Discussion Paper No. 4

# Taming Food Inflation in India

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New Delhi
April 2013

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## Disclaimer

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## *List of Abbreviations*

| | |
|---|---|
| CACP | Commission for Agriculture Costs and Prices |
| CCTs | Conditional Cash Transfers |
| CPIAL | Consumer Price Index for Agriculture Laborers |
| CPI-IW | Consumer price Index-Industrial Workers |
| CSO | Central Statistical Organization |
| FAPI | Food Articles' Price Index |
| FPI | Food Price Index |
| FRBMA | Fiscal Responsibility and Budget Management Act |
| GDP | Gross Domestic Product |
| IMF-FAO | International Monetary Fund- Food and Agriculture Organization |
| M3 | Broad measure of money supply in an economy |
| MOSPI | Ministry of Statistics and Policy Implementation |
| MSP | Minimum Support Price |
| NFMI | Non-food Manufacturing Index |
| NFSB | National Food Security Bill |
| RBI | Reserve Bank of India |
| WPI | Wholesale Price Index |
| FY | Financial Year |

## Executive Summary

Food inflation in India has been a major challenge to policy makers, more so during recent years when it has averaged 10 percent during 2008-09 to December 2012. Given that an average household in India still spends almost half of its expenditure on food, and poor around 60 percent (NSSO, 2011), and that poor cannot easily hedge against inflation, high food inflation inflicts a strong 'hidden tax' on the poor.

Correct diagnosis about the nature, structure, and factors influencing food inflation, therefore, is critical for any rational policy decision to contain it within comfortable limits. Accordingly, this study finds that the pressure on prices is more on protein foods (pulses, milk and milk products, eggs, fish and meat) as well as fruits and vegetables, than on cereals and edible oils, especially during 2004-05 to December 2012. This normally happens with rising incomes, when people switch from cereal based diets to more protein based diets.

Economic literature on factors that could plausibly explain food inflation in India, coupled with econometric analysis, reveals that three factors stand out in this regard: ballooning/monetized Fiscal Deficit, rising farm wages, and transmission of the global food inflation; together they explain 98 percent of the variations in Indian food inflation over the period 1995-96 to December, 2012. The study takes 1995-96 as the starting point as major changes in agri-trade policies were ushered in at that time, which paved the way for gradual integration of Indian agriculture with global markets.

Based on the empirical results of the econometric analysis, it is suggested that the policies to rein-in food inflation will foremost require winding-down fiscal deficit, which has gone (above 8% of GDP for Centre and States combined) way beyond the guidelines laid out in FRBM Act, 2003. In this context, rationalizing and pruning fuel, food, and fertilizer subsidies would be important, at least at the Central level. CACP's calculations show that direct transfer of food and fertilizer subsidies in cash to targeted beneficiaries has the potential to save almost Rs 60,000 crores, without any major adverse impact on the beneficiaries. This would require political courage as well as innovative ways to implement direct cash transfers to targeted beneficiaries through Aadhaar.

In the face of rising farm wages, mechanization of farms with a view to raise labour productivity, and dovetailing of MGNREGA with farm operations through *panchayats*, could be

a way to contain this 'cost-push' inflationary pressure. And, in order to ensure that small farms are not over-capitalized raising their costs of production, land lease markets should be freed to let the economically viable size of the holdings emerge. Also, custom hiring of capital farm machinery will have to be developed to contain capital costs. Global food inflation seeping through domestic prices cannot be wished away as India is increasingly integrating with the world economy. Yet stable, predictable, and open trade policies with moderate duties of 5 to 10 percent, and with provision of special safeguards to protect from sudden spikes and troughs, can be helpful to keep Indian food inflation within the comfort zone of less than 5 percent per annum.

Finally, there is also need to boost the supply response in agriculture and save on large wastages in the supply chains. This would require large investments in the whole supply chains, from agri-R&D to get high quality and high yielding seeds, to investments in irrigation to tap the remaining potential of about 30 million hectares, to logistics (warehousing and movement), to processing and organized retailing. Private sector investments can be leveraged through open and more investor friendly policies on one hand, and farmer producer organizations on the other, with the two reinforcing each other for a take-off in agriculture. These are more in the realm of structural and institutional reforms in agriculture.

These policy steps, if taken in a synchronized manner, will go a long way in not only taming food inflation in India but also lifting agri-growth and reducing rural poverty much faster than has been the case so far.

# Taming Food Inflation in India

## 1. Backdrop and Rationale

1. High food inflation, which has averaged 10 percent during FY 2008-09 to December 2012, has been a major concern for policy makers in India. This is all the more important as an average household in India still spends almost half of its expenditure on food, and poor households spend even more than 60 percent on food (as per the Report on Key Indicators of Household expenditures in India, 2009-2010, NSS 66th Round, 2011). These poor households cannot easily hedge much against inflation. No wonder, high food inflation inflicts a 'hidden tax' on the poor.

2. Lately, RBI's reluctance to reduce interest rates against an overwhelming demand for it from the industry, has juxtaposed a trade-off between growth and inflation. RBI has indicated time and again that government needs to rein-in fiscal deficit before it can reduce interest rates, else, too much money in the system will be putting further pressures on prices in general and food prices in particular. The fiscal deficit of the Centre and States' combined had more than doubled in two years, 2008-09 and 2009-10 over 2007-08, and stayed at high levels, going very much against the norms and guidelines laid out under the Fiscal Responsibility and Budget Management Act, 2003 (FRBMA)[1]. *The Economist* in its February 2013 issue highlights that it was the increased borrowings by the Indian government which fuelled inflation and a balance-of-payments gap. It categorically puts the responsibility on the government for having launched a pre-election spending spree in 2008, which continued even thereafter.

3. It is interesting to observe that high inflation in India has resulted in another peculiar problem. With many people seeing their savings in cash getting eroded due to high inflation, they have started buying more gold as a hedging instrument against inflation. As a result, imports of gold have increased tremendously; in financial year 2012-13 they are expected to cross US$ 50 billion, almost becoming the second largest import item after crude oil imports. This has contributed to the straining of current account deficit and is putting pressures on domestic currency, with rupee depreciating against the US dollar.

[1] The Fiscal Responsibility and Budget Management Act, 2003 (FRBMA) was enacted by the Parliament of India to institutionalize financial discipline, reduce India's fiscal deficit, improve macroeconomic management and the overall management of the public funds by moving towards a balanced budget.

4. Politically also, food inflation remains a major worry. On February 20-21, 2013 just before the Budget Session of the Parliament, e.g., several opposition parties in India held a nation-wide strike causing billions of rupees' worth of loss of GDP. Their first major point of concern was stubbornly high food inflation, and they blamed the government for irresponsible economic policies causing high food inflation, which was hurting the poor all the more.

5. Thus, from every angle, taming food inflation and bringing it down to comfortable levels (below 5 percent) needs to be accorded high priority in policy making. This is what has prompted us to look into the nature and structure of food inflation in detail (section 2); plausible factors that are influencing it (section 3), and testing them rigorously using econometric tools (section 4), with a view to see what possible policy options are there to contain food inflation to acceptable levels without adversely affecting growth (section 5).

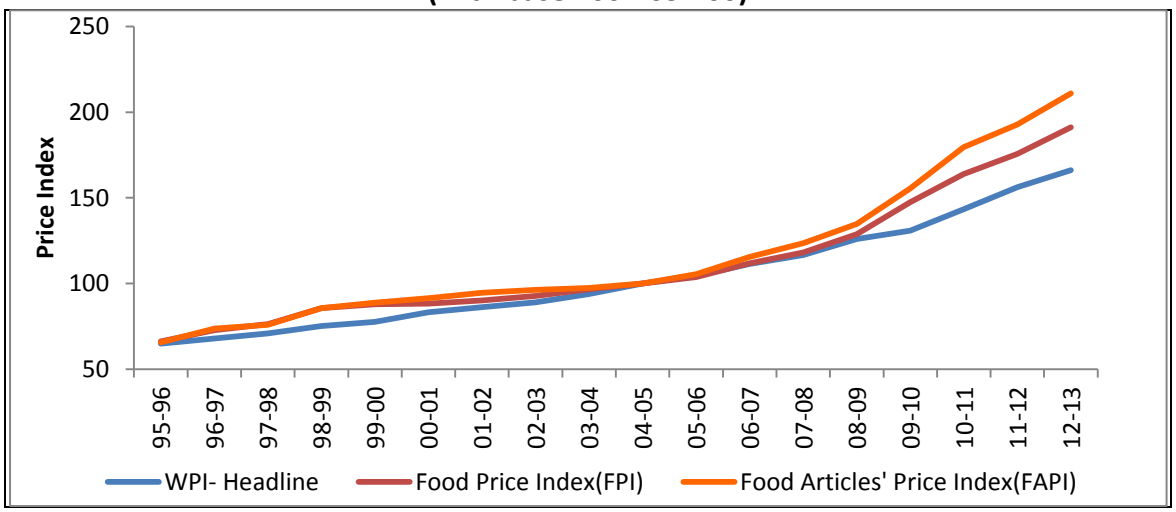
6. The period of analysis chosen is 1995-96 through December 2012. The choice of 1995-96 is specifically made as this is literally the first year when major agri-commodities were opened for international trade, be it exports of common rice and wheat, or imports of edible oils under Open General License (OGL) with use of tariffs rather than quantitative restrictions. This helped gradual integration of domestic agri-markets with global markets, and therefore, over time, domestic food inflation has been influenced by what is happening in the global agri-markets. In this context, it may be important to understand the phenomenon of high inflation post 2007-08 period, when global agri-prices erupted and have stayed at relatively high levels since then with some occasional dips in between.

## 2. Nature of India's Inflation

### 2.1 Trend

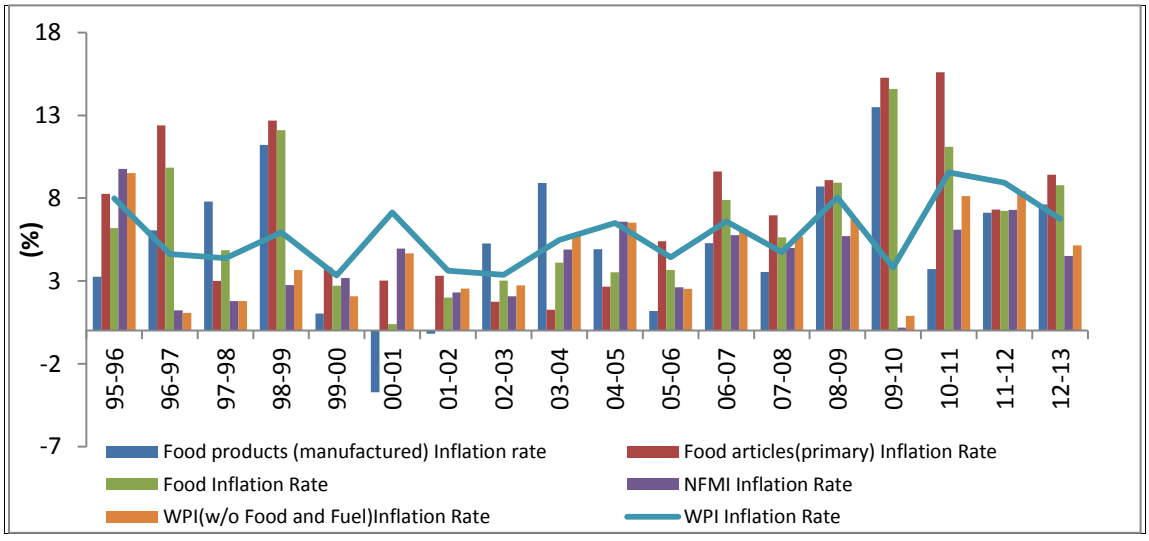
7. The average year-on-year overall inflation rate, as measured by the wholesale price index (WPI) of all commodities, comes out to be 5.8% for the period between 1995-96 through December 2012 (Figure-1). The period between FYs 2000-01 and 2007-08, saw an average WPI rate of 5.2% which however escalated to 7.4% post 2008- crisis period. The Food Inflation, especially Food Articles Price Index (FAPI), increased even at a faster pace (Figure-1).

**Figure 1: Indian Inflation: Wholesale Price Indices, 1995-96 to December 2012 (with base 2004-05:100)**




Source: CSO, MOSPI

**Figure 2: India Inflation Story- WPI and sub-WPI inflation rates**




Source: CSO, MOSPI
Data for 2012-13 is calculated for the period between April-December 2012.

8. It is interesting to note that during this study period of 18 years, generally the overall inflation (WPI) has hovered between 3 to 8 percent, except the years of FY 2010-11 and FY 2011-12 (Figure 2).

Also, the period FY 1995-96 through FY 2002-03 saw a gradual decline in overall inflation, with some occasional blips. But thereafter, there has been a gradual acceleration in overall inflation, with some volatility in between. Inflation measured for the group comprising of the Non-food manufactured products'(NFMI), continued to show moderation from its peak in latter half of 2011-12. The recent moderation in the overall inflation numbers has lot to owe to the fall witnessed in this composite group. As per the Economic Survey 2012-13, the contribution of this composite group to overall inflation also declined from over 43 per cent in Q3 of 2011-12 to around 30 per cent in Q3 of 2012-13. However, the most interesting part is to see that inflation in food articles price index (FAPI), which is critical for poor, has been higher than 8 percent in 8 out of 18 years. It indicates that generally poor had to bear the brunt of inflation more than non-poor, as they spend largest proportion of their expenditure on food, especially food articles.

9. The period between FY2000-01 and FY2007-08, saw the rates moderating, especially for food, with WPI rate for all commodities for the period being 5.23%, and the Food inflation rate at 3.78%, and Food articles' inflation rate being close to 4.3%. The trend nearly reversed since 2008-09, wherein the WPI rate for the period 2008-09 to 2012-13 shot to approximately 7.4%. The change is more evident in the numbers for food inflation and food articles' inflation, which increased to an average yearly rate of 10.13% and 11.34% respectively during this period. In the last five years, post 2008, food inflation contributed to over 41% to the overall inflation in the country.[2]

10. Both Food and Food Articles' price indices saw the year-on-year inflation rate move into double digits in the last month of 2012. Interestingly, the contagion of such increase into the headline WPI is subdued owing to the relative weights each of these are assigned in the calculations of the latter; while food has a weight close to 24% in the total WPI calculations, food articles has a weight of only around 14%.

## 2.2 Components of FAPI

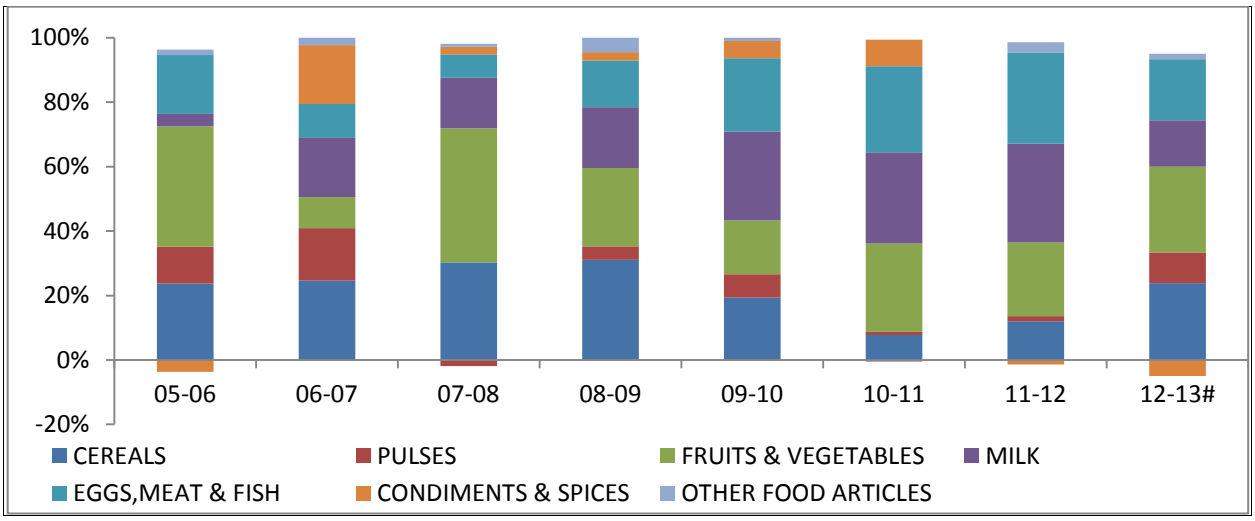
11. The study of the structure of inflation in food articles by various components reveals yet another interesting feature. During the period, 2005-06 to 2012-13, most of the time, pressure on food articles price indices (FAPI) has come from high value products, namely fruits and vegetables and protein products viz., milk, eggs, meat and fish (Figure 3a). The cereal inflation was higher in initial years, but was subdued subsequently, only to re-emerge in 2012-13, purely because of sub-optimal food management. This structure of inflation during the last few years shows that with higher growth of the

[2] Relative contribution by each of the 4 WPI sub-indices, namely WPI-Food, WPI-NFMP, WPI-Fuel and WPI-other non-food, to the headline WPI inflation rate was calculated for the last 5 years- since 2008-09. Then the average annual percentage contribution by each sub-index was calculated, and on an average Food inflation contributed 41% (annually) to the WPI inflation numbers.

economy, demand pressures are building up fast on high value agri-products as consumption patterns shift from cereal based diets to fruits and vegetables and protein foods. The Economic Survey 2012-13 highlights that the share of protein foods within overall food expenditure increased from 26.28 per cent during 1950-60 to 33.71 per cent during 2007-2012.

12. As a result, the price indices of protein foods and fruits and vegetables have increased faster than cereals over this period (Figure 3b; also see Gokarn, 2013). Also, these commodities are largely perishable in nature and require a fast moving infrastructure, cold storages, etc, and there is extreme paucity of these in the country, pointing towards the need for a major reform package to build their efficient supply lines.

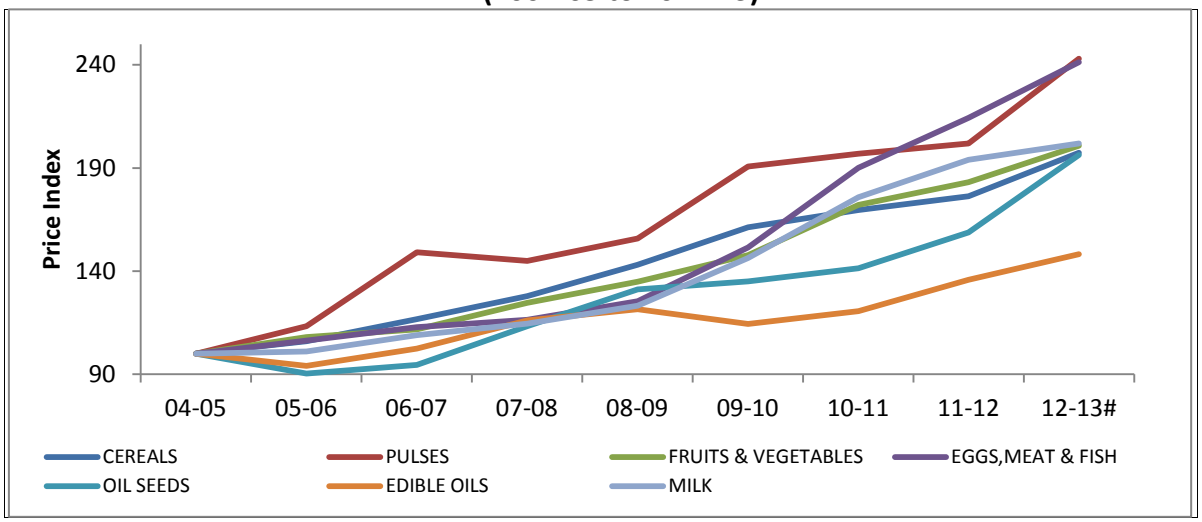
**Figure 3a: Components of Food Articles Price Inflation, 2005-06 to 2012-13**




Source: Authors' calculations and MOSPI

[#] The calculations for FY 2012-13 are done for the period between April and December, 2012.

**Figure 3b: Temporal behavior of Price Indices of various Food Components (2004-05 to 2012-13)**




Source: MOSPI

# The calculations for FY 2012-13 are done for the period between April and December,2012.

## 3. Factors Influencing Indian Food Inflation

13. To understand Indian inflation, and what plausible factors influence it, first step would be to decide on a relevant measure of inflation. RBI considers changes in the wholesale price index (WPI), as the headline inflation, which is the most relevant variable representing overall picture of inflation in the country as well as useful for policy articulation (Mohanty, 2011). We concur with this view and follow the same in our paper. Accordingly, an attempt is made to decipher the trends in two sub-WPI indices, known as the Food Price index (FPI), which is calculated as the weighted average of the price indices of both the food articles (primary food) and food products (manufactured food) and we also study a sub-component of food price index, the food articles' price index. The objective is to decipher all possible triggers of an inflation measure most relevant to the country's poor, namely food inflation.

14. Based on a comprehensive review of literature[3], we hypothesize that there are basically three types of variables that impinge on food inflation in general and food articles' inflation in particular. These three variables are: (1) policy variables especially related to deficits (budget, revenue, fiscal) and those related to monetary expansion (say M3, broader definition of money supply); (2) domestic supply

[3] The Inflation/Output Trade-off Revisited John B. Taylor; Imported Inflation: The Evidence from India, Janak Raj, Sarat Dhal and Rajeev Jain; Reserve Bank of India Occasional Papers Vol. 29, No. 3, Winter 2008; The Political Economy of Food Price Policy : India Case Study, Kavery Ganguly and Ashok Gulati, Dec 2012; A Revolution in Monetary Policy: Lessons in the Wake of the Global Financial Crisis, Joseph E. Stiglitz. It is a lecture given in January 2012

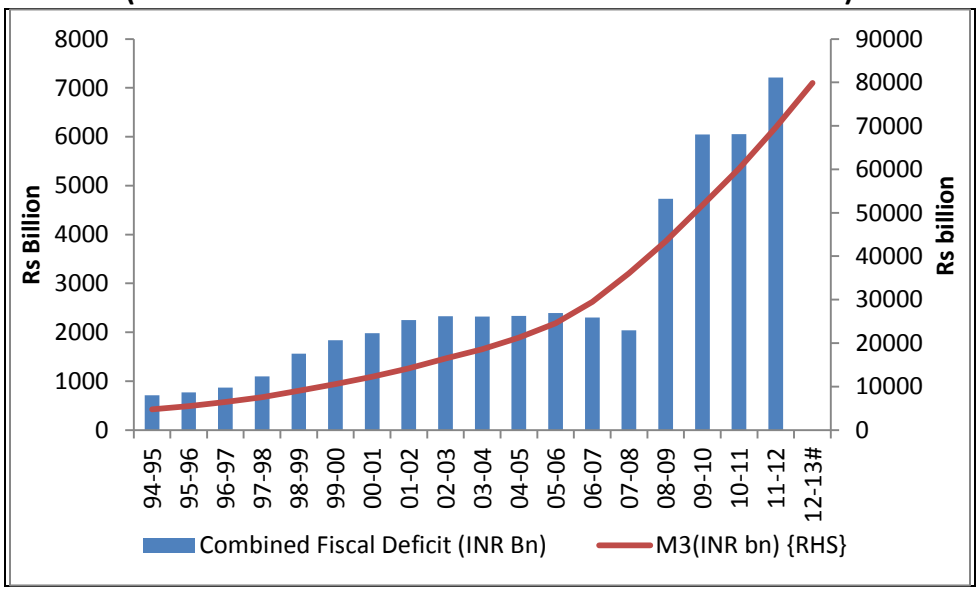
shocks through droughts or deficient rainfalls, and lately the issue of rising farm wages, which is believed to be putting severe pressure on cost of production of food -articles and thus leading to a 'cost-push' inflation (Damodaran, 2012); and (3) global food inflation, which with increasing globalization of Indian agriculture is supposed to influence domestic prices of food articles. We study all these variables in some detail below with a view to find out what are the key drivers of Indian food inflation, particularly food articles' inflation.

## 3.1 Fiscal and Monetary policies

15. Abundant existing literature points to the impact of government fiscal deficit on money supply and the effect of the latter on real output and prices (Jadhav, 1990, 1994). In fact, our analysis for the studied period shows that one percent increase in fiscal deficit increases money supply by more than 0.9 percent (Figure 4). In fact, as long back as in 1983, a study by Barnett, Bessler and Thompson (1983) on the role of money supply in explaining the inflation in agri-prices in USA in 1970s, remarked that "without monetary expansion, no long-run inflation can occur." Studies also reveal that while excess money leads to long run-inflation, increase in real output lowers it. The negative impact of real output on long run inflation in India is tenable, as supply factors are understood to play an important role (Khundrakpam and Goyal 2008).

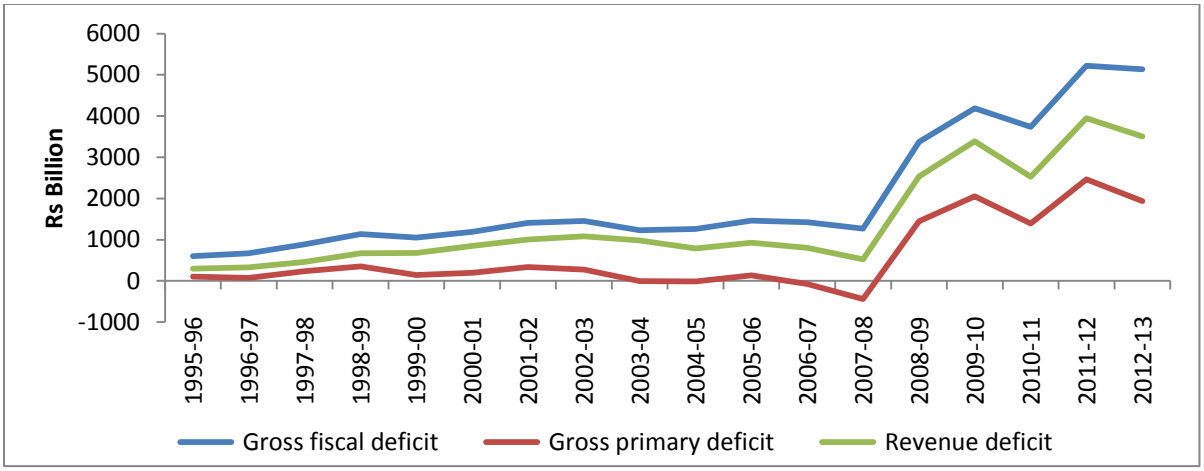
16. In recent debates in India on the issue of high inflation, experts (like Parthasarthy Shome) have linked the 2009 fiscal profligacy and the eventual digressions from the FRBMA targets as a key factor responsible for the present persistent inflation. Delivering an address at a January 2013 roundtable on budget, Yashwant Sinha, former finance minister, also remarked that the government had fallen into the vicious cycle of increasing fiscal deficit, especially the revenue component, which has led to rising prices. He held the high and sticky revenue deficit as the main culprit behind persistently high Indian inflation (Figure-5). Y.V. Reddy, former RBI Governor, in his recent book on '*Economic Policies and India's Reform Agenda*' highlights the distinction between the structural and cyclical aspects of the fiscal deficit and suggests the stimulus package has become a structural problem, putting pressure on prices (Reddy, 2013). In fact a recently released paper by C. Rangarajan and Alok Sheel (2013), has correlated the protracted fiscal stimulus with the present inflationary trends and have highlighted how such a trend have rendered monetary policy, as a tool for stimulating growth in the present pressing times, ineffective.

**Figure 4: Combined Fiscal Deficit and Money Supply[4] Trends (Fiscal deficit is combined for the State and the Centre)**




Source: MOSPI

**Figure 5: Study of Central Government finances**




Source: MOSPI

[4] For the period since 1990s, on an average the money supply (measured by M3) has increased by 18% and this is combined by an agriculture GDP growth rate of 3%.The numbers are not much different when the data through 2000s is studied: the M3 has grown year-on-year at a rate of 17%, while agri-GDP has increased by 2.71% and GDP growth rate has gone up by 7.21%. So understandably, it is the situation of "too much money, chasing too few goods.

17. But the big question is: why did India go astray on its fiscal path delineated under the FRBMA 2003? To properly understand this digression, one will have to look at the global financial crisis of 2008, and the concomitant fear of a severe recession and unemployment that may follow. It was this fear, and its strong possibility, that brought together the G-8 and plus 5 countries to think of the *possible pathways out of this recession.* What came out of this collective wisdom was the age old principle of Keynesian economics, boosting demand through deficit financing. As a result, a major global fiscal stimulus was conceived and injected by most of the countries. IMF recommended up to 2% of GDP to be given as fiscal stimulus. US Congress passed the Economic Stimulus Act of 2008, wherein a tax rebate of about $600 billion was to be given to low and middle income Americans. Chinese State Council approved a stimulus package of $586 billion in November 2008, and the European Union too developed a stimulus package of about 200 billion Euros (roughly 1.2% of GDP).

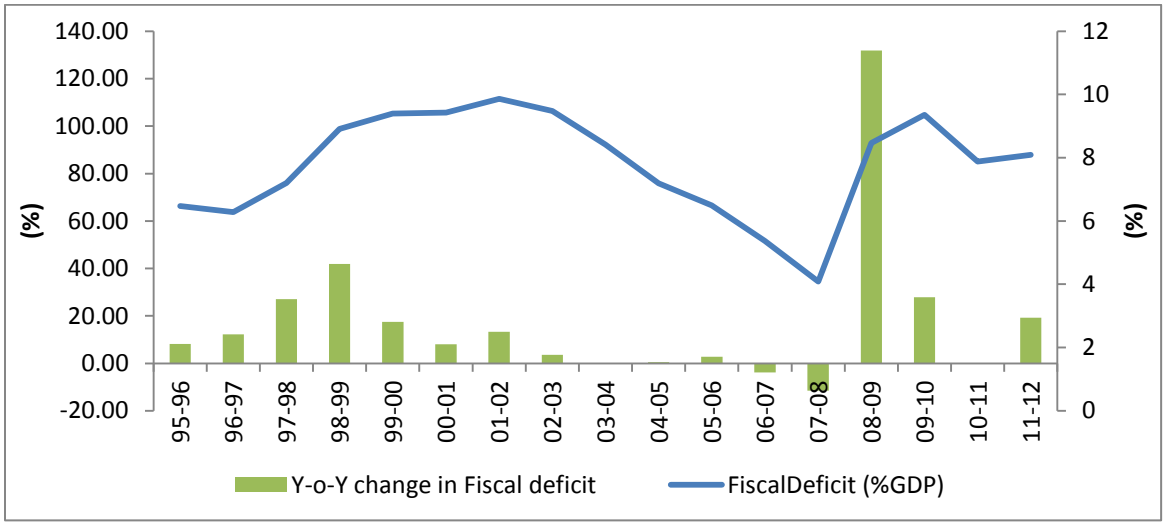
18. India was not far behind. It was very much a part of this symphony and increased its fiscal deficit to more than 100 percent in 2008-09 and 2009-10 over 2007-08. However, the major difference between the Chinese and the Indian stimulus packages was that while China spent lot of it on developing infrastructure, Indian fiscal package largely comprised of boosting consumption through outright doles (like farm loan waivers) or liberal increases in pay to organized workers under Sixth Pay Commission and expanded MGNREGA expenditures for rural workers. All this resulted in quickly boosting demand. But with several supply bottlenecks in place, particularly power, water, roads and railways, etc, very soon, 'too much money was chasing too few goods' (Figure-6). And no wonder, higher inflation in general and food inflation in particular, was a natural outcome. The political difficulty in rolling back what was meant to be temporary spending to boost a troubled economy made it a long-term challenge to manage the deficit.

19. It is interesting to observe that after India had passed the FRBM Act in 2003, it was trying to contain fiscal deficit, and as a percentage of GDP, the combined fiscal deficit of the Centre and the States was coming down steeply from almost 10 percent in 2001-02 to 4 percent in 2007-08 (Figure 6), which was a commendable achievement on fiscal front. As is clear from Figure 5 the revenue deficit was close to zero and primary deficit had a marginal surplus. No wonder, this is also the period that experienced lowest rates of inflation in the country (Figure-2). But this situation changed dramatically in the wake of fiscal stimulus of 2008-09 and 2009-10. The combined fiscal deficit was hovering above 8 percent of GDP in the two years, and if one included the off budget bonds issued to fertilizer companies, etc. it amounted to more than 10 percent of GDP! This led to an average M3 growth of 17% in the period through 2008-09 to December 2012 (Figure 7). The period witnessed an average 7% GDP growth rate, with an average 10% of food inflation rate.

20. Overall the picture seemed totally out of line with the growth in output, which after having registered peak of 9 percent plus in 2009-10, was gradually decelerating and by 2012-13, India was

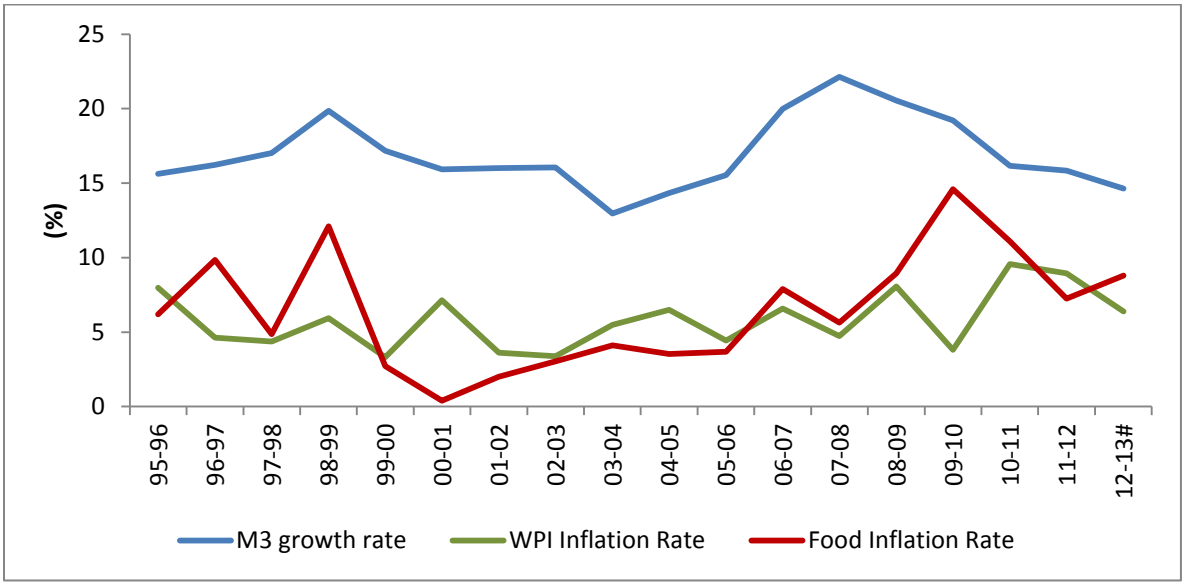
talking of likely GDP growth of only 5.5 percent, but with persistently high fiscal deficit. The challenge now is to wind it down in a calibrated manner without giving an abrupt shock to an already fragile growth.

**Figure-6: Changes in Fiscal Deficit, 1995-96 to 2011-12**




Source: Planning Commission, MOSPI

**Figure-7: Relation between M3 and Inflation measures**




Source: MOSPI

[#] the data for 2012-13 is for the period between April and December 2012

### 3.2 Domestic Supply Shocks and Rising Costs of Production

21. In order to explore the potential role of agriculture's supply-side factors in contributing to food inflation, one needs to decode the cyclical linkages between macroeconomic policies and agriculture. There are two peculiarities with agriculture: first, that developing economies generally face large income (expenditure) elasticities of demand for farm products and second is the fact that short-run price elasticities of supply are still lower. As a result, macroeconomic policy-induced shifts in demand for farm products (e.g., through fiscal stimulus) can have significant price effects (Thompson, 1988).

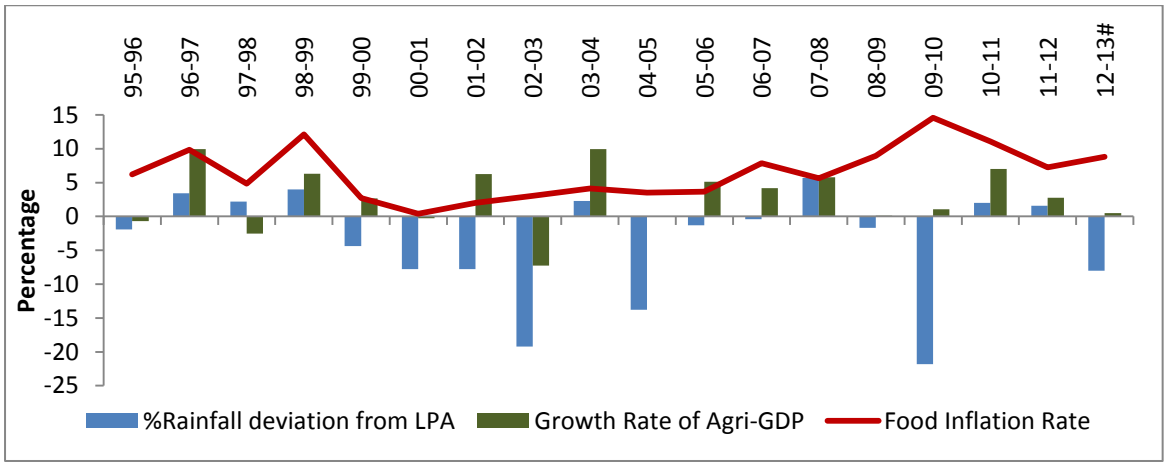
22. Additionally, it is observed that, except for commodities with support prices, agriculture prices tend to be more responsive to monetary shocks, whereas prices of many goods produced by the manufacturing sector of the economy are stickier in the short-run due to long term contracts (Thompson, 1988). In other words, monetary shocks are not neutral at-least in the short run and not at least for the primary agriculture products. Now, the fact is evident in our explanations of the underlying trends in the food inflation numbers. Empirical analysis shows that there is faster response of prices of food articles to domestic shocks (be it monetary or weather) and somewhat a lagged reactions of prices of manufactured food products. So while we hypothesize various factors influencing prices of food articles, it is important to take into account important supply side factors, especially production of agricultural products captured through agri-GDP, which in turn is influenced by weather shocks among other factors, and farm wage rates, which have been influenced lately by government policy through MNREGA under its fiscal stimulus package.

23. As per Reddy (2013), there are necessarily three types of supply reasons causing inflation and each subsequently needing an appropriate policy action. One is a *supply shock*- which is like an exogenous factor, not permanent in nature; second is a *supply bottleneck*: which is endogenous to a system and can be answered by catering to the supply-side logistics and other support mechanisms; and then the third is *supply inelasticity*, which requires substantial investments.

24. In Figure -8, corresponding to the three drought periods and one near-drought situation, the green bars show the fall in the agriculture-GDP witnessed in the country. These years were 2002, 2004 and 2009 where India faced severe drought; 2012 was also close to being defined as one with below expectation rainfall, but with the latter part of the monsoon season picking momentum, the year was saved from being called one. The blue bars correspond to the percentage the actual rainfall deviated from the long period average rainfall for the period. Greater the negative deviation more is the likelihood of a drought. On an average, for the period since 1995, this deviation value is close to 4%; barring 7 years in the entire span where this deviation was positive, largely the value has been negative.

25. It is interesting to note the corresponding fluctuations in the food inflation rates. Now if bottlenecks persist on the supply-side and the money grows incrementally, then this would inevitable result in inflation.[5]

**Figure 8: Trends of Agri-GDP and Rain with Food Inflation**




Source: RBI and IMD
#The data for the period 2012-13 is between April and December, 2012.

26. There is another interesting issue on the domestic supply side of food inflation, which has become prominent lately. And that is the issue of rising costs of production in agriculture, especially triggered by rising farm wages. The Indian farm wage rates are studied for different farm operations ranging from ploughing, sowing, transplanting, weeding, and harvesting. Nominal farm wage rates are calculated based on these five farm operations, and aggregated over 16 major states with agri-labor as the relative weights. Where these 16 states account for 93 percent of total farm labor in the country, nominal wages have been growing at a rate of 9.68% in the studied period, i.e. between 1995-96 and 2011-12. However, during 2007-08 to 2011-12, nominal wages increased at much faster rate, by close to 17.5% per annum (Figure 8 shows this trend in nominal wages through the Farm wage index movements). Nevertheless, if one converts the nominal wage rates to real wages by deflating the nominal wages in each state by that state's CPIAL, then one finds that real farm wages have grown by 3.5% in the studied period, while the rate was close to 6.9% per annum during the five years between 2007-08 and 2011-12. The immediate impact of these increased farm wages is to drive-up the farm costs

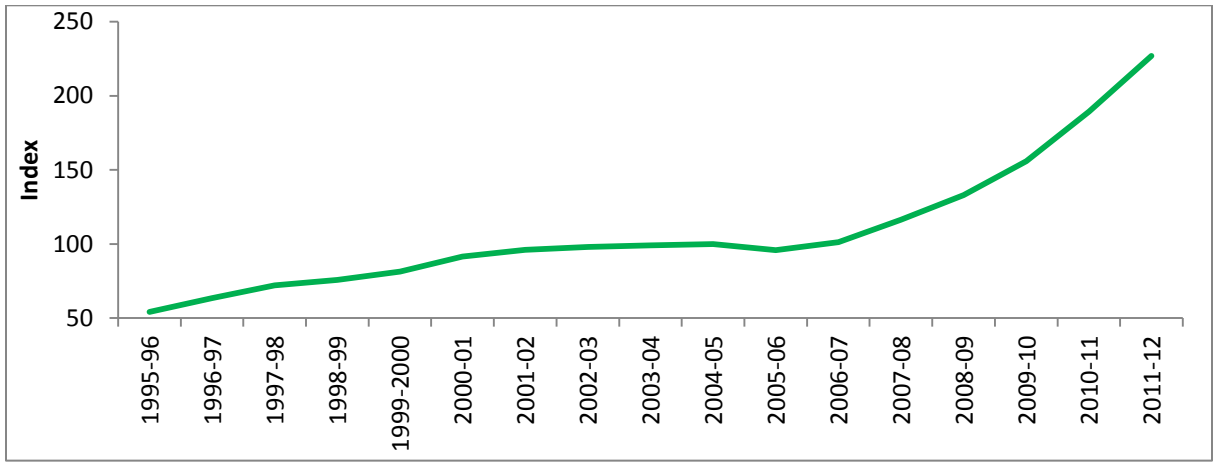
[5] For the period since 1990s, on an average the money supply (measured by M3) has increased by 18% and this is combined by an agriculture GDP growth rate of 3%.The numbers are not much different when the data through 2000s is studied: the M3 has grown year-on-year at a rate of 17%, while agri-GDP has increased by 2.71% and GDP growth rate has gone up by 7.21%. So understandably, it is the situation of "too much money, chasing too few goods

and thus push-up the farm prices, be it through the channel of MSP or market forces. It is typical of 'cost push' inflation.

27. Damodaran (2012) also points out that "apart from the effects on agriculture, what rising farm labour costs also do is to raise the benchmark 'reservation wage' in the economy- the lowest rate that workers are prepared to accept for jobs across sectors." It is evident and imperative, therefore, for us to explore the contribution of increasing farm labor wages to food price index.

28. In order to get a coherent and a uniform comparison and analysis between the studied dependent variables, we converted the nominal wage rate values into an index, farm wage index (FWI) by taking the 2004-05 value as hundred and estimating the rest of the values using that factor.

**Figure 9: Trends of Indian Farm Wage Index: Base 2004-05= 100**




Source: CACP, Ministry of agriculture

## 3.3 Global Food Price Index (GFPI)

29. Globalization does not just refer to the export and import of goods, services and capital alone; it also refers to the export and import of inflation. According to a study by Raj, Dhal and Jain (2008), imported price inflation, on an average, accounts for about 1 to 2 percentage points increase in domestic inflation.

30. In a recent study by Gulati, Jain and Hoda (2013) on farm trade, it is clear that Indian agriculture has been gradually integrating with the global agri-markets. The agri-trade (exports plus imports) as a percentage of agri-GDP, which was about 5 percent in 1990-91 when economic reforms started is today more than three times of that, touching 18 percent in 2011-12. It is still low as compared to the share of total trade in goods and services as a percent of India's GDP that has increased from 17.5 percent to 59.1 percent over the same period. Nevertheless, owing to the country's unstable trade policies,

particularly on the agri-trade front, the transmission process of imported inflation into domestic numbers is very much there, although it works slowly and may be with some lag. Even the CACP reports on price policy for kharif and rabi crops for 2013 crop seasons clearly mention that in its exercise on MSP policy recommendations, it does incorporate what is happening to international prices of the comparable commodities under consideration. Generally, in case of exportable commodities, MSPs are closer to export parity prices and in case of importable commodities, MSPs are closer to import parity prices.

31. Food inflation, historically, has been a problem area for India. On overall inflation management, India has fared much better than the world particularly for the period of 1990s; when world inflation rate, measured by IMF-WEO average consumer price percent change, on an average was 18.2%, India's WPI was 8.12%. It will not be wrong to conclude at this juncture that owing to a relatively lesser global integration India was insulated from the severe fluctuations in the prices at large, during this period of 1990s. However for the same period, when one considers the world food prices (FAO global food price index), they were decelerating, clocking an average inflation rate of (-) 1.14%, while India's corresponding index, WPI- food, showed an inflation rate of 8.5%. (See Annexure).

**Table 1 Study of Inflation: Domestic and Global**

| | 2000-07 | 2008 | 2009 | 2010 | 2011 | 2012 | 2008-12 |
|---|---|---|---|---|---|---|---|
| | Average | Annual | | | | | Average |
| **Global#** | | | | | | | |
| World | 3.9 | 6.0 | 2.4 | 3.7 | 4.9 | 4.0 | 4.2 |
| G7 | 2.0 | 3.2 | -0.1 | 1.4 | 2.6 | 1.8 | 1.8 |
| EDEs | 6.7 | 9.3 | 5.1 | 6.1 | 7.2 | 6.1 | 6.8 |
| Global Food Price Index(FAO) | 7.4 | 25.9 | -21.5 | 18.1 | 22.8 | -7.0 | 7.7 |
| **India** | | | | | | | |
| WPI | 5.3 | 8.1 | 3.8 | 9.6 | 8.9 | 6.4 | 7.4 |
| WPI-Food | 3.8 | 8.9 | 14.6 | 11.1 | 7.2 | 8.8 | 10.1 |
| WPI-NFMP | 4.3 | 5.7 | 0.2 | 6.1 | 7.3 | 4.5 | 4.8 |
| CPI-IW | 4.6 | 9.1 | 12.2 | 10.5 | 8.4 | 9.9 | 10.0 |

*Data from IMF, RBI and MOSPI, # Inflation, average consumer prices (percent change), Figures for G7 countries, consisting of France, West Germany, Canada, Italy, Japan, United Kingdom and USA; EDEs is Emerging market and developing economies*

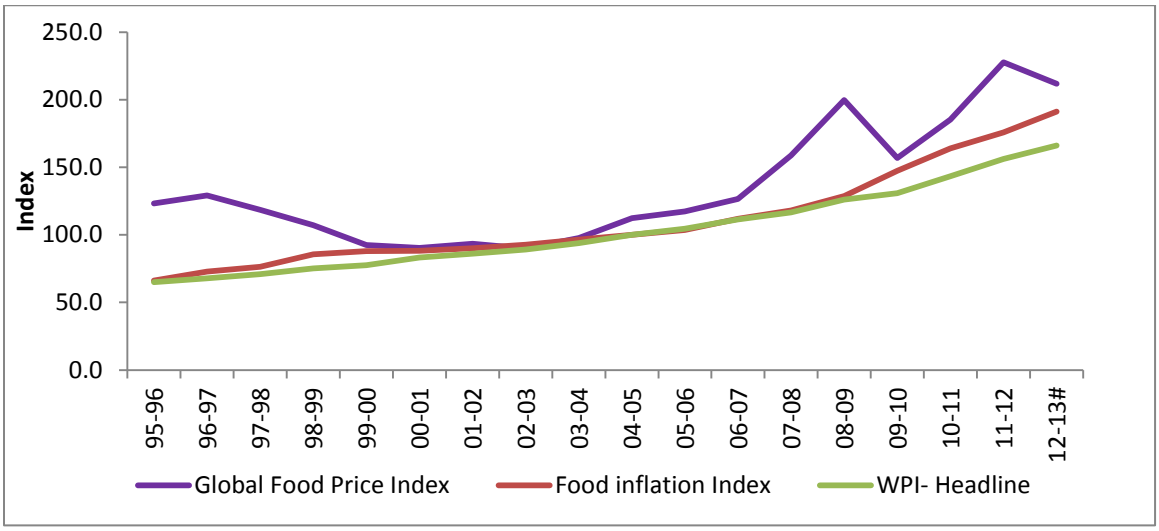
32. However, the trend reversed since 2000; the story of Indian and global inflation for the period is presented in Table-1. As per the information in Table 1, during the period of 2000 to 2007(second column from left), India, with WPI rate of 5.3%, did not fare well on the overall inflation figures when compared with the World average of 3.9%, but notably the figure seemed good relative to the figure of

Emerging markets and developing economies (EDEs). Even on the front of food prices, India performed better than the World average.

33. Inflation overall jumped in the year 2008 when the global financial crisis struck, but moderated across board in 2009, but in the following years the prices rebounded. Upon analysis of averages for the period of 2000-07 and 2008-12, one realizes that when world inflation rate increased from an average 3.9% between 2000 and 2007 to 4.2% between 2008-12, and that of G7 nations decelerated from 2% for period between 2000-2007 to 1.8% for the period between 2008 and 2012, India's WPI registered an increase from 5.3% average between 2000-07 to 7.4% on an average between 2008-12. India's food price index jumped even faster, from 3.8% for the period 2000-2007 to an average 10.1% in the period 2008-2012, while the world food price index increased only marginally from 7.4% for the period 2000-2007 to an average of 7.7% in the period 2008-2012.

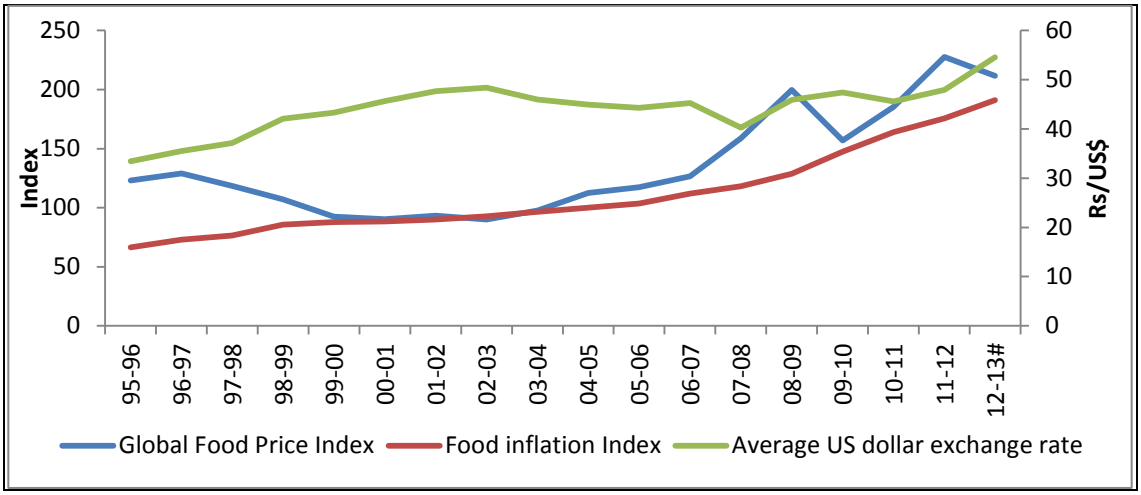
34. Understandably, the Indian WPI inflation numbers and the world inflation numbers look more in sync in terms of the direction of movements, highlighting thus the dynamics of the inherent transmission process. Interestingly, there appears to be a lag in the transmission process of food prices. On little closer inspection of the food numbers, as given in Figure 10a, one can see that when the global food inflation rate reduced from 25.9% in 2008 to -21.55 in 2009, Indian food inflation as measured by WPI-food showed a decline only in the subsequent periods. So one can say that India was able to avoid sudden spikes and troughs in global food prices in 2008 and 2009, but the overall trend in Indian food prices was very close to what was happening in global agri-markets.

**Figure 10 a: Transmission of Global food inflation into India**




Source: MOSPI
# The data for 2012-13 is for the period between April and December, 2012

**Figure-10b: Exchange rate (Rs to a USD), and Global and domestic food price indices**




Source: MOSPI and RBI

#Exchange rate values are average values for the financial year and the 2012-13 values are taken till December 2012

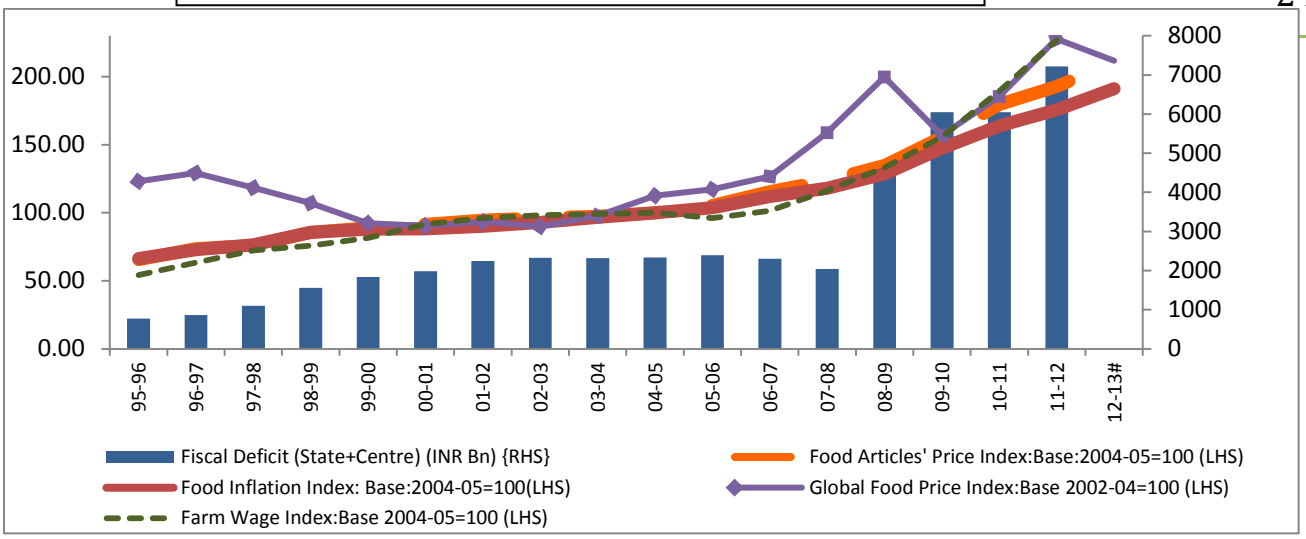
35. It may be noted in Figure 10b, that when global food price index was coming down during 1996-97 to 2002-03, domestic food price index was going up. These may look contrary movements, and therefore cast doubts whether global food prices have any influence on domestic food prices. But when movements in global food price indices are seen in conjunction with the exchange rate movements (of Indian Rupees to a US dollar), the mystery may be clear as to why Indian food price indices were rising when global food prices were falling. The answer lies in exchange rate movements, rupee depreciating vis-a-vis dollar.

## *4. Testing the Hypotheses and Empirical Results*

36. In the previous section, we have delineated various hypotheses about the plausible factors that could be influencing Indian food prices. These hypotheses need to be tested rigorously with econometric tools to see their statistical significance in explaining Indian food inflation.

37. In the analysis that follows, we consider two dependent variables, i.e., Food Price index (FPI or simply FI) and Food Articles' Price index (FAPI or simply FAI), with each explained through three independent variables: two domestic- combined fiscal deficit of Centre and State (FD) and Farm Wage Index (FWI) and one global, namely, FAO's Global Food Price Index (GFPI). So, the key issue now is to test empirically what factors can explain variations in food and food articles price indices, which in turn are key factors influencing overall WPI for all commodities. The relation between the studied underlying variables for the period 1995-96 and 2012-13 (till December 2012) is highlighted in Figure-11.

**Figure 11: Relation between the studied variables**




Source: Authors' calculations based on data from various sources (Domestic prices' data from OEA; wages data from Labour Bureau, fiscal deficit data from MOSPI, and global food prices data from FAO)
#The data for 2012-13 is for the financial year till December,2012

38. The nature and degree of influence of different domestic and global factors in explaining the movements in price indices of food and food articles is assessed by adopting a log-linear regression model. The beta values so derived from the model are then equivalent to the elasticity of dependent variable with respect to the independent variable. The empirical results of the best fits are:

| Equation[6] | Adjusted $R^2$ |
|---|---|
| **Log FPI = 0.267 + 0.457 Log FD (T-1) + 0.322 Log FWI (T-1) + 0.305 Log GFPI (T)**<br>**(3.354) (2.147) (7.086)** | **0.988** |
| **Log FAPI = 0.038 + 0.472 Log FD(T-1) + 0.308 Log FWI (T-1) + 0.305 Log GFPI (T)**<br>**(3.58) (2.122) (7.302)** | **0.989** |

FPI=Food Price index, FAPI=Food articles' Price index, FD=Fiscal Deficit, FWI= Farm wage index, GFPI= Global food price index, T-1= data with a 1-period lag, T=data without any lag

The t-values, used for analyzing the variables' explanatory relevance in the model, for the independent variables are given below each equation in parenthesis.

[6] The above empirical result is also robust when the analysis is repeated for the period 1995 through January 2013.

39. The two dependent variables in our case therefore are Log of FAPI and Log FPI values and the independent variables are lag and log values of:

1. Domestic policy variables: Fiscal deficit(FD)
2. Domestic supply variables: Farm wage index (FWI) (with base 2004-05=100 to correspond to the base year of various price indices) (The supply shocks from rainfall and the subsequent changes in the Agri-GDP figures could not empirically explain the WPI sub-indices satisfactorily)
3. Global food price Index (GFPI) (FAO, base years 2002-04)

40. As postulated in the beginning, the empirics show that the three variables together explain more than 98% of the variations in the two studied WPI sub-indices. Interestingly, the elasticity of food price indices (FPI and FAPI) is highest with respect to fiscal deficit (FD), followed by farm wage index (FWI) and global food price index (GFPI) (in that order). And FD and FWI have a one year lag in influencing food price index.

41. These empirical results clearly indicate that it would not be incorrect to blame the ballooning fiscal deficit of the country today to be the prime reason for the stickiness in food inflation. And the fiscal digression of the 2008-09 is at the heart of this issue. As Y V Reddy says in an interview in the Economic Times, "the crisis was caused by excess liquidity, yet the solution the world is pursuing is creation of further liquidity. So, are we erring somewhere? Remember, monetary excesses have quasi-fiscal implications." (Economic Times, January 31, 2013) It is more important than ever, in this post-crisis period to return to the fiscal consolidation targets as laid out in the FRBM Act of 2003. The Mid-quarter Monetary Policy Review of March 2013 indicates that on the fiscal front, unless the things came under full control, India may continue to suffer from high food inflation. It is consoling to see that the budget of FY 2013-14 in India is attempting to revert back to that in a calibrated manner over a three to four years period.

42. The second domestic factor, namely the Farm Wage Index (FWI), as can be seen in the graph, show a sharp rise especially from 2007-08 onwards. Several reports indicate MNREGA expansion has led to sharp increase in farm wages making Indian agriculture expensive, and food prices are therefore a result of this "cost-push" inflation. CACP has done some in-depth analysis of this. It finds that MGNREGA is only one factor, especially in states where MNREGA had large scale operations, in pushing up farm wages. But there are equally important factors, e.g., the overall growth of State GDP, or in construction sector, or revival of agricultural growth in many states, which have pulled the farm wages up. But sure enough, farm wages do have a strong influence on food prices via rising costs of production. The model shows that a 1% increase in this index causes close to 0.3 percent increase in both food articles' price index and in the food price index.

43. The third important factor is the Global food price index (GFPI) influencing domestic food prices. Its influence is almost as strong as the influence of farm wages, though less than that of fiscal deficit. As per our empirical model, 1% rise in the GFPI causes nearly 0.3 % increase in the domestic food price index. So Indian food inflation is not insulated to what is happening in the global food markets, though we may be able to avoid sharp spikes or troughs temporarily.

44. Thus, together, the three factors, i.e., domestic fiscal deficit (FD), domestic farm wages (FWI) and global food prices (GFPI), when put in a log-linear equation explain more than 98 percent variation in prices of Indian food articles, and all of them are statistically very significant.

What does it mean for policies to tame food inflation?

## 5. The Way Forward

45. Taking ahead from our econometric analysis, which clearly reveals that the biggest culprit behind high food inflation is abnormally high fiscal deficit. This is followed by rising farm wages and global food prices. In particular, the 'fiscal stimulus' that was given to the economy in 2008-09 and 2009-10 to avert the global economic recession, is one of the prime reasons behind the present persistent inflationary pressures in India. Thus, if we have to control inflation, we must first get to the root of the problem, which is fiscal deficit. The good news is that policy makers are quite aware of this and have started working in that direction.

46. However, the art of policy making will be tested in bringing down fiscal deficit in a calibrated manner, without abruptly and adversely hitting the growth rates in the economy. This can be done by pruning revenue deficit- particularly subsidies and non-investment expenditures. The big components of fiscal deficit at the Centre are the subsidies on fuel, food, and fertilizers. And at the state level, it is power subsidy. The pricing of these four commodities need to be rationalized for their efficient usage and also to contain the subsidy bills within manageable limits. The calculations at CACP suggest that food and fertilizer subsidies can be pruned by almost Rs 60,000 crores in FY 2013-14 itself, if one moves through direct cash transfer route using Aadhaar in case of food and fertilizers to direct beneficiaries.

47. By liquidating excessive grain stocks in the domestic market or through exports, massive savings of non-productive expenditures can be realized. For example, as against a buffer stock norm of 32 mt of grains, India had 80 mt of grains on July 1$^{st}$ 2012, and this may cross 90 mt in July 2013. Even if one wants to keep 40 mt of reserves in July, liquidating the remaining 50 mt can bring approximately Rs 80,000-100,000 crores back to the exchequer. And with this much grain in the market food inflation will certainly come down. Else, the very cost of carrying this "extra" grain stocks alone will be more than Rs 10,000 crores each year, counting only their interest and storage costs. All this can be saved, and fiscal and current account deficits improved, if one moves faster on policy front. By going through cash

transfers route, one can plug in leakages in PDS which, as per CACP calculations are around 40%, and save on high costs of storage and movement too, saving in all about Rs 40,000 crores on food subsidy bill.

48. Similarly, fertilizer subsidy, if given directly to farmers on per hectare basis (Rs 4000/ha to all small and marginal farmers which account for about 85 percent of farmers; and somewhat less (Rs 3500 and Rs 3000/ha) as one goes to medium and large farmers, and deregulating the fertilizer sector can bring in large savings of about Rs 20,000 crores along with greater efficiency in production and consumption of fertilizers.

49. Second factor in our analysis that exacerbated the food inflation is the rising farm wage rates. The way forward is not to stall this increase but to complement this increase with increased productivity, so that the increased demand caused by rising wages is supplemented by increasing output per worker. And this increase in labor productivity, as per the recently released Economic Survey (2012-13) "comes from more physical capital employed per worker (in turn resulting from greater saving and investment), more human capital per worker (which comes from more education as smaller families lead to greater spending on education per child), and greater total factor productivity (TFP)". To achieve this increase in labour productivity, therefore, farm mechanization will have to be given priority, and so would be the investment in farm extension, etc. But to ensure that in this drive towards farm mechanization, one does not end up in over-capitalizing small farms, one needs to free up the land-lease markets so that economically viable size of the holdings emerges. Also, custom hiring of farm machines will have to be promoted through farmers' organizations/*panchayats*.

50. In terms of the high wage costs burden on the government due to MGNREGA, the program can be dovetailed with agri-operations, wherein farmers pay a part of the wage payment (say Rs 100/day) and the other part (say another Rs 100/day) is paid through MNREGA. Such group wise agri-operations can be organized through *panchayats*. This would keep the agri-wage costs for the farmer under control, give more income to farm labor, and also keep farm labor more productive. There is urgent need to do this fusion, and CACP has already been recommending to the government on these lines in its price policy reports.

51. Thirdly, global food inflation is not within India's direct control, but India can moderate its influence, especially of spikes, on domestic prices by an active and variable tariff structure, rather than outright bans on exports or imports. Indian trade policy has oscillated between complete export bans to high import duties with an overarching objective to attain domestic price stability at relatively low price levels. This in-built pro-consumer bias prevents farmers from realizing a remunerative value for their produce, and thereby slows down investments and growth in agriculture. So there is an increasing need for a stable, liberal and neutral (for producers as well as consumers) trade policy, with increased

alignment of the domestic and international prices with Agricultural Special Safeguards used extensively to hedge against sharp spikes and troughs.

52. Besides these three key policy changes, it would always help to invest in agri-R&D for better seeds, and irrigation to tap the remaining 30 million hectares of irrigation potential, with a view to raise overall supply response in agriculture. However, building efficient supply lines for agri-products, especially the perishable ones like fruits and vegetables, milk and milk products, eggs, meat and fish, etc, where the pressure of food inflation is much more than on cereals, deserves priority. This requires massive investments in logistics, agro-processing, and organized retailing, all of which can be leveraged through the private sector. Viewed from this perspective, a special mission on food processing and FDI in organized retailing are steps in the right direction. They can be made much more inclusive, if organized retailing has a window for franchise for *kirana* stores and even vendors, who can act as extension counters of organized retailers. This will create fusion between the organized players and unorganized sector, bringing synergy, and reining-in food inflation. On the supply side, farmer producer organizations will have to be organized to scale up production in line with the demand from organized processors and retailers. These structural and institutional reforms are critical to bring about greater efficiency in the country's agri supply-chain management and production incentives.

53. Therefore, rationalization of agricultural policies for high value products, and overhauling of the foodgrain management system, together with a winding down of fiscal deficits by restructuring and rationalizing food and fertilizer subsidies, promoting appropriate farm mechanization and dovetailing of MNREGA with agri-operations, and predictable and stable trade policy for agriculture, will surely go a long way in taming Indian food inflation.

# Annexure

World and Country group data for Inflation-1995 - 2012

| Country Group Name | 1995 | 1996 | 1997 | 1998 | 1999 | Average for 1990s |
|---|---|---|---|---|---|---|
| World (Inflation, average consumer prices) | 14.49 | 8.63 | 6.14 | 5.56 | 5.45 | 18.20 |
| Advanced economies(Inflation, average consumer prices) | 2.61 | 2.45 | 2.10 | 1.56 | 1.40 | 2.93 |
| Major advanced economies (G7)(Inflation, average consumer prices) | 2.24 | 2.18 | 1.98 | 1.24 | 1.39 | 2.61 |
| Newly industrialized Asian economies(Inflation, average consumer prices) | 4.60 | 4.27 | 3.39 | 4.49 | 0.01 | 4.75 |
| Emerging market and developing economies(Inflation, average consumer prices) | 39.05 | 20.38 | 13.46 | 12.86 | 12.80 | 56.91 |
| Global food inflation rate(Inflation, average consumer prices) | 11.40 | 4.85 | -8.26 | -9.60 | -13.72 | -1.14 |
| Inflation, average consumer prices(percent change) | 10.225 | 8.949 | 7.399 | 13.24 | 4.658 | 9.57 |
| India(WPI) (MOSPI) | 7.98 | 4.63 | 4.38 | 5.94 | 3.32 | 8.12 |
| Country Group Name | 2005 | 2006 | 2007 | 2008 | 2009 | |
| World (Inflation, average consumer prices) | 3.76 | 3.71 | 4.05 | 6.00 | 2.43 | 3.95 |
| Advanced economies(Inflation, average consumer prices) | 2.32 | 2.34 | 2.17 | 3.38 | 0.13 | 2.01 |
| Major advanced economies (G7)(Inflation, average consumer prices) | 2.33 | 2.33 | 2.16 | 3.17 | -0.10 | 1.89 |
| Newly industrialized Asian economies(Inflation, average consumer prices) | 2.21 | 1.63 | 2.23 | 4.49 | 1.30 | 2.00 |
| Emerging market and developing economies(Inflation, average consumer prices) | 5.83 | 5.59 | 6.50 | 9.25 | 5.12 | 6.81 |
| Global food inflation rate(Inflation, average consumer prices) | 4.35 | 7.97 | 25.33 | 25.88 | -21.45 | 6.32 |
| Inflation, average consumer prices(percent change) | 3.97 | 6.268 | 6.373 | 8.349 | 10.882 | 5.55 |
| India(WPI) *(CSO)* | 4.44 | 6.59 | 4.74 | 8.05 | 3.81 | 5.37 |

## *References*


- Abler, D. (2010), "Demand Growth in Developing Countries", OECD Food, Agriculture and Fisheries Papers, No. 29, OECD Publishing. Available at http://dx.doi.org/10.1787/5km91p2xcsd4-en
- Barnett, Richard C., Bessler, David A, and Thompson, Robert L (1983). The Money Supply and Nominal Agriculture Prices, American Journal of Agriculture Economics, Vol. 65, No. 2, May 1983.
- Ganguly, Kavery and Gulati, Ashok(2012) The Political Economy of Food Price Policy India Case Study, December 2012.
- Government of India (2012). 12th 5 year Plan. Planning Commission. Government of India.
- Government of India (2012). Mid-Year Economic Analysis, 2012-2013. Ministry of Finance. Department of Economic Affairs. Economic Division. December 17, 2012.
- Government of India (2013). Economic Survey 2012-13. Ministry of Finance. Government of India. February 27, 2013.
- Government of India. (Various years). National Accounts Statistics. Central Statistical Organization.
- Government of India. Reserve Bank of India (2011). Handbook of Statistics on Indian Economy Reserve Bank of India. Government of India.
- Gulati, Ashok, and Anjan K. Jena (2012). Rural prosperity no mirage; real rural wages have grown 6.8% each year in last 4 years. 4th October, 2012. The Economic Times. New Delhi.
- Gulati, Ashok, Surbhi Jain, and Anwarul Hoda (2013): Farm trade: tapping the hidden potential, CACP Discussion paper 3, Commission for Agricultural Costs and Prices, Ministry of Agriculture.
- IMF- WEO (2012). World Economic Outlook, Coping with High Debt and Sluggish Growth. October 2012.
- IRADe Study (2012). Taming Diesel Subsidy to Curtail Inflation and Foster Economic Growth, October 29, 2012. Integrated Research and Action for Development (IRADe), New Delhi. India.
- Jadhav, Narendra and Singh, Balwant (1990). Fiscal Monetary Dynamics in India- An Econometric Model, Economic and Political Weekly, Vol. 25 , No. 3, January 1990.
- Khundrakpam, Jeevan K. and Goyal, Rajan (2008). Is the Government Deficit in India Still Relevant For Stabilization? Reserve Bank of India, Occasional Papers, Vol. 29, No. 3, Winter 2008.
- Khundrakpam, Jeevan Kumar (2012). Estimating Impacts of Monetary Policy on Aggregate Demand in India, December 2012, WPS(DEPR):18/2012, RBI Working Paper Series.
- NSSO(2011). Key Indicators of Household expenditures in India, 2009-2010, NSS 66th Round, National Sample Survey Organization. Central Statistical Organization. Ministry of Statistics and program Implementation. Government of India. New Delhi. India.
- OECD/FAO(2012), OECD-FAO Agricultural Outlook 2012-2021. OECD Publishing and FAO. Available at http://dx.doi.org/10.1787/agr_outlook-2012-en
- Patnaik, Ila, Shah, Ajay and Veronese, Giovanni (2011). How Inflation be measured in India? Economic and Political Weekly. Vol 47, No 16, April, 2011,.
- Raj, Dr. Janak and Misra, Sangita (2011). Measures of Core Inflation in India- An empirical Evaluation, September 2011, WPS (DEPR):16/2011, RBI Working Paper Series.


- Raj, Janak, Sarat Dhal and Rajeev Jain (2008). Imported Inflation: The Evidence from India; Reserve Bank of India Occasional Papers Vol. 29, No. 3, Winter 2008.
- Rangarajan, C and Sheel, Alok (2013). Growth or Austerity: The Policy Dilemma, Money & Finance, ICRA Bulletin, February 2013.
- RBI (2013). A revolution in Monetary Policy Lessons in the wake of the Global Financial Crisis, Remarks by Dr. D. Subbarao, Governor RBI. Available at http://rbidocs.rbi.org.in/rdocs/Speeches/PDFs/SPECD030113F.pdf. Accessed on January 3, 2013.
- RBI (2013). Indian Inflation Puzzle - Speech by Deepak Mohanty, Ex. Director, Reserve Bank of India. Available at http://rbidocs.rbi.org.in/rdocs/Speeches/PDFs/SPADMS310113_F.pdf . Access date: January 31, 2013.
- RBI (2013). Mid-quarter Monetary Policy Review, March 2013, Reserve Bank of India, March 19, 2013. Available at http://rbidocs.rbi.org.in/rdocs/PressRelease/PDFs/IEPR1565MD0313MQR98456.pdf
- RBI (2013). Report On Currency And Finance 2009-12 (2013): Fiscal-Monetary Co-Ordination, March 2013.
- RBI (2013). State Finances: A study of budgets of 2012-13. Reserve Bank of India. January 2013. Available at http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/00SF090113FUL.pdf
- RBI (2013). Third Quarter Review of Monetary Policy 2012-13 by Dr. D. Subbarao, Governor Reserve Bank of India, January 29,2013. Available at http://rbi.org.in/scripts/NotificationUser.aspx?Id=7833&Mode=0
- RBI(2013). Is There a New Normal for Inflation? Speech by Dr. D. Subbarao, Governor, Reserve Bank of India. Available at http://www.rbi.org.in/scripts/BS_SpeechesView.aspx?id=789 . Access date: March 8, 2013.
- Reddy, YY (2013). Economic Policies and India's Reform Agenda- A New Thinking. Orient Blackswan.
- Shahrokh Fardoust, Justin Yifu Lin and Xubei Luo (2012). Demystifying China's Fiscal Stimulus, Policy Research Working Paper- 6221, The World Bank. October 2012. Available at http://elibrary.worldbank.org/docserver/download/6221.pdf?expires=1363857695&id=id&accname=guest&checksum=1194B6EAF60E4EF873B1383A8410BD55
- Shei, Shun-Yi and Thompson, Robert L (1988). Chapter 4. Inflation and Agriculture: a Monetarist- Structuralist Synthesis. Macroeconomics, Agriculture and Exchange Rates, Edited by P. L. Paarlberg, Robert G. Chambers. Westview Press.
- Taylor, John B (1994). The Inflation/Output Variability Trade-off Revisited. Journal: Conference Series , Federal Reserve Bank of Boston
- The Economic Times (2013). Staggered rise in diesel price will squeeze inflation: By Swaminathan S A Aiyar. The Economic Times. January 2, 2013. Available at http://articles.economictimes.indiatimes.com/2013-01-02/news/36111738_1_diesel-price-price-inflation-fiscal-deficit Access date: January 2, 2013
- The Economic Times (2013). Regulation should not kill beneficial innovation: YV Reddy, former governor of RBI. January 31, 2013.
- The Economist (2013). India's public finances- A walk on the wild side. February 23rd 2013.
- The Hindu (2012). An alternative 'theory' of Inflation. Harish Damodaran. June 12, 2012.
- Thompson, Robert L (1988). Chapter 7. US Macroeconomic Policy and Agriculture. Macroeconomics, Agriculture, and Exchange Rates. Edited by P. L. Paarlberg, Robert G.


Chambers. Westview Press. 1988.

- Yahoo India News (2013). Bite the bullet, Yashwant Sinha tells Government.ANI. January 10, 2013. Available at http://in.news.yahoo.com/bite-bullet-yashwant-sinha-tells-govt-130353976.html. Access date: January 10, 2013.