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A Note on Food Inflation in Pakistan

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"....inflation tends to redistribute income and wealth. It is said to redistribute income away from wage earning classes who are alleged to consume it all, and towards the profit recipients in the community who are alleged both to save a good deal and to invest their savings ..." Milton Friedman (1963) page 13.

Abstract

Food inflation hurts poor more than rich as poor spend higher proportion of their income on food items compared to rich. Higher global food and crude oil prices in 2008 resulted in higher (than historical average) food inflation in Pakistan. Global food inflation caused food inflation in Pakistan. However, food inflation diffusion has been lower compared to non-food inflation in Pakistan. Food inflation volatility in Pakistan was found to be half of that observed in the world. Compared to global food inflation persistence, there is no evidence of food inflation persistence in Pakistan. However, within the food group, most of the goods which were manufactured exhibited inflation persistence. With the help of comparison of food inflation with wage increases for labour (after 2008 global commodity prices shock), the poor (labour class) was found to be at disadvantage.

Key Words: Inflation, Food Inflation, Persistence, Volatility, Diffusion, Pakistan

JEL classification: E31

1. Introduction

It is usually said that inflation hurts poor more than rich. I would suggest rephrasing this saying as food inflation hurts poor more than rich. Poor individuals spend larger proportion of their income on food compared to rich. It is also true for low and middle income countries, in particular. In low and middle income countries, food spending share (40 percent) is double compared to high income countries (20 percent) despite the fact that with the passage of time these shares have declined with increase in real per capita income as suggested by Engel's Law[2]. Engel's Law states as income rises, the proportion of income spent on food falls (and thus

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[2] Specifically, food spending share is 48.5, 31.1, and 20.4 percent for low, middle, and high income countries respectively as documented (based on World Bank International Comparison Program, 2005) in Table 9 (budget shares for broad aggregates and conditional budget shares for food categories) available on Economic Research Service (US Department of Agriculture) website http://www.ers.usda.gov/Data/InternationalFoodDemand/ retrieved on April 11, 2012. In the study of 144 countries the low (high) income countries are those which have real per capita income below 15 (above 45) percent of US real per capita income and rest are middle income countries.

income elasticity of food is between 0 and 1). South Asian countries, including Pakistan, are concerned with food inflation as half of the world poor (people living below US$1 per day) live in SAARC region[3]. Pakistan recently graduated from low income group to lower middle income group as reported by World Bank income group classification. With rising per capita income in Pakistan, share of food expenditure has also declined from 61.60 percent in 1959-60 to 34.83 percent in recent most revision of CPI basket in 2007-08 by Pakistan Bureau of Statistics. Notwithstanding the recent lowering of food related items' weight in Pakistan's CPI basket, our share of food expenditure is lower than that of Bangladesh (58.84), India (46.19), Philippine (46.58), and Sri Lanka (45.50).

Higher food and oil price rise in 2008 (than recent historic levels) resulted in above (historical) average food inflation in Pakistan in subsequent months. Pakistan was worst hit by the global food and oil price rise of 2008. We had to import wheat at historical high prices. Generally, Pakistan is not a net wheat importer, especially after 2000. When we were completely out of the impact of 2008 international food and oil prices shock effects on food inflation in Pakistan, we were severely hit by devastating floods in 2010 and heavy rains in 2011. It resulted in another rise in food inflation, particularly related to perishable food items, during the last two years. Latest inflation data indicated deceleration of food inflation to single digit levels (after more than 50 months of double digit food inflation). Unfortunately, there is another wave of rising global food prices, at least in the case of wheat, corn, and soybean prices which have increased significantly during the last couple of months (June-July 2012). Despite its importance, as rising food prices are becoming a growing policy challenge, we do not find any comprehensive study on reasons, features and consequences of recent food inflation episode in Pakistan. This study attempts to fill this gap in the literature. Dataset used for analysis in this study and the methodological approaches applied are briefly given in section 2. In section 3, a brief review of literature is presented. Insightful observations are shared and empirical findings are discussed in section 4. Last section is reserved for conclusion.

2. Dataset and Methodological Approaches

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[3] http://www.nationmaster.com/graph/eco_pov_sha_of_all_poo_peo-poverty-share-all-poor-people#source

In this study both Pakistan and world food prices related data for January 1992 to December 2011 has been used. Monthly consumer price index (CPI) as well as wholesale price index (WPI) data regularly released by Pakistan Bureau of Statistics (PBS) has been used. Monthly world commodity prices data released by IMF has been used as a proxy for global prices. For investigation of the phenomenon of inflation persistence in Pakistan, monthly changes in prices of (374) individual commodities, as reported by PBS for July 2001 to June 2011, have also been used in this study. Skilled and unskilled labour wage increases during June 03 to June 11 have been used, from the labour force survey of PBS, for the purpose of comparison of food inflation with wage increases.

Initial insights are built upon simple statistical measures (like mean and standard deviation) and graphical analysis. The rigorous analysis is then based upon applied time series econometrics. The first step in the time series analysis comprises testing degree of integration of the series of interest. Dickey and Fuller (1979) unit root test has been used to test the degree of integration of food inflation in Pakistan and that of world. Lag selection (and inclusion of intercept and / or trend) has been decided on the basis of their statistical significance in the estimated equation. For causality analysis, Granger (1969) non-causality test has been used to test the null hypothesis that food inflation in Pakistan is not driven by the world food inflation against the alternate that food inflation in Pakistan is driven by the world food inflation.

When there is higher (than average) food inflation in the country, it is important to see how wide spread is the inflation in the basket of food items. For this purpose an index called inflation diffusion index (IDI) is constructed (for the first time in Pakistan). IDI is the difference between the share of items with increasing prices and the share of items with decreasing prices in the group we are interested in. In case IDI is zero, it means the share of commodities with increasing prices equals the share of items with decreasing prices in the group. Since IDI measures the spread of inflation amongst commodities, wider is the spread of inflation amongst the commodities when higher is the inflation levels based on an established phenomenon of positive relation between the level and dispersion of inflation.

Since Pakistan has just ended the longest phase of double digit (YoY) inflation in history. It would be useful to look at the inflation persistence in Pakistan. Persistence in inflation refers to the dependence of current inflation on its own past values. Hanif et al (2012) studied this

phenomenon at overall, group-wise, and at the micro level using month-on-month (MoM) inflation figures of 374 commodities used to be in the Pakistan's CPI basket prior to July 2011. In this study, the phenomenon of persistence is explored for the volatility in food inflation in Pakistan as well. For global food inflation, persistence is diagnosed both at level of and volatility in the MoM changes in food prices. Generally, a first order autoregressive [AR(1)] model, $\pi_t = \mu + \alpha \pi_{t-1} + \in_t$, is estimated for the degree of (inflation) persistence. Here π_t denotes the inflation at time t, μ is the mean inflation rate, and α is the AR(1) coefficient. Statistically significant estimated (positive) coefficient implies a positive serial correlation, and thus inertia, in the inflation series. Similar approach is used for persistence in volatility in food inflation.

Balquees (1988) found that the debate on monetarists versus structuralists view on inflation determinants is relevant for Pakistan. Notwithstanding this debate, State Bank of Pakistan has herself been pointing out from time to time the supply side as one of the explanations of inflationary in the country, at least during the periods of relatively higher inflation. In this study we have used monthly time series data on key macroeconomic variables of Pakistan economy for July 1993 to June 2011 and structural vector autoregression (SVAR) to quantify the role of supply (and demand) shocks in explaining the (errors in forecasts of) overall and NFNE inflation in the country.

3. Literature Review

Understanding inflation has always been an area of interest in theoretical as well as empirical economics research around the world. But food inflation could not attract same attention in the economics literature. Similarly, while inflation in Pakistan attracted some economics researchers, food inflation could not. It might be because food inflation had usually been lower than non food inflation in Pakistan after 1961-70 (when higher food inflation was observed in Pakistan prior to the recent episode). However, some studies focusing on overall inflation considered some food related items as one of the determinants of inflation in the country. Such studies include Khan and Schimmepfennig (2006) and Hanif and Batool (2006). While examining the monetarist's versus structuralist's hypothesis using monthly time series data (from January 1998 to June 2005) of credit to private sector, broad money supply, nominal exchange rate, and support price of wheat (representing supply side) Khan and Schimmepfennig (2006) found that while monetary factors played dominating role in determining inflation in

Pakistan with a lag of around one year, wheat support price also had an impact on inflation in the country though in the short run. Hanif and Batool (2006) also found the support for significant and positive contribution of (contemporaneous growth in) support price of wheat to inflation in Pakistan (in addition to lagged and contemporaneous reserve money growth, real GDP growth, and international trade openness) based on annual data for 1973-2005. After Khan and Schimmepfennig (2006) and Hanif and Batool (2006), there have been some separate studies on food inflation in Pakistan which are discussed below.

UN (2008), based on partial equilibrium simulation modeling using Household Integrated Economic Survey (HIES) PSLM data for 2005-06 and rapid assessment household surveys and trade surveys, assessed the impact of price spiral and food shortages on the livelihood and general welfare of Pakistani households, particularly vulnerable and marginalized ones. This study's findings indicated that more than half of the surveyed households experienced high food prices as a shock. The simulation study showed the poorest (richest) quintile spent 13 (5) more on food during the shock period as against two years earlier. This assessment suggested that the household who cannot afford to obtain medical assistance when proportion of sick people increased from 6 percent to 30 percent. This study was based on a mission fielded for a very short period of time during June 9 to July 13, 2008 and thus lacks a lot what happened to food prices after July 13, 2008 and the subsequent implications for people of Pakistan.

Hanif et al (2010) while building a macroeconometric model for Pakistan economy formulated two separate equations for food and non-food inflation considering monetary policy might have relatively more influence on non-food inflation compared to food inflation. Based on the annual dataset for 1973-2006, they found wheat support price and real output in the Pakistan to be the main determinants of food inflation in the country. This study was, however, confined to determinants of food inflation in Pakistan. Akhtar (2009) studied food inflation in relatively more detail. He used reduced form modeling to quantify the impact of macro policies (such as support prices), agriculture output, import and export prices and quantity indices, and money broad supply on food inflation in Pakistan over the period of 1991 to 2006. He found that growth in broad money supply played a major role in inflation in Pakistan while growth in the index of food production helped dampen the food inflation in the country. He found the impact of agriculture support prices on inflation in the country to be positive and significant. His finding of

higher impact of unit value index (of food import) in accelerating food inflation in Pakistan than (food import) quantity index in stabilizing food prices in Pakistan suggested higher international food prices transmitted large positive impact on Pakistan food prices compared to liberal food imports policy's small negative impact on domestic food prices. This study was based on a very limited time period dataset and is open to technical criticism due to use of small number of observations for such analysis.

One the basis of above (and others') findings of impact of international prices on national prices, it will be pertinent if we can see what other countries' studies found about the role of global factors in local (national) inflation. Mumtaz and Surico (2008) based on their study of 11 countries (UK, US, Spain, New Zealand, Netherland, Japan, Italy, Germany, France, Canada, and Australia) using quarterly data for 1961:1 to 2004:3 found that inflation rates were much closer across the countries (than in 1970s). Their results suggested that there had been a fall in the level, persistence, and volatility of inflation across the sample countries. They observed an increase in the co-movements of inflations rates across the countries during the last two decades of their study. The on-going globalization was suggested by them as one of the explanatory factor for such increased co-movement of inflation rate. Ciccarelli and Mojon (2008) also showed that inflation in 22 OECD countries was largely a global phenomenon as a common factor alone accounted for about 70 percent of variance in their inflation rates. The co-movement of inflation was found to be largely a result of common shocks. There was a robust 'error correction mechanism' which brought national inflation rates back to global inflation. Global inflation was found to be a function of real developments at short horizons and monetary developments at long horizon.

In the light of reviewed studies, we would like to explore in this study the role of global food prices in food inflation in Pakistan. In addition, important features like volatility and persistence of food inflation in Pakistan are going to be explored for the first time in this study.

4. Empirical Observations and Findings

Let us start with an observation based upon domestic and global food prices behavior. Though we are out of the impact of world food price shock of 2008, our food prices inflation is still linked to global food inflation. Figure 1 and Figure 2 show Pakistan and world food inflation

move in tandem. They not only move in tandem, food inflation in the world causes food inflation in Pakistan whether it is 'month on month' or 'year on year' basis. In order to see the role of world food inflation in the Pakistan's food inflation we formally conducted the Granger non-causality test. However, before applying the Granger non-causality test we need to see if the underlying times series are stationary or not. Using Dickey Fuller test for unit root we find that both the Pakistan and World food inflation series are stationary (see Table 1a and 1b). Food inflation in Pakistan is largely driven by the world food inflation. That is what we find when we tested the Granger non-causality hypothesis and found it rejected for the period January 1992 to December 2011 (see Table 2a and 2b)[4].

Overall behaviour of food inflation in Pakistan was found to be the result of changes in global prices of food at commodity levels during the analysis period. It can be clearly seen from the graphs 3 to 6 (pertaining to wheat, rice, palm oil, and sugar price changes in Pakistan and world) that inflation in these commodities prices in Pakistan followed changes in corresponding commodities' prices in world market being a small open economy[5]. There is a limited set of commodities inflation in which leads to overall food inflation, and which contributes to overall inflation more than its weight in the Pakistan's CPI basket. Contribution of food inflation (YoY) has been about 51 percent in overall inflation (YoY) during July 2002 to July 2011 as against it weight around 40 percent. Interestingly, there is no difference in this contribution share during pre and post 2008 global commodity prices shock notwithstanding higher levels, of both food as well overall inflation in Pakistan, in the later period. Within food group, only a handful of items (wheat & allied products, sugar & gur, meat, fresh milk, and vegetables) contributed to half of the food inflation in Pakistan during both the pre and post 2008 commodity prices shock (see figure 7)[6]. It means spread of inflation has been limited to a few commodities in Pakistan. This

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[4] It is pertinent to state here that analyzing what determines global food inflation is out of the scope of this study. Such determinants may include: shift in demand and supply in world, increased biofuel production/consumption, higher energy prices, changes in weather patterns, and/or higher food consumption in emerging economies in addition to global monetary factors including US dollar exchange rate dynamics.

[5] Pakistan is the third largest world exporter according to world rice exports in 2010. On the other hand, Pakistan is fourth largest world importer of palm oil according to world palm oil exports in 2011. However, according to popularly used openness criterion (export plus import to GDP ratio) Pakistan ranked 109 out 112 countries analyzed based on 2010 annual data from International Financial Statistics (IMF). Only three countries more close than Pakistan were Japan, US and Brazil. Most open economy was found to be China with trade volumes more than four times her income.

[6] Historic growth in the wheat prices occurred in Pakistan when government increased wheat (support) price by 52 percent in FY10, to Rs. 950 per kg, that too over and above 47 percent raise given just a year earlier (in FY09). This

can also be seen from figure 8 with the help of inflation diffusion indices, based on MoM changes in the prices at micro level, for food as well as non food group for the case of Pakistan. Food inflation diffusion has been lower, than for non-food group, on average during both the pre and post international commodity prices shock of 2008. Food inflation diffusion reaches the levels of non-food inflation diffusion only during the FY08, the year of global commodity price shock. We can see that IDI for food group has been more volatile than for non-food group. We now turn to volatility in food inflation in Pakistan.

These are not only the levels of food price changes in world and Pakistan which are linked, the volatilities in the two markets are also linked as has been shown in the figures 9 and 10. Though on average volatility in food inflation in Pakistan was half of that in the world food inflation, much lower part of the global food inflation volatility was passed on to the Pakistani markets during the 2008 commodity price shock. This holds irrespective of whether we see the MoM or YoY food price changes. Here, another important question arises: is world food inflation comparable to WPI food inflation in Pakistan rather than retail markets food inflation in the country? It was our wholesale markets which absorbed most of the volatilities in the food prices. We can see, during the last four years particularly, volatility in our wholesale markets was higher (than those in the retail markets) but still lower compared to global market as shown in the figure 11. We know that prior to the commodity prices shock of 2007-08, volatility in our retail and wholesale market was almost at same levels but during the shock times our wholesale market worked as shock absorber. However, the food inflation volatility persistence was found to be higher in case of Pakistan compared to world food inflation volatility persistence. We also explored the food inflation persistence in Pakistan at levels. That is where we now turn to (see Table 3).

It is well established that the effectiveness of monetary policy in stabilizing prices depends largely upon inflation dynamics - in addition to the credibility of the central bank, the level of cooperation between monetary and fiscal policies, the exchange rate regime and the degree of aggressiveness of monetary policy. One of the determinants of inflation dynamics is the price setting behaviour of firms in the country. When a significant number of firms adjust

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(123.53 percent) wheat price inflation in 'two years' is almost double than earlier highest 'two years' wheat price inflation at 64.4 percent during 1974-76. Going into the details of resultant transfer of money from urban to rural population of the country and subsequent implications for the economy as a whole is out of the scope of this note.

their prices based on past information, the country faces inflation persistence (Gali and Gertler (1999)) – the tendency of inflation to converge slowly to its long-run level following a shock. Choudhary et al (2011), based on a survey of a large number firms in Pakistan by State Bank of Pakistan (SBP), found that 71 percent of manufacturers in the country used backward looking information in price setting. This gives rise to inflationary inertia as when a large proportion of firms use backward looking information while setting prices, inflation cannot transition (easily) to a (new) lower steady state in response to any unexpected announcement of a, permanent and, credible lowering of growth in the nominal anchor (Fuhrer, 2009). Hanif et al (2012) explored (intrinsic) inflation persistence in Pakistan using month on month time series data of consumer price index (CPI) for 2001-11, various group level consumer price indices, and 374 individual prices, released by the Pakistan Bureau of Statistics (PBS) – the country's statistical agency. They found the evidence of core (non-food-non-energy) inflation persistence in Pakistan but they could not find any evidence of food inflation persistence in Pakistan during the last decade. Core inflation basket is dominated by manufacturing goods. Core inflation persistence confirms earlier observation in price setting survey by the State Bank that 71 percent of manufacturing firms in Pakistan used backward looking information in setting prices of the goods produced. But, did inflation persistence or its absence at group level imply that all commodities in it showed similar behaviour? Obviously, it might not be a necessary case. And that was what was found for the case of food group in Pakistan, in particular. When inflation persistence in Pakistan based on individual commodities was further explored, it was found that more than half of the goods in 'food beverages and tobacco' group showed significant inflation persistence. It was observed that more than 80 percent of goods showing inflation persistence in food groups were manufactured food items. Compared to it, only 40 percent of those which were not showing inflation persistence belonged to manufactured food items. It showed that, these were again the manufactured items in which inflation was found to be persistent in Pakistan.

In the beginning it was suggested stating that the food inflation hurts poor more than rich instead of saying that inflation hurts poor more than rich. Let us see what happened to wages in Pakistan, particularly of labour class when country faced world commodities prices shock of 2008. With the help of comparison of food inflation with wage increases for skilled and unskilled labour (figure 12 and 13) we can see that labour are at disadvantage. During the period of July 03 to June 2011 inflation in food prices (179.80 percent) was higher than the growth in the wages of

skilled labour (154.53 percent) but slightly lower than the unskilled labour wage increase (186.63 percent). However, on average the food price inflation during this period was higher than the average wage change during the same period (see figures 12 and 13). If we consider the period when country faced relatively high food inflation as a consequence of global food price shock after FY08 we can see that in each of the last four years food inflation was higher than the wage growth (see Table 4). It is not only the growth in the wages of skilled and unskilled labour which lagged behind the food inflation; the story of minimum wages for unskilled workers was not different. The minimum wage increased by 433.3 percent during FY1993 (at Rs.1500 per month) to FY2012 (at Rs. 8000 per month) as against rise in the food prices by 511.07 percent during first month of FY1993 to first month of FY2012. Unfortunately, a significant proportion of employed (unskilled) labour has been earning less than the minimum wage announced by the government from time to time (see Irfan (2008), page 29). In this way, lack of complete implementation of the minimum wage (regulation) and the sluggish growth in minimum wage itself, even where implemented, failed to neutralize the impact of inflation and thus to protect the living standards of labour[7]. We all know the weights in CPI basket for food group are representative of all income groups in the country and lowest income group has highest share of food expenditure compared to all other income group. People falling in this group are thus most affected when their wages are not even compensated for the rise in food prices despite the fact that food price inflation has been higher relative to overall inflation in Pakistan. That is what we discuss now.

If we consider the last two decades' observed change in the relative prices we can find the commodities in which price changes have been higher than the average price change in the country. Thus, we can look at the relative price changes at commodity level for all the commodities in the CPI basket. But, it may be difficult to extract any meaningful result from the detailed presentation of MoM or YoY change in relative prices of each of the commodities in the basket. However, it will be useful if we look at (both MoM and YoY) observed change in

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[7] Here we have not discussed the unprivileged groups of society. Government of Pakistan runs some targeted programmes for supporting these groups including Zakat and Benazir Income Support Programme (BISP). BISP was started in late 2008 which provides Rs. 1000/- per month to (some of the) poorest of the poor families in the country. The amount, however, has not been increased by the government despite more than 50 percent increase in food price index since then. Furthermore, there are some institutional arrangements (through Utility Stores Corporation of Pakistan) for provision of necessary food items at significantly lower than market prices for poor families.

relative prices for various groups in the CPI basket as in Table 5. Positive (negative) relative price change means inflation in the group has been higher (lower) than the overall inflation in the country. It is obvious from the Table 5 that the 'food beverages & tobacco (FBT)' price inflation has always been higher than overall inflation in Pakistan and that 'fuel & lighting,' or 'transport & communication' has usually been the second such group showing higher than overall inflation in Pakistan. We have already seen that Pakistan food price inflation follow world food prices changes. It is also obvious that the inflation dynamics of 'fuel & lighting (F&L),' and 'transport & communication (T&C)' groups are, in one way or other, linked to global crude oil prices behavior since we are heavily dependent upon crude oil imports. Expected find in Table 5 is the size of the (weighted) average price change in food group inflation after the global commodity prices shock of 2008. Whether we look at MoM or YoY inflation we can see that the (weighted) relative price change in food group inflation during FY08-FY11 is three fold than the same observed during the earlier part of 2000s and many fold compared to what we observed in the 1990s. Supply side factor(s) and/or elasticities of demand are behind this observed phenomenon as commodities in the FBT, F&L and T&C groups are more prone to supply shocks and tend to be less price elastic compared to those in other groups. In the next discussion we see how much of overall inflation in Pakistan is supply side driven. But before we explore the role of supply side factors in overall inflation let us see how food price inflation impacts non-food price inflation in Pakistan.

In addition to (direct) impact of food inflation upon overall inflation being a component, rather highest weight carrying group amongst various groups in Pakistan CPI basket, there are some pass through (indirect effect) from food inflation to non-food inflation and thus to aggregate inflation. One of such (second round effect's) channels is the higher wage demand by wage earners, in response to higher food inflation in the country, which results in cost-push inflation. Another channel may be the expectations channel: agents may form higher future overall inflation expectation and set prices and wages accordingly. Finally, the credibility channel: when people, while experiencing high food inflation, consider the central bank's ability to tame inflation inadequate and expect higher future inflation and behave accordingly in the product and labor markets. Since share of food inflation is large in developing countries like Pakistan (compared to developed world), the direct and direct effect of higher food inflation upon non-food and finally upon general inflation is even larger. Quantification of first round

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impact of food inflation upon overall inflation is directly an accounting exercise and is relatively simple. With higher food inflation, its direct impact upon inflation increases according to its share in our CPI basket. Quantification of second round impact, however, requires an econometric exercise as in World Economic Outlook (IMF 2007) which is based upon a VAR model consisting of three endogenous variables (domestic food prices, non-food prices and broad money year on year changes) and two exogenous variables (global food and international crude oil prices year on year changes). Estimated results (impulse response function) for Pakistan for January 1991 to December 2007 period show that a 1 percentage point increase in food price inflation results in 0.24 percentage point increase in non-food inflation and this impact is seen in about 21-24 months. Given the weight of food group in overall inflation and lagged indirect impact of food prices upon non-food prices, the combined effect of food inflation upon overall inflation is significant. This seemingly small number of 0.24 is greater than 10 times (0.02 percentage) impact upon inflation in response to 1 percentage point increase in food inflation in ten Asian economies [as documented in Cheung et al (2008)]. This significant impact of food price inflation in Pakistan (0.24) doubled (to 0.48) after international commodity shock of 2008 to with period halved from 21-24 month (for January 1991 to December 2007 period) to 11-12 months (for January 1991 to December 2011 period).

For overall inflation, the monetarist view that inflation is always and everywhere a monetary phenomenon (Friedman, 1963 page 17) is widely accepted in the economic literature as a long term proposition. Accordingly, monetary policy framework in Pakistan, as in most of the advanced economies, is primarily designed around the monetarists view. If we consider the long term (average) behaviour of broad money, income, and inflation for 1951-2010 we can see that inflation in Pakistan has been roughly equal to rate of broad money growth minus the real output growth. Even the standard deviation (a measure of volatility) of inflation during this period has been same as that of broad money growth. Riazuddin (2008) has explored how money growth has interacted historically with inflation in Pakistan, in a bit more detail, and found that inflation is primarily a monetary phenomenon. Considering below (above) median M2 growth and inflation as low (high), he found that three-fourths times high broad money growth was followed by high inflation next year and not surprisingly low broad money growth was followed by low inflation next year with similar odds during 1958-2007. He also found that food inflation too is a monetary phenomenon in Pakistan in the long run. However, it has also been found in

some other studies that the supply side factor also play role in driving inflation in the case of Pakistan, especially the food inflation. That is what where comes in the structuralists' point of view on inflation. Balquees (1988) was the first to explicitly test the monetarist and structuralist views of inflation for the case of Pakistan. She found the debate on monetarists versus structuralists 'relevant' for the developing countries like Pakistan. Khan and Schimmelpfennig (2006) also found the role of supply side factors in explaining short run dynamics of inflation in Pakistan. Besides these studies State Bank of Pakistan has also been pointing out from time to time, in its flagship publications like annual and quarterly reports and in monetary policy statements, the supply disruptions as one of the explanations of inflationary pressures in the country. We cannot understand inflation in developing countries without considering the supply side factors. And, in case of food inflation these are the supply side factors which are of more importance at least for the case of Pakistan. Using structural vector autoregression (SVAR) approach upon the monthly data of macroeconomic indicators (see Khan and Hanif (2012) for the list of variables) for July 1993 to June 2011 for the case of Pakistan, it was found that one sixth of the impact of a supply shock on overall inflation occurs in contemporaneous month and three fourth of the overall impact of a supply shock on aggregate inflation occurs during the first year of the shock. It reaches to 85 percent during the 18 months and it completes in almost 36 months. Based on the same dataset set for July 1993 to June 2011, it was found that 39.50 percent of variation in non-food non energy (NFNE) inflation in Pakistan is explained by the supply shocks. However, the role of supply side factors in explaining overall inflation is higher by more than one-fifth to 48.30 percent (see figure 14). These supply side contributions in explaining inflation are relatively higher than our previous knowledge on Pakistan economy based upon same dataset but excluding the last 5 years when around 24 percent of the variation in (NFNE as well as overall) inflation were attributable to supply side factors as documented by Khan (2008). It shows the havoc played to inflation in Pakistan by the recent international commodities prices shocks and Pakistan's 2010 flood and 2011 heavy rains. Moreover, supply disruptions due to law and order situation have also increased during the past five years. The crux of the story is inflation (and even NFNE inflation) cannot be termed as purely a monetary phenomenon at least in the case of Pakistan and particularly during the recent history.

5. Concluding Remarks

Most important findings of this study can be summarized by saying that food inflation is a global phenomenon and that the food inflation hurts poor more than the rich. It was found that Pakistan and world food inflation co-moved, and that global food inflation caused food inflation in Pakistan during the last two decades. However, there was a small basket of food items (wheat, sugar, meat, fresh milk, and vegetables) inflation in which resulted in food inflation in Pakistan. That is why food inflation diffusion in Pakistan had been lower, than for non-food group. Food inflation in Pakistan and world were found to be linked not only at the levels but also in terms of volatilities. Our wholesale markets had been absorbing a part of the volatility in global food inflation, particularly during the post 2008 international commodity prices shock period, and thus volatility in (retail) food inflation in Pakistan had been half of that found in the global food price increases. But, persistence in food inflation volatility in Pakistan had been higher compared to the persistence in the world food inflation volatility. When we compared the phenomenon of persistence in inflation (at level) we could not find any evidence of food inflation persistence in Pakistan whereas global food inflation was found to be persistent. However, when explored at the individual commodity level, it was found that manufactured food items showed significant inflation persistence in Pakistan during July 2001- June 2011. To explore the impact of the recent food inflation in Pakistan upon labour class (being most vulnerable to food inflation), a comparison was made between the food inflation and wage increases of the labour class. With the help of comparison of food inflation with wage increases for skill and unskilled labour (during the period of July 03 to June 2011) we found the poor (labour class) at disadvantage during most of the period for which the consistent data on wages was found. During each of the last four years (of post 2008 crisis period) food inflation had been higher than the (labour class) wage growth. Higher food inflation (compared to non-food) is not only a post 2008 phenomenon. During the last two decades, food group prices increased most compared to increases in price of any other group in CPI basket; following fuel & lighting and transport & communication groups. Commodities in these three groups are more prone to supply shocks and tend to be less price elastic compared to other commodities in our CPI basket. Based on the monthly dataset of macroeconomic indicators for July 1993 to June 2011 for the case of Pakistan, it was found that 48 percent of variation in overall inflation in Pakistan is explained by the supply shocks compared 24 percent found by Khan 2008 based on July 1993 to September 2006 dataset. It

showed the havoc played to inflation in Pakistan by the supply factors like international commodities prices shocks, last year's heavy rains, and flood a year earlier.

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Appendix

Table 1a: Results of Unit Root Analysis of MoM Inflation

Variables	DF Test Value (p-values in parenthesis)*	Lag (included) Max Lag= 13
Pakistan Food Inflation (Level)	-13.90 (0.00)	0
World Food Inflation (Level)	-10.35 (0.00)	0
*: MacKinnon's one-sided p-values. We followed 'Schwartz Information Criteria' for lag selection.		

Table 1b: Results of Unit Root Analysis of YoY Inflation

Variables	DF Test Value (p-values in parenthesis)*	Lag (included) Max Lag= 13
Pakistan Food Inflation (Level)	-1.46 (0.55)	12
World Food Inflation (Level)	-2.16 (0.22)	12
Pakistan Food Inflation (First Difference)	-7.72 (0.00)	11
World Food Inflation (First Difference)	-8.52 (0.00)	11
*: MacKinnon's one-sided p-values. We followed 'Schwartz Information Criteria' for lag selection.		

Table 2a: Results of Granger Non-Causality Test (MoM Inflation)

Null Hypothesis	F-statistic	Probability	Result
World Food Inflation does not Granger cause Pakistan Food Inflation	2.82	0.00	Rejected
Pakistan Food Inflation does not Granger cause World Food Inflation	1.06	0.40	Unable to reject

Table 2b: Results of Granger Non-Causality Test (YoY Inflation)

Null Hypothesis	F-statistic	Probability	Result
Δ in World Food Inflation does not Granger cause Δ in Pak Food Inflation	3.09	0.00	Rejected
Δ in Pak Food Inflation does not Granger cause Δ in World Food Inflation	1.33	0.20	Unable to reject

Table 3: Inflation Persistence and Inflation Volatility Persistence – Pakistan and World

	Period	AR(1) coefficient for MoM inflation series	AR(1) coefficient for squared MoM inflation series
(1)	(2)	(3)	(4)
Pakistan	Jan 1992-Dec 2011	0.11	0.33*
World	Jan 1992-Dec 2011	0.39*	0.21*
*: Significant at 5 percent critical level			

**Table 4: Food Inflation and Wages Increase in Pakistan (%)**

	Food Inflation	Skilled Labour	Unskilled Labour
Jul 03-Jun 11	179.80	154.53	186.63
Jul 07-Jun 11	90.38	63.06	61.79
FY08	17.53	18.65	16.85
FY09	24.31	21.26	18.45
FY10	12.47	6.18	9.44
FY11	18.40	9.94	10.51

Table 5: Group-Wise (Weighted) Relative Price Changes in Pakistan during the Last Two Decades

Groups	MoM			YoY		
	FY92-FY00	FY02-FY07	FY08-FY11	FY92-FY00	FY02-FY07	FY08-FY11
Food Beverages & Tobacco	**0.0161**	**0.0421**	**0.1033**	**0.1181**	**0.4831**	**1.4668**
Apparel, Textile & Footwear	-0.0052	-0.0105	-0.0192	-0.0739	-0.1735	-0.2553
House Rent	-0.0083	*0.0000*	-0.0514	-0.1414	0.0222	-0.6023
Fuel & Lighting	*0.0025*	-0.0012	*0.0035*	*0.1029*	-0.0040	*0.0532*
Household Furniture & Equipment	-0.0033	-0.0036	-0.0127	-0.0384	-0.0553	-0.1697
Transport & Communication	-0.0012	-0.0043	-0.0011	0.0213	*0.0504*	-0.1367
Cleaning, Laundry & Personal Appearance	0.0002	-0.0104	-0.0018	0.0033	-0.1503	-0.0756
Medicare	-0.0009	-0.0043	-0.0048	0.0082	-0.0642	-0.0763
Recreation & Entertainment		-0.0041	-0.0047		-0.0548	-0.0593
Education		-0.0037	-0.0111		-0.0534	-0.1447

Note1: Entries which are bold show highest relative price change. Entries which are bold & italics show second highest relative price change.
Note2: During 1990s, there were 8 groups in the CPI basket of Pakistan. 'Recreation and Entertainment,' and 'Education,' were added in 2001).
Note3: Iqbal and Hanif (2012) found that the estimated coefficients of changes in relative prices of all groups are significantly different from zero.

Figure 1: Pakistan and World Food & Beverages Inflation (YoY)-Volatility Comparisons
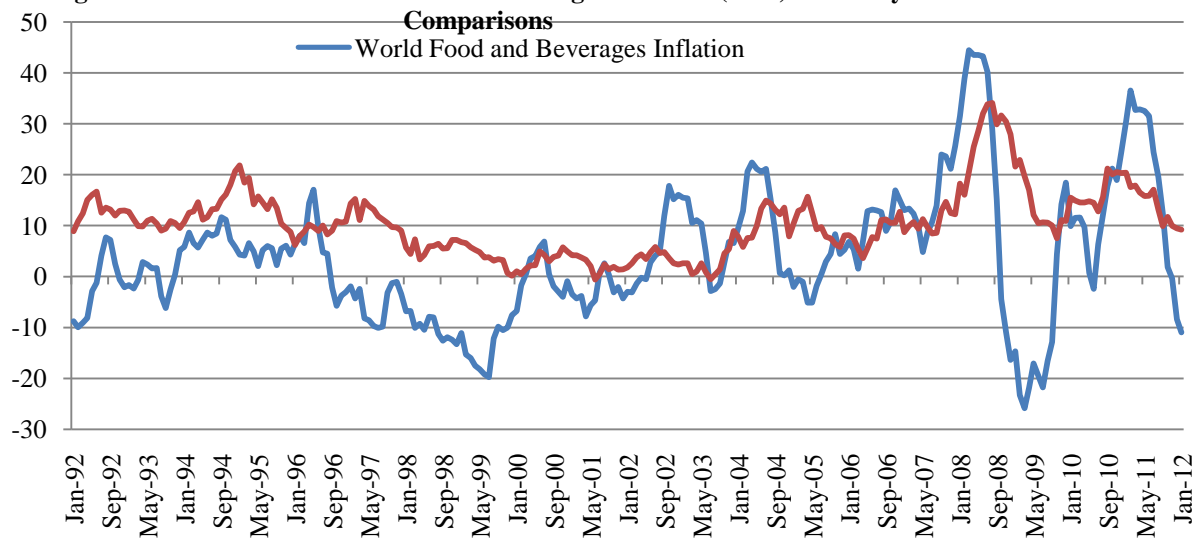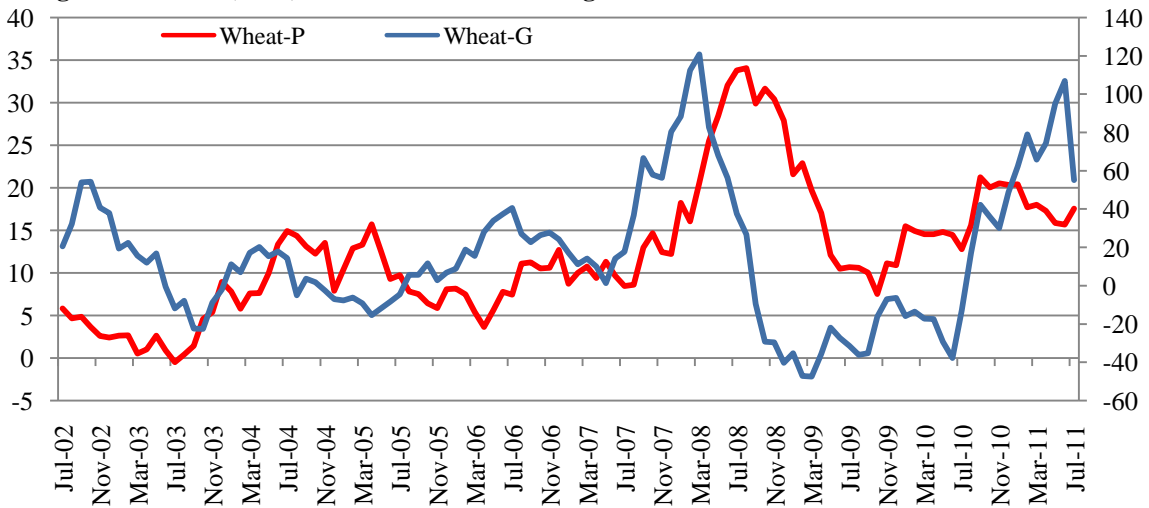
Sources: Haver Analytics , Pakistan Bureau of Statistics

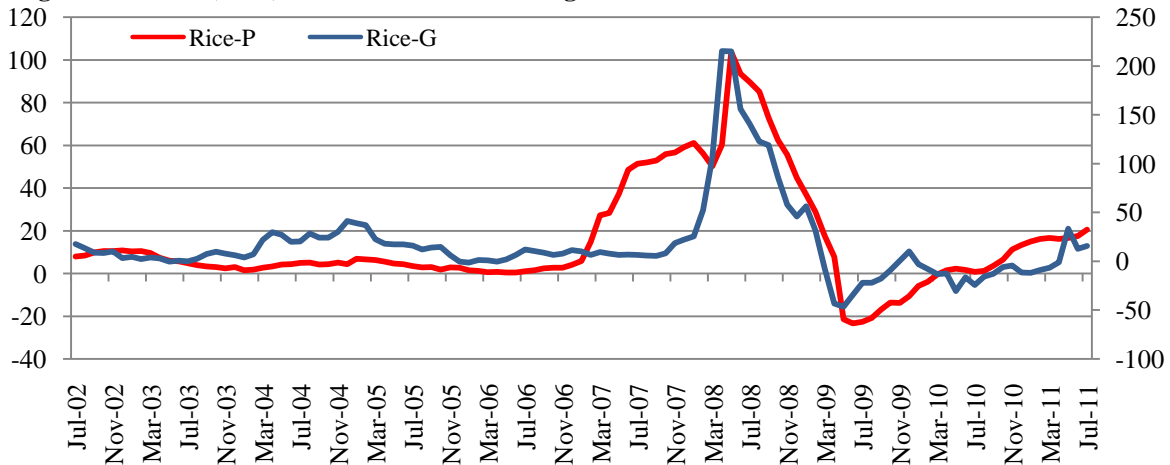**Figure 2: Pakistan and World Food & Beverages Inflation (MoM)**

Legend: World Food and Beverages Inflation — Pakistan Food and Beverages Inflation
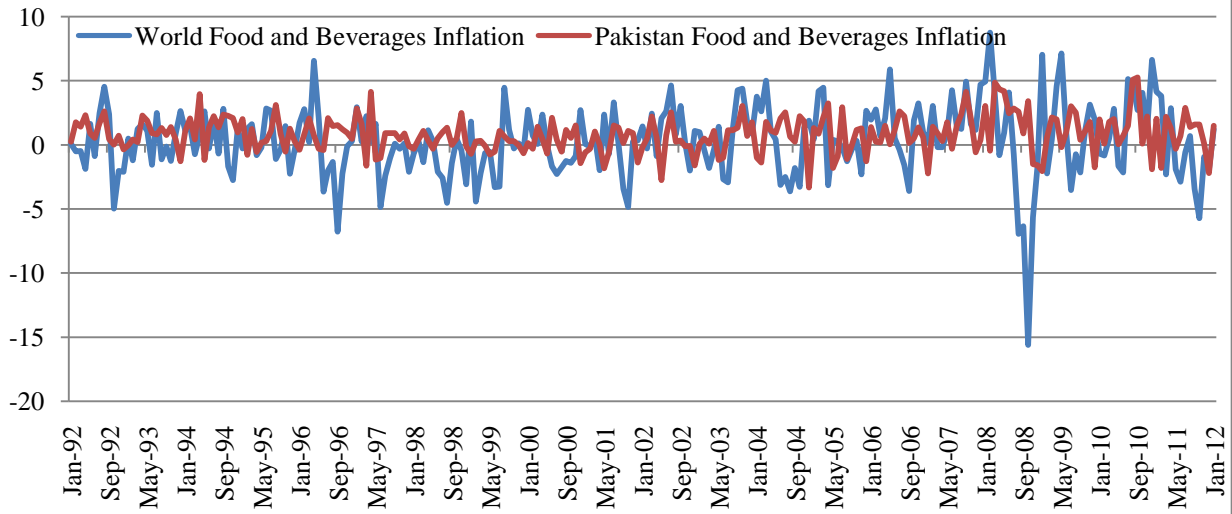
Source: Haver Analytics , Pakistan Bureau of Statistics

Figure 3: Global (RHS) and Pakistan YoY Change Prices
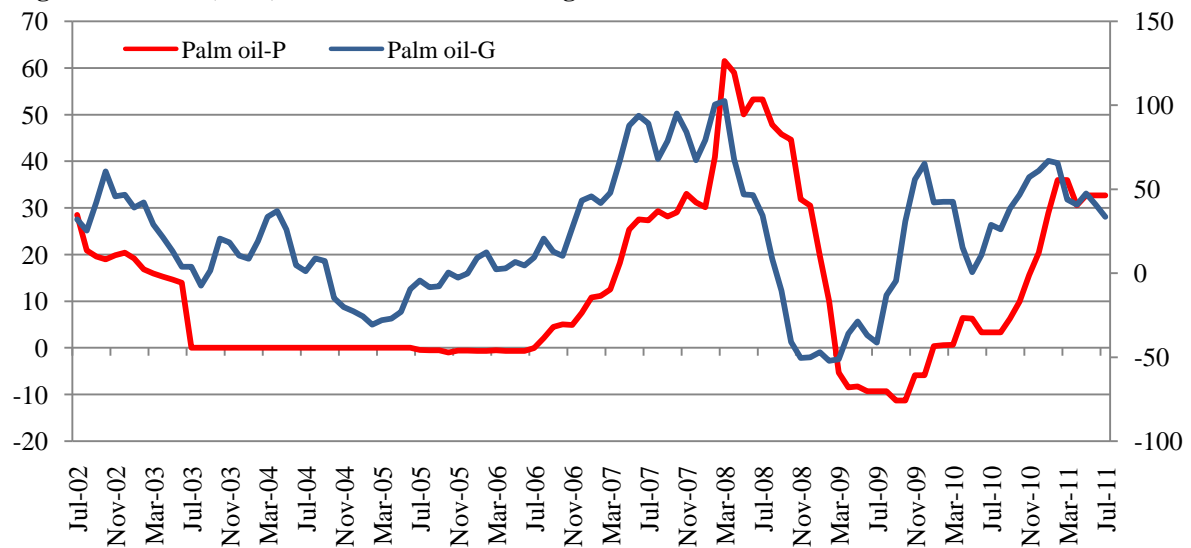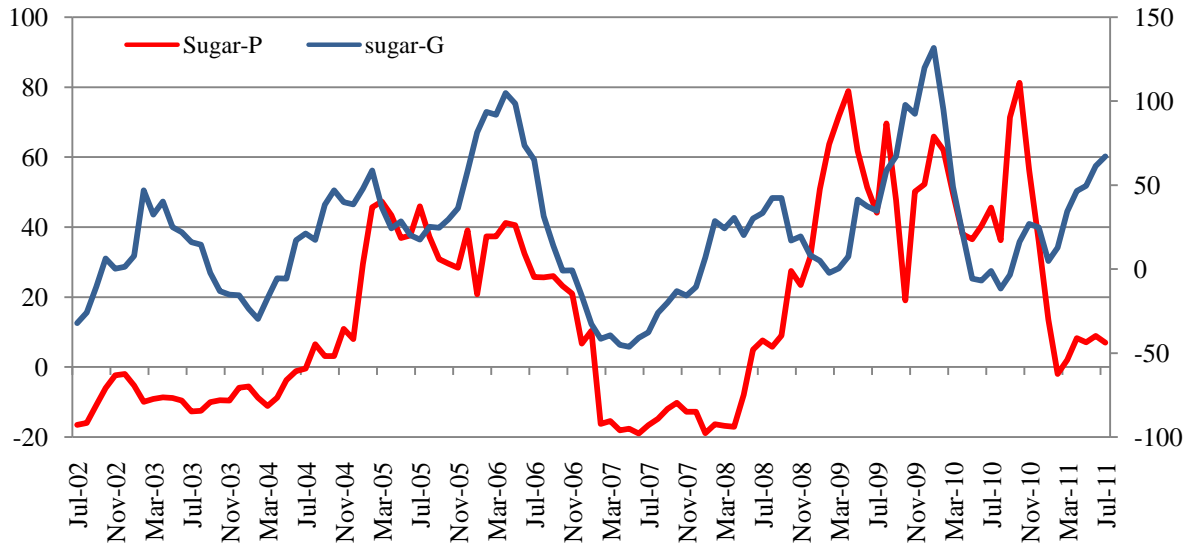
Legend: Wheat-P — Wheat-G

Source: IMF, Pakistan Bureau of Statistics, and author's calculations

Figure 4: Global (RHS) and Pakistan YoY Change Prices

Sources: IMF, Pakistan Bureau of Statistics,, and author 's calculations

Figure 5: Global (RHS) and Pakistan YoY Change Prices

Source: IMF, Pakistan Bureau of Statistics, and author 's calculations

Figure 6: Global (RHS) and Pakistan YoY Change Prices

Source: IMF, Pakistan Bureau of Statistics, and author's calculations

Figure 7: Commodity Level and Food Group YoY Inflation in Pakistan
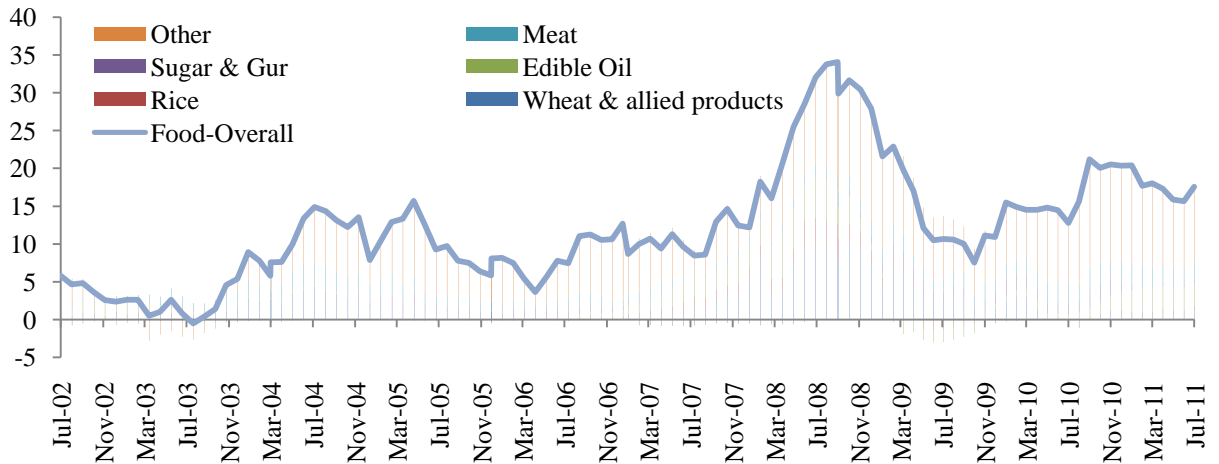
Source: Pakistan Bureau of Statistics, Author's calculations

Figure 8: Inflation Diffusion in Pakistan
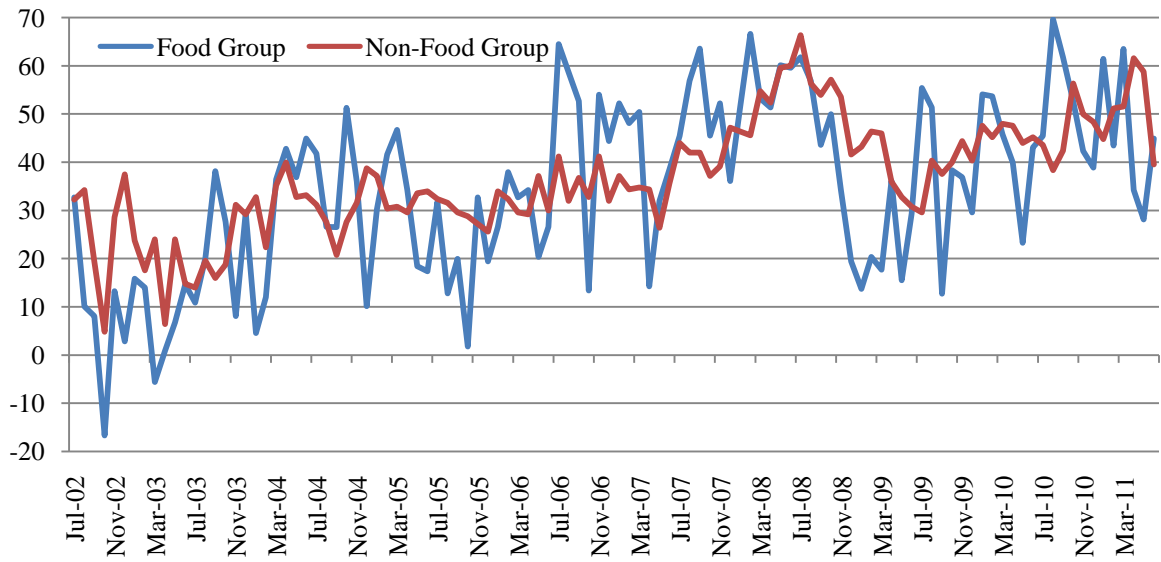
**Figure 9: Annual SDs - Pakistan and World Food&Beverages Inflation (YoY)**
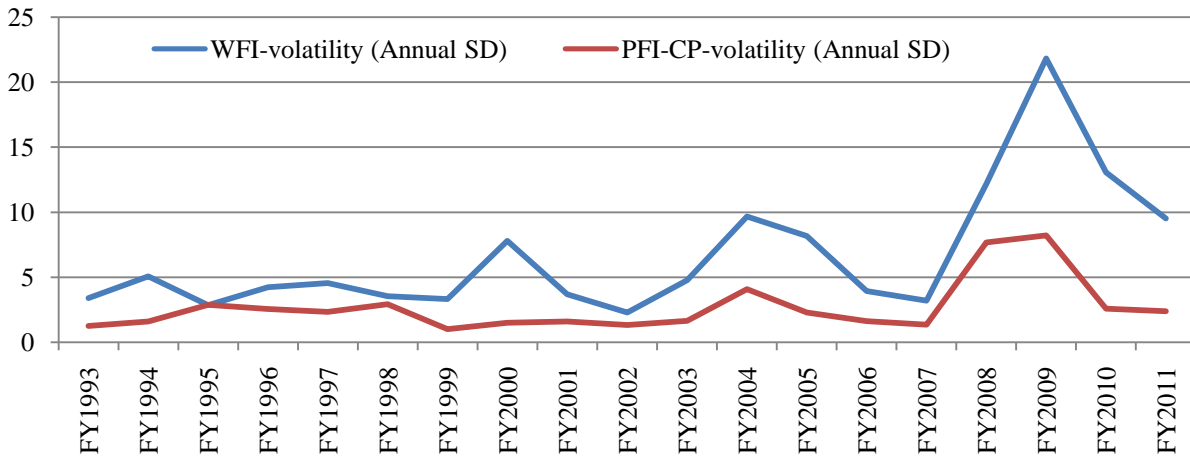
Source: Haver Analytics , Pakistan Bureau of Statistics, author's calculations

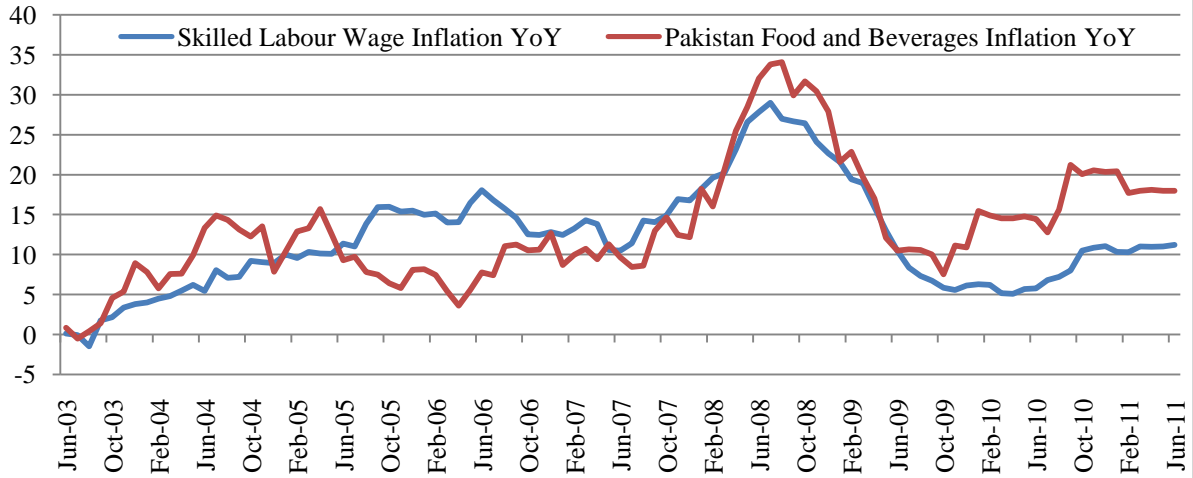**Figure 10: Annual SDs - Pakistan and World Food & Beverages Inflation (MoM)**
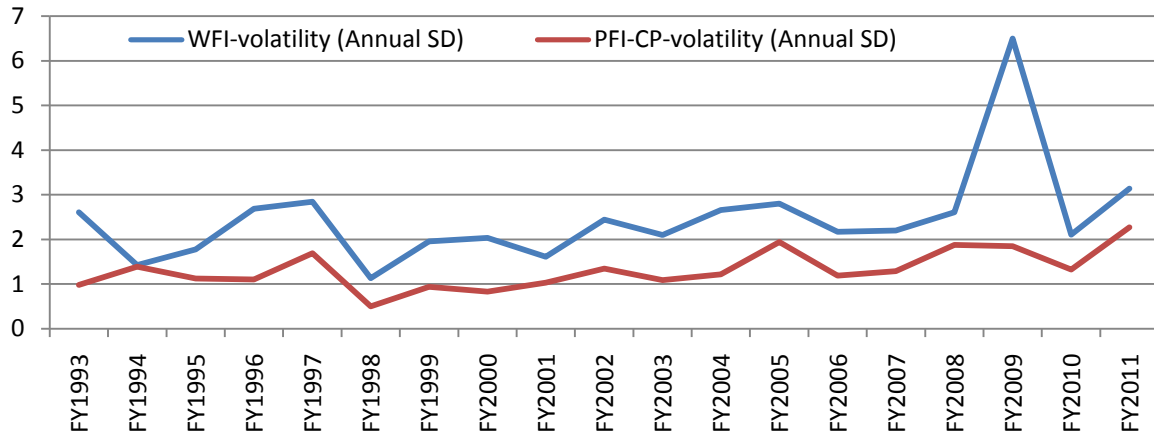
Source: Haver Analytics , Pakistan Bureau of Statistics, author's calculations

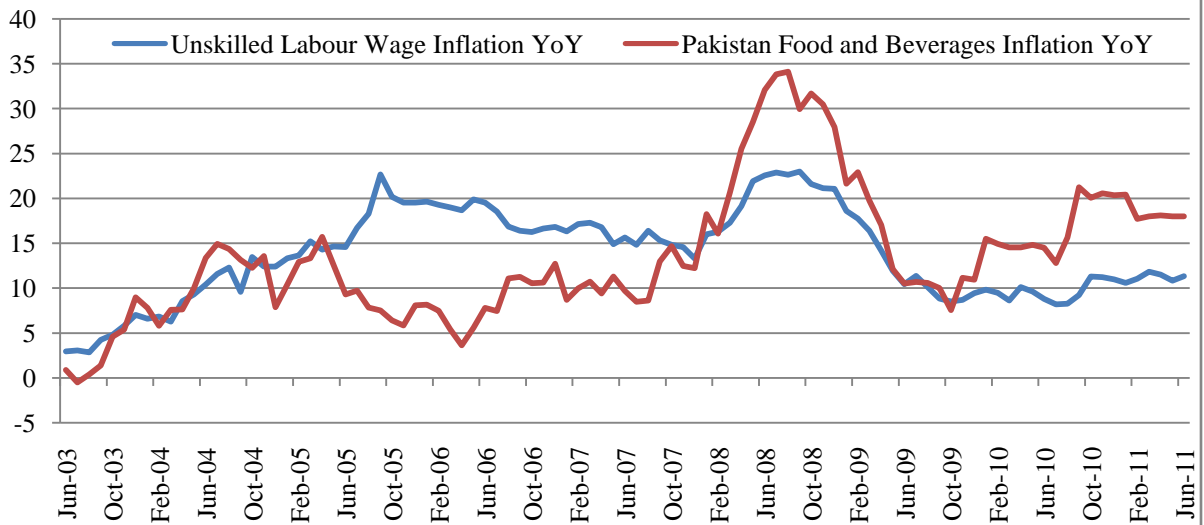**Figure 11: Annual SDs - Pakistan and World Food & Beverages Inflation (YoY)**
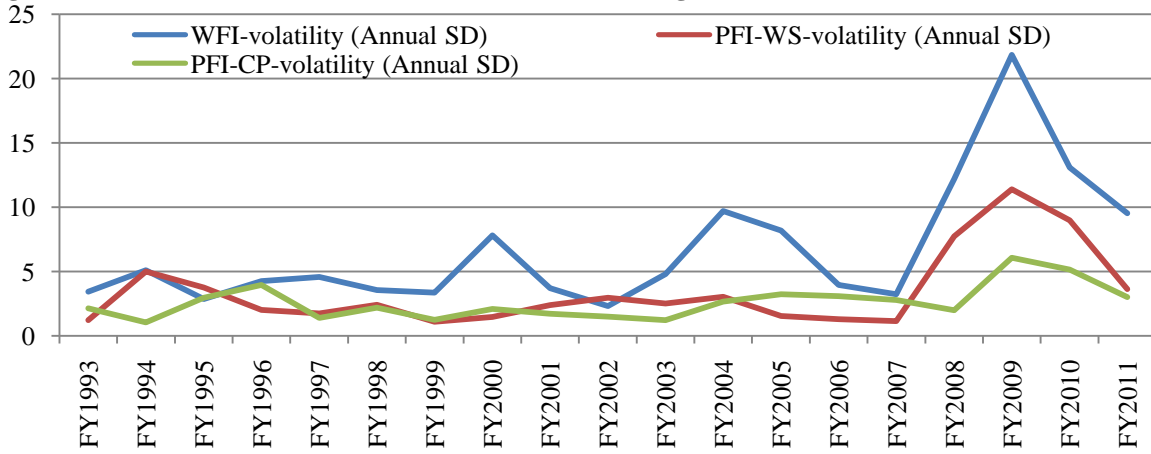
Source: Haver Analytics , Pakistan Bureau of Statistics, author's calculations

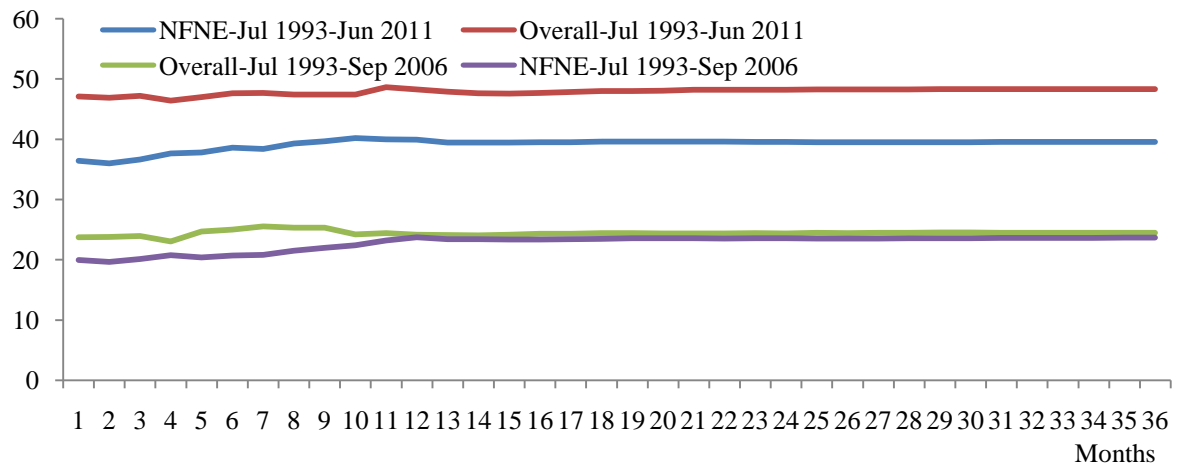**Figure 12: Food Inflation and Skilled Labour Wage Increase**

Source: Pakistan Bureau of Statistics, author's calculations

Figure 13: Food Inflation and Unskilled Labour Wage Increase

Source: Pakistan Bureau of Statistics, author's calculations

Figure 14: Countribution of Supply Side Factors in NFNE and Overall Inflation (%)

Source: Khan and Hanif (2012) and Khan (2008)