

Relationship between inflation and economic growth

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Indian Economic Service, New Delhi Faculty, BITE-MBA Programmer, Advantage, Karakas. L. INTRODUCTION The relationship between inflation and growth remains a controversial one in both theory and empirical findings. Originating in the Latin American context in the 1970s, the issue has generated an enduring 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. There are two aspects to this debate: (a) the nature of the relationship if one exists and (b) the direction of causality.

Friedman (1973: 41) succinctly summarized the inconclusive nature of the relationship between inflation and economic growth as follows: 'historically, all possible combinations have occurred: inflation with and without development, no inflation with and without development]. The impact of inflation on growth, output and productivity has been one of the main issues examined in macroeconomics. Theoretical models in the money and growth literature analyze the impact of inflation on growth focusing on the effects of inflation on the steady state equilibrium of capital per capita and output (e.g. Orphanides and Slow, 1990). There are three possible results regarding the impact of inflation on output and growth: i) none; ii) positive; and iii) negative. Assiduous (1967) established the first result, showing that money is neutral and superneutral in an optimal control framework considering real money balances (M/P) in the utility function. Dobbin (1965), who assumed money as substitute to capital, established the positive impact of inflation on growth, his result being known as the Dobbin effect. The negative impact of

inflation on growth, also known as the anti-Dobbin effect, is money as complementary to capital.

Following Friedman's (1977) Nobel Lecture the theoretical and empirical research on the relationship between inflation and output growth has progressed along two distinct lines. The first line of research starting with Friedman's hypothesis that higher nominal inflation raises inflation uncertainty, has tended to investigate the relationships among inflation, inflation uncertainty, growth and growth uncertainty. The second line of research has tended to remain within the traditional macroeconomics and investigate the relation between inflation and growth without reference to inflation uncertainty and growth uncertainty.

This study follows the second line and examines the nature of the relation between inflation and growth in the Indian economy. Within the second line of research two distinct camps, with 2 opposite predictions on the relation between inflation and growth, have distinguished themselves. Researchers of the first camp base their arguments on the Phillips curve and output gap, defined as the difference between actual and potential output and assert a positive relation between inflation and growth. The underlying reasoning is that if actual output rises above potential output, this will create an upward pressure on wages in the labor market.

Higher wages, in turn, will lead to higher production costs and hence higher prices. This conclusion has been supported by empirical findings. Sherlock and Seems (1999), for instance, show that 1% increase over potential output

raises inflation by 0.2% in the subsequent quarter in the MME-5 countries. Moreover, since inflation is serially correlated, future inflation rate will also rise. Another interesting study has been undertaken by Paul et al. (1997) who work with data pertaining to 70 countries and the 1960-1989 periods. They report that the relation between inflation and growth is positive only in some countries.

Amelia and Chowder (2001) analyses inflation-growth dynamics in four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka) and find statistically significant evidence of a positive relation between these two variables. Researchers belonging to the second camp base their arguments on the Real Business Cycle theories and assert that inflation negatively affects growth. One of the main studies investigating this negative relationship between inflation and growth has been carried out by Jutland and Prescott (1990). These authors argue that supply shocks, not demand shocks, are responsible for the inverse relationship.

Supply shocks render the prices countercyclical, while demand shocks cause prototypical moves in prices towards output. However, there is a condition to be taken into account: Price flexibility. In an environment with sticky prices, a demand shock will increase the output while prices move very little. As output is on the way towards its trend, prices may be rising. Hence, a negative correlation between these variables can also be observed even when a demand shock is responsible for these movements. Ball and Manana (1994) and Judd and Teheran (1995) study these effects.

In addition, Den Han and Wetter (2000), by using long forecast horizons within a VARY framework, argues that a negative correlation between inflation and growth. Yet another study showing the divergence of output growth from inflation in developing countries is that of Agenda and Hovercrafts (1997), who employ generalized VARY analysis to examine the short run dynamics among inflation, output, nominal wages and exchange rate. They find that a fall in the depreciation of the exchange rate reduces inflation and stimulates output. But the expansion in output is short lived.

Germanous (2001), by employing VARY models shows that high inflation rates in Turkey cause lower economic growth. Mendoza (2003) finds evidence of inflation-output trade off in 3 the Turkish economy using VARY and GARTH models. Beside VARY models, panel data studies also support this negative relationship, especially for countries that suffer from high inflation. Barron (1996), for instance, shows that a negative relation exists for a set of countries that had inflation rates above 15%. Judson and Orphanages (1996) use a 10% threshold. Bruno and Easterly (1998) argue in favor of a 40% inflation as the relevant threshold inflation rate.

Gosh and Philips (1998) find a positive effect for low inflation rates, but for those above 5% they find a non-linear negative effect. Based on cross-country and panel regression, several studies have demonstrated in recent years, that there is negative correlation between inflation and growth in the long run due to the influence of the former on reducing investment and productivity growth. There is yet another set of studies (Bruno & Easterly,

1998, Cares, 1996) which show that harmful effects of inflation are not universal, but appear only over the [threshold] level of inflation.

Nevertheless, there is the growing concern in developed countries; particularly in the MME area that excessively low inflation threshold may hurt economic growth. It is argued that the developed countries do have very well developed financial markets and less government interventions in goods markets. Such economies are mostly demand driven, in which case 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 interventions in financial and goods markets and macroeconomic rigidities such as rigidities in labor laws cause market failure and macroeconomic instability. Therefore, prices do not give correct signals about the policies and the course of actions of the economic agents. It is in this context, it will be interesting to know the inflation-growth nexus in developing countries. The objective of this study is to examine the inflation-growth nexus in India using annual data for the period 1972-2007. We will examine the relationship between growth and inflation in India.

In the short run, the relationship between growth and inflation is usually positive. Policies that raise output (for example, expansionary fiscal and monetary policies) also raise prices. Inflation is undesirable because it adversely affects some sections of the population (especially the poor and

those whose earnings are not indexed to prices), distorts relative prices, assets and creates instability. The ultimate policy objective is a higher level of well-being for the population, but a conflict arises in the means of achieving it? by higher growth or by lower inflation.

There is a trade-off involved and both cannot be achieved together. 4 A tightening of fiscal and monetary policies may achieve lower inflation but only at the cost of growth. The government needs to find the right balance between contraction and expansionary policies to maximize the well-being of its people. Macroeconomics has, until recently, focused on the positive short-term relationship between the rate of increase in prices, and output. Recently there has been an exploration into the nature of the long-term relationship between inflation and long-term growth in output.

Developments in growth theory have resulted in both a theoretical and an empirical analysis of the effect of inflation on longer growth. Theoretically the relationship has been located in the effect of inflation on investment. If investment is assumed to be the engine of growth in a model of endogenous growth, an adverse impact of inflation on investment implies an inverse relationship between inflation and growth. Empirical evidence supports the hypothesis of an inverse relationship between inflation and longer growth.

This is in contrast to the short-term experience, where inflation and output growth occur together. Growth and inflation in the Indian economy: The growth rate of GDP in India increased from 3.5 % in the 1950s to 5.5 % in the 1960s. This increase in growth has been attributed to both demand and

supply-side factors. But it has been suggested that 'Keynesian expansion', or the increase in aggregate demand due to higher government spending and larger fiscal deficits, was primarily responsible for pushing up growth rates (Cochise and Little 1994).

In the early 1980s public investment was growing rapidly, but in the second half of the decade it slowed down and government consumption expenditure grew at a much faster pace. The revenue deficit grew, indicating that government consumption was being financed by borrowing, which entailed interest and repayment commitments. The success of expansionary fiscal policies in raising output growth, at least in the short run, can partly be attributed to the under-utilization of productive capacity in the preceding years.

By the end of the 1980s, when output was above trend levels, fiscal policy continued to be expansionary creating excess demand in the system (Cochise and Little 1994). The reform of the financial sector consists primarily of a reduction in the statutory liquidity ratio and a rationalization of subsidized credit to priority sectors, relaxation of interest controls and restrictions on firms' access to capital markets, and more autonomy for public sector banks. The 5 privileges such as protection from external and domestic competition and preferential access to budget and bank resources.

Though the condition relating to an effective 'exit' policy for the closure or restructuring of money-losing firms in the private and public sector has not been fulfilled, the reforms made have largely been in line with the program's

objectives. Monetary policy and growth: A noteworthy feature of Indian growth process over the last one and a half decades has been its stability. This is evident from the substantially lower coefficient of variation of real GAP growth during the post-reform period as compared to that during the pre-reform period, that is, before the nineties.

It is also important to note that Indian's growth is driven by domestic consumption, contributing on an average to almost two-thirds of the overall demand, while investment and export demand are also accelerating. As consumption is less volatile component of demand, this has also contributed to reducing the volatility of GAP. The inflation rate accelerated steadily from an annual average of 1.7% during the sass to 6.4% during the sass and further to 9.0% in the sass before easing marginally to 8.0% in the sass. India had generally not experienced runaway inflation. On the other hand, the volatility in the inflation rate, as measured by the coefficient of variation, which was fairly high in the sass at 4.4, moved in a narrow band of 0.4-1.0 in the subsequent decades, thus reducing the inflation-risk premium. The pick up in inflation rate from sass onwards reflected the impact of a sharp rise in money supply growth and also partly supply shocks from crude oil prices and crop failures.

Demand pressures, emanating partly from the widening fiscal imbalances, also contributed to inflationary pressures in the sass. The second half of the sass was marked by a significant turnaround in the inflation outcome reflecting the improved monetary-fiscal interface. The "Great Moderation": One of the defining characteristics of global economic developments over

the last three decades has been termed the ? Great Moderation? -the sustained decline in the volatility of output and inflation.

This development has been due to the structural changes that many economies have undergone. Some have attributed these changes to the implementation of better policy options and others to simply good luck. Professor Kenneth Oregon of Harvard University has argued on many 6 occasions that improved competitiveness as a result of increased globalization pulled with better policies has had a major positive impact on inflationary trends in many countries. The declining trend in inflation since 1990 is clearly evident in India and South Africa.

Inflation in India has declined steadily from an average of 10.3 % between 1990-1994, to 8.9 % during 1995-1999 and to 4.3 % in this decade. Similarly in South Africa, inflation has declined from an average of 12.5 %, to 7.3 % and to 5.1 has also been quite impressive. Since 1990, India has experienced average growth rates of around 6 % per annum. Inflation could hamper economic growth mainly due to the following reasons Economies that are not fully adjusted to a given rate of inflation usually suffer from relative price distortions caused by inflation.

Nominal interest rates are often controlled, and hence real interest rates become negative and volatile, discouraging savings. Depreciation of exchange rates lag behind inflation, resulting in variability in real appreciations and exchange rates. Real tax collections do not keep up with inflation, because collections are based on nominal incomes of an earlier

year (the Tanzania effect) and public utility prices are not raised in line with inflation. For both seasons, the fiscal problem is intensified by inflation, and public savings may be reduced.

This may adversely affect public investment. High inflation is unstable. There is uncertainty about future rates of inflation, which reduces the efficiency of investment and discourages potential investors. II. LITERATURE REVIEW

Understanding the relationship between inflation and real growth has all along been a key concern in macro-economic research. According to Ranging (1998), the question, in essence, presupposes a possible trade-off between price stability and growth either in the long or short run.

The new endogenous growth theories, for instance, surmised that inflation has an adverse impact on growth because of its harmful effects on productivity and efficiency. Others such as Choc, Smith and Boyd (1996) echoed a similar view and argued that inflation, in the presence of information asymmetry can harm growth by accentuating financial markets frictions and thereby adversely affecting the provision and allocation of investment.

The rational expectations revolution inter alai, criticized the non-neutrality proposition of Keynesian by arguing that, under flexible markets, 7 updated monetary shocks meant to facilitate growth could only lead to ever increasing levels of inflation in the long run [Ranging 1998]. Bruno and Easterly (1998) conclude that there was no evidence of a growth-inflation tradeoff in a sample which excluded discrete high inflationary crisis. On the

other hand, there was ample evidence to show that growth turned sharply negative when inflation crossed past a high threshold rate of 40 % per annum.

They also argue that the failure of investigators in detecting a meaningful relationship between inflation and growth can be attributed to a stylized rapid recovery of output after inflation which, on an average, renders the overall statistical relationship insignificant. On the other hand, Cares (1997) attempts an alternative empirical investigation of the problem and also concludes that inflation affects growth only if it breaches a specific 'threshold' rate of inflation but not otherwise.

He concludes that an inflation threshold of about 8 % for a pooled sample of a large number of countries, including common threshold is an estimate from a pooled sample, it may not be exactly suitable for particular country if taken in isolation. There is, therefore, a need to have et another empirical assessment of the problem of finding the level at which inflation actually begins to erode economic growth in given economy. Earlier works (for example, Tune Way, 1959) failed to establish any meaningful relationship between inflation and economic growth.

A more recent work by Paul, Carney and Chowder (1997) involving 70 countries (of which 48 are developing economies) for the period 1960-1989 found no causal relationship between inflation and economic growth in 40 % of the countries; they reported bidirectional causality in about 20 % of countries and a unidirectional (either inflation to growth or vice eras)

relationship in the rest. More interestingly, the relationship was found to be positive in some cases, but negative in others. Recent cross-country studies, found that inflation affecting economic growth negatively, includes Fischer (1993), Barron (1996) and Bruno and Easterly (1998).

Fischer (1993) and Barron (1996) found a very small negative impact of inflation on growth. Yet Fischer (1993: 281) concluded 'however weak the evidence, one strong conclusion can be drawn: inflation is not good for longer-term growth'. Barron (1996) also preferred price stability because he believed it to be good for economic growth. Bruno and Easterly (1998) work is interesting. They note that the ratio of people who believe inflation is harmful to economic growth to tangible evidence is unusually high.

Their investigation confirms the observation of Doorknobs (1993), Doorknobs and Reynolds (1989), Levine and Renelt (1992) and Levine and Servos (1993) that the inflation-economic growth relationship is influenced by countries with extreme values (either very high or very low inflation). Thus, Bruno and Easterly (1998) examined only cases of discrete high-inflation (40% and above) crises and found a robust empirical result that growth falls hardly during high-inflation crises, then recovers rapidly and strongly after inflation falls.

Cross-country evidence: Some recent studies have found cross-country evidence supporting the view that long-term growth is adversely affected by inflation (Cordoned and Maguire 1985; Fischer 1983, 1991, 1993; De Gregory 1993; Gleason 1991; Robbing and Salad-I-Martin 1992; Greer and Outlook

1989; Levine and Servos 1992). Countries (especially in Latin America) that have experienced high inflation rates, have also witnessed lower long-term growth (Carrots and Fishbowl 1989; De Gregory AAA, Bibb).

This literature is part of the endogenous growth literature, which tries to determine the causes of differences in growth rates in different countries. There is now considerable evidence that investment is one of the most important determinants of long-term growth (Barron 1991; Levine and Rennet 1992). It has often been suggested that a stable macroeconomic environment promotes growth by providing a more conducive environment for private investment. This issue has been directly addressed in the growth literature in the work by Fischer 1991, 1993; Easterly and Rebels 1993; Franken and Khan 1990; and Blarney 1996. Certainty on private investment. Multi-country panel data studies on investment report that measures of macroeconomic instability, like the variability in the real exchange rate or the rate of inflation, have an adverse impact on investment (Server and Salomon 1992). In a study of 17 countries, Cordon (1990) finds that although there are outliers, evidence generally supports the view that high growth is associated with low inflation. This is suggested both by cross-country evidence and comparison over time for countries where the rate of growth has fallen in relation to an increased as the rate f inflation.

Fischer (1993) examines the role of macroeconomic factors in growth. He found evidence that growth is negatively associated with inflation and positively associated with good fiscal performance and undistorted foreign exchange markets. Growth may be linked to uncertainty and macroeconomic

instability where temporary uncertainty about the macro economy causes potential investors to wait for its resolution, thereby reducing the investment rate (Pinprick and Salomon 1993). Uncertainty and macroeconomic stability are, however, difficult to quantify.

Fischer suggests that, since there are no good arguments for very high rates of inflation, a government that is producing high inflation is a government that has lost control. The inflation rate thus serves as an indicator of macroeconomic stability and the overall ability of the government to manage the economy. Fischer finds support for the view that a stable macroeconomic environment, meaning a reasonably low rate of inflation, a small budget deficit and an undistorted foreign exchange market, is conducive to sustained economic growth.

He presents a growth accounting framework in which he identifies the main channels through which inflation reduces growth. He suggests that the variability of inflation might serve as a more direct indicator of the uncertainty of the macroeconomic environment. However, he finds it difficult to separate the level of inflation from the uncertainty about inflation, in terms of their effect on growth. This is because the inflation rate and its variance are highly correlated in cross-country data.

Evidence is in favor of the view that macroeconomic stability, as measured by the inverse of the inflation rate and the indicators of macroeconomic trends, is associated with higher growth. To examine the mechanism through which macroeconomic variables affect growth, Fischer regresses the rate of

capital accumulation on these variables. The coefficient of the rate of inflation is found to be negative, suggesting that an important route through which inflation affects growth is the reduction of capital accumulation.

Fischer further finds that the inflation rate is negatively correlated with the rate of productivity growth measured by the Slow residual. He also examines the possibility that the above results are due to the inclusion in the sample of countries with very o 1 5 %), medium (1 5 to 40 %) and high (above 40 %)? results show that, contrary to what might have been expected, the association between inflation and growth and its determinants on average weakens as inflation rises. This supports the results obtained by Levine and Servos (1992).

Thus it is not the case that high inflation outliers are responsible for the overall negative correlations between inflation and growth, capital accumulation and productivity growth. Rather, Fisher's results suggest that the association between growth, inflation and capital accumulation is trotter at the low and moderate levels than at high inflation. De Gregory (1993) presents evidence from 12 Latin American countries over the period 1950-85. He finds a significant negative correlation between inflation and growth.

Though both inflation and its variance have negative effects on growth, since they are highly correlated in crossly country evidence, the results cannot discriminate whether it is the level or the variability that negatively affects growth. Even when high inflation countries were eliminated from the regression, the impact of inflation was both negative and significant.

However, though results suggest a negative relation between inflation and investment in physical capital and foreign investment, the relationship is not significantly different from zero.

Though Fisher's results suggest that inflation affects the level of investment, De Gregory finds that it is the efficiency of investment that is affected and that is what leads to the effect of inflation on growth. This result is supported by cross-country evidence presented in Levine and Rennet (1992). Blarney (1996) finds that poor macroeconomic policy, measured by fiscal balance and real exchange rate volatility, appears to be negatively correlated with growth.

In his sample, inflation is positively correlated with the real exchange rate and when included in the same regression inflation does not appear to have a negative influence on growth. Since the two are correlated, this suggests that the choice of one of the two variables may depend on the degree of openness and the relative influence of the domestic and foreign prices for investment decisions. High inflation rates also tend to be volatile and the associated negative and unpredictable real interest rates discourage domestic financial savings.

Unanticipated high inflation erodes the real value of financial assets and the volatility of inflation increases the risk associated with holding them.

Conversely, low-to- moderate inflation, particularly at stable rates, encourages financial savings. Fry (1988) and Glee (1989) find, from pooled cross-economy time series data, a consistently positive and significant

relationship between economic growth and the real rate of interest. To separate the effects of inflation in a financially repressed regime from those of real interest rates, a World Bank study re-estimates the equations (World Bank 1993).

Evidence from a sample of twenty countries, for the impact of the real interest rate and the inflation rate on the GNP growth rate is reported. The real interest rate has a statistically significant and positive impact on growth. But when inflation is included, the coefficient for the real interest rate is no longer significant. This suggests that the positive relation between real rate of interest and growth was actually reflecting a negative relation between inflation and growth in financially repressed regimes, where nominal interest rates are kept fixed.

Perhaps that is why, for a sub sample of economies for which real interest rates are positive, the coefficients of both the real interest rate and inflation are negative, indicating that lower real interest rates may have had a positive impact on growth. The study also suggests that another condition that was particularly important to investment was public investment in infrastructure. If inflation reduces public saving, public investment is likely to fall. 11 The Asian experience: Cross-country evidence appears to support a cross-country negative relationship.

In general, countries with higher growth are those with lower inflation rates. A World Bank study finds that the high-performing East Asian countries, that have had sustained high growth for the last three decades, have each had a

stable macroeconomic environment that fostered high rates of investment and economic growth (World Bank 1993). Macroeconomic stability has been defined as inflation being kept under control, internal and external debt remaining manageable, and resolving the macroeconomic crisis that emerged within a year or two.

Though the cross-country evidence suggests a negative correlation between inflation and growth, a distinction is not made between open and closed economies among these countries. It may be that the negative correlation is strong in the case of open market economies which rely on private foreign and domestic investment that is encouraged by low inflation and where maintaining export competitiveness and preventing capital flight have a larger role to play.

In a closed planned economy, where the reliance on public investment is substantial and financed by inflationary means, the relationship between growth and inflation may even be positive for long periods of time. As India moves from a closed planned economy to an open one, where private domestic and foreign investment is expected to be the engine of growth, it is relevant to examine the impact of inflation on investment. The empirical evidence also underwent similar changes in views.

The evidence of an inverse relationship between inflation and growth was vociferously advocated mainly since the beginning of the 1970s in contradiction to the earlier stands taken by several researchers including Johnson (1967) who indicated that " there was no conclusive empirical

evidence one way or the other". However, especially, since the arrival of the new evidence of a negative relationship, a large body of empirical research has explored various paradigms in inflation analysis.