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# Understanding Inflation and Controlling It

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## Abstract

Inflation management is one of the hardest tasks an economic policymaker has to undertake. It appears, at first sight, that one can rely entirely on commonsense to carry out this task. But that will be a cardinal mistake. While inflation policy does require judgment and intuition, it is essential that these be backed up with statistical information and an understanding of economic theory. This paper tries to bring together the formal analytics that underlie inflation policy. It surveys some of the standard ideas and also questions some of these and, in the process, tries to push further outwards the frontiers of our understanding.

**Acknowledgements** The paper is based on the First Gautam Mathur Lecture that I delivered in New Delhi on 18 May 2011, at the invitation of Santosh Mehrotra. I am grateful to Montek Singh Ahluwalia for his extensive and valuable comments, following the lecture. In writing this paper I have benefited greatly from discussions with Surjit Bhalla, S. Bhavani, Anil Bisen, Satya Das, Dipak Dasgupta, Supriyo De, R. N. Dubey, Russell Green, Vijay Joshi, Kalicharan, Rajiv Kumar, Ken Kletzer, Rajnish Mehra, Dilip Mookherjee, Sudipto Mundle, Debraj Ray, Rajashri Ray, T. Rabi Sankar, Partha Sen, Nirvikar Singh and T. N. Srinivasan. I would also like to thank Rangeet Ghosh and Shweta for research assistance.

# Understanding Inflation and Controlling It

## 1. Introduction

Inflation is, at the same time, one of the most dreaded and one of the most misunderstood of economic phenomena. We know from experience, combined with cogitation, that the prices of commodities will, over time, rise and fall, responding to the pulls and pushes of demand and supply. A failure of a particular crop or a flash fashion for a certain kind of clothing can cause the price of that crop and the cost of that kind of clothing to rise, just as an unexpected glut in the production of onions will cause the price of onions to fall. These price movements are nature's way of signaling to consumers that they should consume less of the commodity facing shortage and more of the good in glut and to producers to produce more of what is in short supply and less of what is available in plenty. To even out these ebbs and flows of prices would be folly, as we know from countless examples of misdirected government interventions.

Inflation, on the other hand, has little to do with these changes in *relative* prices of goods and services. It refers, instead, to a sustained rise in prices across the board, that is, a phenomenon where the average price of all goods is on an increasing trajectory for some stretch of time. Of course, this may be accompanied by changes in relative prices. For the common person, there is something threatening about the phenomenon of inflation, especially on those occasions when the rise in prices of goods is not matched by an equivalent increase in the price of labour.

Inflation has been with humankind ever since we moved away from barter to the use of mediums of exchange, like paper money, precious metals or even cigarettes, as happened in a prisoners of war camp during the Second World War (Radford, 1945). While it is true that we do not fully understand inflation and, to that extent it remains a threat, what is comforting is that years of data collection

and theoretical research have given us deep insights into this troubling phenomenon. And even though we do not fully understand its origins, as in the case of the emperor of maladies, we have developed techniques and policy interventions that can control it. For some of these antidotes, there is good reason to be cautious when using them and in deciding what dose to administer, since each such policy intervention comes with side effects. But it is a testimony to the advance of economics as science that the spiraling hyperinflations that occurred ever so often till even half a century ago, now seem to be a matter of history.

Inflation is an emotive matter and its occurrence gives rise, understandably, to popular resentment. Yet, its solution cannot be left to “popular cures.” Those will be as successful in controlling inflation as witchcraft was in controlling illness in sixteenth and seventeenth century. Fortunately, despite its many caveats, the science of inflation has made huge strides in recent years. The aim of the present paper is to draw on these recent advances, point to some of the gaps in our knowledge, and show how at least some of those gaps can be bridged.

This paper moves away from the everyday, firefighting problems of inflation, away from what inflation will be the next week or the next month, away from whether the repo rate will rise or fall over the next few six-week slices. Since those questions asked every few weeks elicit broadly the same answers, that discussion adds little to our understanding of this intriguing economic malady.

I want to use this occasion to mull over some of the deeper and more conceptual questions pertaining to inflation and its management. Such an exercise may not have any bearing on what policy we adopt next week or even next month but, in the long run, by advancing our understanding of inflation, it can yield benefits that are disproportionately high. If today we do not have to worry about the hyperinflations that shook Europe just before and after the Second World War and continued to send shivers down the spines of Latin American economies into the 1990s, it is because analysts, mainly in western, industrialized nations, beginning with John Maynard Keynes in the 1930s, paused

from everyday firefighting to ask foundational questions concerning what gives rise to this emperor of economic maladies and what policies are best suited to blight the run of this malignancy.

Many of the policies that we use nowadays routinely and without thought are the outcome of the research and contemplation of economists of earlier years. If, today, we don't have to worry about our 9% inflation spiraling up to 30% or 100% or even trillion percent, as happened in Hungary in 1946 or Germany in 1923, it is because of the march of ideas and science. In this advance of fundamental ideas most of the contributions have come from Europe and the United States. That in itself is not a matter of concern. Knowledge generated anywhere is knowledge and of value to all of us. At the same time, the context matters in shaping our focus of attention. As has been pointed out for medical science, our knowledge of tropical illnesses has not progressed far enough because these are the concern of the tropics and not of the industrialized nations. Even in economics there are peculiarities that are specific to different regions and for nations at different stages of development. It is therefore important to do fundamental analytical research on inflation where the backdrop is an emerging market economy such as India.

That is the spirit in which the present paper is written. As such, it begins with a brief description of the inflationary experience of India with some comparative descriptions from other nations. Thereafter, the analytical sections are organized as follows. Section 3, written in the spirit of a digression, draws attention to a peculiar—almost paradoxical—dilemma which government agencies entrusted with the twin tasks of monitoring inflation and controlling it face. The remaining three sections are all concerned with policies for controlling inflation. Section 4 deals with income redistribution and inflation, sections 5 and 6 with macroeconomic demand management and inflation, and section 7 looks into the problems of inflation management in a globalized world and the scope for action on the part of multi-lateral organizations such as the G20.

## 2. Inflation in India

Before getting into the analytics of inflation, it is useful to have the basic facts on the table. India is right now in the midst of an inflationary episode that has gone on for 17 months. It began in December 2009, when the WPI inflation climbed to 7.15%<sup>1</sup>, it continued to rise, peaked in April 2010, at just short of 11%. Thereafter, it has been on a broadly downward trajectory. What has caused some concern once again is that there was a small pick-up in inflation in December 2011 and also because the downward trajectory has been disappointingly slow. Before this 17-month run, we had one year of negligible inflation; but just prior to that there was another rally from March 2008 to December 2008, when WPI inflation hovered in and around 10%. Before these two rallies in quick succession, India had very little inflation for a dozen years. There were occasional months when inflation would exceed 8% and not a single month when it was in double digits during these twelve years of relative price stability<sup>2</sup>.

For reasons of completeness it may be mentioned that independent India's highest inflation occurred in September 1974, when inflation reached 33.3%. Arguably our worst inflationary episode was from November 1973 to December 1974, when inflation never dropped below 20% and was above 30% for four consecutive months starting June 1974. Table 1 gives the full inflation data for WPI and food prices from 1971 to the most recent available.

What is good performance and what is bad depends on the yardstick. Even during the dozen years of price stability we had more inflation than in virtually any industrialized country in recent times but, in comparison to most emerging

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<sup>1</sup> All inflation numbers, unless explicitly stated otherwise, refer to annual inflation, that is the growth rate of the price index on a year-on-year basis.

<sup>2</sup> When analyzing inflation in India, throughout this paper, I shall be using the WPI based inflation numbers. On the few occasions when other indicators will be used, this will be made explicit.

market economies and developing nations in the world, India's performance was creditable.<sup>3</sup>

One reason for the concern with the past 17 months inflation-run is the fact that since the mid nineteen nineties and all the way till 2006 we had price stability. This concern has led to the talk of runaway inflation and hyperinflation. It is however important to get the perspective right. We are nowhere near hyperinflation—usually described as inflation over 50% per month (Cagan, 1956). The world's biggest inflations occurred in Europe, once around 1923 and again around 1946. The record is held by Hungary from August 1945 to July 1946. During these twelve months, prices rose by  $3.8 \times 10^{27}$ . That is, what cost 1 pengo on August 1<sup>st</sup>, 1945, would cost 38000... (a total of 26 such zeroes) pengos on 31 July 1946. In August 1946 the pengo was replaced with the forint in an effort to shed the trillions of zeroes that were needed to express prices in pengos.

Comparable inflations have occurred in Russia from December 1921 to January 1924, in Greece in 1943, in Zimbabwe in 2008, in Germany in 1923 and in many other instances. The German hyperinflation of 1923 may well be the most analyzed and diagnosed inflation. It played havoc with the economy, created political tensions which contributed to the rise of Nazism, and also caused psychological disturbances. Doctors in Germany in 1923 identified a mental illness called "cipher stroke" which many people were afflicted with during the height of the hyperinflation. It referred to a neurotic urge to keep writing zeroes and also to a propensity to meaninglessly add zeroes when responding to routine questions, such as to say two trillion when asked how many children the person has (Ahamed, 2009).

Not quite as large as these European inflations but nevertheless staggeringly big ones occurred till two or three decades ago in many Latin American countries (see Garcia, Guillen and Kehoe, 2010). These being closer to our times may have greater relevance to us. One country that has coped with

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<sup>3</sup> As for what is an "acceptable" level or "threshold" level of inflation for India, there is a lot of literature, most of it clustered around numbers ranging from 4 to 7% (for a discussion, see Rangarajan, 2009, Chapter 1).

mega inflations, many times larger than what we have in India, and seems to have at last stabilized, and is now among the forerunners of well-run economies among emerging market economies, is Brazil.

A study of the Brazilian economy, since 1962, shows that the nation did not have a single year where inflation was in single digits from 1962 to 1997. There were only two years (1973 and 1974) when inflation was below 20%. The real bad period was 1988 to 1994. Prices were rising on average close to 2000% per annum during this time. Brazil's experience gives us a bit of an insight into what inflation does to growth. A pure eyeballing of the data suggests that, when inflation is below ten percent, there is little correlation between the rate of inflation and the growth rate. But at higher levels, inflation is usually associated with lower growth; and especially when inflation, starting at a high level rises even further, growth slows down. During the six hyperinflationary years mentioned above, growth had a real set-back with GDP growing at negative rates in three out of those six years. All this is not to deny that there are examples of nations sustaining over 10% inflation with very high growth over multiple years.

Asian countries have in general had more stable prices. South Korea, which grew at astonishingly high rates from the late 1960s to recently, did have high inflation but nowhere near the experience of Latin American economies like Brazil. The average inflation in South Korea in the 1970s was in double digits, with inflation peaking in 1980. While this coincided with high growth for quite some time, it eventually seemed to have had a restraining effect on GDP growth. Tighter monetary and fiscal measures brought inflation down in the 1980s and, eventually, restored high growth.

This wide range of experience from around the world and prodigious amounts of research have vastly enhanced our understanding of inflation. The relatively good inflation record among all industrialized nations and emerging market economies over the last two decades is testimony to this. However, this experience has also taught us that there is a lot that we do not understand and

that the drivers of inflation, like bird flu, can change over time rendering standard antidotes less effective and calling for fresh research and, maybe, new medicines.

For years, the US Fed kept a control on prices by buying and selling government bonds which was the other side of, respectively, releasing money into and absorbing money from the economy. However, money is not the only medium of exchange. There are 'near monies' that can do some of the work for money. People can use all kinds of other commodities and papers to trade goods. If, for instance, government bonds were fully acceptable as a medium of exchange, then the central bank selling bonds and collecting money would have very little impact on the economy. It is the appearance of 'near monies' that has compelled the US Fed to change some of its strategies for maintaining stable prices.

Since these endogenous features of the economy can vary from one country to another, this calls for independent research in each nation. Over the last few years there is a sense that the inflation faced by emerging economies is changing some of its stripes, thereby demanding not just greater resolve but new ideas in order to have price stability<sup>4</sup>. Rakshit (2011) points to the somewhat unusual divergence between CPI inflation and WPI inflation in recent times, even though it should be pointed out that the two have converged once again over the last six months. We can also see from Figure 1 that the volatility of inflation also seems to have changed.

The use of the WPI in deciding on policy has often come under criticism (see Patnaik, Shah and Veronese, 2011; Rakshit, 2011). However, it can be argued that for most purposes and certainly in the context of this paper, it will not matter very much which particular index is used. It is true that there was considerable divergence between the WPI on the one hand and the several consumer price indices (CPIs) that India tracks, during 2010 but this was exceptional; by and large

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<sup>4</sup> For an excellent analysis of the changing nature of this inflation, see Rakshit (2011). The multiple sources of India's recent inflation are discussed by, among others, Mishra and Roy (2011) and Mundle (2011).



inflation measured by these indices tend to converge over time.<sup>5</sup> Moreover, theoretically, it is not clear that one is better than the other. It is true that the WPI does not track the price of services, which is increasingly the major part of India's value added in GDP. However, since services constitute an important input for manufacturing and agricultural products, it is arguable that the price of services gets indirectly reflected in the WPI. Further, in a nation with as much income and living-condition disparity as in India, it is difficult to think of a representative consumer in a meaningful way. As a nation India tries to get around this problem by computing at least three different kinds of consumer price indices, for three different classes of consumers. This raises the vexing question of which of these to use for crafting national policy.

The most popular among the consumer price indices, the CPI for industrial workers or CPI (IW), has another rather interesting problem. Let me briefly touch on this despite the digressive nature of the matter. For most bureaucrats and government workers, salaries in India are indexed by using the inflation rate as measured by CPI (IW). Since it is government workers and bureaucrats who collect the data for constructing the CPI (IW) index there is a potential conflict of interest, with the possibility of a tendency to record higher numbers wherever the opportunity for this arises. Indeed, a direct study of the two indices shows that the CPI (IW) index has grown faster consistently since around August 2008. This can of course happen for natural reasons because the two indices after all do not track the same commodities.

However, it so happens that they do also track several of the same commodities. So one possibility is to take the commodities common to the two indices, and change the weights in one to match with the weights in the other. This still leaves one problem. The CPI (IW) is computed with 2001 as the base year, whereas the WPI is computed with 2004-05 as base year. But this is very

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<sup>5</sup> Their divergence and causal links have recently been studied by Goyal and Tripathi (2011).

easy to change to get both indices to the same base year. Once we make these changes we can see if there is an upward bias in the CPI (IW).

Doing precisely the above exercise<sup>6</sup> and plotting the two indices on the same graph does reveal a small but fairly systematic upward bias in the CPI (IW), as compared to the WPI. In this exercise we made 2006 the base for both indices. So both indices start off at 100 in April 2006. Almost immediately after that the CPI (IW) moves up faster and then on, barring six or seven months, the CPI (IW) out performs the WPI. This was a quick preliminary exercise and will need more careful study but it does suggest a small upward bias in the consumer price index on which the salary increases of the people engaged in computing the numbers depends.

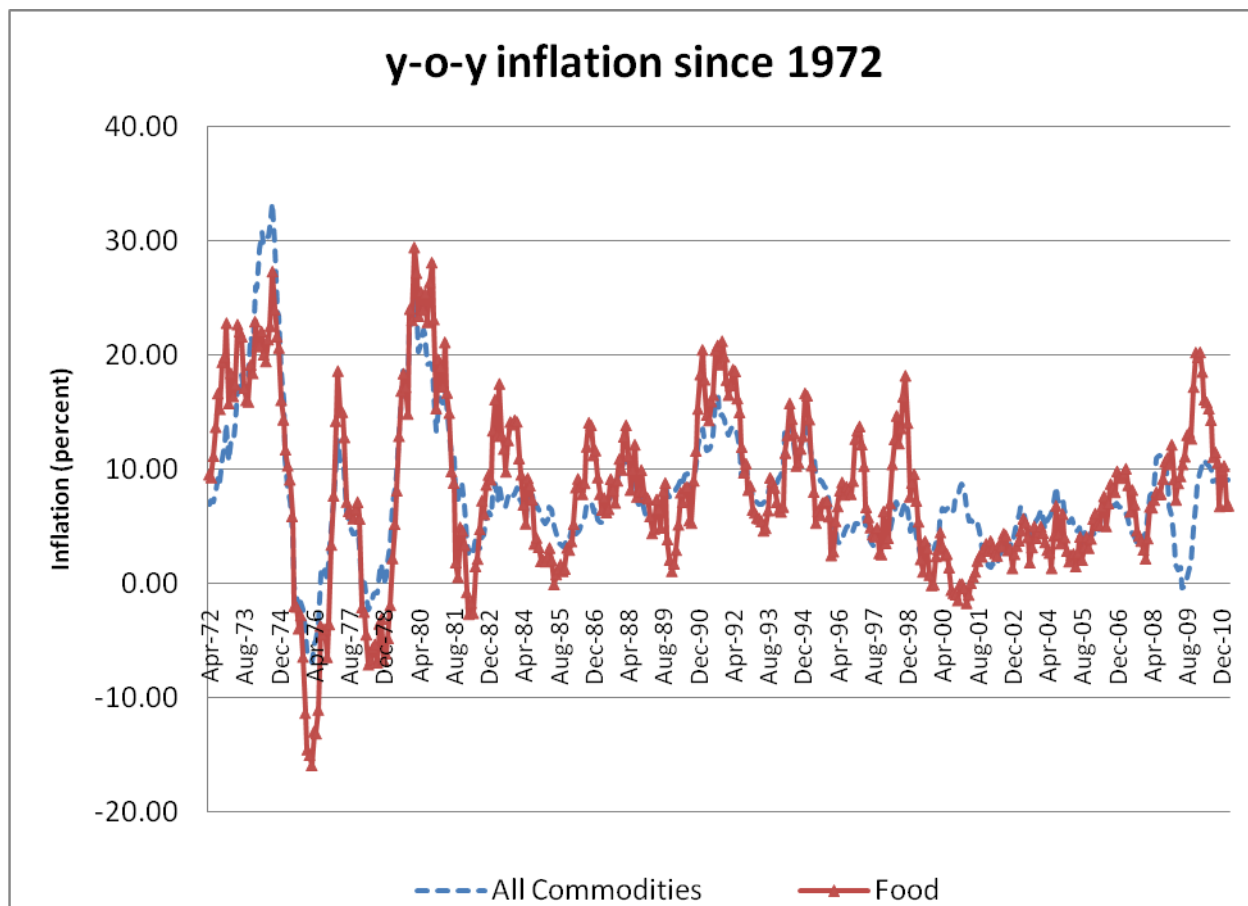
On the other hand, it also turns out that if we compute the inflation between the two indices between April 2006 and January 2011, there is little difference between the two. Hence, for policy and analysis, especially since our instruments for managing inflation are at best blunt, the differences between the wholesale price inflation and consumer price inflation are not sufficient to warrant preferring one over the other. With this digression behind us, let me now return to the main concerns of this paper.

As is evident from Figure 1, while inflation, both for WPI and food, is clearly on the rise since 2000, it seems to be distinctly less volatile than it used to be, for instance, before the mid 1980s. There is also a marked divergence between food and non-food inflation, since October 2008, as is clear from Figure 2.

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<sup>6</sup> I am grateful to M. C. Singhi, Senior Economic Adviser in the Ministry of Commerce and Industry, for suggesting this procedure for comparing the two data series and then doing the necessary statistical computation with remarkable competence. A similar exercise is being done in a paper-in-progress by Anant (2011), which is throwing up some rather interesting implications, including on the use and timing of monetary policy instruments.

Figure 1



Before 1982 we had some stretches of very low inflation but also peaks of a kind that, fortunately, we do not see any longer. This is in part a sign of learning on the part of government and the RBI, whereby they can manage price instability better than they did in the past but it could also be an indicator of the changing character of inflation.

Figure 2

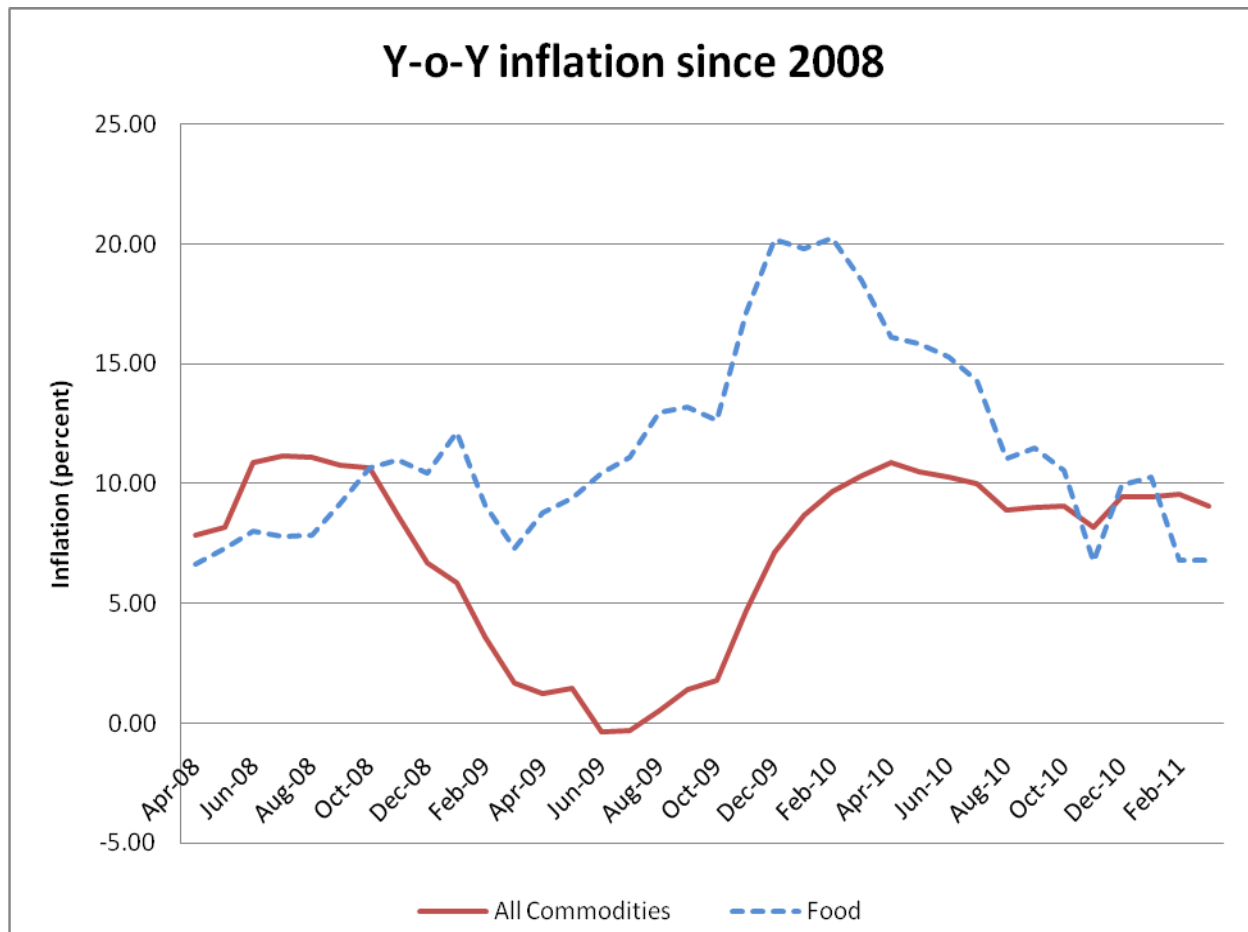
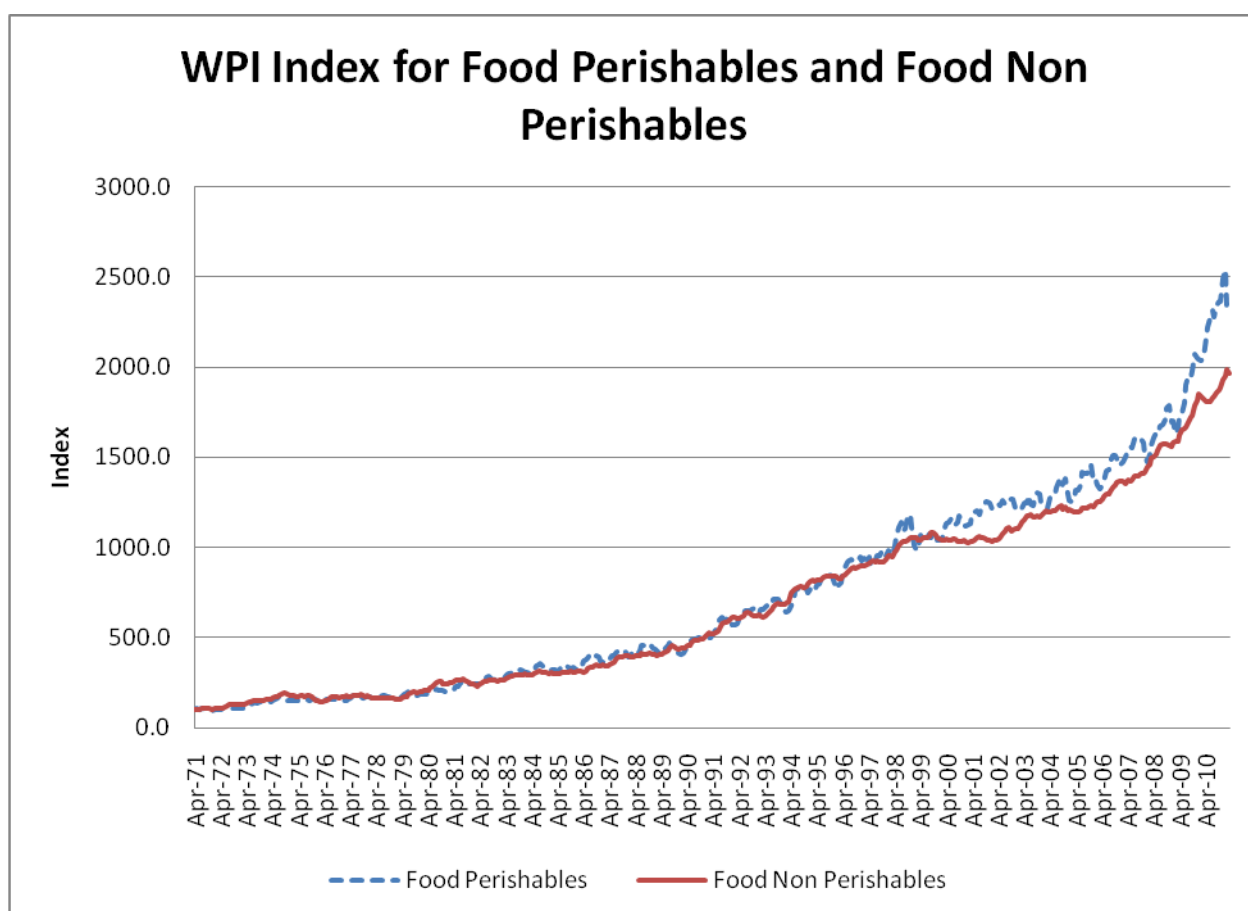


Figure 3 reveals another interesting pattern. In this figure we show the comparative price movements of perishable food items and non-perishable food items. Non-perishables can be stored and so, with rational individuals, we would expect people to store in times of plenty and draw on the stored food in times of shortage. This would lead us to expect less volatility and also less inflation, for non-perishables. The figure seems to bear this out, especially over the last decade. This underlines one important point. This makes us realize that hoarding food should not be castigated under all circumstances. It can lead to price stabilization. Also, for many big retail suppliers there is need to store food before

they can take them over to the retail outlets. A thoughtless use of the essential commodities act, treating all acts of storing and hoarding as unlawful, can do a lot of damage. The aim of the law should be to stop hoarding that is used by large traders to deliberately manipulate prices. Reactive hoarding in response to price cycles, on the other hand, has much to commend.

**Figure 3**



Some of the above discussion explains (albeit in a somewhat tautological way) why the difference between CPI inflation and WPI inflation has been more marked in recent times. However, this also points to a new-found resilience of the Indian economy. It is arguable that earlier, our overall inflation was powerfully

driven by the agricultural sector. What happened to food prices affected everything else and so the two indices moved more or less in tandem. Over time, the share of agriculture in the total GDP has fallen and the growing strength of the economy means that food prices alone may not be in the driver's seat the way they were for the first several decades after independence.

This has an immediate policy implication that is worth noting here. In controlling overall inflation, food prices may not be as important as they were in the past. Of course, controlling food inflation is important in itself, since such a large segment of India continues to be poor and any inflation in food prices hurts them disproportionately. This is discussed at some length in this year's **Economic Survey** (Government of India, 2011). But in controlling overall inflation, we have to turn our attention much more to macro demand management—fiscal and monetary—though, even here, we will need to look for newer channels of policy action.

Before going off the topic of food and commodities management and inflation<sup>7</sup>, it should be put on record that, even apart from the connection of commodities with inflation, this is a topic of considerable importance in itself. A lot of our basic commodities—foodgrains, kerosene and LPG, for instance—are supported through government subsidies. This is as it should be in a developing economy. The idea is that the poor need to be specially aided to get access to these critical items. However, most of this debate turns on the fiscal viability of the subsidy. What this misses out on is that *how* we administer this subsidy has huge implications for efficiency, even when it is fiscally neutral (Basu, 2011).

Consider foodgrains. Studies show that an astonishingly high fraction of the grain meant to be given to the poor and vulnerable through our Public Distribution System (PDS) get diverted, presumably sold off at illegal high prices or wasted. According to a study by Khera (2010), in 2001-02, 39% of foodgrain meant to reach the poor through India's PDS was lost to leakage and diversion. A

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<sup>7</sup> I have written on this elsewhere: Basu (2011). For related discussions see Dev and Sharma (2010), Himanshu and Sen (2011), Kotwal, Murugkar and Ramaswamy (2011) and McCorrison et al (2011).

more recent study by her (Khera, 2011; see also Jha and Ramaswamy, 2010) shows that the problem has got worse. In 2007-08, the diversion of foodgrain was at 43.9%. It had risen to as high as 54% in 2004-05. This disappointing story is mirrored in the fact that only a fraction of the poor get their food from PDS stores. In 2004-05 only 17% of the poorest quintile households received food from PDS stores. And for some poor states, such as Bihar and UP this figure is as low as 2% and 6% respectively (Parikh, 2011).

Clearly, this is unacceptable, since it tends to bloat fiscal expenditure, causing inflation across the board. We have to think of a major overhaul of our public distribution system and give subsidies, as far as possible, by making direct transfers to the poor, who should then be allowed to buy their food from any store, private and public. Fortunately, the government has taken steps to move towards a major overhaul, with the announcement in the last Union Budget, presented in February 2011, that we will move over to direct transfers to a targeted population, in lieu of the earlier system of trying to deliver subsidized for kerosene, LPG and fertilizers to all. There has also been some discussion in government arguing that improving supply chain management through modern retailing can help cut down the gap between farm gate price and retail price but there are also some voices of dissent on this (see, for instance, Singh, 2011)

A related but distinct problem occurs in the case of diesel and petrol. If we try to help consumers by holding the price of petrol low and constant, our consumers will not economize on petrol and switch to substitutes when petrol supply runs short and global price rises. By holding prices constant a major signal for altering behavior to suit changing supply conditions gets switched off. This is a much more important consideration than the impact on the fiscal deficit. Since till recently we have, by and large, held the price of petrol and diesel constant, we have contributed to these inefficiencies. People in India ply large luxury cars liberally, unmindful of when the global price of fuel is high and when low.

It should be pointed out that even the government indulges in a fair amount of this waste and this is harder to control through price changes. Since

many users of fuel do not have to pay for it out of their own pockets, they tend to use this resource without being adequately sensitive to the level of its price. This is an embarrassing topic and, maybe for that reason, is seldom talked about. But it is important to face up to these inconvenient questions so that we can devise new mechanisms to increase overall efficiency. A lot of our problems are rooted in these micro inefficiencies and we need to work to improve them. However, I shall now turn to the subject of macroeconomic policies for combating inflation.

### **3. The Paradox of Predicting Inflation and Controlling It**

Before turning to the subject of macro demand management I want to digress briefly and draw the reader's attention to another intriguing problem with inflation management. There are agencies, in every nation, that are entrusted with the task of both forecasting inflation and trying to adopt policies that keep inflation under control. A nation's central bank tries to do this as does the treasury or ministry of finance. But this twin tasking gives rise to an intriguing conundrum, which is specific to the social and economic sciences and has few parallels in engineering and the natural sciences, even though Heisenberg's famous uncertainty principle could be thought of as a counterpart to this from the natural sciences.

Discussing the effort of Herbert Hoover, the U.S. President, to boost confidence in the economy in the aftermath of the Great Crash of 1929, Ahamed (2009, p. 363) observes, "To some extent he was caught in a dilemma that all political leaders face when they pronounce upon the economic situation. *What they have to say about the economy affects its outcome—an analogue to Heisenberg's principle.* As a consequence they have little choice but to restrict themselves to making fatuously positive statements which should never be taken seriously as forecasts." (my italics)

This is an interesting observation, worth elaborating upon. I shall point out how, drawing on another mathematician-philosopher-scientist, L. E. J. Brouwer,



we can rescue ourselves from Ahamed's trap of forecasts "never be taken seriously."

It is widely believed and is arguably true that when a well-informed responsible government or quasi-government agency makes an inflation forecast that, in itself, can cause the course of inflation in the future to change. This is because, at least in the short run, the actual inflation rate depends, in part, on what people expect the inflation rate to be. Inflation can get worsened by the very fact of higher inflationary expectations and likewise prices can be stabilized, to a certain extent by virtue of leading people to expect that prices will be stable.

Thus, we often hear about how a policymaker stoked inflation by saying in public that inflation will go up. Usually, behind such an observation is the critique that no one should be so irresponsible as to fuel inflation by making such statements. But this immediately places the Central Bank and the Treasury in a dilemma that Ahamed (2009) alludes to and may be logically impossible to resolve.

To understand this, suppose that if no public forecast is made by the Treasury about future inflation, inflation will be 5% per annum. This is shown by the horizontal line, A', in Figure 5.

Now suppose, if the Treasury forecasts an inflation number, then this will influence human expectations and behavior in such a way that actual inflation will turn out to be halfway between 10% and what the Treasury forecasts.<sup>8</sup> This is shown in the Figure 4 by the upward-sloping line, B. In this figure, the horizontal axis refers to the forecast made by the Treasury and the vertical axis the actual inflation. For every inflation forecast of the Treasury, we can read off the actual inflation that will occur from line B. Let me, in brief, call all such graphs that plot the relation between forecasts and actual inflations as the "forecast function." A

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<sup>8</sup> It could be that people earlier expected inflation to be 10% but, on hearing the authoritative voice of the Treasury make a different forecast, they believe that actual inflation will be the average of 10% and the forecast; and this in turn makes them cut deals in the market in such a way that that is exactly the inflation that occurs.

more complex model with dynamic features would allow for adjustments to this forecast function based on the forecaster's past record of forecast accuracy. But I shall stay away from this here.

What is of interest here is note that the fact that the actual inflation moves with the forecast does not, however, mean that we can never make an accurate forecast. What we need to do is to look for the 'fixed points' of this forecast function<sup>9</sup>.

Assuming that the forecast function in the economy under consideration is depicted by graph B in the figure, let us ask what the Treasury should do. Assume for simplicity that inflation forecasts can only be a non-negative number.

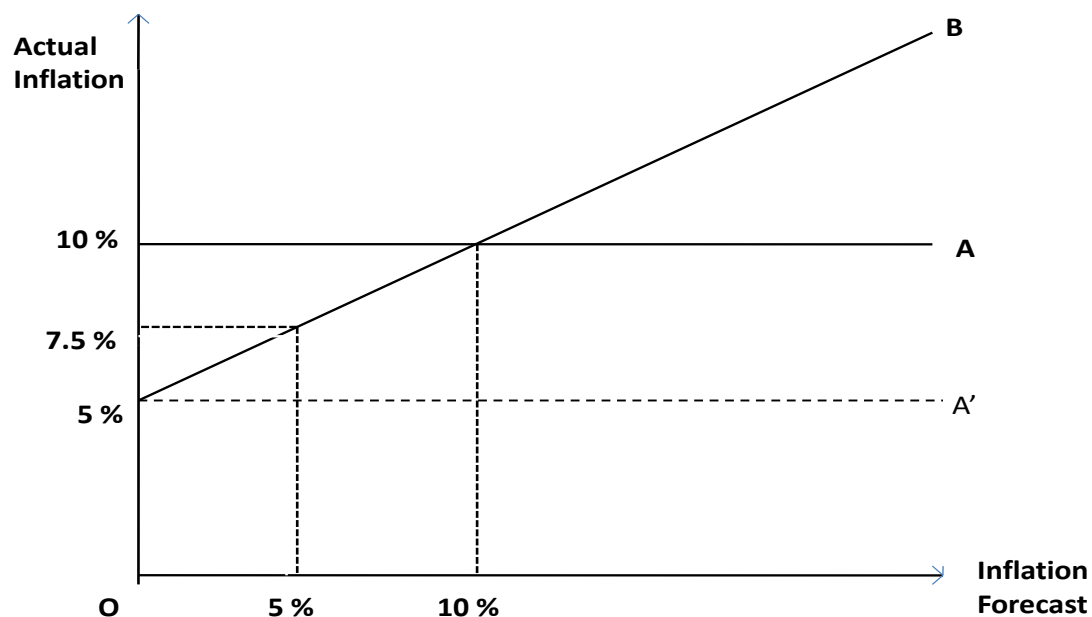
In this model when the Treasury tries to forecast inflation it has to treat its own forecast as one of the determinants of the inflation. If, for instance, it makes a forecast of zero inflation, actual inflation will be 5%. If it forecasts inflation to be 5%, actual inflation will be 7.5%. It is now easy to see that, if the Treasury wants to forecast inflation correctly, it has to make a forecast of 10% inflation. No other forecast will be borne out in practice. Basically, an accurate forecast is a search for the fixed points of the forecast function.

Now suppose that the Treasury takes its job of holding inflation down seriously. Then, keeping in mind that its own forecast of inflation is one of the causes of inflation, what forecast should it make. Clearly, it should forecast inflation to be 0%. The forecast will turn out to be false but inflation will be as low as possible, to wit, at 5%. So, the objective of accurate forecasting and the objective of inflation control, pull in different directions.

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<sup>9</sup> The somewhat frivolous reference to Brouwer, above, is because Brouwer specified a set of sufficient conditions under which a function will have a fixed point. If a forecast function has no fixed point, we are caught in the trap suggested by Ahamed. It is impossible to make an accurate forecast. Otherwise, we can make an accurate forecast but simply have to take account of the self-referential problem of the forecast itself influencing the outcome.

Figure 4



Therein lies the dilemma. It is not always possible to carry out both tasks that the Treasury is entrusted with, namely, accurately forecasting inflation and minimizing inflation. There are situations, as illustrated above, where an internal consistency problem arises between the two tasks. Do one task perfectly, the other gets thrown out of gear. Do the other task diligently, and the former gets out of control. This is not a problem specific to India or China or the US. This is a problem with the way the world is. There is no way to resolve this; all policymakers in a position to make publicly-observed forecasts have to live with this dilemma.

In case the forecast function is nonlinear and has more than one fixed point (that is, it cuts the  $45^{\circ}$  line in multiple places), then each fixed point would be an

accurate forecast. In such a situation the task of predicting inflation accurately and trying to keep inflation low can have significant content. It will simply mean that we should forecast the lowest value of inflation, which is also a fixed point of the forecast function.

Before moving away from this topic, it is worth digressing briefly on an interesting connection between expectations and government policy. In the above discussion, I did not elaborate on why greater inflationary expectations lead to greater actual inflation. One class of analysts have argued that widespread expectations of inflation lead government to behave in ways—such as running large deficits—that in fact help fulfill those expectations (Sargent, 1982; Mankiw, 2010, Chapter 13). One way to break this link is for government to visibly alter its rules of behavior, such as making an open and credible commitment to maintaining lower deficits in the foreseeable future.

#### **4. Benefits for the Poor and Inflation**

Let me now turn to more routine matters of inflation management and control. I will begin by examining a particular argument which was being used in India in the context of the last seventeen months of inflation, which began with a sharp upward rally of food prices. Food price inflation peaked in the early months of 2010, when it exceeded 20%. Non-food inflation would pick up a little later.

It has often been argued that the sharp rise in food prices in 2009 and the early months of 2010 were likely caused by the drought of 2009 which led to a decline in foodgrains production but also by the fact that government had considerably expanded income support to the poor, for instance, through the NREGS and loan waivers to poor farmers. This explanation has run into controversy. Unfortunately so, because much of the argument can be sorted out through pure economic theory.

The Deputy Chairman of the Planning Commission, Montek Singh Ahluwalia, has argued, as have several others (see, for instance, Government of

India, 2011), that the greater benefits given to the poor may have caused some of the initial food price inflation in 2009 and early 2010. Let me refer to this as the “benefits-based inflation hypothesis.”

This hypothesis has often given rise to a raucous debate with some misparaphrasing this into: “The poor are to be blamed for the inflation.” As far as I know no one has made that claim, so that can be safely put aside.

A more serious criticism of this claim that has been made may be summed up as follows:

*If it were indeed true that it is the greater demand for food on the part of the poor that caused the inflation, then we would expect to see the poor consuming more. But (so goes this argument) there is no evidence for this. Hence, the benefits-based inflation hypothesis is invalid.*

For ease of reference let me refer to this challenge to the hypothesis which is written in italics above as the “consumption-based challenge.”

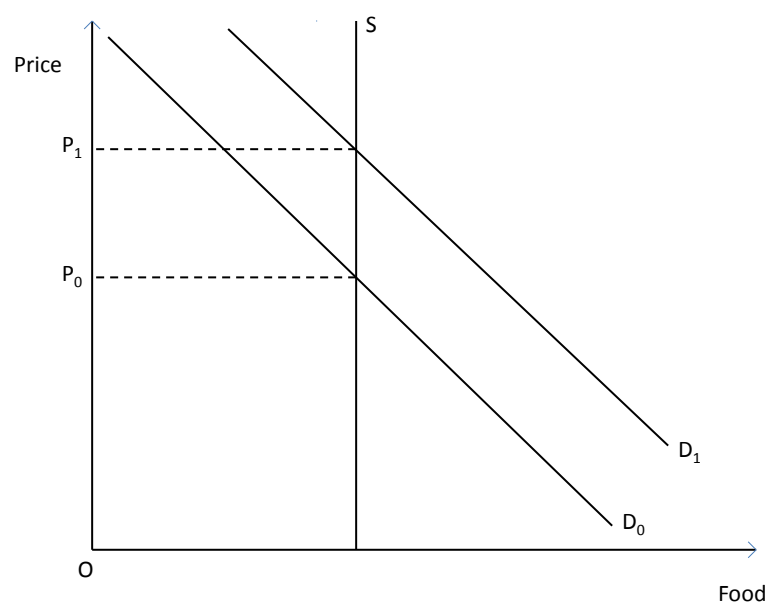
What is easy to see is that the consumption-based challenge, though interesting prima facie, does not stand up to scrutiny. And the benefits-based inflation hypothesis does have plausibility even though it may not be empirically established. To understand this, note that the poorest quintile of the rural population devotes approximately 67% of its consumption to food. We know this from 2004-05 NSSO household survey data (see Government of India, 2011). The rich spend nowhere near that proportion of their money on food. So, if money and financial benefits are diverted to the poor from the rich, it only stands to reason that the demand for food will rise in the nation. If that happens, the price of food will rise disproportionately. Since this is exactly what was happening in the late 2009 and early 2010, the benefits-based inflation hypothesis seems to have plausibility.

But then what about the consumption-based challenge, which claims that there is no evidence that the poor are consuming more food and that this destroys the thesis that redistribution in favour of the poor has contributed to

India's inflation? A little thought will show that there is no contradiction between the two. Even if we do not contest the claim that the poor have not been consuming more food, it is possible to maintain that their higher income is contributing to the higher inflation. To see this it is important to understand that a greater demand for food does not necessarily mean a greater consumption of food.

Let  $D_0$ , in Figure 5, be the aggregate demand curve for food of the poor people. Now suppose that the poor get an income supplement which raises their demand for food. Then the new demand curve will be like  $D_1$ . This however does not in itself mean that the poor will actually consume more. If the supply of food that is available to the poor is unchanged or, in other words, the supply curve of food is completely inelastic, then the increased demand will not translate into greater consumption of food but it nevertheless is the cause of food price rising. This is shown in Figure 5. It should be evident from the figure that the fact that the beneficiaries do not manage to consume more after their demand increases is the reason why prices rise even more. If the supply curve of food were merely upward sloping, instead of being vertical, the price increase would be less.

Interestingly, this phenomenon is also logically compatible with the poor becoming worse off, as we know from theoretical studies showing how the recipient of a benefit can end up worse off because his or her receiving that benefit causes such an adverse movement in the prices of goods that are consumed in large quantities by the recipient that the net benefit, in equilibrium, is negative (see also Basu, 1997, Chapter 5).

**Figure 5**

This, of course, does not resolve the empirical question: Are the poor actually worse off? While the answer to this is not germane to the argument here, from the piecemeal evidence that we have, it is possible to claim that the answer has to be no. The most recent round of NSS data shows that poverty in India has declined from around 37% in 2004 to approximately 32% in 2009 (using the Tendulkar measure of poverty in *both* cases). While 32% is still high and no reason for complacency, the sharp decline in poverty is commendable and suggests that the steps taken to transfer more buying power to the poor have had some effect<sup>10</sup>.

In conducting the above analysis, I have stayed clear of deeper general equilibrium questions. If the larger benefits for the poor are made possible by transfers from the rich, then there must be a deflationary pressure on prices of goods consumed primarily by the rich. So, while relative price of food may rise, why should overall inflation increase? Such questions take us to the heart of some

<sup>10</sup> For a general empirical investigation into inequality, poverty and inflation in India, see Mishra and Ray (2011).

of the most puzzling questions about the connection between the real and the financial economies, discussed by, for instance, Hahn (1982). In the discussions that follow I shall skirt around some of these matters. A full discussion of these still-unresolved matters of “money in general equilibrium” is beyond the scope of this paper. Luckily so, since it is also beyond the capability of the author.

## 5. Interest Rates and Liquidity

Inflation is one of those peculiar phenomena which, even without our understanding its causes and triggers anywhere near fully, we have learned several techniques for controlling. The controls are often imperfect and, further, each one comes with side effects<sup>11</sup>, which calls for some judgment regarding how strongly we can administer these medicines, but what is comforting is that, thanks to sustained research, we at least have several known antidotes.

It is worth clarifying that by inflation I am here referring to an overall increase in prices and not the relative price increases of some goods. When the price of some goods increases, we can respond by trying to supply more of those goods (by diverting effort from the production and supply of other goods). But if the prices of all or virtually all goods increase, there is little we can do in terms of supply, because there is no known way of suddenly providing more of all goods. If there was a way to do so, we should have done so already and made everybody better off. This is the reason why, when there is overall higher inflation, we have no choice but to turn to some form of demand management<sup>12</sup>, even while working on easing specific supply bottlenecks that may exist. The case for easing supply bottlenecks and enhancing productivity is there at all times, with or without inflation, since that increases welfare.

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<sup>11</sup> As Keynes noted (1940, p. 61), “There is no difficulty whatever in paying for the cost of the war out of voluntary savings, *provided we put up with the consequences.*” (my italics)

<sup>12</sup> This is broadly in keeping with the view expressed in V. K. R. V. Rao’s (1952) celebrated paper. For a critical assessment of this see Patnaik (2011).



Relative price increases are, for the most part, best left alone, unless there is evidence that these are caused by sudden collusive behavior or the artificial manipulation of markets by large sellers. Such relative price movements are the market's way to equilibrate demand and supply<sup>13</sup>. There is plenty of evidence from nations that would try to control relative price rises by government decree. The result would be the encouragement of black markets. And from regular markets goods would often vanish, with consumers queuing up for long hours to get rationed supplies of goods.

Inflation, on the other hand, is a mismatch between overall supply and overall demand and certainly demand appropriate policy action. Overall demand in the economy comes from many sources--corporates, farmers, labourers, housewives and government. So what any single agent can do is limited. Also, actions by other agents can undo what one agent does. This is what contributes to making inflation one of the hardest problems to manage—the emperor of economic maladies.

From the above description it is obvious that certain rather blunt instruments can curb inflation though their political economy is questionable. Since inflation is caused by aggregate demand exceeding aggregate supply at a certain point of time, one such blunt instrument is to redistribute some of the demand from that time to the future. This can be done by, for instance, confiscating from people a certain amount of their income for a certain duration of time. This can take the form of a 5% temporary income tax, which is then held by the government *without being put to use* (that would defeat the very purpose of withholding buying power) and eventually paid back to the taxpayers over the next 4 or 5 years, once the inflation eases out. This can have the side-effect of output declining in case producers realize that demand will decline as a

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<sup>13</sup> This is not to deny the substantial literature on non-Walrasian general equilibria, where markets clear without relative price movements (for a summary statement of this, see Basu, 1992). While theoretically these models are of great scope and challenge, they rely on elaborate systems of rationing that have few counterparts in our everyday economic life and so will be ignored here.

consequence of this move. But executed suddenly, it can curb the pressure on prices, though it is unlikely to make the government popular at the polls.

But before getting into matters of policy, we need to understand the causes of inflation at a more fundamental level. At an abstract, elemental level, inflation is the product of our ability to make contracts and deliver on promises. If we were a totally untrustworthy people, who never delivered on promises, we would not have inflation. Of course, we would also be crushingly poor and living in primitive conditions. But, if that is any comfort, there would be no inflation<sup>14</sup>.

While we think of promises mostly in bilateral terms, the most important 'economic' promise, one that has made modern civilization possible, is the mysterious promise represented by money—the note in your wallet or the bank balance in your account, which in itself is of no value but is a record of work you did for which you are yet to redeem goods and services. Money is nothing but a generic promise from society—government being the most important representative of that—that you will be able to change these useless bits of paper for actual goods and services in the future. It is this which enables the worker who toils all day to not insist that his employer hand over to her food, clothing, and shelter material in the evening in exchange for the hard work. Instead, she accepts money. Money is a kind of pledge to her by society at large. She can redeem that pledge at leisure and in small measures--buying food, shelter, education, as and when she needs these.

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<sup>14</sup> This should make us understand that in economics, as in medicine, all policies come with side effects. As Reddy (2011, Chapter 17) points out, the trade-off is not simply between growth and inflation but between these and financial stability. Interestingly, there are also connections to the policy of financial inclusion. In India, of the approximately 600,000 human habitations, only around 30,000 are fully serviced by commercial banks (Subbarao, 2011). The government's financial inclusion policy is a plan to bring most of these habitations into the ambit of formal banking. It is arguable that this policy will enhance the velocity of circulation of money by bringing into the financial system currency that was earlier lying dormant in the homes of village people. But to recognize that the policy of financial inclusion leads to an upward pressure on inflation does not mean that we should abandon financial inclusion. Likewise, to say that greater benefit directed to the poor will cause the price of essentials to rise does not mean that we should not give greater benefit to the poor. The fact that antibiotics administered to a patient suffering from pneumonia is likely to cause acidity does not mean that you stop giving the antibiotic but simply that you take additional precautions, if need be, to keep the acidity under control.

Money was not discovered one day in a moment of scientific triumph. It emerged gradually, in small measures and through little innovations. But in terms of human achievement it must stand right there at the pinnacle of inventions. Without it we would have very little of what we know today as human society and civilized life.

It was soon realized that, unlike most other products, where we encourage multiple producers to get into business and to have competition, money is one area where competition is not desirable. Since money entails a generic promise, it creates scope for free-riding in a way that does not happen for other goods. If there are many entities that can create money and the value of money is a public good, with competition we risk creating excess money, since at the time of creating money, the creator gets the value and the erosion of value in the future is borne by all.

It was soon decided that this is one area where, far from boosting competition, what we want is a monopoly. Each economy must have at most one money-creating authority. It was with this principle in mind that the Bank of England was created in 1694, though its monopoly rights to creating money would be firmed up much more clearly only at the time of renewal of its Royal Charter in 1742<sup>15</sup>.

Inevitably the central bank and the nation's treasury became the managers of a nation's liquidity and, through that, the value of money and the level of prices. In India, the major instruments for managing liquidity are the repo, reverse

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<sup>15</sup> It has been argued elsewhere (see Government of India, 2011, Chapter 2) that this principle of one-economy-one central bank has got weakened in recent times. With globalization the world economy is increasingly beginning to look like a single economy, but, to the extent that the world has many central banks with the right to create money, we are tending to get back to the kind of world we worked hard to get out of. This is one phenomenon (multiple money-creating authorities in an increasingly unique global economy) that is dramatically altering the nature of inflation in recent times. As Reddy (2011, Chapter 4) warned in 2009, the injection of liquidity around the world to jumpstart various economies caught in recession created the risk of inflation. Subsequent experience has borne this out.

repo and cash reserve ratio (CRR)<sup>16</sup>. This system has evolved over time. The main instrument of liquidity management, the Liquidity Adjustment Facility or LAF was introduced in 2000. The concept of repo auctions was introduced in May 2001. As Jalan (2001, p. 180) noted, the market responded to these changes positively “with an appreciable rise in turnover and a decline in volatility.”<sup>17</sup>

It is interesting to check how well these policy instruments have succeeded in controlling inflation. In India, government does not control interest rates, excepting a few, such as the basic savings account interest rate for bank deposits. In adjusting the repo and reverse repo rates it is expected that these changes influence the behavior of banks and cause the free market interest rates, for instance, on mortgages, fixed deposits and other lending plans, to move in similar directions<sup>18</sup>. Hence, through the adjustment of repo and reverse repo rates the RBI manages to influence interest rates in general<sup>19</sup>. The idea is that this in turn will influence liquidity and, through that, inflation.

In the accompanying Figure 6, we track the repo rate, the reverse repo rate and inflation. It is immediately evident that, while there is some connection between the two, especially with some appropriate time lags put in, there is also a lot of noise.

There can be no doubt that the reckless fuelling of demand by a nation’s treasury or the central bank can fuel inflation. When, in 1923, Rudolf von

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<sup>16</sup> From now on, there will be no reason to treat the repo and reverse repo as separate variables, since at the time of the last monetary policy review, on 3 May, 2011, the Reserve Bank of India declared that it was freezing the spread between the repo and reverse repo at 100 basis points. If the repo is set at  $x\%$ , by definition the reverse repo will be  $(x-1)\%$ .

<sup>17</sup> For an analysis of the Indian repo market, see Bandopadhyay (2009).

<sup>18</sup> This does not happen in a mechanical fashion. Indian banking, in this sense, is not “boring” (Subbarao, 2011). There is nevertheless a link and a certain amount of pass through between inter-bank interest rates and bank to customer interest rates.

<sup>19</sup> Recently, the RBI has also tried to use the savings account interest rate as a monetary policy instrument, raising it in May 2011 from 3.5% to 4.0%

Havenstein, the president of the German Reichsbank (the predecessor of the Deutsche Bundesbank), acquiesced to the government's demand to spend more by recklessly printing money, it was but inevitable that Germany would get embroiled in hyperinflation. On 17 August 1923, von Havenstein proudly announced that he would soon be issuing new money in one day equal to two-thirds of the money in circulation. He kept his word and Germany paid for it. Yet, in the relation between liquidity, as controlled by the central bank and the government, and prices there is a lot of white noise.

The noise is important. It illustrates that there is much more to liquidity than what can be controlled through central bank action or the policies of the Ministry of Finance. What the corporates, the banks, the farmers and ordinary individuals do can also effect liquidity and, through that, the level of inflation<sup>20</sup>.

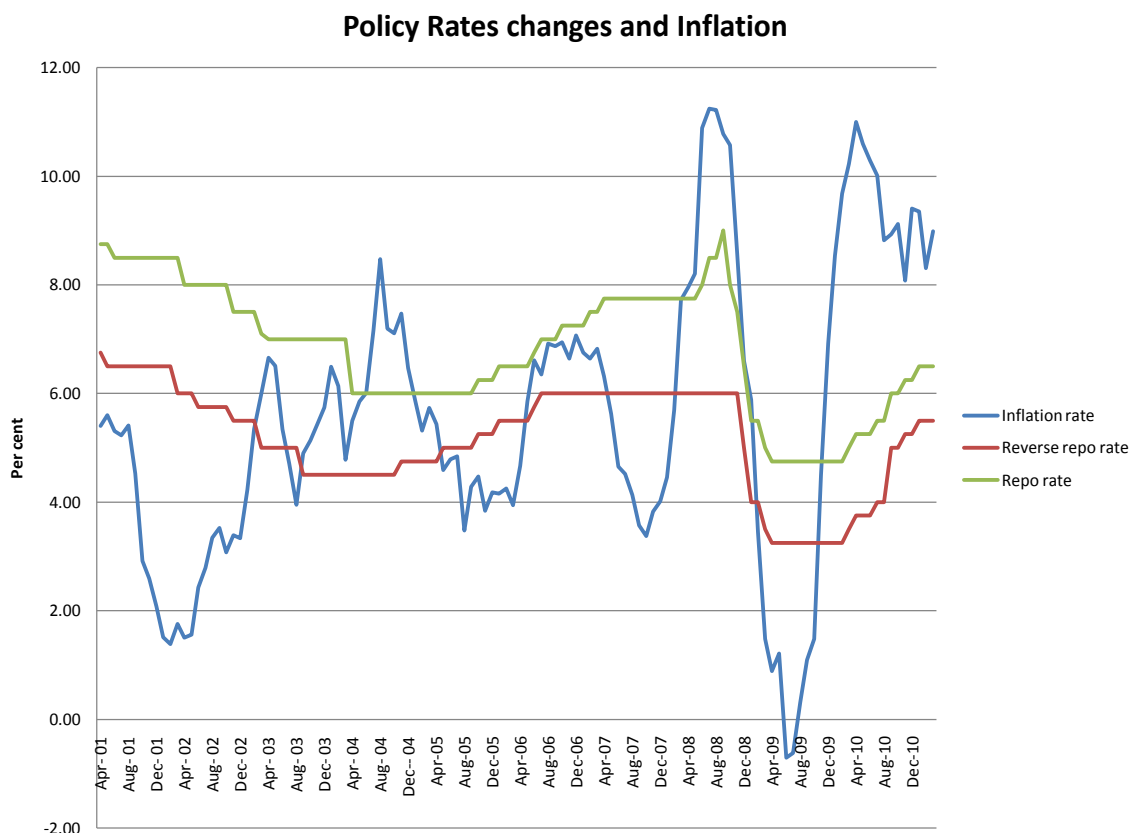
The management of inflation cannot be reduced to a mechanical engineering problem, where the formula connecting what is to be done by the government or the RBI and what will be achieved is written in stone<sup>21</sup>. For instance, a period of financial integration, when ordinary people begin to keep their money in banks or in mutual funds, instead of keeping it under the pillow at home, can cause the velocity of circulation of money to rise, thereby putting upward pressure on prices.

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<sup>20</sup> Inflation can also be affected by changes in the exchange rate regime and policy concerning capital account convertibility (for discussion, see Tarapore, 2001). These are however not discussed in the present paper. Further, in recent years there has not been any major shift in these policies for that to be an important factor in explaining shifts in the inflation rate.

<sup>21</sup> For philosophical accuracy it may be pointed out that even in engineering it is not written in stone, though the relationships are more stable there than in banking science.

Figure 6



Equally, there are stretches of time, when emerging economies face financial deepening, with decreasing velocity of circulation. These are usually endogenous changes in the economy and may have little to do with explicit central bank action (see Lall, 2011).

It is assumed in popular discourse that if interest rates are raised, the demand for credit will go down; and hence the total amount of liquidity in the system will be less. This is generally true. However, it can be shown that in certain contexts the opposite will occur. Consider the standard description of a credit market where the demand for credit is downward sloping while the supply of credit is upward rising, as shown in Figure 7. This simply means that, as the

interest rate is raised, people will be prepared to save more and hence supply more credit. On the other hand, those seeking to borrow money, say, to invest in projects will now want to borrow less. It is the latter that leads to the standard wisdom that you can curb liquidity by raising interest rates.

Suppose the existing interest rate is at or above  $r^*$ , that is, in the zone where there is 'excess liquidity'<sup>22</sup>. Then this standard logic works well. Raise the interest rate and the supply of credit will rise and the demand for credit will decline. Since in this region the demand is the binding constraint, it is a decline in demand for credit that is of consequence. In other words, aggregate liquidity dries up and, hopefully, this has a sobering effect on prices. While the direction of this effect is right, it is important to point out that how effective the interest intervention is depends on the elasticity of the demand curve for credit. It is arguable that if a large part of a nation's credit demand comes from the government, then, since governments are usually not very cost conscious and hence not interest sensitive, then the demand curve for credit will be less elastic and one will need a larger increase in the interest rate to achieve the same mopping up effect as in a nation or a context where the bulk of the borrowing is done by private agents. Whether the effect is robust or feeble, it is evident that in an excess liquidity situation, an interest rate increase impacts on aggregate credit usage in the expected direction, that is, it causes it to increase.

There is, however, no reason why we should assume that the initial interest rate prevailing in the economy will always be at or above where the demand and supply curves intersect. Credit markets are subject to interventions by central banks and the government, and they also have other external rigidities, which can deflect the interest rate from the neoclassical market equilibrium rate  $r^*$  to a rate where demand is not equal to supply, in particular, to a rate below  $r^*$ , that is, a zone where there is 'liquidity deficiency'. There are also endogenous explanations

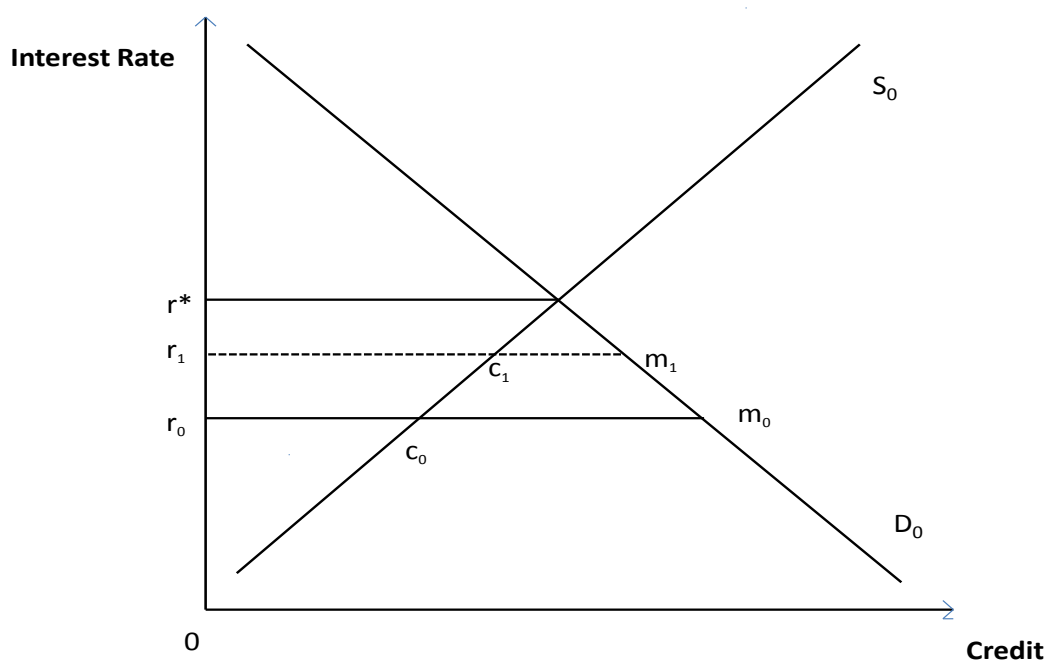
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<sup>22</sup> The analysis from here till the end of this section was deeply influenced by my discussion and correspondence with D. Subbarao, Governor of the Reserve Bank of India. However, the argument presented here and the positions taken are mine and do not necessarily reflect the views of the Reserve Bank.

for why the credit market may not clear in equilibrium and, in particular, market imperfection can lead to credit rationing (Stiglitz and Weiss, 1981). Hence, it is possible that the initial interest rate is below  $r^*$ .

Let us now see what would happen if that were the case. Suppose, specifically, that the interest rate is at  $r_0$  in Figure 7. So, the demand for credit exceeds the supply of credit. Now suppose the government or the central bank raises the interest rate, suppose to  $r_1$ . What happens to total credit in the economy? To answer this note that the demand for credit falls and supply rises. However, since it was the supply that was the binding constraint, this rise in interest means that the total amount of money lent in the economy will increase. In this case the total credit goes up from  $r_0c_0$  to  $r_1c_1$ .

**Figure 7**





Since there was excess demand for credit in the original equilibrium a small decline in demand is of no consequence. Hence, we get a paradoxical response to the interest rate tightening, whereby there is no reduction in liquidity and, in fact, a possible increase in liquidity, assuming that the supply curve of credit is upward sloping. Lillienfeld-Toal, Mookherjee and Visaria (2011) have reported on some empirical corroboration of this and a similar line may also be found in a recent review in the **Economic and Political Weekly** (see EPW Research Foundation, 2011, section 1.4). This has important policy implications. If we are in a predicament where raising interest rates has a feeble effect on inflation, we may consider using this policy more aggressively; but if we are in an economic context where interest rates have no effect on liquidity, or have a pathological reverse effect on liquidity, then we may have to desist from using this policy and look to other kinds of interventions.

It should however be kept in mind that there is a difference between raising the call money rate (maybe via interventions in the repo market) and raising the cap on the interest rate on ordinary bank savings.<sup>23</sup>

There is also the open question concerning the very concept of liquidity. Why should the fact of banks lending more mean greater liquidity? After all, greater lending simply means an altered portfolio of assets for people and not an increase or decrease in assets. This refers to some deep theoretical issues regarding the difference between money and various forms of near monies—deep enough to be considered beyond the pale of this paper.

This is also related to a fascinating question about the units into which a nation's aggregate money supply is divided. This is easy to see by considering the polar case. If the entire amount of currency in circulation in the nation (that is,  $M_0$  minus bankers' and other deposits with the central bank) consisted of one large-

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<sup>23</sup> The argument may also hinge critically on what the cause of the interest rigidity is, in the first place. It is possible to argue that my analysis does not work, at least not in any straightforward manner, when the initial rigidity is caused by the Stiglitz and Weiss (1981) type of argument. But, minimally, this warns us that the nature of connection between interest rate and liquidity may be more complex than is popularly assumed. And it points to the need for research on the intricate connection between interest rates and liquidity.

denomination note (the denomination being the size of aggregate currency in circulation), clearly this would be a very illiquid nation. And unless there was some sophisticated substitute for signing contracts for exchange over time, most people would be starved of money at all times, since there is only one note in the hand of one agent. It immediately follows that not only do the monetary aggregates in the nation matter, a lot depends on how finely these aggregates are broken up—into notes of thousands, five-hundreds, hundreds and so on. In fact, it is arguable that it is the granularity of the aggregate money that matters more than the aggregate money, when it comes to the measure of liquidity and inflationary pressure.

What the above analysis does is to warn us about possibilities. Economic theory simply alerts us to the need for empirical and statistical analysis to make sure that overall conditions in the economy are appropriate for us to use interest rate tightening as a measure for controlling inflation. The theory also tells us where the empirical study ought to be focused. In this case, we are told to check out the prevailing conditions in the credit market, in particular, whether or not there is excess demand for credit, before we use interest-rate tightening to control inflation. It warns us that there exists situations where interest-rate tightening will have no effect and we will be paying the cost of such tightening, without the attendant benefit of reduced inflation.

It is also worth remembering that the zone in which the economy is situated can change rapidly. Suppose that in India in early 2010 the economy was in the excess liquidity zone, that is, the prevailing interest rate was at or above  $r^*$ . Once the celebrated 3G auction was begun in India, firms were scrambling to raise credit in order to be able to bid for spectrum. In other words, this auction caused the aggregate demand for credit to rise. That is, the curve,  $D_0$ , to shift to the right. Note that this could easily mean that the economy shifted from the excess liquidity to the liquidity deficient zone, even without any change in the interest rate. Did the 3G auction actually cause this? The answer is we do not know. But the direction of move of the demand curve must have been exactly as explained above. To know whether this caused a zonal shift would require

empirical investigation. What this paper tries to do is to draw our attention to the kinds of questions that deserve empirical theoretical investigation and how the efficacy of standard monetary policy could depend critically on the results that such an investigation yields.

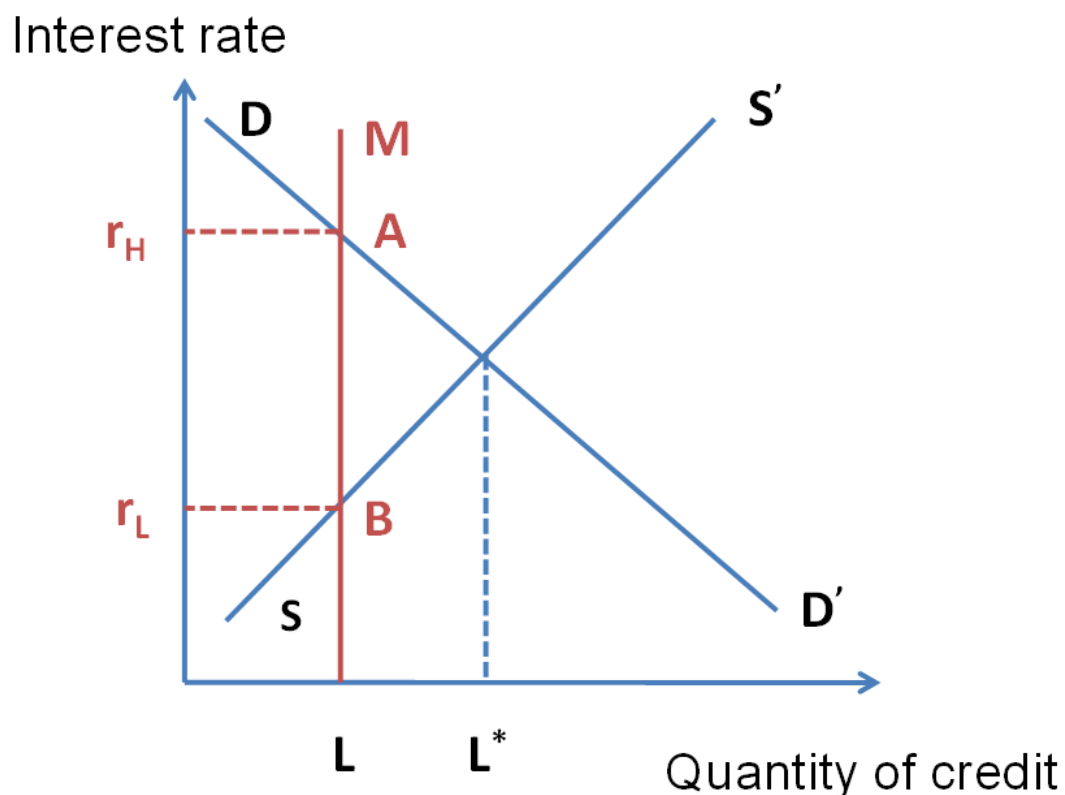
## **6. A Digression on Capital Controls**

The above analysis draws our attention to the importance of detail in designing economic policy. Minor flaws can have large unintended consequences. This is a nice occasion to illustrate a similar point about policies to restrict capital flows. There are contexts where it is reasonable for a nation to place restrictions on capital flows. Even the IMF has recently endorsed the need for such restrictions in certain situations.

Suppose for some form of credit, the Indian demand and the international supply are as illustrated in Figure 8. This could be the case of ECBs. For simplicity let me go along with a simple neo-classical analysis. Left to itself, the amount of borrowing that would occur in this market is shown by  $L^*$ .

Let us now suppose that government decides that so much of foreign borrowing is undesirable and we should restrict the total borrowing to  $L$  instead, as shown in Figure 8. Hence, government decides to place a restriction on debt inflows into India to ensure that the total flow remains within  $L$ . I am not here questioning the merit of this decision, but simply taking it as given. The aim is to illustrate how different microeconomic ways of achieving this macroeconomic target can have very different implications for the economy.

Figure 8



Suppose that government decides to implement this limit by restricting the *supply* of credit that comes into the nation. This will leave the demand curve,  $DD'$ , unchanged but the supply curve will be now given by  $SBM$ . By locating the point of intersection between the new supply curve and the demand curve, it is easy to see that the total credit will be  $L$ .

An alternative intervention is to leave the supply unchanged but place restrictions on the aggregate *demand* for credit by suitably rationing the amount that Indian firms can borrow. In this case the supply curve remains  $SS'$ , whereas

the demand curve becomes DAL. Once again the total credit coming into India will be L.

Both interventions achieve the objective of limiting credit flows into India, but there is one big difference. In the former intervention, the interest rate will be  $r_L$ , whereas in the latter intervention, the interest will be  $r_H$ . Thus, in one case Indian borrowers get to have credit at a much lower interest rate than in the other case, with large implications for efficiency, corporate profitability and growth. Evidently, a policy intervention without careful attention to detail can easily have us make a mistake on this.

## 7. Salad Bowl Stagflation

Another problem of using standard macro-economic demand management for controlling inflation that we have to contend with in today's altered world has to do with globalization. In our increasingly flat world, there is need to worry about thy neighbour's money in a way that we never had to in the past (see, for instance, Subbarao, 2011a). One gets a sense of this by looking at the landscape of growth and inflation across the nations<sup>24</sup>. It becomes quickly evident from such a study that the world is suffering from stagflation, albeit of an unusual kind. One sees evidence of stagnation in virtually all industrialized nations, including the U.S., European countries and Japan; and one sees inflation on a high in virtually all emerging market economies, including India, Argentina, Brazil, Vietnam and China. In other words, what we have is a world economy in which some parts are caught in a "stag" mode and some in "flation" mode, which may together be referred to as 'salad bowl inflation'.

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<sup>24</sup> I have in this paper, for the most part, stayed away from the classic debate about macroeconomic trade-offs between inflation and other growth related variables. A recent paper by Dholakia and Sapre (2011) finds little evidence of the traditional Phillips curve type negative relation between inflation and unemployment in India and the paper argues that a strategy of fast recovery from adverse shocks is unlikely to give rise to inflation, thereby implicitly suggesting that, if there is inflation as is the case at the time of writing this paper, its cause is not the growth recovery but lies elsewhere.

This has much to do with the nature of contemporary globalization. Following the recession of 2008 and the painfully slow recovery in most industrialized nations, these nations are continuing to resort to liquidity easing and monetary expansion in order to boost demand. As Ahluwalia (2011a) noted, this was not the outcome of a formal agreement but was facilitated by the informal process of the G20. However, instead of boosting demand, as would happen pre-globalization, now a large part of the extra liquidity is flowing to emerging market economies that have growth potential and the ability to use money. The resort to QE2 by the United States economy is the most discussed such action. But there have been similar actions across the board in developed market economies, all amounting to a combination of keeping interest rates low and expanding money supply. However, this extra liquidity, instead of fuelling growth in industrialized nations, has arguably gone over to the emerging economies which are already growing well and fuelled inflationary pressures<sup>25</sup>. This is what lies behind the salad bowl stagflation that we see in the world today. It must, however, be pointed out that, unlike in the pre-Lehman days, there is no evidence of disproportionate *direct* capital flows into India from the U.S. There are, however, indirect channels through which global liquidity can put upward pressure on prices.

There is one reason to expect that this is going to be a stubborn problem. This is because the U.S. Fed is caught in a bit of a bind. Much of its quantitative easing process consisted of buying up long term securities. QE2 consisted of buying up 600 billion dollars worth of long-term bonds. This was financed by using the short term credit in the form of borrowing from the excess reserves with private banks. These reserves could be borrowed at very low interest rates,

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<sup>25</sup> There has been a lot of soul searching in the US in recent times about the slow decline in unemployment rate and the paucity of new job creation. It is arguable that this is a natural side effect of low interest rates and abundant liquidity. Given that productivity is rising, what this indicates is that firms are using relatively more capital intensive techniques because of the availability of cheap capital. Even during the Great Depression in the United States, the last indicator to pick up was employment. Even in 1936, seven years after the Great Crash, job creation was weak. This becomes less worrying once one realizes that it is a natural side-effect of the effort to jump-start an economy by easing credit.

usually 75 basis points. The long-term bonds, on the other hand, fetch the Fed interest as high as 3 percent. This made for large profit and windfall gains for the Fed. Indeed, last year, the 12 Federal Reserve banks of the U.S. posted an aggregate profit of over \$80 billion. There is however a downside catch to this.

If, in an effort to tighten liquidity, the Fed decides to raise interest rates, its cost of borrowing will rise, since the Fed is using short-term borrowing to finance its long-term debt. This can cause a deterioration in its balance sheet. It is only natural that it will resist making a move that results in such deterioration. This implies that the Fed's easy money policy may end up lasting longer than it might have otherwise.

Another matter that will feed into this brew over the next months and may be longer is the expected revaluation of the renminbi. There are signs that China intends to do this and from China's point of view, this is the right policy. China's exchange rate policy has been widely misunderstood. If it were true that China would perpetually keep its currency undervalued and so, effectively, sell its products to the world at below cost price, this would be of no concern to other nations. However, that would be foolish of China to do this. What it is instead doing is good strategy and is best understood by considering habit goods. Certain products are habit forming, such as a newspaper. Once you get used to a newspaper, you prefer to read that newspaper instead of another one. For habit goods, the right strategy for the producer is to sell the product initially for a special low price, if need be below cost, in order to get customers used to it, and then, later, to raise the price and make up for the initial losses.

Buying from a particular country is a habit good. There are so many idiosyncracies associated with each nation's bureaucracy and infrastructure that once we get used to buying from a nation, it is not worthwhile to easily switch to another. China has played this strategy just right. Nations have got used to buying from China, even though China profited little from this and may even have incurred a loss. But this strategy would be useless unless you subsequently raise the price and redeem your losses of cheap selling. So we have every reason to

believe that this is what China will do and we will see a steady revaluation of the renminbi.

Given that many nations have asked for this, why should this be of worry? The answer is because this will also mean increased consumption on the part of China, as it redeems its earlier losses. This in turn will create an upward pressure on prices, which was not there when China was in its undervaluation mode.

Hence, the problem of salad bowl stagflation is likely to last for some time and the need for coordination of macro-demand management policies across nations becomes that much more urgent. What the world is currently caught in is best understood by imagining the Indian economy in which we have high interest rates in Gujarat and low interest rates in Bihar. This would give rise to perverse capital flows from one region to another. The global economy being virtually a single economy, the current predicament of very different interest rates across nations is a similar situation. All that this emphasizes is that, like so many other domains of policymaking in the modern world, there is now need to achieve a higher degree of coordination in policies pertaining to macroeconomic demand management across nations. Till this is achieved we have to continue to use our somewhat impaired instruments of country-specific demand management to keep a control on inflation. In the long run however there is no escape from using multi-country agencies, such as G20, to work collectively to address problems such as that of inflation in emerging economies and stagnation in developed economies.

Collective global action on this will not be easy because, as this paper in fact argues, this is an area where our understanding of the complex economic processes and interlinkages is as yet limited. As Subbarao (2011a, p. 874) observes, “[Because] our understanding of spillovers and best practices remains limited, it is far too early to think of reaching new formal agreements on policy behavior.” So what we can hope for at this stage is the exchange of information and peer review and informal agreements along the lines of what G20’s Mutually Assessment Process (MAP) is attempting. What we just argued is that



international coordination is important not just for achieving strong, sustainable and balanced growth as the MAP attempts but also for the containment of excess liquidity and inflation.

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**Table 1.** Inflation in India, 1972-2011

	All Commodity	Combined Food *		All Commodity	Combined Food *
Apr-72	6.88	9.53	Apr-75	8.41	10.30
May-72	7.23	9.27	May-75	7.09	9.08
Jun-72	7.07	11.14	Jun-75	4.04	5.88
Jul-72	8.11	13.69	Jul-75	-0.34	-2.00
Aug-72	9.51	16.62	Aug-75	-1.17	-2.05
Sep-72	8.93	15.24	Sep-75	-2.47	-3.95
Oct-72	10.98	19.37	Oct-75	-1.66	-2.80
Nov-72	12.27	19.82	Nov-75	-2.31	-6.43
Dec-72	13.96	22.78	Dec-75	-4.19	-11.35
Jan-73	10.75	15.76	Jan-76	-5.94	-14.55
Feb-73	12.71	18.39	Feb-76	-6.36	-15.02
Mar-73	12.77	16.38	Mar-76	-6.87	-15.92
Apr-73	13.89	17.38	Apr-76	-5.25	-12.96
May-73	16.96	22.65	May-76	-4.99	-13.14
Jun-73	17.13	22.04	Jun-76	-3.54	-11.06
Jul-73	18.24	21.60	Jul-76	0.91	-3.71
Aug-73	16.70	17.09	Aug-76	0.51	-4.49
Sep-73	16.57	16.04	Sep-76	1.13	-3.98
Oct-73	17.67	15.89	Oct-76	0.28	-6.45
Nov-73	21.61	19.12	Nov-76	1.90	-3.58
Dec-73	20.78	18.39	Dec-76	4.85	3.37
Jan-74	25.99	22.91	Jan-77	7.45	7.67
Feb-74	25.87	20.75	Feb-77	10.86	14.21
Mar-74	29.20	20.78	Mar-77	12.48	18.59
Apr-74	30.69	22.05	Apr-77	10.77	15.06
May-74	29.70	20.02	May-77	10.69	14.98
Jun-74	30.16	19.42	Jun-77	9.80	12.79
Jul-74	30.33	21.35	Jul-77	6.25	7.13
Aug-74	31.17	22.53	Aug-77	5.55	6.33
Sep-74	33.33	27.30	Sep-77	4.85	6.13
Oct-74	29.45	23.97	Oct-77	4.28	5.68
Nov-74	23.76	21.61	Nov-77	4.30	6.50
Dec-74	23.43	20.62	Dec-77	4.68	7.12
Jan-75	18.49	16.04	Jan-78	3.19	5.65
Feb-75	15.94	14.33	Feb-78	-0.71	-2.11
Mar-75	10.86	11.71	Mar-78	0.00	-2.49

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-78	-0.87	-4.47
May-78	-2.29	-7.10
Jun-78	-1.91	-6.66
Jul-78	-1.01	-5.63
Aug-78	-0.80	-5.33
Sep-78	-0.85	-6.93
Oct-78	1.19	-3.52
Nov-78	1.68	-3.11
Dec-78	-0.11	-6.73
Jan-79	0.60	-6.15
Feb-79	1.82	-4.81
Mar-79	3.39	-1.90
Apr-79	7.12	2.19
May-79	8.41	5.19
Jun-79	9.58	8.12
Jul-79	13.33	12.89
Aug-79	16.91	16.85
Sep-79	18.54	18.36
Oct-79	18.51	17.17
Nov-79	18.40	14.83
Dec-79	22.44	24.01
Jan-80	22.68	23.02
Feb-80	25.23	29.40
Mar-80	23.32	27.16
Apr-80	20.20	23.38
May-80	20.91	25.51
Jun-80	22.13	23.94
Jul-80	21.78	25.35
Aug-80	19.13	22.85
Sep-80	19.26	26.35
Oct-80	19.08	28.07
Nov-80	16.49	23.10
Dec-80	13.26	15.32
Jan-81	15.59	19.60
Feb-81	16.21	18.94
Mar-81	15.78	17.20

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-81	17.32	21.10
May-81	15.79	16.68
Jun-81	13.19	14.92
Jul-81	11.02	9.80
Aug-81	11.10	8.80
Sep-81	7.96	1.82
Oct-81	7.37	0.55
Nov-81	8.86	4.91
Dec-81	8.71	4.61
Jan-82	6.80	3.36
Feb-82	3.68	-0.77
Mar-82	2.63	-2.67
Apr-82	3.26	-1.70
May-82	2.84	-2.59
Jun-82	4.05	1.50
Jul-82	3.01	2.13
Aug-82	3.10	4.75
Sep-82	4.20	7.25
Oct-82	4.16	6.05
Nov-82	5.72	8.63
Dec-82	6.18	9.51
Jan-83	5.88	9.08
Feb-83	7.80	13.37
Mar-83	8.72	16.10
Apr-83	7.21	12.90
May-83	8.66	17.47
Jun-83	7.34	12.97
Jul-83	7.06	11.76
Aug-83	6.70	9.77
Sep-83	7.58	12.52
Oct-83	7.98	14.12
Nov-83	7.66	13.91
Dec-83	7.77	14.28
Jan-84	8.32	14.15
Feb-84	7.40	10.94
Mar-84	7.19	9.51

	All Commodity	Combined Food *
Apr-84	6.54	6.88
May-84	5.71	5.22
Jun-84	7.29	9.20
Jul-84	7.75	8.56
Aug-84	7.69	7.32
Sep-84	6.52	3.45
Oct-84	6.87	4.00
Nov-84	6.41	3.19
Dec-84	5.89	1.94
Jan-85	5.58	2.06
Feb-85	5.23	1.93
Mar-85	5.57	2.34
Apr-85	6.66	3.10
May-85	6.43	2.01
Jun-85	4.95	-0.09
Jul-85	4.22	0.79
Aug-85	3.53	1.26
Sep-85	3.39	1.66
Oct-85	3.21	1.07
Nov-85	3.22	1.27
Dec-85	4.07	3.12
Jan-86	3.97	2.94
Feb-86	4.89	3.68
Mar-86	5.12	5.21
Apr-86	4.30	8.39
May-86	4.59	9.16
Jun-86	4.80	8.48
Jul-86	5.48	7.82
Aug-86	5.87	8.78
Sep-86	6.72	11.96
Oct-86	7.02	14.07
Nov-86	7.11	13.85
Dec-86	6.23	11.22
Jan-87	6.68	11.63
Feb-87	5.53	9.27
Mar-87	5.34	7.82

	All Commodity	Combined Food *
Apr-87	5.37	6.44
May-87	5.93	7.49
Jun-87	6.10	6.21
Jul-87	5.87	6.51
Aug-87	8.09	9.13
Sep-87	8.17	8.14
Oct-87	7.98	7.05
Nov-87	9.03	8.99
Dec-87	9.69	10.89
Jan-88	10.06	9.95
Feb-88	10.70	12.84
Mar-88	10.66	13.84
Apr-88	10.70	11.15
May-88	9.52	8.19
Jun-88	9.42	9.95
Jul-88	9.74	12.14
Aug-88	7.07	7.58
Sep-88	6.93	8.03
Oct-88	7.73	9.93
Nov-88	6.57	8.03
Dec-88	6.10	7.55
Jan-89	5.48	7.42
Feb-89	5.41	5.87
Mar-89	5.45	4.38
Apr-89	5.60	4.78
May-89	6.37	7.35
Jun-89	6.18	6.50
Jul-89	5.96	4.85
Aug-89	7.90	8.06
Sep-89	9.07	8.79
Oct-89	7.88	3.85
Nov-89	7.58	2.07
Dec-89	7.55	1.06
Jan-90	7.83	1.73
Feb-90	8.27	2.91
Mar-90	8.62	5.14



	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-90	9.09	7.94
May-90	8.73	7.10
Jun-90	9.47	8.35
Jul-90	9.60	8.44
Aug-90	8.10	5.50
Sep-90	7.49	5.28
Oct-90	8.91	8.99
Nov-90	10.51	11.61
Dec-90	12.00	15.27
Jan-91	12.86	18.29
Feb-91	13.51	20.43
Mar-91	12.70	17.84
Apr-91	11.57	14.75
May-91	11.76	14.27
Jun-91	12.15	15.93
Jul-91	13.11	16.49
Aug-91	16.09	20.42
Sep-91	16.31	20.83
Oct-91	14.68	19.15
Nov-91	14.75	21.20
Dec-91	14.26	19.84
Jan-92	13.55	17.81
Feb-92	12.94	16.49
Mar-92	13.56	17.33
Apr-92	13.80	18.72
May-92	13.76	18.57
Jun-92	12.95	16.19
Jul-92	11.74	14.98
Aug-92	9.37	11.95
Sep-92	9.65	9.70
Oct-92	10.56	10.49
Nov-92	9.09	8.18
Dec-92	8.54	8.52
Jan-93	7.57	6.44
Feb-93	7.58	6.19
Mar-93	7.07	5.74

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-93	6.93	5.69
May-93	6.95	5.44
Jun-93	7.01	4.61
Jul-93	7.28	4.83
Aug-93	7.95	6.38
Sep-93	8.76	9.24
Oct-93	8.52	8.88
Nov-93	8.59	8.37
Dec-93	8.77	7.10
Jan-94	9.11	6.42
Feb-94	9.45	6.28
Mar-94	10.51	6.70
Apr-94	13.55	11.42
May-94	13.24	12.96
Jun-94	13.67	15.76
Jul-94	13.25	14.39
Aug-94	12.16	13.12
Sep-94	10.52	10.28
Oct-94	10.73	10.56
Nov-94	11.49	11.78
Dec-94	12.73	12.89
Jan-95	13.95	16.63
Feb-95	13.69	16.43
Mar-95	12.45	14.34
Apr-95	10.98	10.32
May-95	10.99	8.01
Jun-95	9.73	5.29
Jul-95	9.63	6.34
Aug-95	8.94	5.97
Sep-95	8.94	7.04
Oct-95	8.43	7.10
Nov-95	8.22	7.18
Dec-95	6.64	5.85
Jan-96	4.99	2.46
Feb-96	4.45	2.79
Mar-96	4.53	5.45

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-96	3.69	6.75
May-96	3.58	8.13
Jun-96	3.65	8.84
Jul-96	4.27	7.75
Aug-96	4.93	8.47
Sep-96	5.09	8.18
Oct-96	4.58	7.81
Nov-96	4.49	8.97
Dec-96	5.24	12.64
Jan-97	5.16	13.38
Feb-97	5.49	13.75
Mar-97	5.40	12.16
Apr-97	5.82	10.28
May-97	5.06	6.66
Jun-97	5.04	5.79
Jul-97	3.62	4.89
Aug-97	3.29	4.28
Sep-97	3.75	4.12
Oct-97	4.38	4.85
Nov-97	3.98	2.64
Dec-97	4.05	2.54
Jan-98	5.07	6.30
Feb-98	4.19	3.53
Mar-98	4.35	3.97
Apr-98	4.58	7.02
May-98	5.66	10.42
Jun-98	6.39	12.62
Jul-98	7.07	14.68
Aug-98	6.52	12.25
Sep-98	5.94	13.56
Oct-98	6.45	16.35
Nov-98	7.14	18.18
Dec-98	6.28	14.04
Jan-99	4.53	7.60
Feb-99	5.37	8.80
Mar-99	5.36	9.57

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-99	4.02	7.23
May-99	3.33	5.41
Jun-99	2.50	2.12
Jul-99	1.99	1.01
Aug-99	2.84	3.70
Sep-99	3.20	3.03
Oct-99	3.45	0.74
Nov-99	3.09	-0.17
Dec-99	2.81	-0.12
Jan-00	3.55	2.36
Feb-00	3.54	2.98
Mar-00	5.58	4.46
Apr-00	6.53	3.24
May-00	6.30	2.46
Jun-00	6.56	2.57
Jul-00	6.54	1.40
Aug-00	6.09	-0.58
Sep-00	6.47	-0.84
Oct-00	7.49	-0.97
Nov-00	7.62	-1.49
Dec-00	8.49	-0.05
Jan-01	8.70	-0.04
Feb-01	8.33	-0.42
Mar-01	6.42	-1.72
Apr-01	5.41	-1.01
May-01	5.60	0.05
Jun-01	5.30	0.57
Jul-01	5.23	1.01
Aug-01	5.41	1.96
Sep-01	4.52	2.40
Oct-01	2.91	2.35
Nov-01	2.59	3.04
Dec-01	2.08	3.47
Jan-02	1.51	2.85
Feb-02	1.39	3.71
Mar-02	1.76	3.07

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-02	1.50	2.65
May-02	1.56	2.41
Jun-02	2.43	3.39
Jul-02	2.79	3.23
Aug-02	3.34	4.36
Sep-02	3.53	4.21
Oct-02	3.08	2.89
Nov-02	3.39	3.02
Dec-02	3.34	1.32
Jan-03	4.22	2.56
Feb-03	5.35	3.25
Mar-03	5.99	3.75
Apr-03	6.65	4.61
May-03	6.51	5.66
Jun-03	5.34	5.33
Jul-03	4.71	4.03
Aug-03	3.95	1.83
Sep-03	4.90	3.16
Oct-03	5.13	5.00
Nov-03	5.42	3.95
Dec-03	5.74	4.50
Jan-04	6.50	4.97
Feb-04	6.14	4.42
Mar-04	4.78	3.59
Apr-04	5.50	2.91
May-04	5.86	2.68
Jun-04	6.12	1.34
Jul-04	7.15	4.16
Aug-04	8.48	6.80
Sep-04	7.20	4.31
Oct-04	7.10	3.49
Nov-04	7.47	6.06
Dec-04	6.47	4.01
Jan-05	5.86	2.85
Feb-05	5.32	1.92
Mar-05	5.63	2.46

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-05	5.33	2.59
May-05	4.59	1.49
Jun-05	4.68	2.67
Jul-05	4.84	4.07
Aug-05	3.48	2.05
Sep-05	4.38	3.18
Oct-05	4.67	4.07
Nov-05	3.94	3.08
Dec-05	4.38	3.90
Jan-06	4.36	5.65
Feb-06	4.45	6.12
Mar-06	4.24	5.24
Apr-06	4.97	5.08
May-06	6.05	6.71
Jun-06	6.80	7.62
Jul-06	6.54	4.99
Aug-06	7.11	7.01
Sep-06	6.96	8.71
Oct-06	6.93	8.35
Nov-06	6.73	7.98
Dec-06	6.96	9.82
Jan-07	6.64	9.31
Feb-07	6.63	9.22
Mar-07	6.72	9.62
Apr-07	6.22	10.04
May-07	5.52	8.60
Jun-07	4.46	6.26
Jul-07	4.42	8.17
Aug-07	4.04	6.92
Sep-07	3.39	4.60
Oct-07	3.19	4.16
Nov-07	3.73	3.72
Dec-07	4.01	2.94
Jan-08	4.54	2.17
Feb-08	5.68	3.93
Mar-08	7.71	6.71

	<b>All Commodity</b>	<b>Combined Food *</b>
Apr-08	7.86	6.63
May-08	8.20	7.30
Jun-08	10.89	8.00
Jul-08	11.15	7.78
Aug-08	11.12	7.82
Sep-08	10.78	9.15
Oct-08	10.66	10.64
Nov-08	8.65	10.97
Dec-08	6.68	10.42
Jan-09	5.87	12.14
Feb-09	3.61	9.10
Mar-09	1.65	7.31
Apr-09	1.21	8.76
May-09	1.45	9.37
Jun-09	-0.39	10.42
Jul-09	-0.31	11.10
Aug-09	0.54	12.97
Sep-09	1.40	13.21
Oct-09	1.79	12.66
Nov-09	4.73	17.17
Dec-09	7.15	20.21
Jan-10	8.68	19.80
Feb-10	9.65	20.22
Mar-10	10.35	18.50
Apr-10	10.88	16.09
May-10	10.48	15.85
Jun-10	10.25	15.30
Jul-10	9.98	14.31
Aug-10	8.87	11.06
Sep-10	8.98	11.49
Oct-10	9.08	10.56
Nov-10	8.20	6.76
Dec-10	9.45	9.94
Jan-11	9.47	10.28
Feb-11	9.54	6.77
Mar-11	9.04	6.81
Apr-11	8.66	7.60

**Table 2: Inflation in Korea and China**

Year-on-year inflation						
Year	China	Korea		Year	China	Korea
1971	-0.10	13.43		1991	3.40	9.33
1972	0.15	11.48		1992	6.40	6.21
1973	0.10	3.22		1993	14.70	4.80
1974	0.64	24.53		1994	24.10	6.27
1975	0.44	25.21		1995	17.10	4.48
1976	0.29	15.27		1996	8.30	4.93
1977	2.72	10.18		1997	2.80	4.44
1978	0.66	14.44		1998	-0.80	7.51
1979	1.88	18.26		1999	-1.40	0.81
1980	5.99	28.70		2000	0.40	2.26
1981	2.38	21.35		2001	0.73	4.07
1982	1.93	7.19		2002	-0.77	2.76
1983	1.50	3.42		2003	1.17	3.52
1984	2.83	2.27		2004	3.90	3.59
1985	9.30	2.46		2005	1.82	2.75
1986	6.50	2.75		2006	1.47	2.24
1987	7.30	3.05		2007	4.77	2.54
1988	18.80	7.15		2008	5.90	4.67
1989	18.00	5.70		2009	-0.69	2.76
1990	3.10	8.57		2010	3.33	2.96

Note: Inflation figures from 1971 to 1979 are from ILO, and from 1980 onward from WEO database.