003 to 2007/08) have the hallmarks of a miracle.

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The relationship between inflation and growth remains contradictory in both theory and empirical findings. In the 1950's this issue was generated and initiated a debate between structuralists and monetarists. The structuralists believe that inflation is essential for economic growth, whereas the monetarists see inflation as detrimental to economic progress.

The impact of inflation on growth, output and productivity has one of the main issues examined in macro-economics. In an economy if actual output rises above potential output, this will create an upward pressure on wages (in labor market). Higher wages, in turn, will lead to higher production costs and hence higher prices of commodities. An interesting story has been undertaken by Paulet al (1997), who worked on the data pertaining to 70 countries and in the period of 1960-1989. The report said that the relation between inflation and growth is positive only in few countries. On the other hand, some authors argue that supply shocks not the demand shocks, are responsible for the inverse relationship between inflation and growth. It is argued that the developed countries do have very well developed financial markets and less government intervention in goods markets. Such economies are mostly demand driven, which are stimulus to demand results in rising prices and a clear trade off is observed at low level of inflation.

On the other hand, the developing countries are more vulnerable to supply shocks causing high variability in inflation and disturb the consumption, investment and production behavior. Further, the government intervention in financial and goods market and macro-economic rigidities in labor laws cause market failure and macro-economic instability. Therefore, prices do not give correct signals about policies and course of action of the economic agents.

Macro policy essentially means the attainment of the twin goals of sustainable growth and low inflation. How India has stood in this regard over the last 60 years and why India is a major focus of this paper. Particular emphasis is given to the developments over the last 28 years, a period during which the GDP growth rate has averaged 6.2% per annum, a full 2.6% points above the average growth during the first period was much slower than the global average, while parts of the second period (2003-04 to 2007-08) have the hallmarks of a 'miracle'.

The facts about the GDP growth are clear, but controversy and puzzles persist. A simple 10 year analysis suggests that (1) there was an acceleration in India's growth rate in the 1980's (2) that the average growth rate, post the major economic reforms of 1991, stayed the same as the pre-reform decade of 1980's and (3) there has been a sharp acceleration in GDP growth to 8.5% plus, since 2003/04. Thus, there three questions and puzzles, and hence the controversies. First, what

caused India's growth to accelerate in the 1980's, second what prevented India's growth from accelerating in the 1990's as would have been forecast by the magnitude of the 1991 economic reforms. And third, what caused the growth rate to sharply accelerate in 2003-04 without the benefit of any new reforms, whether major or minor. While there are several analysis of the first question, very few attempts have been made to answer the second and even fewer attempts to answer the third. This paper is an attempt to answer all three of the above mentioned questions.

India was a predominantly a rural economy at the time of Independence in 1947, with agriculture accounting for approximately 75% of the work force and 55% of GDP. In the early stages of development, the extra growth that an economy receives is due to the reallocation of labor from low productivity in agriculture sector to the higher productivity in non-agricultural (Industrial) sector. Only later do factor accumulation and technological change matters as contributors to higher growth. This factor reallocation has been estimated by Robinson (1971) to an average around 16 to 18% of the early growth in developing nations.

This reallocation is the part of a long term process. In the short term, GDP growth for a heavily agricultural economy is dependent on weather. The first step in analyzing growth, and its acceleration; is to model the contribution of weather to agricultural GDP, and in turn, to overall GDP, Appendix 1 details the data on rainfall used for this exercise. These data are available from 1870 onwards and the low rainfall data has been transformed into an Index that represents the number of standard deviation that rainfall was away from the mean. A zero value of the Index means that both the pattern and magnitude of rainfall was average or normal.

AGRICULTURAL GROWTH

Table (1) depicts the result for a model explaining agricultural and GDP growth. Surprisingly, rainfall alone explains as much as 60% of the variation in the growth of agricultural output. Decomposition of the data into two different time periods, pre and post 1978, yields the same result. The last three years, India had exceptional agricultural output growth averaging 4.7% per year. The rainfall model predicts agricultural growth at a much lower 2%. The chart 1 explains the fitted and actual value of agricultural for the period 1978-2007.

Rainfall and its effect on growth:- Agriculture and GDP

Variables	Agriculture Growth			GDP Growth		
	1950-1977	1978-2007	1950-2007	1950-1977	1978-2007	1958-2007
Year	1950-1977	1978-2007	1950-2007	1950-1977	1978-2007	1958-2007
Constant	2.5	3.0	2.7	3.8	5.7	4.8
Rainfall	10.6	15.4	12.8	6.1	5.6	5.3
Rainfall lagged	-11.3	-10.4	-11.0	-3.6**	-3.5	-4.0
R ²	0.51	0.74	0.61	0.38	0.34	0.33
No. of observations	27	30	57	27	30	57

Note : All coefficients (except **) are significant at the 1% level of confidence.

Industrial Growth

The reallocation model pre-supposes a movement of labor from agriculture to industry. However, one of the striking stories about economic growth, and economic reform in India is the lack luster performance of Indian Industry. And this in large part explains the low rate of Independence. Even today, profits and money making activity are viewed with contempt by many policy makers and most politicians. Industrialists are constantly upon suspicion. For most of the post economic reform period, Indian industry has paid considerably higher cost of Capital than most of its competitors. In addition, the one advantage India ostensibly had; cheap labor; was reduced to zero by both an overvalued exchange rate and restrictions on employers for hiring and firing. All of these policies have contributed to India's pitifully lower share of Industry, compared to an economy at its level of development and size. The figures are too stark to be missed: in 2006, Industries share of GDP in India was only 28%, in China it was 22% higher points at 48% i.e., almost twice the size.

The low share is the result of the growth of Industrial output. Table-2 reports the highest 10 years moving average growth in Industrial value added in selected countries. Data are till 2005 and revealing. The maximum 10 years average in China was 12.9%, the maximum ever achieved in India, as 6.9%, is a figure almost half that of China. Of 81 developing countries, India's rank is 48th. And several countries have a maximum industrial growth rate near double that achieved by India. India's position has improved in the last few years, but it is still revealing that India has never registered a decadal industrial growth rate of above 7%.

Two policies affect Industrial production greatly, and more than policies most often cited by policy makers and experts. It is not labor reforms, nor regulations in the small scale sector, nor the lack of effective bankruptcy laws, nor the lack of privatization, nor the public sector charter of Industry that has made Indian Industry a bad performer. All these good policies matter, but not as much as a competitive exchange rate and competitive real interest rates. This is examined next.

Decadal Industrial Growth: 1960-2005

(Percentage)

Country	Average	Maximum
Bangladesh	4.5	10.0
Brazil	3.9	10.0
China	10.4	12.9
India	5.3	6.9
Kenya	4.7	10.1
Mexico	3.9	7.2
Pakistan	6.4	10.4

Source: World Bank, World Development Indicators, 2007

Monetary Policy

On money supply growth, both as a tool and as an indicator of monetary tightening, has declined in most parts of the world. The data accompanying the bi-annual IMF flagship product on growth and inflation, world economic outlook, has no information on money supply growth. Curiously, in India, money supply growth still reigns supreme in the minds of policymakers. All policy documents of the RBI, and policy pronouncements, contain copious references to the level of money supply growth, how it is missing its target level and how deviations of money supply growth from this target level are believed to be linked to inflation. For example, in its policy review of July 2008, when the RBI unexpectedly raised the lending rates overnight by 50 basis points, RBI stated, "it is necessary to moderate monetary expansion and plan for a rate of money supply growth in the range of around 17% in 2008-2009 in consonance with the outlook on growth and inflation so as to ensure macro-economic and financial stability in the period ahead. In its press statement on the stance of monetary policy three months later, on October 24th, 2008

– this at a time when world economics and world financial markets had crashed and entered the sharpest downfall in real activity ever- the RBI stated- “Non -food credit has posted a growth of 29% on a year on year basis as of October 10th, 2008 which is well beyond the projected level of 20% for 2008-09.” A large part of this excess was due to commodity price inflation that had already been experienced, but in the year to year methodology adapted by the RBI, this simple fact was missed. In contrast to this strong belief, no research document of the RBI shows any significant statistical relationship of Money Supply Growth to either economic growth or to inflation. Indeed, the research strongly supports the link hypothesis.

However, Rangarajan (1998), former Governor of the RBI, does argue for a strong link between Money Supply, works out to 0.271, while the long run elasticity is close to unity. This is likely the basis for the RBI’s consistent belief in the role of Money Supply in affecting inflation

Yet, with the addition of a mere 7 years of data for the 1970 regression for the entire 57 years period; 1950-2207, do show that Money Supply Growth has a statistically significant effect on growth and inflation. It is perhaps this regression result which has led Indian policy makers to constantly emphasize on money supply growth. It is well known that in the 1970’s, there was stagnation around the world due to the large commodity price rise exaggerated by the quadrupling in the price of oil in October 1973 and the doubling in the price of oil in 1979. The monetary accommodation of this price change led to a strong correlation between inflation, Money Supply Growth and GDP growth in the 1970’s. The fact that this correlation ceases to appear for any period after or before lends strong support to the hypothesis that Money Supply Growth, in the broad observed ranges (2% to 21%) holds little information about inflation or GDP growth in India.

While it may appear as if the volatility in money supply growth is large, it is actually smallest in India among all countries of the world; and smallest by a large margin. Among 165 countries for the period 1998-2007; volatility in India was 1.7%, the 2nd lowest volatility was observed by USA at double of this level, 3.4%; and another large economy, China had a rank of 34 at volatility almost four times higher, 6.5%. The median volatility among all nations was 11.4% per annum, or about 7 times higher than India.

The lack of statistical relevance of Money Supply Growth has not prevented the govt. of India, via the RBI, from initiating major monetary tightening moves on the basis of short term hikes in the inflation rate, these moves have not had any effect on inflation but have affected long term

growth prospects, via the effect on interest rates. The mid 1990's monetary tightening is an important case in point, as has been recently in 2007-2008 also. In both instances, the policy was in response to a surge in WPI (Whole Sale Price inflation), in domestic demand, "overheating" was considered the real culprit. In both instances, the rise in inflation was imported. Thus, the policy for containing domestic inflation was in response to factors determining international inflation.

WPI inflation had moved to double digits in March 1994 from an average of 7.7% in the preceding 12 months. In response, the RBI increased the CRR by 1% point to 155, and all money market rates doubled to 12% plus by January 1995. The wholesale price inflation in India also peaked in 1994, but consumer price inflation did not- and nor did the GDP deflator. The GDP deflator was not then available on a quarterly basis, but data on CPI was, albeit with a 2 month lag.

The close relationship between domestic and world inflation suggests that domestic policymakers do not have the tools to make it moderate. In tandem, Indian Inflation (WPI, CPI, GDP deflator) went up with world inflation . By end of December, 2008 world inflation was close to zero and Indian inflation had also come down.

Very few variables can explain the pattern of inflation in India, Money Supply Growth, a favorite of Indian Central Bankers and policy makers, cannot explain much at all. But Median inflation in the world, along with currency undervaluation in the US and India, can explain close to 90% of Indian Inflation for the last 20 years.

FISCAL POLICY

The second major belief of Indian policymakers has been that fiscal deficits observed in India matter for both growth & inflation. This belief is consistent with the belief worldwide. Hence, a favorite policy recommendation, for both developed and developing economies, has been, prepared to reduce the fiscal deficit. This can be observed in any of the hundreds of documents produced by the IMF, the Ministry of Finance, or the RBI, unlike Money Supply Growth, there is plausible economic reasoning behind this recommendation. The benefits of deficit reduction are supposed to be manifold: greater efficiency, in production, less losses in Govt. undertakings and less "crowding out" of private investment. Indeed, institutions like the European Union, and the Maastricht treaty, have partly been based on the notion that Govt. deficits matter a lot. An important reason why fiscal deficits can matter is strong theoretical relationship between fiscal

deficits and real interest rates, at least in a closed economy. High fiscal deficit means a higher than “normal” real interest rates for private investors- the crowding out thesis.

Inflation Indicators, fiscal year 1950 to 2008

Year	GDP Deflator	CPI	WPI
1950-1959	1.9	---	---
1960-1969	6.0	6.4	6.3
1970-1979	8.1	7.5	8.6
1980-1989	8.6	9.2	8.0
1991	13.8	13.9	13.8
1995	9.4	10.2	8.0
2000	3.4	3.2	7.1
2005	4.8	5.3	4.4
2006	5.6	6.7	5.4
2007	4.5	5.5	4.7
2008	1.5	6.0	1.0

There are several statistical problems in estimating the effect of fiscal deficits on GDP growth in India. First, there is a very close correspondence between the doubling of fiscal deficits from 5% to 10% of GDP and acceleration in growth rate. Second, is the low volatility in the level of these deficits, for most of the period past 1980; Consolidated Fiscal Deficits of India have hovered around 8% of GDP. Given that fiscal deficit higher is the GDP growth. This is, of course, the Keynesian expectation, and the expectation to day when the world is faced with a global slowdown and Keynesian stimulus is considered necessary for battling the slowdown.

An additional reason for the lack of significance of the fiscal deficit is the “structure” of these deficits. The link between fiscal deficits and interest rates in India is the opposite to that which prevails in most of the world.

The Indian policy on fiscal deficits was as follows. The Ministry of Finance set a very high assured interest rate on savings for depositors in “small savings” funds. Administered interest rates were kept high in the 1990’s, despite rapidly falling inflation, because of the Government’s pre-occupation, and belief, and one fully endorsed by the RBI’s tight monetary policy, the GDP growth of 7% meant overheating and higher future inflation. Perceived future inflation had to be

reduced, and this could only be done by more monetary tightening. So, administered interest rates, in the form of interest rates on “small savings” administered by different state governments, were kept at a nominal level of 12.5% or higher.

The method of financing the fiscal deficit- the states and Centre freed from the wary of raising funds for deficit financing because depositors were paid an inordinately high rate of interest rates, rather than fiscal deficits being the cause of high interest rates. Even with inflation at the trend level of 8% meant a real on deposits of 4.5%, adding the normal spread of 3.5% meant real landing rates averaging 8%, among the highest in the world and considerably higher than rates prevailing in the developed world or in East Asia.

The high borrowing rates caused Government interest rate payments to rise which caused the fiscal deficit also to rise. In the mid to late Nineties, interest payments accounted for more than 50% of the fiscal deficit, reaching a peak of 98% in 2007. In 1980's interest payments in the consolidated fiscal deficit in India has been higher than 60% in every year since the mid-1990's and in the last few years has been approaching 100%. Thus, high interest rates have caused high deficits and this has resulted in lower GDP growth.

Exchange Rate Policy

Balassa was one of the original, and leading, proponents of export-led growth for developing countries. In short, export led growth is “currency undervaluation” and the empirical proof of this is success story of Japan, East Asia; China etc. Exchange rate is important in determining economic growth- more specifically about how undervaluation of currencies helps a country to achieve a faster rate. If Under valuation of currency causes growth, then the question arises; how does one measure undervaluation? There are several methods and these are discussed in detail. The most popular method is to either take a basket of currencies, or the US Dollar, and derive inflation adjusted exchange rates with respect to a “base” year. This is also the method followed by the RBI for the Indian Rupee, with 1993-94 as the base year. The major drawback of the IMF/RBI method is that the base or “equilibrium” needs to be defined as ex ante. An alternate method is to use the procedure first suggested, and employed, by Balassa (1964). This method refers the real exchange rate on per capita income, and deviations represent the degree of over and under valuation.

The channel of influence of currency undervaluation on GDP growth is via investments. An undervalued currency directly leads to greater profitability of investments, a higher investment

rate and therefore higher growth. Striking conformation of this simple model of investments is obtained from regressions. No matter what the time period or specification real interest rates, the impact of undervaluation is large-each 10% increase in under-valuation leads to almost 1% increase in the Investment rate. In a reduced form growth model, the same significant relationship holds, each 10% increase in undervaluation leads to 0.2% point in GDP growth. Currency undervaluation is most significant variable in all the growth regressions. Its importance can be gauged by examining the partial regressions plots for various time periods, and with or without other important regressions like the real interest rate.

Growth Acceleration in the early 1980's

India is in the near identical levels of economic growth before and after the reforms of 1991-92. The 1991 reforms were mature in a short period of time, the reforms achieved the following:- devaluation of the rupee by 20%, reduction in the peak tariff rate 300% to 110%, elimination of the Monopolies and Restrictive Trade Practices act(MRTP), a structural adjustment loan from the International Monetary Fund(IMF). Starting in 1994, the Indian economy felt the full impact of these reforms as growth accelerated to above 7% for three consecutive years. Agricultural growth fluctuations had caused GDP growth to be above 7% (e.g. in 1964,1967,1975) however, this was the first time such growth had occurred without a snap back from a preceding drought year. But soon the economy suffered and registered an average growth rate of only 5.1% for the period 1997-2002.

Such research only started post 2000. Until then, most economic research on India had highlighted the important causative role of 1991 reforms in accelerating India's growth. The common assumption among researchers was that since India had clearly jumped in the following years, it was unlikely that growth in the eighties which was anywhere near the post-reform growth. The growth trends in India from 1950-2007 are shown through the following table :-

GROWTH IN INDIA (1950-2007)

Levels % GDP	1950-79	1980-89	1999-2002	2003-2007	2006-2007
Share of Agriculture	42.8	32	-26.4	19	18.1
Currency undervaluation	138	93.4	11.9	-28	-31.5
Savings	14.9	20.6	25.2	33	35.8

Investment	15	21.7	25	33	36.7
Real interest rates	-----	1.3	4.2	2.3	2.8
Capital	4.8	4.7	5.6	9.4	11.3
Labor	1.4	1.8	1.9	2.8	2.8
GDP Growth-actual	3.6	5.7	5.2	8.5	8.9
GDP Growth predicted	3.5	3.6	4.2	6.8	8.0

GDP growth shows a clear acceleration from an average of 2.8% in 1970 to a level double that in 1980's- 5.1% per annum. Hence, the conclusion about trend setting growth acceleration in the early 1980's seems to be valid. A re-examination of Indian growth data, however suggests that there was minimal acceleration.

Growth de-acceleration in the 1990's

Responding to the economic reforms, GDP growth did accelerate on an average of above 7.4% in each of the three years 1994 to 1996. But this acceleration to potential had some unintended consequences. The irony is that the Govt. itself did not believe that reforms it had instituted would increase the potential GDP growth rate to above 7%.

In the mindset of the Indian politicians, and most policy makers, it was inconceivable that the Indian Economy could grow at East Asian growth rates. The 7 plus percentage growth rate was considered as an overheating phase deserving strong policy response. Possibly it was the crisis of 1991 that prevented the policy makers from realizing that an expansion from 5.7% to 7.4% growth was mildest of acceleration. When this acceleration collided with global and domestic inflation, the RBI panicked and tightened monetary policy to an unprecedented degree. Further, the RBI didn't cut the interest rates in response to the decline worldwide, keeping deposit rates at high double digit levels and inflation collapsing, the RBI ensured that real rates reached double digit levels. This caused the growth to collapse, as documented in the previous section.

Sharp Growth acceleration in 2003

The new Congress Government came to power in May 2004, after the agriculture induced robust growth of 8.4% in 2003-2004. During the preceding five years, GDP growth averaged only 5.3% per annum, about 0.3% per year less than the long-term 1980's and 1990's average of 5.6% with

no growth friendly policy inputs during 2004-2007. The economy continued to average 9% growth, a record by any yardsticks.

In an erratic replay of the 1990's, there is a new controversy, no economic growth acceleration happened despite the claims of several Economists and senior government officials. The Economists and the IMF had claimed that the acceleration is proof of over-heating and growth much is excess of potential GDP growth of 7%. Others claimed that there was a structural break in Indian growth rate starting 2003, and that the potential GDP growth of India, without any additional economic reforms, is close to 9%.

Structural Break in the Growth of 2003-2004

In 1999, inflation had reached a low of 3.5% and the government took the first major step towards interest rate reforms. Within a space of 4 years, government bond yields were 5%, down from double plus levels of the late 1990's. In "normal" economies, such a large decline in long term real interest rates would ordinarily be headline news for several years. Analysts would relate industrial growth, GDP growth, Stock prices, to this mega event. After all in Western Economies, a mere 2.5 basis point change in interest rates is a momentous occasion. So, it is in several Developing Economies including China. This interest rate change is most likely a major cause for the marked increase in investment that is observed for the 2003+ period. Savings rates had hovered around 15% the previous decade (1993 to 2002) and investment rates had averaged the same. Since 2002, in just five years, Savings and Investment rates had increased by 11 to 12 percentage points respectively.

Industry has most likely been the biggest beneficiary of this slower interest rate regime. Growth in industry rose at its fastest pace in 2004-2007. While industry grew at 8% for 2004-2007, manufacturing growth was strong at around 9.1%. The increase in GDP growth since 2002 is the sharpest, and longest in Indian history, a large 4 to 5% point acceleration to beyond 9% per annum. However, most analysts, and economists and especially the monetary authority doubts the sustainability of this acceleration and feel that the economy is or has been in a substantial overheating phase. The basic case belief is that any growth rate above 6 to 7% per annum is not sustainable.

No policy maker or very few analysts have pointed to the decline in real interest rates as an important cause, let alone the cause, for India's growth acceleration. Lower real interest rates add to GDP growth, and 500 basis point decline in real rates is enough to add somewhere between

1.5 to 3% extra GDP growth. Higher GDP growth leads to higher Saving Rates and expectations of higher growth lead to an increase in Investment Rates. This is what explains the jump in Investment Rates, Savings Rates, and GDP growth Rates in the last 5 years. And this change is structural not cyclical.

CONCLUSION

This paper has attempted to put the Indian growth and Inflation story of 60 years in perspective. The known determinants of growth and inflation were examined in detail. There are two explanations for the much discussed and much hyped growth acceleration in the 1980's. Reallocation from Agriculture to Industry resulted in the potential growth rate being as high as 5%. The sharp rise in real interest rates induced by very tight monetary policy at a time of falling Inflation rates in the mid to late 1990's resulted in industrial growth which was slowed down before the point reached its potential. The reversal of this interest rate hike and reduction to realistic and competitive levels during 1999 is a major reason for the miraculous growth acceleration observed starting 2003. Aiding and abetting this process of an Economy moving towards a new and higher potential GDP growth of around 9% were two factors, the maintenance of an increasingly competitive exchange rate since 1993-1994 and the development and expansion of the middle class.

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