

POLICY PAPER

GLOBAL FOOD PRICE SHOCKS TRANSMISSION TO LOCAL MARKETS AND WELFARE IMPLICATIONS FOR GEORGIAN HOUSEHOLDS

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Abstract

Paper examines influence of global price shocks of wheat and sugar on the domestic prices using reduced form VAR model. Analysis suggests close correlations between global and domestic prices of sugar and wheat products. Namely, 1 percentage point shock of global sugar prices results in 0.32 percentage point increase in domestic sugar prices, for the case of wheat products effect is 0.13 percentage point. This research also assesses welfare impacts of 2007-08 and 2010-11 food crises. As suggested by the findings, if 2010-11 food price shock repeated in 2013, rural as well as urban households will be harmed more compared to 2007-08 price shock mainly due to the fact that during 2010-11 food crises price of almost all types of food products increased, as opposed to a less widespread impact on domestic prices of 2007-08 food crises. In case of repetition of 2010-11 crises households with incomes lower than GEL 400 would require on average approximately 10% more expenses to maintain their consumption at 2013 year levels.

Introduction

In the period of 2003 - 2013, real growth of GDP averaged 6.3% in Georgia, however the benefits of the growth has not been equally shared among different groups of population. Despite the robust growth over the past ten years, as of 2013, 9.3% of total population remains below the poverty line. This poses significant challenges to the food security policy in Georgia. According to the Global Hunger Index¹ (GHI) measured by the International Food Policy Research Institute, Georgia lags behind most of the countries in the region in terms of food security.

¹ IFPRI, <http://www.ifpri.org/book-8018/ourwork/researcharea/global-hunger-index>

Table 1: Global Hunger Index (GHI)

GHI index	1995	2000	2005	2013
Georgia	16.6	9.2	11.3	9.3
Armenia	10.2	8.2	<5	<5
Azerbaijan	14.5	11.9	5.4	<5
Moldova	7.7	8.8	7.3	9.2
Uzbekistan	10.3	9.3	6.6	5.3

GHI represents simple weighted average of three components:

- Share of inadequately nourished people in total population
- Share of underweight children under 5 years
- Children mortality

Higher the index, more vulnerable the country is towards the hunger. In terms of last two components of the index, Georgia scores better than countries given in the table 1. However, it has the highest share of inadequately nourished people among peer countries, standing at 24.7% as of 2013. With the score of 9.3 Georgia enters the group of countries with “moderate” risk of hunger, however, this score for Georgia is only slightly lower than for countries with “serious” risk of hunger as classified by the IFPRI.

Global hunger index once more demonstrates the need for well-tailored food security policy in Georgia. The main goal of this paper is to call attention of the relevant stakeholders, and particularly, policy makers about the vulnerability of different socio-economic groups towards hunger in Georgia.

This study is focused on the food price on global markets and the influence of global price shocks on domestic consumers. Along with the deeper integration of world markets, global trade in food products has been on a steady growth path over the last several decades. In 2002, global trade in food products stood at USD 176 billion², ten years after, in 2012, trade in food products was almost tripled and reached USD 516 billion. Big chunk of the growth was on the account of developing countries, which increased imports of food products from USD 41 billion, in 2002, to over USD 150 billion, in 2012. Increasing reliance on imported

² Worldbank, Comtrade database

foodstuff on one hand helps to diversify menu in developing countries, however, on the other hand food markets in developing countries become more exposed to global food price shocks.

This global trend is even more pronounced in case of Georgia. In 2002, import of food products from the rest of the world was USD 85 million, while, in 2012, it reached USD 685 million. Nowadays total food consumption heavily relies on imported products, according to data from 2012, self-sufficiency ratios for main food products in Georgian consumer basket - wheat, meat and pork - were 9%, 36% and 36%, respectively. At the same time, share of food in total consumption stood at around 33% for average Georgian household³, meaning that significant portion of household consumption consists of imported food products. Therefore, impact of international price fluctuation might have a significant direct impact on the well-being of Georgian households. This paper aims to test this hypothesis and estimate the impact of global food price shocks on local prices, as well as explore welfare implications of these fluctuations.

The transmission of global food price shocks to local markets has been extensively researched (Godsway et al. 2008, Minot 2011), especially for developing countries, where food expenditures of households occupy significant portion of total expenditures. However there has been no comprehensive study on this subject for the case of Georgia. In this paper, we will try to make first step to fill this gap. The paper is organized as follows:

- first chapter will present the analysis of food price trends on local and global markets, as well as the description of the food production and consumption patterns in Georgia;
- second chapter will review the relevant literature; third chapter will present the empirical analysis of global food price transmission into Georgian market;
- Findings of the empirical analyses will be employed in the next part of the paper which will examine the welfare implications of global food price shocks for the domestic households.
- Paper concludes with the summary of findings and recommendation for food safety policy design in Georgia.

³ http://geostat.ge/?action=page&p_id=184&lang=geo

I. Global Food Prices and Domestic Market

Global food crisis in 2007-08 affected prices of almost all food products; increases were especially notable in case of prices of grains and dairy products. As FAO⁴ food price index⁵ clearly demonstrates, food prices not only increased during 2007-08 crisis, but also became more volatile since then. Producers of the staple foods increased production as a response to price increase in 2007-2008 and, consequently, prices quickly returned to the levels before the crises. Another sharp increase in food prices happened in 2010-2011. This time price increase was more broadly based across different food products. As estimated by Maros Ivanic et al⁶, for the sample of 28 low and middle income countries, 2010-11 food price shock had much more stronger and sizeable negative welfare impact, compared to the food price shock in 2007-08, mainly due to the fact that during 2010-11 crises price of almost all food commodities.

In 2007 and 2008, FAO's food price index increased by 26.9% and 24.8% annually – biggest increase of food prices since 1974 food crises. As can be seen from the Figure 1, till 2007-2008 crises, global prices of cereals, dairy and other food products were more stable with few spikes along the way.

Underlying reason for the 2007-2008 spike in food prices was related to the famine and low production of cereals globally, effect of which was aggravated by protectionist policies of main cereals exporters, who were trying to protect domestic consumers by restricting exports and consequently fuelling more increase in prices globally. Export restrictions were imposed by major grain providers – Argentina, Russia, Kazakhstan and Ukraine (Joachim von Braun et al. 2012).

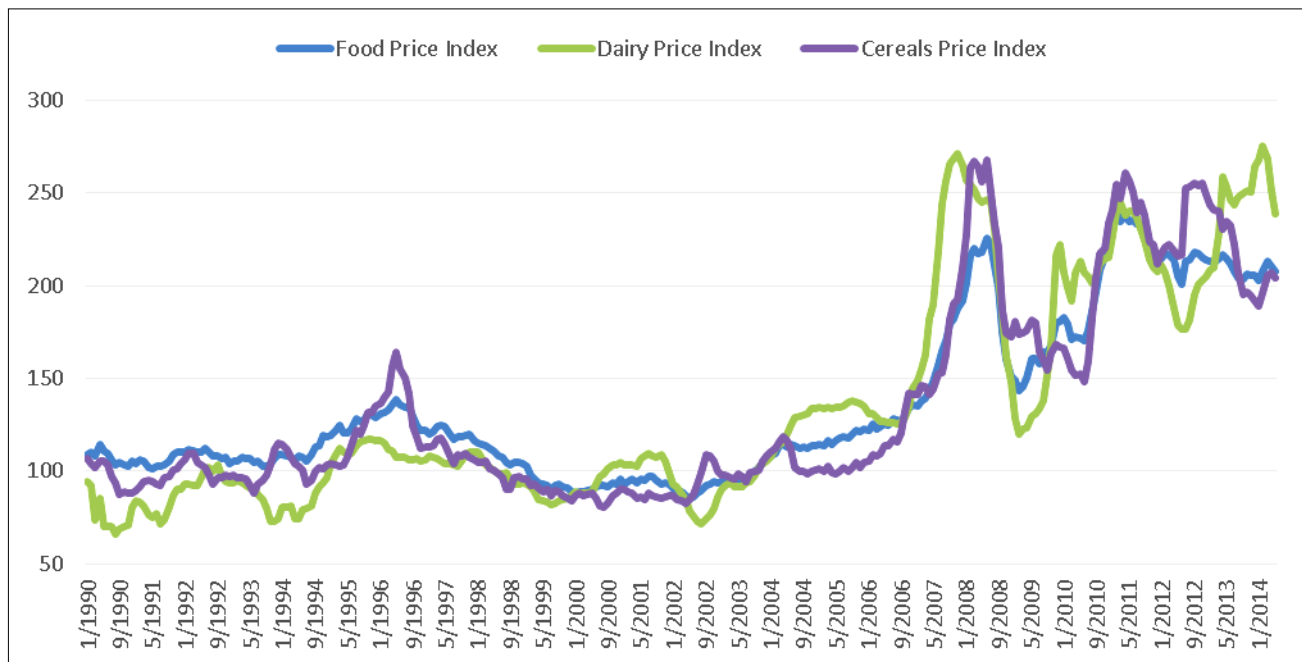
Another frequently named reason behind the more volatile food prices, especially cereals prices, is speculations on stock markets, which feeds in to the higher volatility of overall food price index. Hoping that increasing price trend will continue in the future, investors, in search of bigger gains on the stock markets, invested more in grain stocks. As a result, increased demand for grain stocks created a sudden jump in main food commodity prices on global markets.

⁴ FAO- Food and Agriculture Organization of the United Nations: <http://www.fao.org/home/en/>

⁵ [Food Price Index](#): consists of the average of six commodity group price indices weighted with the average export share of each of the groups for 1998-2000: in total, 55 commodity quotations considered by FAO commodity specialists as representing the international prices of the food commodities are included in the overall index

⁶ “Estimating the Short-Run Poverty Impacts of the 2010-11 Surge in Food Prices”, Maros Ivanic, Will Martin, Hassan Zaman, 2011

Figure 1 Food Prices on International Markets (monthly, 2002-2004=100)



Source: FAOSTAT

In 2007-08 along with the grain products, prices were up for dairy and cereal products as well. Meat product prices also increased, but to a lesser extent. Overall, food prices are projected to increase over the coming years. By 2020 cereal prices are forecasted to increase by 20% and meat products prices by 50% (OECD-FAO, 2011).

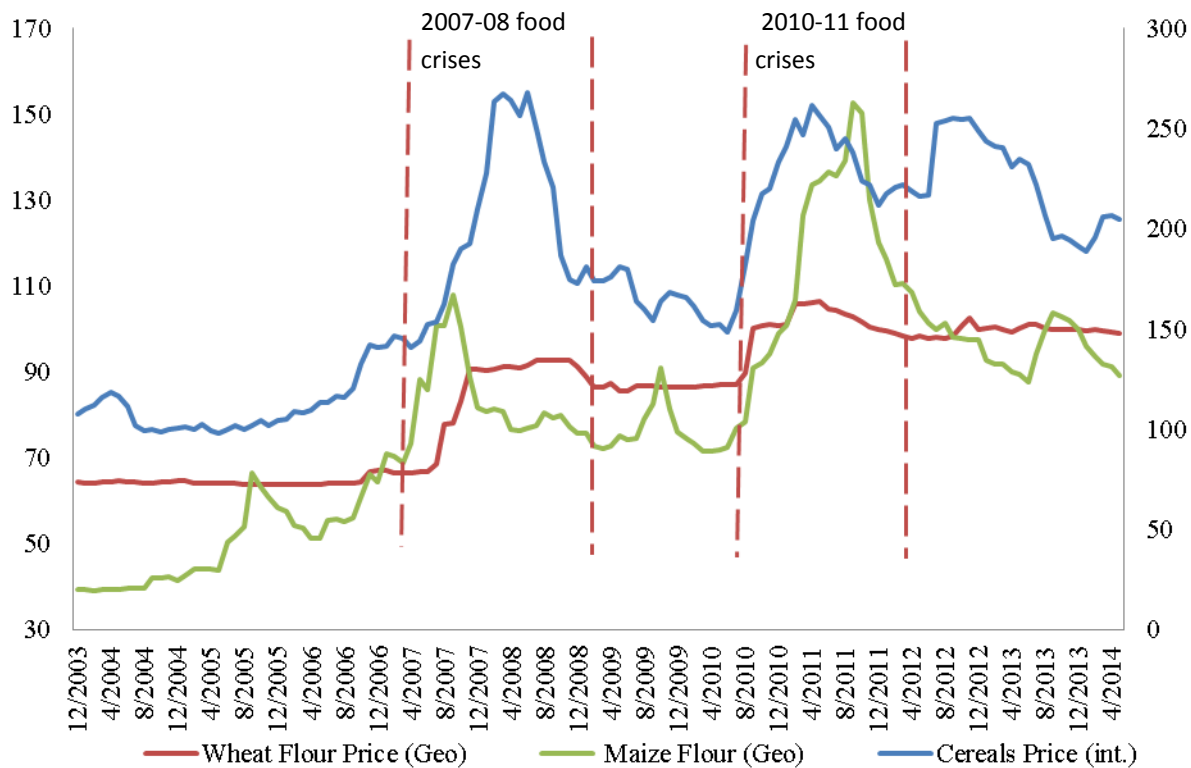
During the price transmission analysis paper mainly focuses on the prices of sugar and wheat due to several reasons:

- Wheat and sugar represent comparatively homogenous products and it is easier to find comparable domestic and international prices for these food commodities
- As it will be shown in section 3, wheat and sugar are among the most important food products in the menu of the average Georgian consumer
- Georgia heavily depends on the imports of wheat and sugar, which makes prices of these commodities particularly vulnerable to global price shocks and thus interesting for the purposes of this paper

Prices of other food commodities like meat and dairy products are also important for the domestic consumers, although due to the lack of comparable data on domestic and global

markets these commodities are omitted from the analysis. As Figure 2 shows domestic prices of wheat flour and maize flour react to the changes in international prices of cereals.

Figure 2: International and Domestic Monthly Price Indices for Cereals



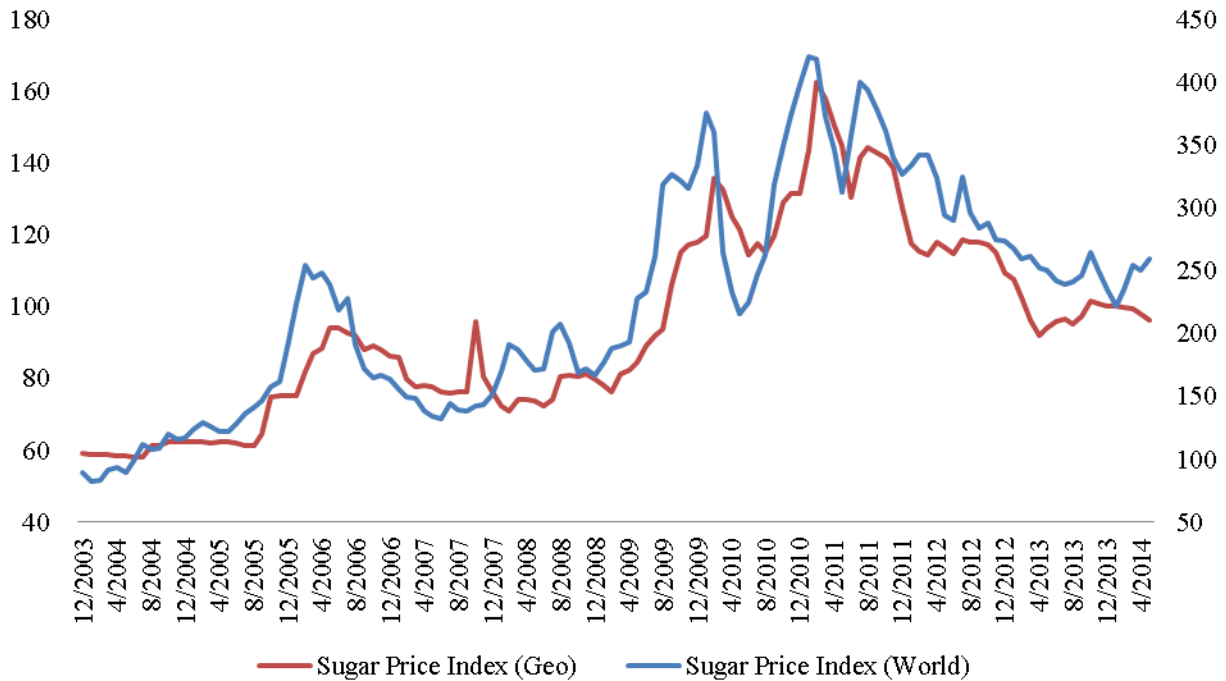
Source: FAOSTAT, GEOSTAT

As demonstrated on the Figure 2, spike in 2007-08 was experienced on Georgian market as well – in response to global price increase, also domestic producers of wheat and maize increased prices. It is worth mentioning that maize flour price in Georgia exhibits more volatility compared to wheat flour prices. One of the reasons to that is the fact that Georgia accumulates stocks of wheat in order to avoid excessive volatility in wheat flour and bread prices, through enabling importers of the wheat to smooth out minor spikes in international prices. Prices of storable commodities are characterized by long periods of stability which is interrupted by short lived but intense spikes (Deaton and Laroque, 1992). This observation seems to be valid in case of the price of wheat products in Georgia, too.

Similar analysis reveals even more significant co-movement between international and domestic prices of sugar, which represents important part of the consumer’s diet in Georgia

(Figure 3). Unlike wheat, price of which is comparably stable with only several spikes, sugar prices reveal excessive volatility and closely follow prices of sugar on international markets.

Figure 3: International and Domestic Prices for Sugar



Source: FAOSTAT, GEOSTAT

Thus, visual inspection gives a room for deeper analysis in order to give conclusive answer about the degree of transmission of global prices to domestic markets, which will be presented below.

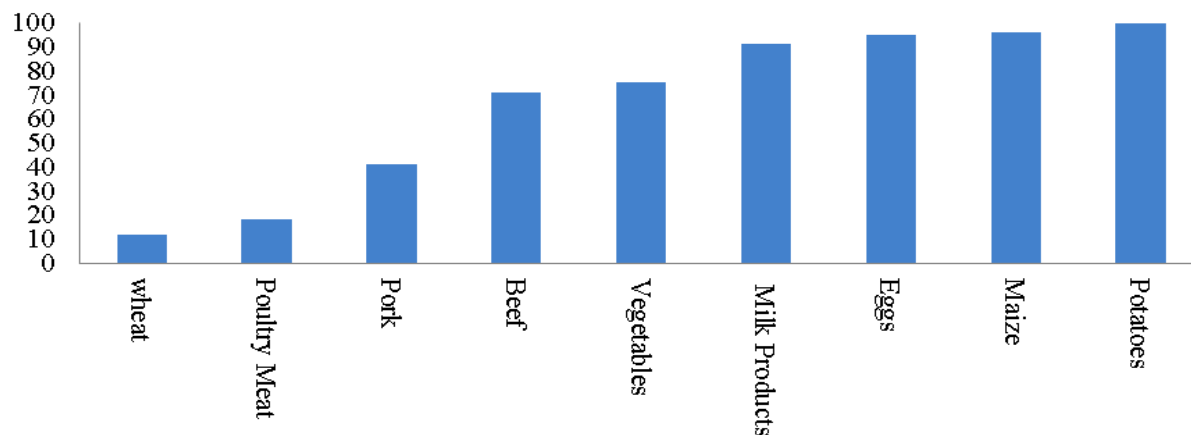
Domestic food production and consumption structure

Structure of the domestic food production also influences the extent to which global prices are transmitted to local markets. Food prices in countries that are largely self-sufficient in staple food production tend to respond less to global price shocks (Godsway et al, 2008). As Figure 4 demonstrates, Georgia is self-sufficient in potatoes, maize, eggs and milk products⁷. For these commodities, more than 90% of domestic consumption is satisfied with

⁷ It is important to mention that self-sufficiency in milk products is achieved mainly by using imported milk powder in the domestic production of dairy products

local production. Yet wheat, poultry meat and pork consumption mainly relies on imports from other countries.

Figure 4: Self-Sufficiency Ratios, 2013 (%)



Source: GEOSTAT

Based on self-sufficiency ratios, we will to select the list of food products on which paper will focus on during price transmission analysis. Also selection will based on the share of these products in the consumer expenditure of average Georgian household, as a proxy of importance of particular food product in consumer basket.

Food products given below (**Table 2**) make a big chunk of the consumption of average Georgian household. In 2014, food products together with beverages and tobacco account for 35% of consumer basket. White bread, dairy product, meat products, vegetables and sugar represent main sources of calories for average Georgian consumer. As of 2012⁸, main food products had following weights in total consumer basket:

⁸ No significant revision of the weights in consumer basket has taken place since 2012

Table 2: Weights of staple food products in Consumer Basket, 2012 (%)

Food Products	Share in 2012 Consumer Basket (%)
Bread and Wheat	5.69
Cheese	2.55
Other Dairy	2.16
Beef	2.14
Poultry Meat	1.3
Pork	0.28
Other Meat Products	1.49
Sugar	1.2
Other Grain Products	0.92
Total	17.73

Source: GEOSTAT

As evident from the table 2, wheat products represent the most important food product for average Georgian household – 5.69% of total expenses of average household is allocated for wheat products. Given the importance of wheat products as well as high dependency on imports of wheat, paper will devote particular attention to the price transmission analysis for wheat products.

Cheese and other dairy products taken together also occupy around 5% of total expenses of average Georgian household. Given the importance of dairy products in daily consumption, it is also interesting to study if there is a link between global and local or regional and local prices. However, as Georgia mainly relies on imported milk powder, it is harder to find comparable global and domestic prices for this commodity, which makes analysis impossible within the scope of this paper.

Meat products also occupy sizeable share in the consumption basket of the average Georgian household. On top of that, domestic consumption significantly relies on the imports of pork and poultry meat. Given the high dependency on imported pork and poultry meat, as well as considerable share of these commodities in the consumption basket, it would be

important to study global to local transmission of prices for these products. Although due to the non-homogenous nature of meat products, we could not identify relevant global and local prices to be analyzed in the context of the study.

Weights of different food products, given in the table above are calculated for the average consumer; however, consumption structure varies across households with different socio-economic characteristics. Poorer households usually tend to spend higher portion of their expenditures on the food consumption. There are also differences between rural and urban households in terms of the amount they spend for buying food. Majority of the rural households produce food for own consumption, while urban households primarily depend on the purchased food. Analysis of the consumption patterns for different income groups in rural and urban areas separately, gives a better idea about the degree of dependence on food price fluctuation of households with different socio-economic characteristics.

Expenditures on food products as a share of total expenses vary across the different income groups of Georgian households.

Table 3: Shares of Food Expenses in Total Expenses of Different Income

Total Income	Share of food expenditures in total expenditures in 2013 (%)	
	Urban	Rural
<100	56.9	59.8
100-150	51.2	51.2
150-200	47.9	45.6
200-250	46.5	41.4
250-300	44.4	37.9
300-400	42.6	36.5
400-500	38.3	31.0
500-600	37.9	28.4
600-700	34.7	27.4

Source: GEOSTAT, Household Survey Database

Food expenses at the low end of income distribution reaches 60% for rural as well as urban households, as income increases, less portion of the expenditures goes for the foodstuff. It can be noted from the table 3, that urban households usually spend more on food as compared to the rural households from the same income group. This difference must be explained by the production of food products in the villages for own consumption.

Initial analyses suggest that low income consumers from urban areas are likely to be more vulnerable to food prices shocks, urban households are net buyers of food and thus they will be hit harder by the food prices shocks. As opposed to the urban families, some of the rural families can insulate themselves from the price fluctuation by accumulating reserves of domestically produced food products.

II. Literature Review

2007-2008 food crises triggered new wave of research on the topic of food prices transmission from global to local markets. Post crises research significantly contributed to the exploring characteristics of food prices transmission mechanisms and implication of global shocks for local markets. The issue of price transmission has been researched especially well for sub-Saharan countries, where the poverty is more widespread and spending on food accounts for the major portion of consumer spending. Share of food spending in total consumer spending falls in between 50-70% for most of the sub-Saharan countries.

Nicholas Minot in his paper "Transmission of World Food Price Changes to Markets in Sub-Saharan Africa" investigated the implications of 2007-2008 world food crises for 11 African countries. Research analyzed 62 price series using Vector Error Correction model (VECM). Research showed significant variations in the size of food prices transmission across different countries and different food products. Countries that heavily depended on imports of particular goods showed higher degree of sensitivity towards global shocks. In addition, geographical factors also influenced the degree of the food prices shock transmission. Landlocked countries experienced global shocks more heavily and price responses were more persistent, compared to the coastal countries. Overall, research identified statistically significant relationships between local and global prices for 13 out of analyzed 62 food price series. Research also suggests that protectionist policies exacerbated the response of local prices in some of the analyzed countries.

Food price shocks can have dual effect on the welfare of households, on the one hand, net consumers of the food products will be harmed by increased expenditures, however, on the other hand, net producers of food might benefit if prices of the goods they sell on the market will be up, given that cost of production will not increase. Which of these two effects dominates depends on the characteristics of the households and their consumption/production patterns. As demonstrated by Maros Ivanic and Will Martin (2008), poor families from developing countries are especially vulnerable to the food prices fluctuations. Global price shocks can have serious malnutrition effects for poor in developing countries. Higher the transmission of global shocks to local markets, more the poor households will be harmed by global price shocks.

Analyzing short-run poverty impacts of the 2010-2011 global food price increase was a primary focus for Maros Ivanic et al⁹. Study assessed poverty impacts for 28 middle and low income countries. Authors estimated that as a result of 2010-2011 food crises additional 44 million people fell below the extreme poverty line of USD 1.25 per day. Poverty impact of the food crises was different for low and middle income countries. On average, poverty increased by 1.1 percentage points for low and 0.7 for middle income countries. Positive income effect for net sellers of the food products was vastly dominated by the negative impact of food price increase for net buyers of the food products.

For the assessment of poverty impacts of a food price shock paper takes into account households' net buyer/seller status, authors also allow for substitution of more expensive foods by cheaper substitutes. Calibration of substitution effects is made possible by using Constant Difference of Elasticities (CDE) demand system estimated for 112 countries.

Above mentioned study also includes several post-soviet countries, which make it particularly interesting for the purposes of this research. Headcount poverty in Armenia was estimated to have increased by 0.67 percentage points. Increasing prices of potatoes, sugar, oils and fats were main reason for increasing headcount poverty in Armenia. As most of the poor families in Armenia are net buyers of the food products, positive impact experienced by net sellers of these goods could not offset the negative impact for poor households significantly. Unfortunately, study excludes Georgia, however due to many similarities between Armenia and Georgia, we can hypothesize that poverty impacts for Georgia could have been similar to what was estimated for Armenia.

⁹ "Estimating Short-run Poverty Impact of 2010-2011 Surge in Food Prices", Maros Ivanic, Will Martin and Hassan Zaman, World Bank, 2011

The only country, which benefited from the food prices surge in 2010-2011 appeared to be Vietnam, Many of the families in Vietnam are net sellers of the food products (mostly rice).

III. Data and Methodology

Time series for domestic food prices is retrieved from the database of National Statistics Office of Georgia (Geostat). Geostat collects monthly price series for all types of food products that are included in the consumer basket. Dataset covers monthly series starting from January 2004 till May 2014, 125 entries for each series of prices. Data on international prices is obtained from the World Bank datasets. Dataset includes US wheat price series, World sugar prices, prices of crude oil¹⁰, beef, pork and chicken meat prices. All prices are normalized so that December 2013=100 for all domestic and international prices.

The most common problem about the prices data is the non-stationarity of series¹¹, which means that price series usually have increasing trend overtime. Non-stationary price series might lead to a spurious regression and significantly distort the results of econometric analysis. There are several ways to cope with the non-stationary data: if price series are integrated of the order one, than difference of the series will give stationary data, Vector Error Correction model represents another way to deal with the non-stationary data if the series contain unit root.

First step in price transmission analysis is to check whether the domestic and global prices have long-run relationship that is to check if prices are co-integrated. Table 4 summarizes Johansen cointegration test results for different food products

¹⁰ Average of Brent and Dubai crude oil prices

¹¹ Graphical Description of the data can be found in Appendix 1

Table 4: Summary of Johansen Unrestricted Cointegration Rank Test (Trace, linear deterministic trend allowed)

Pair of Prices	Number of CEs at 5% significance level
Domestic White Bread Price and US wheat Price	1
Domestic Wheat Flour Price and US Wheat Price	2
Domestic Sugar Price and World Sugar Price	2
Domestic Maize Price and World Maize Price	2
Domestic Beef Price and World Beef Price	0
Domestic pork price and USA frozen pork export Price	0
Domestic chicken price and Brazil chicken export Price	0

Johansen cointegration test results show significant long-run relationship between domestic price of white bread and US price of wheat, as well as for the prices of sugar and maize. Test could not reveal significant long-run relationships between global and domestic prices of beef pork and chicken, which implies that in the long run prices of meat product locally are determined by factors other than global meat product prices. These other factors might be domestic regulations for meat production (sanitary standards etc.), trade regulations as well as other trade and transport related regulations. For this reason study leaves out prices of beef, pork and chicken from further analysis.

In order to analyze short-term transmission of global food prices to domestic markets, paper will employ Unrestricted VAR model. As already mentioned VAR rests on the assumption of stationary data series, however all of the price series are integrated of order one. For this reason VAR methodology cannot be directly applied to the price series.

To deal with the non-stationary of the series, we choose to use first differences in the VAR analysis. Differencing the price series removes long-run trend from the data and allows capturing short-run co-movement of local and global prices in a more robust way.

On top of that, we had to take account of the fact that domestic prices are denominated in GEL and foreign prices are denominated in USD. To make the domestic and international data comparable, we multiply all domestic prices by the monthly average USD/GEL

exchange rate and transform all prices in USD. This way study manages to control for the effects of the exchange fluctuations in determining domestic prices of imported food commodities.

In addition, to analyze month-on-month growth rates of prices, series are transformed to logarithms and first-differenced. Therefore, coefficients from obtained from the regression represent elasticity of domestic prices to changes in global prices.

In order to investigate international-domestic price transmission more thoroughly, paper employs Vector Auto Regression Model (VAR), which is most widely used in the relevant literature. VAR model has following specification:

$$Y_t = A_0 + \sum_{i=1}^n A_i Y_{t-1} + e_t$$

Where:

Y_t - Vector of endogenous variables

A_0 - Vector of intercepts

A_i - Matrix of coefficients of endogenous variables

e_t - Vector of residuals

Using the above specification of the VAR model first will be estimated price transmission for the cereal products and sugar. Endogenous variables include: domestic and world price indices for sugar, US wheat price index, price index for wheat products¹² on domestic market, price index for other cereal products¹³.

Model satisfies stability condition, which is crucial to ensure that after the initial shock is introduced in the model all variables gradually return to their initial levels.

¹² Wheat flour and white bread

¹³ Other cereal products include: pasta, buckwheat, maize flour

IV. Results of the VAR Analysis

VAR analysis suggest significant price transmission for prices of wheat products, sugar and other cereal products, although size of the shock that transmits from global to domestic markets varies for different food products. Based on the impulse-response analysis we can conclude that price transmission from global markets is highest for sugar among analyzed commodities, domestic prices of wheat products is also sizably affected by global price shocks, as for the other cereal products, they are less affected by the price shocks of wheat on the global markets.

Figure 5: Impulse-Response functions for Wheat Products and Sugar

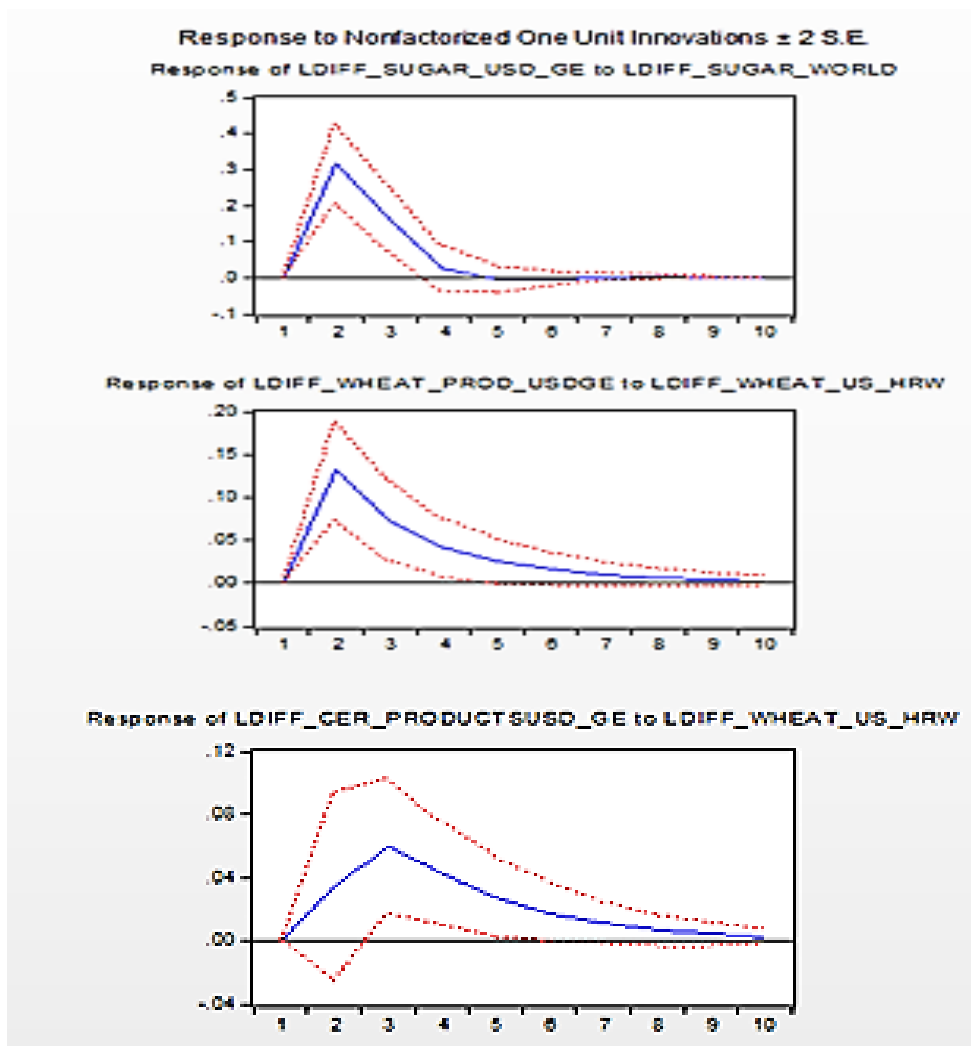


Figure 5 shows the reaction of domestic prices to the shocks in international prices. Shock is equivalent to 1 percentage point increase in international prices. Red dotted lines depict 95% confidence interval around the reaction function of domestic prices.

As impulse-response functions suggest local prices of wheat products respond positively to increases in the international prices of wheat (*left lower chart*). Domestic wheat products prices reaction reaches its maximum 2 months after the initial shock and this effect is statistically significant at 95% confidence level. 1 percentage point increase in US prices of wheat translates into 0.13 percentage point increase in domestic prices for wheat products.

Transmission is much more pronounced in case of sugar (*left upper chart*), 1 pp shock in international prices increases domestic price of sugar by 0.32 pp. effects reaches its maximum after 2 months and then it starts to vanish after 3 periods.

Transmission of global wheat price shock to the prices of cereal products is also statistically significant. Composite price of cereal products, such as pasta, rice, buckwheat and maize flour, increase by 0.06 percentage points 3 months after the initial shock in global wheat prices(*right lower chart*). Transmission of global wheat price shocks to cereal products is quite moderate in size, which might be due to other factors that are more important for the determination of these prices or low substitution effect between wheat products and other cereal products in Georgia.

VAR analysis confirms initial hypothesis about the higher global to local transmission of price shocks for the products which are mostly imported on domestic market. Study finds significant and sizeable global to local price transmission for wheat products and sugar, which represent most important food commodities for the average household living in Georgia. We found statistically significant, although very low transmission of prices for other cereal products (pasta, buckwheat, maize flour), which suggests that prices of these commodities are not significantly influenced by the global shocks of wheat prices.

V. Welfare Impact of Global Price Shock to domestic consumers

Given high share of food expenditures in total expenditures of poor families in rural as well as in urban areas, food price shocks are likely to significantly worsen the economic conditions for most vulnerable part of Georgian population. According to the IFPRI's Global Hunger Index¹⁴, designed to assess food security vulnerabilities in different countries, Georgia lags behind all of the post-soviet countries with the exception of Tajikistan. As of 2013, according to the GHI index Georgia entered in the group of countries with "Moderate" risk of hunger and scored only slightly better than the countries with "Serious" risk of hunger. Although, food security situation in Georgia is not alarming, it is still worse than in all of the Eastern European countries and most of the Post-Soviet states according to the GHI index. Even short term increase in food prices, as it happened in 2007-08 and 2010-11, can result in malnutrition of children and nursing mothers with potential negative long term impact on children's physical and mental development. In order to have a better understanding of potential negative monetary impacts of potential future food prices shock over the expenditures of Georgian households with different socio-economic characteristics, paper will try to replicate 2008-07 and 2010-11 food prices shocks and quantify possible increase in households' expenditures were these shocks to repeat in the future.

In order to estimate the impact of the food price increases on the expenditures of households with different socio-economic characteristics, paper imposes food price shock, similar to the food crises in 2007-2008 and 2010-2011 food crises.

Detailed data on expenditures for different foodstuff for Georgian households is obtained from Geostat's household survey databases. To assess the welfare implication of the two global price shock that occurred in previous years paper proceeds the following way:

- First, expenditures of households from different income groups in rural and urban families for different food products is obtained
- Next, increase of domestic prices for different food products during the two food crises period (2007-08 and 2010-11) is calculated
- Finally, we measure by how much expenditures of household would have been increased, were they to maintain similar level of food consumption as they had in 2013 if prices of different foodstuff increased by as much as during two previous crises episodes

¹⁴ <http://www.ifpri.org/book-8018/ourwork/researcharea/global-hunger-index>

This approach has several limitations that may influence results of the analysis in a significant way. Paper only analyses the losses suffered as a result of price increase, however households that are net sellers of food products may benefit from the increased prices. Analysis also cannot account for the substitution effect between different food products. Increased prices of meat products might force households to switch to alternative products; however, due to the insufficient data, analysis ignores substitution effect. This might lead to an overestimation of negative welfare impact for households.

Numbers given in the tables below are calculated based on the assumptions above. Interpretation of the findings presented in the table below is following: if prices of different food products changed as much as they did over the period from 04.2007 to 04.2008 and 04.2010-04.2011 by how much the expenditures of household with different socio-economic characteristics would increase in 2013, were they to maintain identical consumption basket.

Table 5: Increase of price on food in the period of 2007.04 -2008.04

	price increase from 2007.04 till 2008.04
Bread and flour	37%
Meat products	12%
Seafood	-3%
Dairy products	17%
Oil	83%
Vegetables	-59%
Sugar	-5%

Table 7: Additional expenditures of domestic households of crises of 2007-08 repeats

Income group	Increase in expenses (GEL, 2007-2008 food crises)		Increase in expenses (% of total expenses, 2007-2008 food crises)	
	Urban	Rural	Urban	Rural
0-150	5.4	14.7	3.3	7.8
150-200	7.2	14.6	3.4	7.9
200-250	5.8	15.5	2.3	5.8
250-300	3.8	13.8	1.3	4.5
300-400	6.0	18.5	1.6	4.7
400-500	10.0	16.3	2.2	3.4
500-600	10.3	18.7	1.9	3.1
600-700	9.9	16.8	1.5	2.4

Source: Geostat

Source: author's calculation

Table 7. Price Increase in food

	price increase from 2010.04 till 2011.04
Bread and flour	22%
Meat products	36%
Seafood	10%
Dairy products	24%
Oil	42%
Vegetables	10%
Sugar	20%

Table 8. Additional expenditures of domestic

Income group	Increase in expenses (GEL, 2007-2008 food crises)		Increase in expenses (% of total expenses, 2007-2008 food crises)	
	Urban	Rural	Urban	Rural
0-150	17.0	22.3	10.3	11.8
150-200	20.7	22.4	9.7	12.1
200-250	27.6	23.8	10.8	8.9
250-300	29.1	25.6	9.7	8.4
300-400	36.2	31.1	9.5	8.0
400-500	39.8	31.0	8.8	6.4
500-600	47.8	32.8	8.8	5.5
600-700	50.4	37.5	7.9	5.4

Source: Geostat

Source: Author's calculations

Several conclusions can be made from the findings given in the tables above:

- If crisis of 2007-08 were to repeat, rural households will suffer more than urban households. Cost of the crises similar to 2007-2008 will be negligible for urban households. This finding is partly influenced by the fact that over the period from 04.2007-04.2008 prices of vegetables drastically declined (-58.5%) in Georgia. Positive impact on expenditures coming from the reduced prices of vegetables balanced negative impact of rising wheat products prices. Balancing effect was more pronounced for urban households, as they spend higher share of their total food expenses on vegetables, rural households mainly produce vegetables for their own consumption.
- If crisis identical to the 2010-2011 will be repeated households both in rural and urban areas will be harmed more. As already mentioned, 2010-2011 food crisis was more broadly based and it affected prices of almost all food products.
- If prices of food products will be increased as much as during 2010-2011 rural households with monthly income below 200 GEL will be harmed most, these households will require additional 12% of their incomes to maintain the same level of

food consumption as in 2013. For the higher income groups, urban households will have to spend more additionally to maintain the levels of consumption similar to the levels in 2013

Analysis also reveals that, urban households are more vulnerable to the vegetable and dairy price shocks as compared to the rural households, which are in most cases self-sufficient in these food products and can partially insulate themselves from vegetable price shocks. On the other hand, rural households are more vulnerable to the price shocks of fats, oils and sugar price shocks.

Conclusion

Food prices transmission from global to local markets has been extensively studied following the two food crises in 2007-08 and 2010-11. Most of the research was focused on exploring welfare implications of global shocks for the local households to elaborate policy recommendations to mitigate damage of these shocks. For the case of Georgia, price analysis for wheat products, sugar and other cereals revealed significant transmission of global shocks to local prices. 1 PP increase in global wheat prices results in 0.13 PP increase in prices of domestic wheat products (bread and wheat flour). Prices transmission is significant for the case of sugar as well – 1 PP global shock in sugar prices results in a 0.32 PP increase in domestic prices of sugar. In other words, almost third of the global price shock of sugar is transmitted to local markets. Global wheat prices also significantly transmit to local prices of other cereal products (pasta, buckwheat etc). However the size of the transmission is limited, probably due to many other factors, which play role in the price formation process of these food products. Price transmission of the above mentioned products reaches its maximum in two-three months after the global shock.

Simulation of 2007-08 and 2010-11 price shocks revealed that Georgian households will be harmed more if the crises similar to 2010-11 repeats. Quantitative analysis, based on the Household Survey data from National Statistics Office showed that, Georgian rural households with monthly income less than 200 GEL will require around 12% more spending on food consumption to maintain the pre-crises consumption levels. The same figure is about 10% in case of urban households with less than 200 GEL of monthly income. For the higher income groups, urban households will be harmed more than rural households as a result of a crisis. Analysis also showed that urban households are more vulnerable to the price shocks of vegetable and dairy products, whereas rural households will be harmed more by sugar and oil products prices shock.

Food Security Policy Recommendations

In a world with volatile food prices, there is an urgent need for well-designed food security policy, which will envisage short term as well as long term policy responses to food security challenges in Georgia. As demonstrated by IFPRI's Global Hunger Index, Georgian population is one of the most vulnerable to hunger risks among Eastern Europe and Central Asian countries.

Despite the tangible risks related to the food security of the population, current food security policy of the state is very general and does not define possible reaction of the state if the food crisis happens in the country. As reported by the Ministry of Agriculture of Georgia, food security will be one of the components of the "Agricultural Development Strategy for 2014-2020"¹⁵, however the exact design of the strategy is not known yet.

When talking about the food security policy, it is essential to distinguish between short term and long term measures. In the long term, best response to the food security vulnerabilities is the strong growth of agricultural production and increasing productivity of agro-workers as well as robust economic growth in general. Long term food security is a complex issue, related to almost all types of economic policies of the government. In the scope of this study, we will discuss policies that are essential to strengthen food security in the short term.

Short term challenges of food security are often overlooked by the government policies, however the consequences of the short term crises are no less severe. Malnutrition caused by short term adverse shocks threatens proper mental and physical development of underage children, and can create significant long term consequences for development. Moreover, it might lead to the permanent poverty of poor families because often they begin to sell their assets to finance their increased current consumption expenditures.

For the effective short term policy design, it is of crucial importance to understand better the vulnerabilities of different groups of population. The paper provided first idea of which types of families are more vulnerable to short term price fluctuation. For the future research, more narrow analysis will provide evidence to produce quantitative recommendations for effective short term policies. Based on the findings of this study together with the survey of international best practices, recommendations for the effective food security policy can be summed up in three main points:

¹⁵ <http://moa.gov.ge/index.php?menuid=17&lang=1&id=209#.VAwDwfmSyyo>

- Establishment of comprehensive food security information system
- Development of early warning systems
- Implementation of aid programs for most vulnerable groups of population

Food Security Information Systems

In most of the EU countries, food security policy was built on the basis of information systems¹⁶. These instruments provided timely and accurate information regarding the structure of food expenditures of households across regions and income groups, as well as information on prices, exports, imports and stocks of food products. International practice¹⁷ suggests to ground food security information systems on three basic pillars:

data on availability of domestic food products;

data on stability of food provision;

data on access to food products.

- Data on availability of domestic production of food products should contain information on production levels (plant, animal, fisheries), on availability of agricultural inputs (seed, fertilizer, pesticides, agricultural equipment) as well as areas of production surplus and deficit. This information is regularly collected and reported by National Statistics Office, so it will not take additional resources to incorporate these data into the food security information system.
- Data on stability of food provision should contain information on food prices from domestic as well as from global food markets. In addition to that, countries that represent main trade partners of Georgia in food products should be surveyed on regular basis to keep track of food price developments in these countries. Data on export/import of food products as well as supplies for food production and their breakdown across main trade partners should constitute main part of the second pillar of the food information systems. Several countries (Chad, Senegal, Cameroon) also include information regarding commercial and trade regulations in main trade partner

¹⁶ WHO, *Comparative Analysis of Nutrition Policies in EU Member States*, 1996

¹⁷ *Handbook for Defining and Setting up a Food Security Information and Early Warning System (FSIEWS)*, FAO, 2000

countries, which might provide a valuable input for the possible developments in trade volumes and prices of foodstuff on domestic markets.

- Data on nutritional status of population with highest vulnerabilities (poorest families in rural as well as urban areas, children and women from economically deprived families etc) and dietary habits of these groups of population. Data on food expenditures, which should be the part of the first pillar of food security information system, might not adequately reflect nutritional status of vulnerable families, for this reason additional information regarding the calories intake should be included in the third pillar of food security information system. This type of information is not readily available in Georgia and thus having it will require additional surveys to be conducted among risk groups. It is also of crucial importance to collect and analyze information regarding dietary habits of vulnerable groups of population, in order to understand how families adjust their menu in times of various food supply shocks.

Once the food security information in complies with this standards is in place, it will give the possibility to carefully forecast price developments on domestic markets as well as to identify groups of population which will be harmed most in case of adverse developments on food markets.

Early Warning Systems

Based on the information systems it will be possible to generate several indicators, which will serve as an early warning against the possible adverse developments in food production (global as well as local) and price trends on domestic markets. Possible indicators for early warning systems, as suggest by the FAO, might include for example 25% increase in price or 25% decline in production levels of various food products. These indicators and benchmark levels of indicators vary country by country and selecting the particular benchmark levels of prices or production completely depends on the country characteristics. The exact design of early warning systems must be the subject of further discussion in order to come up with the appropriate indicators and benchmark levels of those indicators.

As shown by the VAR analysis above, it takes around two months until global price shocks on staple foods fully transmit to domestic markets. This finding suggests that if price fluctuations are identified in a timely manner on global as well as on main trading partner country markets, it will be possible to use it as an early warning and assess the influence on domestic food markets beforehand. Having information in advance will enable to conduct

proactive food security policy and plan possible steps ahead to alleviate adverse influence on most vulnerable households.

Implementation of Food Subsidy Schemes

As a response to food price shock in 2008-07, 23 countries increased cash transfers, 19 countries activated food support programs and 16 countries introduced other measures targeted to increasing disposable income of population (FAO, 2009). There is no “one-size-fits-all” approach when talking about food assistance schemes, each of the method has its own shortcomings and advantages. Despite the wide variety of measures that can be applied to assist vulnerable population in case of sharp shocks on food markets, there is a widely agreed consensus, government should take active role when the most vulnerable groups of population are at risk of hunger, in order to avoid possible negative long term consequences for health and development. There are three main types of assistance programs that can be used in Georgia in times of food crises:

cash transfers,

food vouchers,

food price subsidies.

Cash transfer is a very widely used tool of food assistance because of low administration costs and more flexibility beneficiaries of assistance programs. Usually cash transfers are conditional upon complying certain predefined rules. For example, government can make participation in health or education programs necessary precondition for receiving cash transfers, thus, achieving certain human development goals along with the increased food security. It is important to note, that cash transfers are effective only if food markets function properly. If there is a shortage of particular good in the food market, then cash assistance might result in higher food inflation.

Food vouchers have advantage against direct cash transfers. They can be targeted better and can be restricted to certain types of food products in order to ensure appropriate caloric intake. Yet food voucher programs are more costly to plan and administer, compared to cash transfers.

Food price subsidies usually are not recommended, because they are costly, difficult to remove and not well targeted to the poorest groups of population. (WB 2008)

FAO generated list of lessons learned as well as recommendations for design of effective food security programs, based on the experience from 2007-08 food crises:

- Evidence shows that households receiving social transfers spend more on food and tend to experience less hunger, leading to increase in food security. In particular, vulnerable categories, such as children tend to be better nourished (Samson et al. 2006; Adato and Basset 2008). Moreover, transfers may increase productive activities of the households.
- It is beneficial to make short-term social protection measures accessible to meet immediate needs of vulnerable households and to improve their access to food and nutrition support. However, in order to build long-term resilience and fully address the food crisis, it is necessary to develop, in parallel, sound safety net systems, strengthening national design and implementation capacity for social protection (WB 2008; UN HTLF 2008). Previous experience can be basis for effective food security policy to address the potential short-term crises.
- Targeting the most vulnerable groups is essential for ensuring well designed safety net programs. However, costs and benefits of accurate targeting need to be carefully considered, particularly during a crisis (Ravallion 2008).
- It is important to define monitoring and evaluation systems to assess the performance of safety net programs for scaling up on larger social groups, as well as setup good accountability and control mechanisms.
- Safety net programs need to be flexible in the use of tools and resources, thus enabling them to adapt rapidly to changing circumstances and improve coverage to allow more people to benefit from them during a crisis.
- It is important to consider the interactions between safety nets and agricultural and rural development interventions to build on potential synergies and to avoid having either type of intervention undermine the other. Specific nutrition and health interventions, as a complement to social protection programs, might be needed, as well as safety net measures envisaged in favor of producers (FAO 2011; WB 2008).

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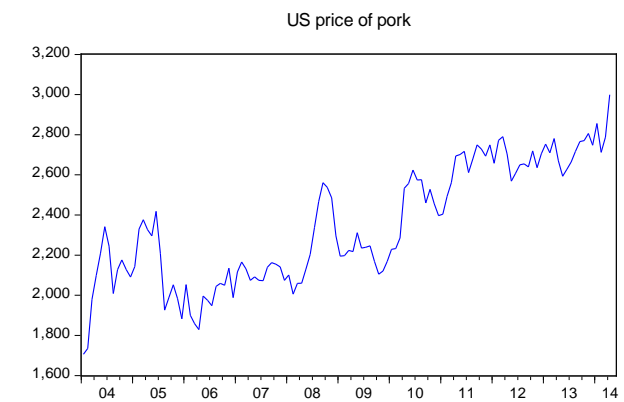
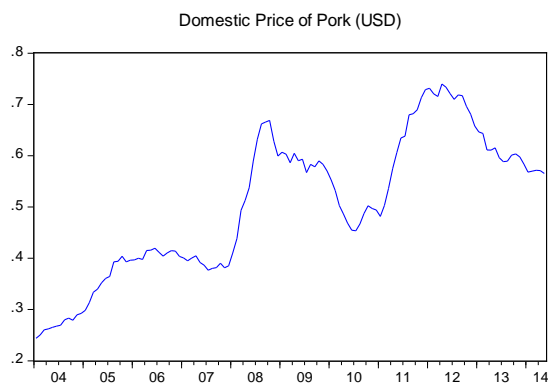
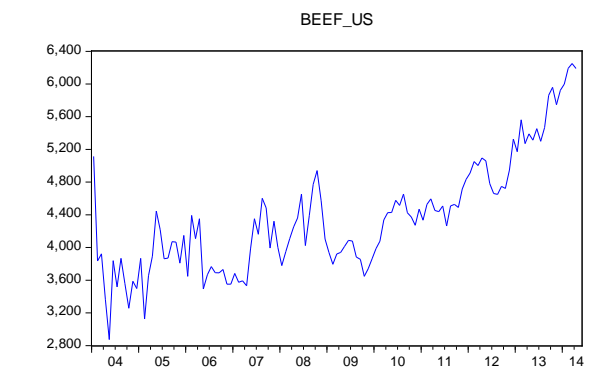
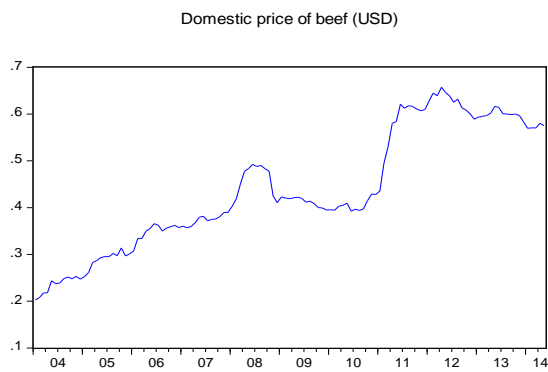
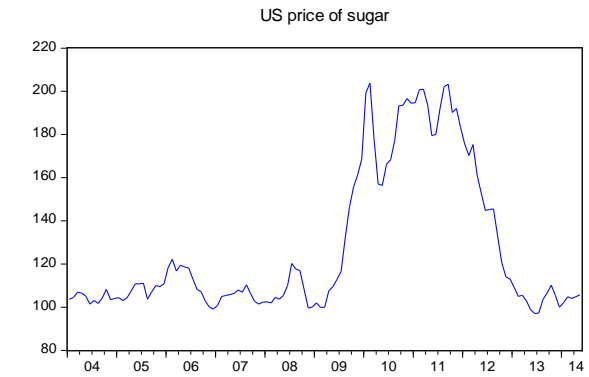
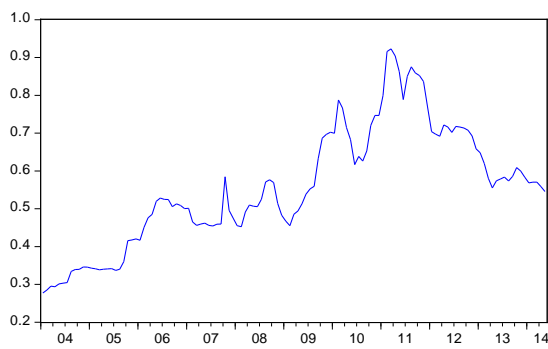
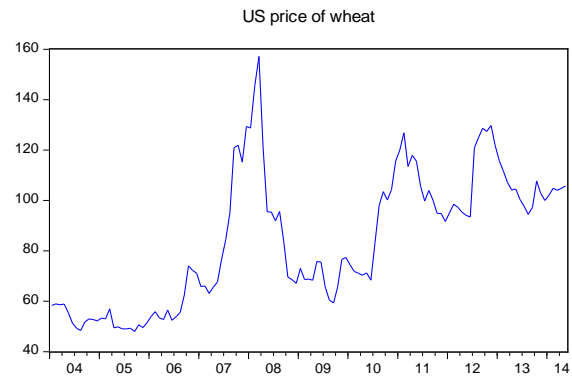
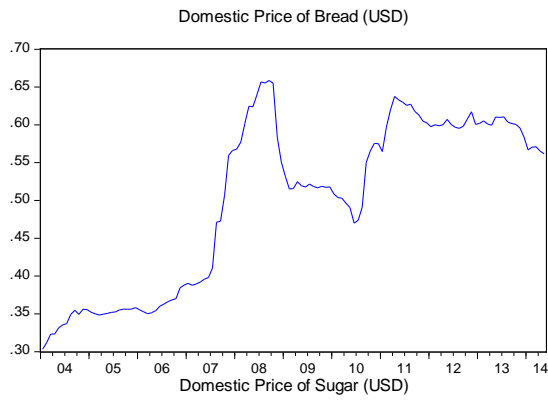
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Appendix





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