Global Food Price Shock
and the Poor in Egypt and Ukraine

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Contents

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Abstract

The global food price shock of 2006-2008 has particularly affected poorer strata of populations in several developing countries. In Egypt and some other countries it has put food subsidy schemes to the test. This paper develops two comparable computable general equilibrium models for Egypt and Ukraine which are used to simulate direct and indirect impacts of the food price surge and various policy options on the performance of the main macroeconomic indicators as well as on poverty outcomes. The results illustrate the limited ability of realistic policy responses to mitigate negative social consequences of an external price shock. Food import tariff cuts are a partial remedy faring better than other analysed options. Furthermore, the Egyptian system of food subsidies needs substantial reforms limiting the related fiscal burden and improving the targeting of the poor population.

1. Introduction[1]

In 2006, following almost three decades of stability or decline, real global prices of agricultural commodities and food entered a period of growth that lasted till mid-2008. The scale of this upturn was not unprecedented, but still quite unusual and one can only quote two comparable episodes in recent history: developments during World War II and during 1973-1974 (Figure 1). The 2006-2008 food price surge coincided with a major increase in oil and other energy commodity prices, creating a series of serious macroeconomic and social challenges around the world.

Figure 1. Wheat prices, 1913 – 2010
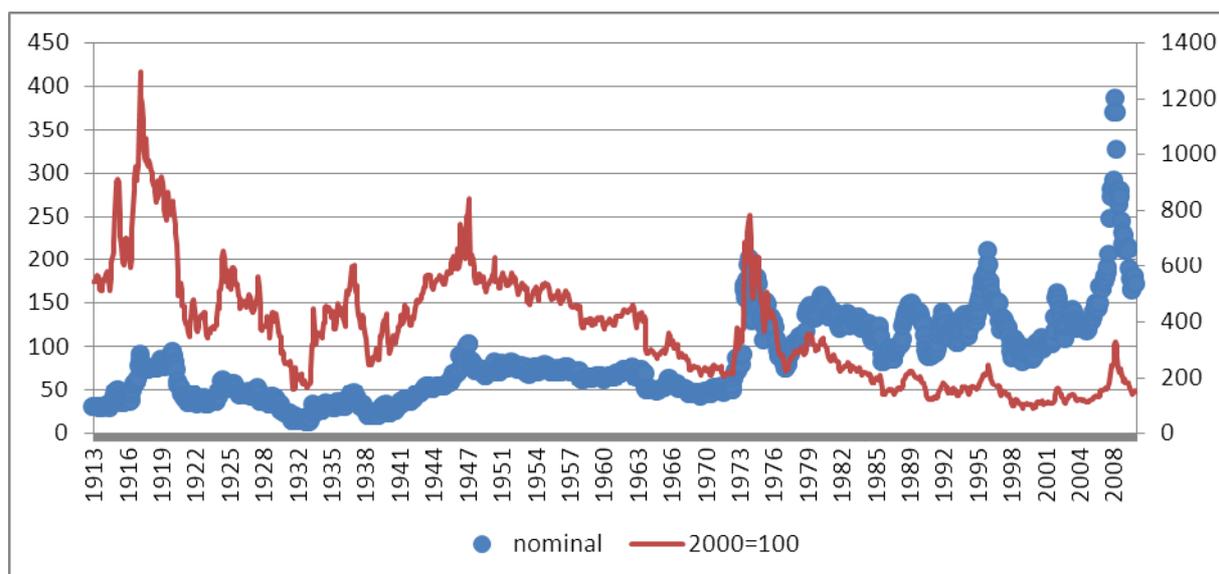
Note: Nominal prices in current USD per tonne: All wheat, U.S. season average price. Prices do not include an allowance for outstanding loans and government purchases. Real prices (average 2000 level = 100) are deflated by the US All Urban Consumers Price index (CPI-U) - U.S. city average.
Sources: USDA, World Agricultural Outlook Board, World Agricultural Supply and Demand Estimates and calculations based on U.S. Department of Labor.

The economies of several low- and lower-middle-income countries have been strongly hit and lower income strata of the population have been seriously affected. The poverty impact of such a major price surge can indeed be highly significant. In Egypt for example, food expenditures account for over 60% or even 70% of the poorest households' budgets. Good understanding of the poverty impact of such a major external shock is in itself a highly relevant policy question.

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[1] The longer version of this paper appeared as Aboulenein et al (2010).

These recent developments have added a new perspective to the on-going discussion on the potential reforms of the large food subsidy programme in Egypt (and in some other Middle East and North African countries) that over the years has created a partly effective, although poorly targeted social safety net, which has also increasingly drained budgetary resources. The external food price shock has put the existing systems to the test.

While the 2006-2008 food price surge has partly reversed and its short- and medium-term macroeconomic consequences have been overshadowed by the global financial and economic crises that strongly affected the analysed economies, the issue of formulating appropriate agricultural and food policies remains topical. This is because the medium- and long-term outlook for global food prices remains uncertain and scenarios foreseeing a more permanent price shift of some basic commodities to a higher level cannot be excluded.

In view of the above this paper analyses the currently applied policy regimes and different feasible food policy schemes in two countries – Egypt and Ukraine – selected on the basis of some important common characteristics and at the same time important differences with regard to their agricultural/food policies. The focus is on alternative policy options and the extent to which they can mitigate the developmental, macroeconomic and poverty effects of food price shocks. The fiscal sustainability of these alternative policies is also studied.

The remaining part of the paper is organised as follows. In the next section, the food and agricultural policies in the two countries are outlined. The third section discusses the role of food products in consumption baskets. The fourth section introduces the model, and the two subsequent sections present benchmark data and the analysed scenarios. Results of the CGE model simulations are discussed in section 7. The concluding part provides a number of policy recommendations.

2. Food policies in Egypt and Ukraine

2.1. Food policies – difficult assessment

Food subsidies of different forms play an important role in several countries, both developed and developing. In developed countries, the complicated subsidy schemes typically work through supporting agricultural production (or land ownership) and systems partly controlling the quantity and prices of selected commodities (e.g. sugar or milk in the EU). There are numerous controversies surrounding these complicated schemes that have been evolving over time. Among important points raised in debates, some claim the importance of ensuing foreign trade distortions, in particular what is considered as unfair competition with non-subsidised domestic agricultural and food production of developing countries (see Bureau and Matthews (2005) for discussion). There are also concerns about health outcomes. The distribution of subsidies among different groups of food products affects their relative prices and hence average consumption patterns. Here, some claim that e.g. increased obesity can be partly linked to the concentration of subsidies on meat and dairy products and other highly processed food items, the consumption of which exceeds levels considered optimal from a healthy diet perspective[2].

The analysis of effects of various food subsidy and food rationing schemes is complicated as the effects often manifest themselves though channels that are difficult to foresee and monitor. Such schemes lead to changes in relative prices and in accessibility of different food products to particular consumers and/or also food production patterns.

One surprising result concerns the outcome of the food-rationing systems that were introduced in the UK and Australia during WWII. Food rationing covered several food items and its main motivation was to ensure sufficient nutritional intake for the whole population and preventing surges in food prices in view of much limited food import options (in the case of the UK) and food requirements related to the war effort (in the case of Australia). In both countries the rationing system was supported by campaigns promoting home-food production, e.g. growing one's own vegetables. The general health outcome of the rationing

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[2] See e.g. discussion in http://www.pcrm.org/magazine/gm07autumn/health_pork.html.

system was rather positive with a decline in diet related problems like obesity, diabetes and heart disease and e.g. birth of healthier and larger babies than before the rationing system was introduced (Brown, 1991)[3]. Another example of surprising results of changes in food policies concerns the cut in subsidies for diary and animal products containing high levels of saturated fats that was introduced in Poland in 1991. Zatonski and Willet (2005) claim to have found a significant drop in deaths from coronary heart disease that can be attributed to this policy change. Their result is not uncontested, e.g. Ravnskov (2005) questions the existence of evidence for the causal link between fat intake and coronary disease.

Summing up, the main point here is that any policies affecting the availability of certain food products for certain categories of consumers may have consequences that are far-reaching and difficult to predict, often going beyond purely economic effects.

2.2. Egypt: Overview of selected food and agricultural policies

2.2.1. Consumer food subsidies

Prices of many goods and services are subsidized in Egypt to make basic needs affordable to consumers. By providing citizens with a minimum level of food at subsidized prices, the government aims to protect them from malnutrition and helps them cope with individual/household food insecurity.

Food subsidies are provided through two main channels: a universal subsidy for baladi bread (local Egyptian wheat bread) available to every citizen with no quota restrictions and ration cards which offer eligible households a pre-determined monthly allowance of basic foodstuffs (including rice, sugar and edible oil) for a maximum of four persons registered on each card[4].

Dramatic rises in global food prices after mid-2006 have increased the fiscal cost of food subsidy ratio to GDP from 1.5 percent in 2006/07 to 1.8 percent in 2007/08 (Table 1). Part of

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[3] For additional information on the rationing systems including the home-food production advertisements see e.g. http://www.diggerhistory.info/pages-food/rationing.htm, http://www.woodlands-junior.kent.sch.uk/Homework/war/rationing.htm.

[4] Ration cards beneficiaries include pensioners; government employees; public sector workers; casual workers; business sector workers whose salaries do not exceed LE 1000 per month; widows; people who are divorced and those eligible to cash transfers (social solidarity).

this increase was due to rising ration quantities and the expansion of ration cards coverage. This already signals that food subsidies could become a major fiscal problem if food prices stay high or in the event of future price shocks.

Table 1. Food subsidies in Egypt, 2005/06 - 2009/10 (% of GDP)

	2005/06	**2006/07**	**2007/08**	**2008/09 Expected budget**	**2009/10 Projected budget**
Percent of GDP	1.5	1.3	1.8	2.1	1.3

Note: The data are presented for the fiscal operations of the budget sector (comprising central government, local governments and some public authorities), on a cash basis consistent with the Government Finance Statistics (GFS) 2001 classification.
Sources: IMF, Arab Republic of Egypt: 2008 Article IV Consultation- Staff Report, IMF Country Report NO. 09/25, January 2009 and Ministry of Finance, Egypt: Briefing on the recent wage and subsidies increases and offsetting budgetary measures, June 2008.

From a fiscal perspective, baladi bread subsidy is the most important, accounting for nearly 79 percent of the total subsidy bill as of 2007/08. Ration cards critically affect consumption of selected food items of the poorest households accounting for 60 percent of their consumption of sugar, 73 percent for oil, and 40 percent for rice (WFP, 2008).

In response to soaring food prices, in 2008 the government decided to update the registration for the food subsidy program to allow people born after 1989 to be registered in the system of ration cards. An extra 22 million people were added, expanding the coverage of the ration card subsidy system to nearly 69.2 million beneficiaries by November 2008. In addition, the quantities of subsidized food items for all ration cards were increased. As of November 2008, ration cards supplied additional quantities of rice, sugar and vegetable oil, at prices well below their market value, as shown in Table 2.

Table 2. Ration scale of the Ministry of Social Solidarity (MOSS) as of November 2008

Commodity	Ration type	Allowance: kg per person per month	Price of rationed food as a % of market price
Rice	Uniform	1.3	24
Sugar	Base ration	1.0	15
	Additional ration	0.66	52
Vegetable oil	Base ration	0.5	9
	Additional ration	0.66	40

Source: WFP (2008).

Despite the long-standing provision of in-kind food subsidies in Egypt and the expansion of the overall coverage of the food subsidy program over the past years, poverty remains high and a large proportion of people remain highly vulnerable to food insecurity and malnutrition. Almost 44 percent of the population subsists on less than $2 per day in purchasing power

parity (PPP) adjusted terms compared to less than 10 percent of the population in Jordan. Similarly, the prevalence of malnutrition among children is more than double the level observed in Jordan and Tunisia (Table 3).

Table 3. Subsidies and transfers spending and indicators for Egypt and selected countries

Country	Per capita subsidies and transfers spending (in US$ PPP adjusted)	GINI coefficient	Malnutrition prevalence (weight, percent of children under 5)	Poverty headcount ratio at $2 a day (PPP) (in percent of population)
Egypt	230.4	34.4	8.6	43.9
Jordan	145.4	38.8	4.4	7.0
Morocco	40.0	39.5	10.2	14.3
Tunisia	184.1	39.8	4.0	6.6

Note: Malnutrition is estimated based on the percentage of children under the age of five who are underweight for their age group.
Source: IMF, Arab Republic of Egypt: Selected Issues - IMF Country Report NO. 07/381.

Egyptian food subsidies are poorly targeted and unnecessarily expensive, resulting in substantial leakage of resources to high-income households. Recent evidence reveals that between one-quarter and one-third of the poor do not benefit from food subsidies, and 83 percent of the value of these subsidies goes to the non-poor (World Bank, 2009a).

A quarter of highly vulnerable households are excluded from participating in the ration card system. This may be attributed to the fact that highly vulnerable households who work in the informal sector and are illiterate do not have the valid credentials needed to apply for ration cards such as an identity document and permanent housing (World Bank, 2009a).

Despite the regulations ensuring punishment for any violation in baladi bread specifications, weight, or use of flour outside the legitimate purpose, it is estimated that more than half a million tons of subsidized flour is smuggled and sold on the black market or lost, and baladi bread is often used as animal feed (Helmy, 2005).

2.2.2. Policies affecting agricultural producers

To bolster national production of strategic crops the Egyptian government offers farmers guaranteed prices for wheat, maize, sugar cane, sugar beet and cotton. The prices are being adjusted reflecting international and domestic market conditions. For example, faced with domestic grain and bread shortages, the government more than doubled the guaranteed

buy-in price paid to Egyptian farmers for wheat between 2006/2007 and 2007/08. The government maintains a procurement program for sugar cane and sugar beet. The delivery price for these products was also increased between 2007/2008 and 2008/09.

Despite government efforts to increase guaranteed prices for strategic crops, they remain low relative to productions costs. In addition, guaranteed prices are not set in line with the profitability of competing crops and a delay in announcing them before the due date for cultivating crops results in an ineffective pricing policy. A consistent, transparent and effective pricing policy for key staples, including a well-defined floor price for wheat and maize (possibly with regional differentiation) could play a central role for national food security and for maintaining a certain level of price stability. In times when international prices fall below domestic floor prices (e.g. for wheat), imported wheat could be taxed (e.g. through tariffs).

To lower agricultural production costs, some inputs such as fertilizers, seeds and pesticides are subsidized. However, government ownership of most fertilizer factories and the distribution of fertilizers through the Egypt's Principal Bank for Agricultural Development and Credit (PBDAC) hamper the development of a competitive market and result in fertilizers' prices being sometimes 40 percent above world market levels (Industrial Modernization Center, 2007). Recent bans on urea and nitrogen used for "fertigation" (the application of fertilizers through an irrigation system) are hampering access to key fertilizers and pesticides. The price of nitrogen fertilizers increased by close to 50% between 2006/07 and 2007/08 and continued to rise in a more recent period.

Notwithstanding government efforts to stimulate domestic food production, subsidies to farmers remain modest and well below levels allowed under the World Trade Organization commitments. Egypt's Producer Support Estimate is very low (2 percent), when compared to OECD countries, China or Brazil (Table 4).

Table 4. Producer support estimate in Egypt and in selected countries (%, 2007)

Country/region	Producer Support Estimate (%)
OECD countries (average)	30
Mexico	21
China	8
Brazil	3
Egypt	2

Note: Producer Support Estimate is gross annual monetary values to support agriculture producers, expressed as a percentage of gross farm receipts.
OECD database (http://stats.oecd.org/Index.aspx?DataSetCode=PSE_2009) provides different values for OECD average and Mexico – 2007 levels are estimated at 22.5% and 13.6%, respectively.
Source: Industrial Modernization Center (2007).

Seen from a different perspective, only 1 percent of the total government subsidy bill in Egypt is transferred to farmers. PBDAC offers favourable terms and low interest rates in soft loans to farmers and the treasury incurs the burden of the interest rate differential.

The food and agricultural products price surge of 2006-2008 has led to several policy responses. To secure food supply, reduce its price in the domestic market and provide some relief to consumers, tariffs on food imports were either eliminated (e.g. for rice, oil, some milk and cheese products and sugar) or reduced (e.g. for other milk, cheese and butter products) and rice exports were banned, starting from April 2008.

In February 2007, the government applied reductions in import duties on 1,114 items, including foodstuffs. The changes reduced the weighted average applied tariffs from 20.1 percent to 16.7 percent. The maximum tariff rate for most imports was reduced from a high of 40 percent to 30 percent. In April 2008, a presidential decree introduced further reductions to customs tariff for several imported products including butter, dairy spreads, cheese and milk for nursing infants. Rice and soybean oil became exempt from custom tariffs.

To secure rice supply and reduce its price in the domestic market, the government decided to halt rice exports, starting in April 2008. In the days leading up to the decision, prices for milled rice reached about USD 450 per tonne, compared to about USD 750 per tonne at the beginning of the export season in October 2007. The decision to suspend exports had an immediate impact on prices, with rough rice prices dropping almost USD 100 per tonne to USD 330 on the local market (USDA 2008 and 2009).

2.3. Ukraine: Overview of selected food and agricultural policies

2.3.1 Direct food subsidies

There are no direct food subsidies determined by the government in Ukraine. However, it is within the local authorities' competence to provide bread subsidies and/or ensure availability of the so-called "mass consumption" bread at low prices.

The term mass consumption bread refers to popular kinds of wheat or wheat-and-rye bread produced by basic recipe. Kinds and prices of mass consumption bread may differ between regions. The prices largely depend on the subsidies provided by the local authorities. Mass consumption bread is often referred to as the "social bread" as well, implying that it should be affordable also for the poorest. However, not only the poorest may buy the "social bread". In fact, mass production bread accounts for around 75% of all bread produced in the country.

Local authorities regulate prices for mass consumption bread either by directly setting them (e.g. in Kyiv, Odessa, Crimea) or determining profit margins for bakeries, with the latter being a prevalent practice. The policies may also set profit margins for flour production to keep input costs down for bakeries. Profit margins determined by regional state administrations typically range from 5% to 10%, with the lower limit being more common. However, in some cases profit margins may be reduced to 2% or so. The prices for mass consumption bread set directly by local authorities are often lower than the costs of bread production. To compensate for losses incurred by bakeries, local administrations subsidise them.

In addition to reducing incentives for bread production and making bakeries unprofitable, tight regulation of bread prices fails to effectively protect the poorest. In some regions, the "social bread" produced may not reach the poorest due to limited supply.

One can also mention other income-support programs that are not directly related to food subsidies but that help to identify the poor and may serve as a basis for food subsidy schemes introduced locally. These programs include:

    (1) benefits to low-income families;
    (2) single mothers' allowances;
    (3) child allowances for 0–3 year olds;

(4) benefits to the disabled, and;

(5) benefits to persons with low incomes taking care of the disabled.

2.3.2 Support for agricultural production

In 2008, the state budget direct expenditures on the agricultural sector amounted to UAH 9.5 billion. Moreover, at least UAH 14.6 billion was granted to agricultural producers due to the special tax regime, in particular VAT exemptions and the fixed agricultural tax (FAT). The total agricultural support reached at least 2.5% of GDP in 2008. With its 6.7% share of GDP, agriculture is the most supported sector of Ukraine's economy. The main types of support are described below.

The fixed agricultural tax

To minimize the tax burden on agricultural producers the fixed agricultural tax (FAT) was introduced in 1999. The FAT is a single tax paid in lieu of a number of taxes and fees, such as enterprise profit tax, land tax (fee), communal tax, and some others. Moreover, FAT payers are also subject to the privileged pension regime, with the difference between standard and privileged payroll tax rate being compensated from the state budget.

The FAT base is the area of agricultural lands in use (or the area of lakes, ponds and water reservoirs used for fishing), and its rates are quite low. In 2008, 82% of agricultural enterprises declared profits totalling UAH 6.9 billion. Should agricultural producers be taxed on a general basis, they would have paid UAH 1.7 billion in corporate profit tax only. Instead, they paid only UAH 129 million in FAT. Moreover, the budget compensation to the Pension Fund on behalf of the FAT payers amounted to UAH 1.2 billion, i.e. around 12% of total budget expenditures on agriculture.

VAT exemptions

The government provides indirect support to agricultural producers through a special VAT regime. During 1999–2008, the sales of livestock and milk by agricultural producers for processing were taxed at a zero VAT rate. The VAT accrued by processing plants after processing of this production was used to subsidize agricultural producers instead of being paid to the budget. At the same time, middlemen were not eligible for subsidies, and in this case the processing plants paid VAT to the budget. To meet requirements of the WTO, in 2009, the zero tax rate for selling livestock and milk for processing and subsidies paid by

processing plants were cancelled.

However, farms and agricultural enterprises are still exempt from VAT; they accrue this tax, but are allowed to keep it to replenish their working capital. Up to 2008, VAT exemptions made up the largest part of support to agricultural producers.

Partial compensation for interest rates on bank loans

The government provides partial compensation for interest rates on bank loans for agricultural and fishery producers, sugar refineries, other processing plants (on loans for purchasing agricultural production), agricultural enterprises affected by unfavourable weather conditions, etc. Interest compensation is granted on a competitive basis. The conditions include good credit track record, implementation of innovations in the production and investments in expanding livestock-breeding or purchase of domestically produced farm equipment. The level of compensations has varied for the last few years, fluctuating in the range of 6-12 percentage points. In response to the financial crisis, the public resources available for this form of support have been limited.

Livestock and crop subsidies

Apart from providing VAT exemptions for agricultural producers, the government directly subsidizes livestock. The list is quite long and includes e.g. subsidies for raised and sold cattle and poultry, paid to both enterprises and farmsteads, to certified producers of organic milk, to beekeepers, subsidies for farms increasing their cow headcount by purchasing or breeding pedigree animals, etc. There are also subsidies for crops based on the area sown with wheat, triticale, rye, oats, peas, buckwheat, millet, soybean, rice, sugar beets, long-fibred flax and hemp.

Sugar market regulation

The state subsidizes domestic beet sugar production. There are several goals behind this regulation: (1) to supply domestic demand for sugar: sugar is considered a strategic commodity as a great number of other industries depend on it; (2) to maintain jobs: in some areas, a sugar refinery is virtually the only local employer; and (3) to ensure the profitability of sugar beet and sugar production. To control the sugar market, the government has undertaken a number of measures including quotas for sugar deliveries to the internal market, minimum prices for sugar and sugar beet, subsidies for sugar beet production. Before WTO entry there were also quotas on sugar cane imports.

In addition, there are restrictions on trade in sugar within the CIS free trade area: mutual restrictions on refined sugar with Russia, the exclusion of sugar from free trade with Uzbekistan, and the exclusion of sugar and sugar syrups from the free trade regime with Belarus, Georgia, Moldova and Russia.

2.3.3 Policy response to the 2006-2008 price surge

Grain export restrictions

Following the experience of 2006, when grain export quotas were first introduced, in summer 2007 grain exports were again restricted. Given expectations of a small grain harvest due to a widespread draught, the government set quotas for exports of wheat, rye, maize and barley at 3,000 tonnes for each crop, the small quota size being effectively a ban on exports.

This quota was used up within 30 days. The government subsequently got involved in a series of extensions/changes in the quota system until May 2008, when grain export quotas were abolished. The quotas are believed to have slowed down the surge of domestic prices. At the same time, these restrictions led to about USD 2 billion foregone farm revenues and grain traders leaving the market (World Bank, 2008). According to data from the international Grain and Feed Trade Association, there were around 1,000 grain traders in Ukraine at the start of 2008, half the figure from the previous year. Small-scale traders mostly left the market.

Oilseed exports restrictions

In March 2008, in view of the sharp rise in prices for oil, the Cabinet of Ministers instituted quotas on exports of sunflower oil and seed valid until 1st July 2008. Exports were limited to 300,000 tonnes of oil and 1,000 tonnes of seed. Institution of the quotas restricted sunflower oil prices growth. Over April–June 2008, internal sunflower oil prices had been declining despite their sharp growth on the world markets. Producers of sunflower oil reacted negatively to the application of export restrictions. Some of them curtailed sunflower oil production. The quotas were abolished in late May 2008, as sunflower oil production was expected to be 4 to 5 times higher than internal consumption.

Efforts to retain price growth through interventions by Derzhrezerv

To control the rise of prices for meat, flour and sugar, in spring 2008 the government tried

using interventions by Derzhrezerv, the state reserves committee. In particular, Rezurspostach, a state enterprise, imported beef and pork from Poland, and Derzhrezerv was selling the imported meat on the domestic market at a loss that was to be compensated by subsidies.

Despite the interventions, prices for meat and meat products continued to grow due to the high demand. Worse yet, the distribution of imported meat without proper tenders set uneven conditions on the meat packing market and fostered corruption.

Other anti-inflationary measures

In March 2008, the government, food processing companies and owners of retail chains signed a Memorandum of Understanding capping price mark-up at 12% for a list of 32 products, including flour, bread and baked goods, noodles, grits, rice, beef, pork, poultry, cooked sausages, milk and milk culture products, creamery butter, eggs, sugar, sunflower oil, and vegetables. The signing of the memorandum did not affect price trends, as it was not mandatory for all retail traders to comply with the Memorandum, and no negative consequences for failing to obey the rules were presupposed.

Attempts to reform the bread subsidy schemes

The bread subsidy scheme run by local authorities also came under pressure with surging grain and flour prices. This motivated attempts for reforms that at the same time tried to address the underlying problem of limited efficiency of the scheme. The solutions assumed much better targeted mechanisms. For example, in Kyiv bread prices almost doubled in the summer 2008 after remaining unchanged since 2006. To alleviate the effects of increased bread prices for the poorest, Kyiv authorities launched a program of targeted assistance, paying UAH 15 (USD 2-3) monthly to every person with low incomes. The scheme was available to around 450,000 persons. However, already in December 2008, faced with deteriorating city finances the Kyiv authorities were forced to stop the scheme.

In Odessa, the local authorities subsidised limited amounts of bread, but it often did not reach the poorest. In June 2008, the authorities switched to a scheme in which people under a certain income level were granted a social card. The cards provide discount for bread purchased at supermarkets and other outlets where special card-readers are installed. The cards entitle buyers to get a discount for up to 10 loaves of bread per month.

3. Food in household consumption – implications of the 2008 surge

Egypt and Ukraine differ quite significantly as regards the balance of domestic production, consumption and foreign trade in agricultural and food products. Egypt relies on food imports for at least 50 percent of domestic consumption and food accounts for more than 15 percent of all imports. Agricultural and food imports of Egypt accounted to roughly one third of exports during 2005-2007. Self-sufficiency rates are estimated at 54 percent for wheat, 53 percent for maize and 77 percent for sugar. Egypt is the second largest importer of wheat in the world, the fourth largest importer of vegetable oils and the fifth largest importer of maize (National Democratic Party, 2008).

Every year, Egypt consumes over 14 million tonnes of wheat and grows nearly 7 million tonnes. This means Egypt imports at least 7 million tonnes per year (Baker and Maitra 2008). The country has a wheat consumption per capita which is one of the world's highest – 196 kilograms in 2008 (FAPRI 2009). In 2006, the average daily caloric intake per capita in Egypt was estimated at 4439, much higher than the world average of 2600 (UNDP, 2008). Egypt is projected to remain a net cereal importer until 2030 and beyond, increasing its cereal imports by 137 percent compared to 2000 levels. The primary driver of increasing net cereal imports is population growth, with income growth playing a smaller role (IFPRI 2008 and FAO 2008).

The situation in Ukraine is markedly different. Close to 90% of food consumed in the country is domestically produced. Ukraine ranked among the top five global exporters of wheat and coarse grains and corn in 2008/2009 (but in 2007/2008 exports were much smaller) (WASDE, 2010). From the perspective of poverty analysis it is also important to note the substantial role of subsistence agriculture. As discussed in more detail by Piętka-Kosińska (2009), 2008 survey data indicate that 57% of the population lives on farmsteads, working their land. The land plots are typically very small with around half of them not exceeding 0.5 hectares.

During the years of economic growth, the share of foodstuffs in the total consumption declined. At the same time, growing incomes resulted in shifting food consumption patterns.

The shares of bread, oils and fats, sugar and confectionery have been declining while the shares of meat, fish, fruit and vegetables have grown. The most significant change in the food basket structure was observed for the households of the first and the second income deciles. During 2004–2007, the share of meat in their consumption expanded, respectively by 6.6 percentage points (pp) and 5pp to 19.3% and 21.2%. Fish consumption grew 1.8pp and 1.5pp to 5.8% and 6.1%. This was accompanied by a decline in the share of bread consumption from 22.9% to 14.9% for the first decile and from 20% to 13.9% for the second decile.

According to the Ukrainian SNA statistics, in 2008, food consumption accounted for about 38% of total consumption. A steady decline of food share in total consumption from 49.2% in 2000 to 36.6% in 2007 was reversed in 2008 due to a surge in food prices.

4. The model

Two comparable CGE (computable general equilibrium) models are developed for Egypt and Ukraine to examine the short run equilibrium effects of the global food price shock along with a set of alternative policy options. The model simulates the direct and indirect impacts of the food price surge and the various policy options on the performance of the main macroeconomic indicators including economic growth, inflation rate, current account balance, trade balance, budget deficit and unemployment rate. The model sectoral coverage and level of households' disaggregation allow for analyzing the effects of policies on sectoral output growth rates as well as on the welfare level of households.

The core model for Egypt is neoclassical; however, it includes some structuralist features that depart from the Walrasian paradigm providing a better representation of the Egyptian economy. The model is characterized by its detailed treatment of households differentiating between rural and urban where each is classified into five different income quintiles. Given the purpose of the study, special focus is given to food subsidies where separate sectors are classified for subsidized food products differentiating between unrationed products, bread and flour, and rationed ones (sugar, edible oil, and rice) as well as a separate subsidy account defining the amount of subsidies received by various activities (producer subsidies)

and commodities (import subsidies). In addition, the model accounts for detailed treatment for various types of taxes including direct and indirect taxes (a detailed description of this model is available in Annex 1).

For Ukraine we employ a small open economy static IFPRI (International Food Policy Research Institute) CGE model developed by Lofgren, Harris and Robinson (2002). The major differences with respect to the Egyptian model are the lack of specific treatment of subsidized products since there are no significant direct food subsidies in Ukraine as well as a different macro closure in relation to the exchange rate.

In the IFPRI model each producer maximizes profits subject to a production technology, which at the top of the nest is specified by a Leontief function of the quantities of value added and aggregate intermediate input (i.e. value added and aggregate intermediate input are used in fixed proportion). In turn value added is a constant elasticity of substitution (CES) function of various primary factors, while aggregate intermediate input is a Leontief function of disaggregated intermediate inputs. Each activity uses a set of factors up to the point where their marginal revenue products equal its price.

The model distinguishes between three factors of production: labour, capital and land. Land and capital are fully mobile across sectors and are assumed to be fully employed. On the other hand, we allow for the presence of unemployment in the labour market, labour is mobile across sectors and its supply is flexible at the benchmark fixed real wage. Household consumption is allocated to different commodities based on the linear expenditure system (LES) demand functions. Households use their income to pay taxes, save, consume and make transfers to other institutions (government, enterprises, rest of the world – ROW). The government collects taxes and receives transfers from other institutions. It uses this income to purchase goods and services and to make transfers to other institutions. Throughout the simulations we assume that government spending is fixed, all tax rates are fixed, while government savings are a flexible residual post. The final institution is the rest of the world which supplies imports and purchases exports. Transfers between the ROW and domestic institutions are fixed in foreign currency. Foreign savings (or the current account deficit) is the difference between foreign currency spending and receipts. Throughout the simulations we keep the trade balance constant, while the real exchange rate is allowed to fluctuate[5]. We

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[5] This assumption differs from the Egyptian model. Despite being relatively stable at around UAH 5/USD between April 2005 and October 2008, the hryvnia lost one-third of its value by the end of 2008 and subsequently continued to depreciate down to 8.0-8.25 UAH/USD in early 2010.

also assume a savings-driven "neoclassical closure", where all non-government savings rates are fixed. The quantity of each commodity in the investment bundle is adjusted to reach the level of investment determined by the level of total savings.

Domestic output consists of several commodities that might be the result of different activities. A CES function is used in the aggregation function of these commodities. At the next stage the domestic output is allocated between domestic sales and exports based on the assumption that at any given aggregate output level the suppliers maximize sales revenue subject to imperfect transformability between exports and domestic sales expressed by a constant elasticity of transformation (CET) function. We employ the small open economy assumption and hence export demand is infinitely elastic. This assumption might not be accurate in the case of some commodities like e.g. barley, where Ukraine accounts for roughly 10% of world exports and hence might be able to influence world prices. However, for the sake of comparability of results across countries and products we keep the small country assumption for all products as the poverty implications of releasing this assumption are likely to be negligible.

The models allow for the disaggregation of households by deciles taking into account their regional distribution (urban versus rural), various income sources and consumption patterns, therefore allowing for detailed assessment of poverty implications of any food price rises or policy changes.

5. Benchmark data

The Egyptian SAM is benchmarked to 2006. An updated input-output table was estimated for this year on the basis of the input-output table for 2002/2003, which was constructed at the Ministry of State for Economic Development (MOED). It includes 22 sectors, of which 14 sectors cover agri-food commodities. Three sectors focus on subsidized goods: bread, flour and other subsidized food. The SAM includes three factors of production: capital, labour and land. It incorporates 13 institutions: 10 households (rural and urban quintiles), companies, government and the ROW.

Egypt is highly vulnerable to international food price risks as the country relies on food

imports for at least 50 percent of domestic consumption and food accounts for more than 15 percent of all imports. Egypt suffers agricultural and food trade deficits standing at LE 13.8 billion and LE 8.7 billion respectively in 2007, reflecting modest export to import ratios for agricultural and food items (33 percent and 30 percent, respectively) (Table 5)[6].

Table 5. Agricultural and food trade balance for Egypt (LE million)

	2005	**2006**	**2007**
Agricultural trade balance	(8,626)	(8,130)	(13,796)
Agricultural exports as % of imports	38.1	37.7	33
Food trade balance	(7,615)	(6,488)	(8,680)
Food exports as % of imports	28.3	31.1	30.3

Source: Authors' calculations based on data provided by the Central Agency for Public Mobilization and Statistics.

For Ukraine we use a social accounting matrix benchmarked to 2006, constructed for the purpose of this study by Veronika Movchan (IET). The SAM focuses on agricultural and food products, distinguishing 24 sectors out of which 7 agricultural and 8 food products' sectors (the complete list of sectors can be seen in Table 6). The SAM includes 3 factors of production: labour, capital and land. The households are disaggregated into rural and urban quintiles allowing for analysis of poverty implications.

In 2006, Ukraine was a net exporter of food and agricultural products. Its major exports consisted of other animal products, other crops (e.g. barley, maize), other food products and edible oil (Table 6). Similar sectors feature prominently in Ukrainian exports along with meat. Ukraine is a net importer of other agricultural products, meat, vegetables and fruit, other food products, beverages and tobacco, rice, sugar and bread. In 2006, trade in agricultural and food products accounted for 10.6% of total exports and 7.6% of total imports.

Table 6. Ukrainian trade in agricultural and food products in 2006

|	EXPORTS (MILLION USD)	IMPORTS (MILLION USD)	NET EXPORTS (MILLION USD)	IMPORT TARIFFS

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[6] In 2007, there was a significant surge in the value of Egypt's food imports, which went up by 78 percent compared to the 2006 level. Nearly 72 percent of the surge was due to the increase in import prices, while 6 percent was attributable to the rise in the volume of imports.

wheat	1739	858	881	57%
paddy rice	0	5	-5	77%
other crops	4086	611	3475	14%
oil crops	1741	210	1531	17%
vegetables and fruits	732	1192	-460	18%
sugar crops	21	2	19	81%
other agriculture	1075	3910	-2835	1%
meat	1350	3104	-1754	5%
edible oil	4165	1118	3048	6%
other animal products	4671	1158	3512	4%
processed rice	23	249	-226	15%
sugar	325	428	-103	10%
bread	136	195	-59	16%
other food	4396	6735	-2339	2%
beverages & tobacco	2326	2688	-362	7%

Source: SAM for 2006.

To understand the impact of increases in prices of food and agricultural products we need to look at their significance to households budgets. For the poorest agricultural households expenditures on agricultural and food products can account for as much as 57% of total expenditures. On the other hand the richest households spend a much smaller, but still significant share of their expenditures on these products (Figure 2). These numbers are typical for developing countries. The poorest people tend to spend up to three quarters of their income on food (*Cranfield*, Preckel and Hertel 2007). On the other hand, the incomes of rural households could increase as a result of higher commodity prices of goods that they produce, but benefits will depend on net sales of these products.

Figure 2. Ukraine: Household expenditure on agricultural and food products in 2006, % share in total expenditure by quintiles

Panel A. Urban households

Panel B. Rural households
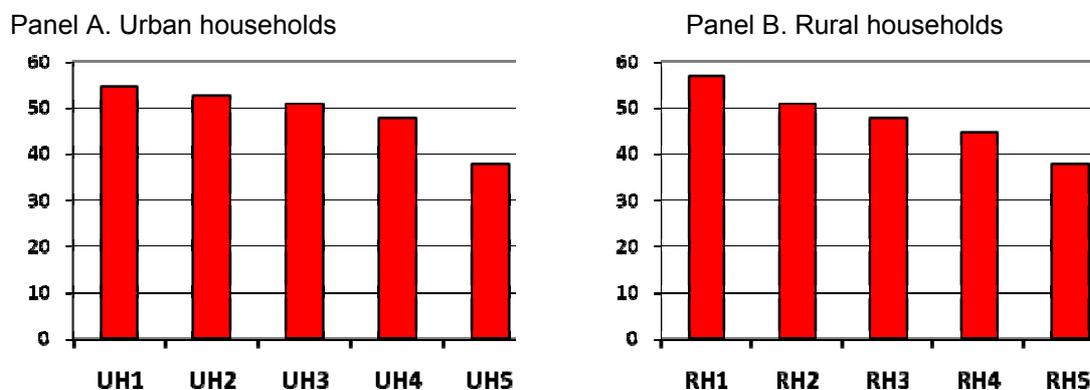
Source: SAM (2006).

6. Policy scenarios

In the case of Ukraine and Egypt we start by analysing two scenarios of price increases. The "high" price increase scenario or Scenario 1 assumes that the historical pattern of price growth observed between average 2006 levels to the level reached when the prices peaked in mid-2008 proves to be permanent. In other words, it describes a situation when the 2006-2008 price surge is not reversed, with prices remaining at the highest level reached in this period. The "moderate" price increase scenario or Scenario 2 corresponds to a (permanent) price rise equalling an average increase of food and agricultural product prices over 2006-2008.

Further, we look at the implications of various policy actions to alleviate the impact of food price increases. In the case of Egypt we consider various fiscal and trade policy measures such as:

- the elimination of all food subsidies and compensating the poor through government cash transfers to households in the lowest two expenditure quintiles in both urban and rural areas (Scenario 3);

- removal of all food subsidies except for baladi bread and compensating the poor through direct cash transfers to the households in the two poorest rural and urban

expenditure quintiles (Scenario 4);

- removal of tariffs on non-subsidized food products (Scenario 5);
- imposing an export ban on processed rice (Scenario 6).

In the case of Ukraine we look at the implications of two policy actions that the authorities could have taken to reduce the impact of the increases in food prices on the poor. The first policy experiment involves the imposition of an export ban on the following sectors: wheat, oil crops, edible oil products and other crops (Scenario U6). It is a stylized approximation of the policy actions taken by the Ukrainian government that imposed export restrictions on wheat, rye, maize and barley in late 2007 and on oilseeds in early 2008. The second policy experiment (Scenario U5) involves abolition of all import tariffs on agricultural and food products. The highest tariffs are imposed on products of which Ukraine is a net exporter. However, sizeable tariffs are also imposed on vegetables and fruits, processed rice, bread, beverages and tobacco.

Table 7. Policy scenarios for Egypt

Policy simulations Variables	Scenario 1 Strong increase in prices of agri-food products	Scenario 2 Moderate increase in prices of agri-food products	Strong price increase scenario (Scenario 1)			
			coupled with various policy responses			
			Scenario 3: Elimination of food subsidies + cash transfers to poorest quintiles	Scenario 4: Elimination of food subsidies except bread + cash transfers to poorest quintiles	Scenario 5: Elimination of import tariffs on food products	Scenario 6: Imposing export ban on processed rice
Flour subsidy rate	0	0	0	0	As base year (13%)	As base year (13%)
Bread subsidy rate	0	0	0		As base year (52%)	As base year (52%)
Rice, oil, and sugar subsidy rate	0	0	0	0	As base year (26%)	As base year (26%)
Exports of processed rice	endogenous	endogenous	endogenous	endogenous	endogenous	As base year * Fixed in quantity

Tariff rates on non subsidized processed food products	As base year (3.3%)	As base year (3.3%)	As base year (3.3%)	As base year (3.3%)	0	As base year (3.3%)
Output and composite prices of subsidized products	Endogenous for all subsidized products	Endogenous for all subsidized products	Endogenous for all subsidized products	Endogenous except for subsidized bread	Fixed (mark-up-pricing)	Fixed (mark-up-pricing)
Government transfers to two lowest urban and rural quintiles	Endogenous	Endogenous	Endogenous	Endogenous	Fixed	Fixed
Real income of two lowest urban and rural quintiles	Endogenous	Endogenous	Fixed	Fixed	Endogenous	endogenous

7. CGE results

This section reviews the key macroeconomic, poverty and other results of various simulations carried out for both countries.

7.1 Macroeconomic implications for Egypt

In both Scenarios 1 and 2 it is assumed that the government will not respond to the global food crisis. The two sets of assumptions for food world price growth rates had almost similar trend impacts on most variables at the macro and micro levels. However, as could have been expected, the impact was more pronounced in magnitude in Scenario 1 (see Table 8). The model results indicate that world food price growth would lead to a higher inflation rate at the aggregate level (increasing CPI by 6 percentage points). Real household consumption declines by 1.8%. Furthermore, the current account balance (CAB) is the most negatively affected macro indicator, turning from a surplus in 2006/07 to a deficit in 2008/09 in response to the food price hikes in mid-2008. This is mainly attributed to the deterioration of the trade balance (or export/import gap) in nominal and real terms (deficit increasing from 4.4% of GDP to 5.8% of GDP) due to the decline in exports (-2.5%) while imports continue to

increase (1.8%) as a result of the low elasticity of demand for food imports (Table 8).

Government revenues increase in nominal terms reflecting rising tariff proceeds and indirect and direct tax bills. Yet expenditures increase at a higher rate reflecting the rise in government consumption and compensation for the losses incurred on subsidized food products. As a result, the budget deficit increases by 3.9% in real terms. However, its ratio to GDP changes only little (from 5.6% to 5.8%). Compared to the base year 2006/07, GDP at factor cost and at market price experiences a slight increase (0.6% and 0.8%, respectively).

In Scenario 3 after eliminating all food subsidies and compensating the poor through government cash transfers to households in the lowest two quintiles in both urban and rural areas, the real consumption demand in these households for a number of food products increases, e.g. for subsidized bread. Yet due to low consumption share of the poor in most products, the real total consumption of all households declines by a further 1.5% relative to Scenario 1 with no policy intervention.

Directing higher transfers to the poorest quintiles slightly boosts exports of some agricultural and food products. Poorest quintiles increase consumption of commodities which are mostly confined to either non-tradable products (like bread) or non-exportable ones (flour and other previously subsidized items) and to some extent vegetables and fruits and other crops.

Government transfers as a share of income of the poorest quintiles increase from an average of 1.2% to 5.4% and from 0.72% to 4.8% in urban and rural households, respectively, to offset the negative impact of subsidy elimination on their real income. Despite this increase in transfers, budget deficit shrinks by 12.2% relative to Scenario 1.

When all food subsidies are removed except for baladi bread and the government compensates the poor through direct cash transfers to the households in the two poorest rural and urban expenditure quintiles (Scenario 4), consumption of baladi bread of the lowest two quintiles increases by 3.6%. Government transfers to households rise at a slower rate to represent 4% and 3% of poorest quintiles spending in urban and rural areas, respectively, to offset the negative impact of subsidy removal on their real expenditure. In this scenario the fall of real household consumption is only 0.4% higher than in Scenario 1, while the budget deficit falls by 1.9% due to the significant reduction of the subsidy bill.

Table 8. Egypt: Main macro indicators – real growth rates compared to base year under Scenarios 1 and 2 as well as net impact of various policy responses (Scenarios 3 to 6 in relation to Scenario 1)

	Scenario 1	Scenario 2	Strong price increase scenario (Scenario 1)			
	Strong increase in prices of agri-food products	Moderate increase in prices of agri-food products	coupled with various policy responses (results in relation to benchmark Scenario 1 with no policy response)			
			Scenario 3: Elimination of food subsidies + cash transfers to poorest quintiles	Scenario 4: Elimination of food subsidies except bread + cash transfers to poorest quintiles	Scenario 5: Elimination of import tariffs on food products	Scenario 6: Imposing export ban on processed rice
Current account surplus	-89.9	-78.5	82.9	38.2	-5.2	7.4
Exports	-2.5	-2.5	3.5	1.4	0.0	0.3
Imports	1.8	1.6	-1.0	-0.8	0.3	0.4
Export-import gap	31.8	29.6	-31.7	-12.3	2.4	0.9
Investment	8.2	7.9	-10.5	-5.9	0.1	-3.2
GDPMP	0.8	0.7	-1.5	-0.5	-0.1	-0.8
GDPFC	0.6	0.6	-2.6	-0.9	0.0	-0.7
HH consumption	-1.8	-0.8	-1.5	-0.4	0.2	-0.9
Government revenue	-3.3	-2.0	4.5	1.4	-0.4	0.3
Government expenditure	-2.0	-0.8	1.6	0.8	0.1	0.4
Budget deficit	3.9	4.5	-12.2	-1.9	2.5	1.0
Unemployment	4.1	-1.6	-4.1	1.1	0.2	-4.9
Subsidy bill	8.0	7.3	-28.7	-11.8	0.2	-3.5

According to the SAM 2006/07, non-subsidized foods are the only food products that have positive import tariffs. In line with the arguments raised in the literature, the results indicate that trade measures adopted by the government of Egypt (GOE) through elimination of tariffs on these food items (Scenario 5) are not expected to contribute significantly in solving the problem of increased food prices (Ghoneim 2008). This is attributed to the low initial values of tariffs (average non-subsidized food tariff rate was 3.3% in the base year).

Imports of non-subsidized processed food represented 10% of total imports and 52% of agricultural and food imports in the base year. Table 8 shows that the results are close to those of Scenario 1 with no policy response. The main differences lie in the current account and in the budget deficit and their components. However, it is worth noting that this is the only one among analysed scenarios leading to an improvement in average household consumption compared to no policy response (Scenario 1), even though this improvement is small (see also Figure 3).

Tariff elimination (Scenario 5) results in a higher decline in the current account surplus i.e. an additional 5.2% relative to Scenario 1 due to the deterioration in the trade balance. Imports of non-subsidized food increase by 24.5% compared to the base year (compared to an increase of 22.4% in Scenario 1) in real terms. Further, tariff elimination leads to a higher growth rate in the budget deficit – 2.5% relative to Scenario 1 on the back of lower tariff revenues. The differences in sectoral consumption are minor. The impact on other macro variables such as CPI, investment, GDP and unemployment is very small, i.e. almost no change relative to Scenario 1.

Imposing an export ban on processed rice (Scenario 6) could have more tangible effects on the economy. Processed rice exports represented 28% of food exports and 1.2% of total exports according to the benchmark SAM. The initial impact for this policy is the decline of the relative domestic price of processed rice and paddy rice[7]. Consequently the relative prices for other agricultural and food products increase. This dampens households' consumption – an additional decrease of around 1% relative to Scenario 1 and consequently also on the aggregate price level. Relative to Scenario 1, a rice export ban leads to higher consumption of rice and a decline in consumption of all other food categories.

A ban on rice exports leads to lower budget deficit and the decline in the surplus of the current account. Household consumption is negatively affected. It is worth noting that although both the share of export-import gap to GDP and that of the budget deficit to GDP are the same in both Scenarios 5 and 6, the two gaps differ significantly in terms of nominal and real percentage change as highlighted in table 8.

As regards household consumption, one of the key findings of the CGE simulations is that

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[7] Paddy rice is a non-tradable commodity that is not demanded for final consumption. It is demanded as an intermediate input by a number of sectors and is an essential input in processed rice, representing 29% of its output.

urban and rural household consumption which would fall significantly under no policy Scenario 1 would be further depressed by most of the considered policy responses (Figure 3). Scenarios 3 and 4 are constructed on the assumption that consumption losses resulting from the price shock of Scenario 1 for the two poorest quintiles are exactly compensated for. This comes at a cost of deeper consumption losses of better-off households. Among rural households, the three upper quintiles need to cut their consumption by a further 3 percentage points in addition to around 1.5% initial consumption loss due to the price shock. It is only in Scenario 5 (elimination of import tariffs) that some of the initial consumption losses are compensated for by policy action. This effect is almost flat among different quintiles.

Figure 3. Egypt: Real per capita consumption by quintiles under different policy scenarios: percentage point changes relative to Scenario 1 (no policy)

Panel A. Urban households   Panel B. Rural households
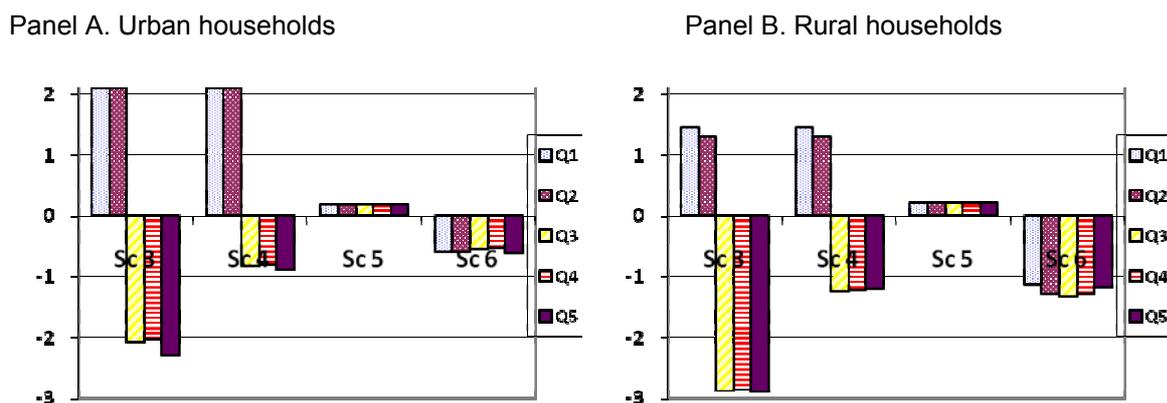

Note: For definition of scenarios see Table 8. The values shown are differences between percentage changes in household consumption change under a given policy scenario and under no policy Scenario 1.
Source: Authors' calculations from the CGE model.

7.2 Sectoral impacts for Egypt

As a result of a strong increase in prices of agri-food products (Scenario 1), composite output prices increase in all sectors except for subsidized food products which are assumed to be fixed. On the one hand, this induces an increase in total output of non-subsidized items, while on the other hand it results in a decline in household demand for those products. Such sectors respond to lower domestic demand and higher export supply prices by shifting some of their output to exports. Households' demand for subsidized food products increases as their relative prices decline. Yet, their domestic production falls due to rising intermediate costs (Figure 4). The increase of households demand for subsidized products boosts their

imports.

Figure 4. Egypt: Real output growth rates by sector under Scenario 1 (%)
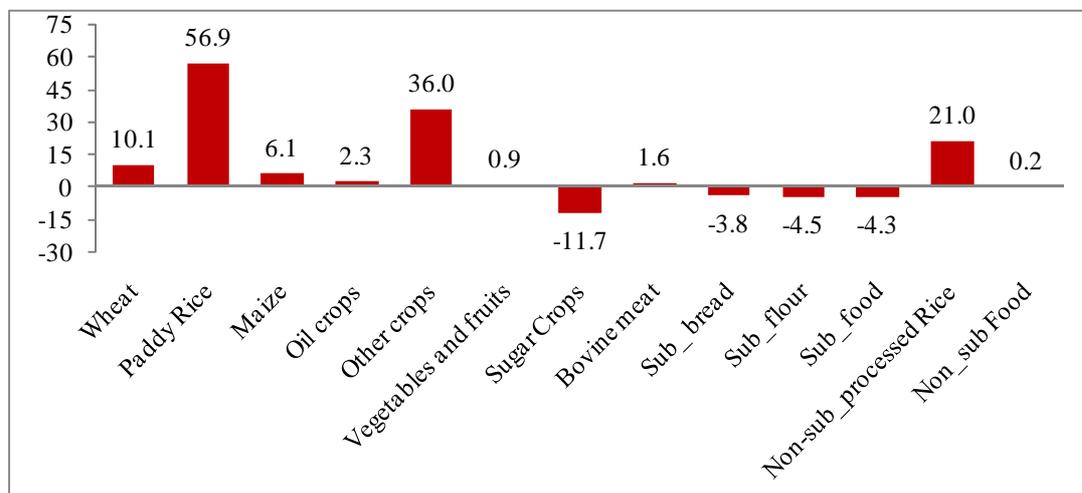
Source:
Results of CGE simulations

The increase in export supply price leading to a decline in private real consumption for many non-subsidized commodities drives up exports of a number of such commodities. Non-subsidized rice exports show the highest increase due to the significant rise in its world price (Figure 5).

Figure 5. Egypt: Real export growth rates under Scenario 1 (%)
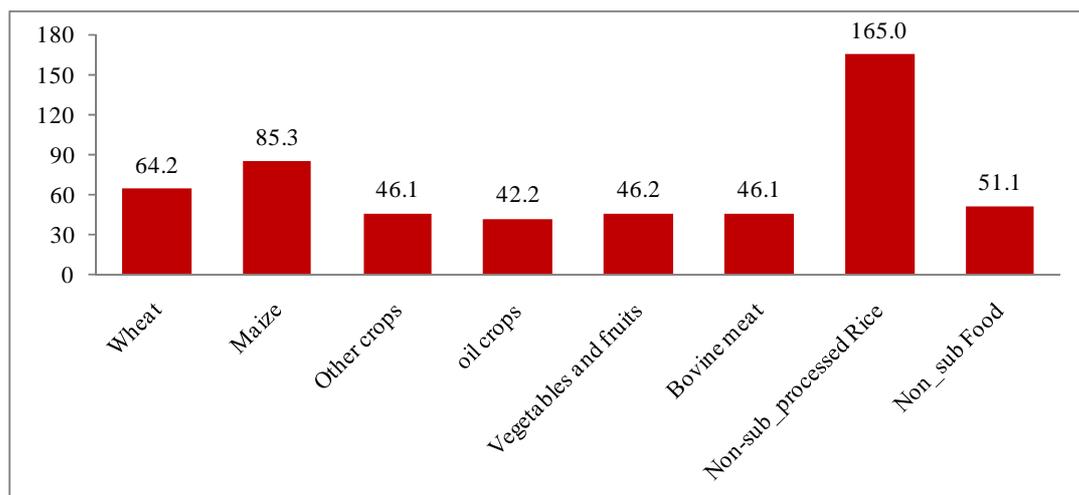
Source: Results of CGE simulations.

7.3 Poverty implications for Egypt

In order to link the CGE model with the micro-simulation framework, a top-down approach is adopted.[8] This approach uses the two frameworks in a sequential way. In the first phase, the standard CGE model is solved and the impact of different scenarios on real income and consumption of different sectors are derived. Consumers have linear expenditure system (LES) preferences and hence changes in real consumption reflect the impact of price changes as well as changes in consumption patterns (as households may be able to reduce the impact of price changes by substituting away from expensive sectors or using cheaper alternatives). Changes of different sources of income are also obtained. In the second phase for each household covered by the 2008/09 household survey, and for each scenario, household consumption on different goods and services as well as its real income are adjusted according to the CGE simulation results. Then, real income effect, poverty and inequality measures are calculated using the adjusted data sets.

Increases in world food prices are expected to have a noticeable impact on poverty. The poverty rate would increase from 21.6% in baseline to 22.8% in Scenario 1. Given that poverty in Egypt is shallow and many households are clustered just above the poverty line, any decline of consumption of households at the lower distribution ladder may result in a significant increase in poverty. In Scenarios 3 and 4 subsidies coupled with compensation of the two poorest quintiles for consumption losses result in slightly lower poverty rates than under Scenario 1. For example, in Scenario 3 the poverty rate falls to 22.4%.

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[8] The top-down approach completely disregards the possible feedback effects coming from the microeconomic side of the economy, which could affect the macroeconomic variables as well.

Figure 6. Egypt: Changes in poverty rate, poverty gap and Gini coefficient; Difference between Scenarios 3-6 and Scenario 1

Panel A. Poverty rate changes (% points)   Panel B. Poverty gap changes (% points)
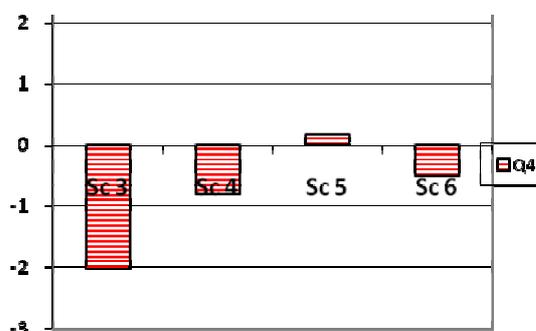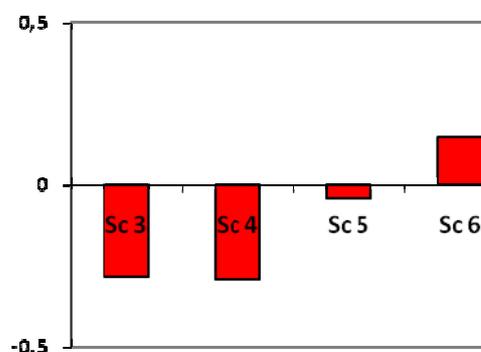
Panel C. Gini coefficient changes
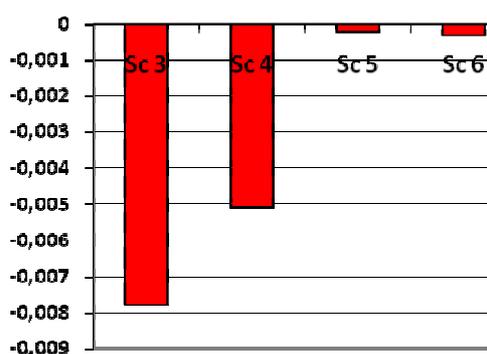
Source: Authors' calculations based on CGE simulations and HIECS 2008/09.

Finally, the poverty gap[9] index also deteriorates compared to the actual poverty gap. The food price shock (Scenario 1) results in an increase in poverty gap from 4.1% to 4.43%. Overall, three out of four analysed policy scenarios improve both the poverty headcount as well as poverty gap outcomes relative to the no policy alternative (Scenario 1). Scenario 6 (rice export ban) worsens the situation with both poverty rate and gap increasing even further.

The inequality measures (Gini coefficient[10] and Theil measure[11]), minimally decline

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[9] The poverty gap is given by the mean distance of the poor below the poverty line, as a percentage share of this line. The non-poor population enters the calculations with a zero poverty gap.

[10] This is the most commonly used measure of inequality. It is defined as a ratio with values between 0 and 1. A low Gini coefficient indicates more equal income, expenditure or wealth distribution, while a high Gini coefficient indicates more unequal distribution. 0 corresponds to perfect equality (everyone having exactly the same income, expenditure or wealth) and 1 corresponds to perfect inequality (where one person has all the income, expenditure or wealth, while everyone else has none).

(indicating a more equal distribution) under Scenario 1 (no policy reaction) relative to the benchmark. This is driven by the fact that more affluent households exhibit relatively larger consumption losses. Such results are typical for Egypt where general declines in real consumption are usually accompanied by falling inequality indices. Among the analysed policy scenarios, Scenarios 3-4 (with compensations for the poorest quintiles) exhibit significant improvements in inequality while for the other two there is almost no change reflecting very similar consumption changes for all quintiles.

7.4 Macro implications for Ukraine

Table 9 presents the results of policy simulations for Ukraine. Scenarios 1 and 2 are the same as those used in the case of Egypt, i.e. increases in food prices with no policy interventions. Then we compare them with two policy scenarios that are very similar to the Egyptian ones i.e. tariff elimination (5U) and an export ban (6U). The difference in specific parameters of these scenarios between Egypt and Ukraine stems from different trade and tariff structures.

The impact on all macro variables with no policy response is proportionate to the increase in agricultural and food product prices. As can be expected, the impact is more pronounced in the high price increases scenario (Scenario 1). With no policy response a high increase in prices is predicted to dent real absorption by 4.5%, reduce real household consumption by the same relative amount and lead to a significant drop in real investment (-7.8%). Real exports are expected to fall by 12.5% and imports by 7.6%. The real exchange rate is expected to appreciate by 2% with the terms of trade deteriorating by 1.5%. Further, investment and government savings as a share of GDP decrease by around 1%, while private savings increase slightly.

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[11] The Theil index is part of a larger family of measures of inequality referred to as the General Entropy class. It shows the difference between maximum 'entropy' (perfect equality) and the actually measured 'entropy' (caused by inequality). It does not have a straightforward representation and has many different possible formulations.

The results displayed in columns (2) and (3) show the net impact of scenarios with trade policy changes i.e. difference between the implications of the two scenarios with trade policy changes and Scenarios 1 and 2, respectively. An export ban leads to even deeper fall in real absorption, household consumption and investment. The real exchange rate depreciates and leads to the expansion of exports of products not covered by the ban, so that the total fall of exports is smaller than under Scenario 1. On the other hand imports fall further. The elimination of tariffs allows for the attenuation of negative impact of increases in food prices. However, due to the fact that Ukraine is a net exporter of food and that import tariffs are not that high, the positive impact is rather small. As a result of tariff removal the real household consumption falls by 0.6 percentage points less than in the benchmark, while exports and imports fall slightly less in real terms too. Hence looking only at macro indicators we conclude that overall export ban aggravates the impact of agricultural and food product price increases, while elimination of tariffs attenuates its impact on real household consumption and other main macro indicators. Next we turn to the analysis of the impact of various scenarios on rural and urban households.

Table 9. Ukraine: Macroeconomic results of CGE simulations.

	STRONG PRICE INCREASES			MODERATE PRICE INCREASES		
	No policy response (Sc. 1)	Export ban (Sc 3)	Zero tariffs (Sc 4)	No policy response (Sc. 2)	Export ban (Sc 3)	Zero tariffs (Sc 4)
	% change	% points change relative to (1)		% change	% points change relative to (4)	
	(1)	(2)	(3)	(4)	(5)	(6)
Real absorption	-4.5	-1.2	0.4	-2.9	-0.9	0.4
Real HH consumption	-4.5	-1	0.6	-2.9	-0.7	0.6
Real investment	-7.8	-2.8	0.1	-5.1	-2	0.1
Real government consumption	0	0	0	0	0	0
Total exports	-12.5	5	0.6	-5.9	1.7	0.6
Total imports	-7.6	-0.9	0.5	-5	-0.5	0.5
Real exchange rate	-2	4	0.1	0.2	1	0.1
Nominal exchange rate	-7.2	6.8	0.3	-2.8	3.5	0.3
CPI	0	0	0	0	0	0
Terms of trade	-1.5	-6.7	0	-1	-5.6	0
Investment share of GDP	-1.1	-0.2	0	-0.7	-0.1	0
Private savings share of GDP	0.3	-0.1	0	0.1	0	0.1
Foreign savings share of GDP	0	0.1	0	0	0.1	0
Trade Deficit share of GDP	0	0.2	-0.2	0	0.2	-0.2
Gov't Savings share of GDP	-1.3	-0.2	0	-0.8	-0.2	0
Tariff Revenue share of GDP	0	0	-0.2	0	0	-0.2
Direct Tax Revenue share of GDP	0.4	-0.2	0	0.2	-0.1	0

Source: CGE model simulations.

The impact of increases in food prices on household consumption is quite significant as evident from Table 10. The fall in consumption in middle urban households reaches up to 6.6% in Scenario 1. Among rural households consumption of the two poorest quintiles is hit hardest with the registered fall of around 2.5%.

An export ban naturally leads to the deterioration of real consumption of rural quintiles, which are not able to sell their products abroad and are forced to scale down their production. This time the richest households are hit hardest as they are the main exporters of agri-food products. On the other hand the net impact on most urban households is positive, as their consumption falls a bit less in this scenario than without this policy intervention. This is

because urban households are benefiting from lower domestic prices as compared to Scenario 1, while not losing any income from sales of agri-food products as do rural households.

Finally, the elimination of tariffs on agri-food products leads to an improvement of welfare of all households relative to the benchmark. All consumers now enjoy lower domestic prices of agri-food products, with rural households benefiting a little more than urban households due to the higher share of imported agri-food products in consumption.

Table 10. Ukraine: Change in real consumption (in %) in rural and urban household quintiles

	STRONG PRICE INCREASES			MODERATE PRICE INCREASES		
	No policy response (1)	Export ban (2)	Zero tariffs (3)	No policy response (4)	Export ban (5)	Zero tariffs (6)
	% change	% point change relative to (1)		% change	% point change relative to (4)	
HURBQ1	-4.6	1.3	0.4	-2.6	0.7	0.4
HURBQ2	-5.9	1.7	0.4	-3.3	0.8	0.4
HURBQ3	-6.6	1.8	0.5	-3.7	0.9	0.5
HURBQ4	-6.1	0.8	0.5	-3.6	0.3	0.5
HURBQ5	-4.7	-1.1	0.5	-3.1	-0.7	0.6
HRURQ1	-2.4	-2.5	0.6	-1.6	-1.9	0.6
HRURQ2	-2.5	-2.8	0.6	-1.7	-2	0.6
HRURQ3	-1.8	-3.9	0.7	-1.5	-2.7	0.6
HRURQ4	-1.1	-5.4	0.7	-1.4	-3.4	0.7
HRURQ5	-0.5	-6.1	0.8	-1.1	-3.9	0.7
TOTAL	-4.5	-1	0.6	-2.9	-0.7	0.6

Source: CGE model simulations.

7.5 Sectoral impact for Ukraine

Increases in prices of agri-food products are expected to lead to expansion of production of these sectors proportionately to the increases in prices. Hence, in Scenario 1 the production of other crops is expected to increase by 80%, production of oil crops by 53% and production of edible oil by 45%. The increased profitability of these sectors would lead to a shift of factors of production away from other manufacturing and service sectors which then record falling output.

In the case of ban on total exports of selected sectors: wheat, other crops, oil crops and edible oils, the production of these sectors drops dramatically, while the expansion of several remaining agri-food sectors is even more pronounced. With the release of productive resources some sectors (e.g. hotels and restaurants) grow in this scenario, while the production fall of other sectors is less pronounced. Finally, in the case of elimination of tariffs the impact on production is rather limited, but the majority of sectors fare slightly better than under the benchmark (i.e. Scenarios 1 or 2). A slightly higher total demand allows for a slightly less negative impact on the production of all sectors, but the benchmark pattern of the expansion of production of agri-food products dominates the results.

The implications of various scenarios for exports and imports are in line with the production changes. In the benchmark scenario exports of agri-food products expand significantly. This effect is eliminated in the case of sectors on which an export ban is imposed. On the other hand the elimination of tariffs leads to the expansion of imports of agri-food products.

Table 11. Ukraine: Percentage change in production following increases in prices of agri-food products

	STRONG PRICE INCREASES			MODERATE PRICE INCREASES		
	No policy response	Export ban	Zero tariffs	No policy response	Export ban	Zero tariffs
	% change	% change relative to benchmark		% change	% change relative to benchmark	
Wheat	17.1	-30.1	-0.5	39.5	-52.2	-0.2
Paddy rice	20.4	-4.6	-8.5	0	0	0
Other crops	79.4	-91.8	-0.1	12.6	-28.5	0.2

	STRONG PRICE INCREASES			MODERATE PRICE INCREASES		
	No policy response	**Export ban**	**Zero tariffs**	**No policy response**	**Export ban**	**Zero tariffs**
	% change	**% change relative to benchmark**		**% change**	**% change relative to benchmark**	
Oil crops	53.1	-90.1	1.4	30.5	-67.9	0.6
Vegetables & fruits	-11.1	13.8	0.2	-5.2	8	0.2
Sugar crops	-7.3	2.5	0.3	-4.1	1.1	0.3
Other agriculture	30.8	33.9	1.3	16.2	9.8	0.9
Crude oil	-2.4	7.8	0.4	-1.4	4.2	0.4
Meat	11.2	3.7	1	5.8	-0.1	0.8
Edible oil	44.8	-74	2.9	23.3	-52.5	1.8
Other animal products	5.3	2.5	0.6	2.5	0.7	0.5
Processed rice	11.5	0.2	1.4	2	-2.1	1
Sugar	-3.6	-1.1	0.9	-2.1	-1.5	0.9
Bread	-5.7	-4.3	2.3	-1.2	-6.1	2.4
Other food	-6.1	0.3	1.2	-2.8	-1.4	1.1
Beverages & tobacco	-5.8	-0.2	0.9	-3.3	-0.7	0.9
Textile and leather	-11.5	7.9	0.8	-5.2	4.1	0.7
Chemicals & petroleum	-25.4	1.3	0.3	-16.2	1.1	0.3
Construction & electricity	-8.9	0.3	0.2	-5.2	-0.1	0.2
Hotels and restaurants	-12.9	15.9	0.9	-4.6	8.5	0.9
Transport & communications	-9.4	8.3	0.4	-4	4.6	0.4
Other industries	-18.2	12.3	0.4	-8.7	7.3	0.4
Other services	-3	1.3	0.2	-1.5	0.5	0.2
TOTAL	-7	2.5	0.4	-3.7	1.2	0.4

Source: CGE model simulations.

7.6 Poverty implications for Ukraine

In the case of Ukraine, the calculations underlying the poverty analysis are simplified. We linearly extrapolate the income and expenditure data by quintiles and also use linearly extrapolated patterns of changes in income and expenditure results obtained from the CGE model. Table 12 reports the calculated effects of scenarios on the poverty rate. In order to improve robustness of the results, different poverty lines were used, corresponding to initial poverty rates of 10%, 20% and 30% and the results reported in the table are the average across these different options. Such poverty lines and rates are consistent with the range used in recent analyses of this subject (World Bank, 2007).

Table 12. Poverty rate changes in Ukraine under different scenarios (% points)

	STRONG PRICE INCREASES			*MODERATE PRICE INCREASES*		
	No policy response	Export ban	Zero tariffs	No policy response	Export ban	Zero tariffs
	(1)	(2)	(3)	(4)	(5)	(6)
	% point change	% point change relative to (1)		% point change	% point change relative to (4)	
Rural poverty	1.2	1.4	-0.3	0.8	0.9	-0.3
Urban poverty	1.6	-0.4	-0.1	0.9	-0.2	-0.1

Source: Simulations based on CGE model results.

The results can be summarised as follows. Without a policy reaction to negative food price shocks, urban poverty increases somewhat stronger than does rural poverty. This effect is more pronounced under more severe price shocks. An export ban has the potential to slightly reduce the urban poverty rate but at the cost of quite a significant increase in rural poverty. The magnitude of the latter effect is similar to the original shock. In other words, an export ban roughly doubles the original negative impact on rural poverty. The elimination of tariffs on agri-food products leads to a small reduction of the poverty rate. This limited poverty-reducing effect is stronger among rural households.

8. Conclusions and policy recommendations

The analysis presented in this paper shows the magnitude and certain features of the macroeconomic and microeconomic effects likely to arise from the sustained food price shock of the magnitude up to the one observed during the period of 2006-2008. While this particular historical surge of global food prices has been partly reversed since then, a future occurrence of a shock similar in scope but more persistent cannot be excluded. Also, the results remain potentially relevant from the policy perspective even in case of stabilisation of global food prices.

The analysis covered in detail two countries that share some common characteristics (size, level of development) but differ in some important aspects. Specifically, while Egypt is a large net importer of agricultural products with a developed system of food consumption subsidies, Ukraine is a net agricultural exporter with a somewhat more developed system of food production subsidies.

The macroeconomic effects of an external food price shock of the analysed magnitude (without any policy actions) can be quite pronounced. Estimated consumer price index or nominal exchange rate adjustments are of the order of several percentage points in both countries. Significant adjustment takes place through the foreign trade channel with Egypt's pre-shock current account surplus almost disappearing. On the other hand in Ukraine a high increase in prices is predicted to decrease real absorption by 4.5% and lead to a significant drop in real investment (-7.8%). Real exports were expected to fall by 12.5% and imports by 7.6%. The real exchange rate was expected to appreciate by 2% with the terms of trade deteriorating by 1.5%.

Household consumption is affected negatively in both countries – by close to 2% in real terms in Egypt and 4.5% in Ukraine in the case of the strong price increase scenario. Urban households suffer bigger losses in both countries – the difference between rural and urban outcomes is more pronounced in Ukraine. This is associated with a visible rise in poverty levels (for a range of different definitions of poverty).

Moving to various possible policy responses to the food price shock, one striking observation

is the limited ability of the policies to reduce the negative social consequences and a rise in poverty. The results for Egypt suggest that most policy interventions have a dampening effect on household consumption across the income distribution range. The only exception is a scenario in which food import tariffs are cut. Also, the scenarios assuming that the two poorest quintiles can be perfectly compensated in cash for the losses incurred due to elimination of food subsidies by definition imply maintaining the level of consumption of this group of households. To what extent such a policy could be executed in practise is not clear. Similarly in Ukraine, the elimination of import tariffs on food products improves the real consumption of households, while an export ban slightly improves the situation of rural households at the expense of the urban population suffering significant additional consumption losses due to surging food prices. The poverty implications of these policy alternatives are similar with food import tariff eliminations slightly improving the poverty situation in both Egypt and Ukraine. In Egypt, theoretical scenarios assuming perfect compensation of the two poorest quintiles also naturally improve poverty outcomes.

Summing up, the CGE modelling exercises illustrate the severity of the shock, and inadequacy of several policy options suggesting cuts in food import tariffs as a partial remedy. Yet, it is also clear that from the analysis that in the case of Egypt maintaining the food subsidy scheme intact is not sustainable from a fiscal perspective. The policy scenarios analysed in the CGE models are quite stylised and their practical implementation would be very difficult. It is therefore important to discuss the practical policy-relevant conclusions and recommendations.

The Egyptian system of food subsidies needs to be reformed with the objective of making it less costly for the budget and better targeted at the poor. This implies that leakage to better off households should be limited. Several elements could be considered here.

One general direction of change could be a gradual switch from subsidising final products to direct support to farmers to allow them to better cope with the fluctuations of international food prices. A system of guaranteed prices for strategic crops could be considered. Alternatively, a system of insurance against price shocks could be introduced. Direct subsidies to farmers conditional on their adoption of good practices such as modern irrigation and balanced fertilization might prove effective. With regard to the organisation of the market measures to reduce non-competitive practices by traders regarding food storage, distribution and supply timing could be introduced.

Reducing the fiscal burden of food subsidies while maintaining their poverty-alleviation role could involve geographical targeting of eligible households. As 78 percent of the poor in Egypt are concentrated in rural areas (World Bank 2009b), proxy means testing combined with poverty mapping would help identify the most vulnerable groups, reduce errors of inclusion (of least vulnerable groups) and errors of exclusion (of vulnerable households). Direct cash transfers to the poorest households instead of food subsidies could then be implemented. In a similar vein, certain types of support could be targeted only at the poorest farmers (instead of subsidised agricultural inputs) avoiding dual prices distorting markets and leading to misallocation of resources. The baladi bread distribution system could be made more efficient if a separation between baladi bread production and distribution process was implemented. Providing direct cash transfers to the poorest households instead of food subsidies and to the poorest farmers instead of agricultural inputs could eliminate dual market pricing which results in distortions and misallocation of resources.

Some more specific points worth mentioning include:

- Enhancing the efficiency of baladi bread production and distribution. Some relative simple approaches could be taken here: improving wheat storage and the bread production technique through public-private partnerships; easing access to financing that would allow bakeries to invest in new equipment, train their workers and more effectively implement health and environmental standards. Also, better supervision of all marketing stages and imposing financial fines to avoid leakages in subsidized flour and bread might be considered.

- Improving the ration card system by facilitating the registration for truly needy households that are currently outside the system, eliminating or reducing subsidies on tea and sugar, considering special allowances for certain categories of households (e.g. a quota of nutritious powdered milk can be offered to households with children) and introducing flexibility to the commodity mix available allowing individual adjustment to tastes and preferences. The currently being piloted electronic smart card system could be instrumental in improving the system.

In Ukraine, there are potentially interesting lessons to be taken from an attempt of some regional/city authorities to replace the bread price control system with cash support for the

poorest. The breakdown of these reforms due to local budget constraints in the wake of the financial and economic crises, i.e. when it was needed the most, suggests that a more crisis-robust scheme might be needed. The new scheme does not necessarily need to lead to a larger involvement by the government responsible for implementation and financing, but stronger guarantees of the functioning of the new system might be needed to win public support for elimination of the provision of subsidised bread.

References

Aboulenein, Soheir, Heba El Laithy, Omneia Helmy, Hanaa Kheir-El-Din, Liudmyla Kotusenko, Maryla Maliszewska, Dina Mandour and Wojciech Paczyński (2010), Global food price shock and the poor in Egypt and Ukraine - a comparison of impacts and policy options, FEMISE Research no. FEM33-14. Available at www.femise.org.

Baker, Marcia Merry and Ramtanu Maitra (2008), Egypt can attain food sufficiency once WTO globalization is shut down, Executive Intelligence Review (EIR), at: www. Larouchepub.com/eir/public/2008, July 18.

Brown, Judith. E. (1991), Everywoman's guide to nutrition, University of Minnesota Press.

Bureau, Jean-Christophe and Alan Matthews (2005), "EU Agricultural Policy: What Developing Countries Need to Know", IIIS Discussion Paper No. 91. Available at SSRN: http://ssrn.com/abstract=922068

Cranfield, J. A. L., Paul V Preckel, and Thomas W Hertel (2007), "Poverty analysis using an international cross-country demand system," Policy Research Working Paper Series 4285, The World Bank.

Dervis, Kemal, Jaime de Melo, and Sherman Robinson (1982), General Equilibrium Models for Development Policy, a World Bank Research Publication, Cambridge: Cambridge University Press.

Ecorys and CASE-Ukraine (2007), "Trade Sustainability Impact Assessment for the FTA between the EU and Ukraine within the Enhanced Agreement", report for European Commission, DG TRADE, available at http://trade.ec.europa.eu/doclib/docs/2007/november/tradoc_136856.pdf.

FAO (2008), "The state of food insecurity in the world, 2008 - High food prices and food security - threats and opportunities", Food and Agriculture Organization of the United Nations.

FAO (2009a), "The State of Agricultural Commodity Markets: High food prices and the food crisis - experiences and lessons learned", Food and Agriculture Organization of the United

Nations.

FAO (2009b), "Arab Republic of Egypt, Initiative on Soaring Food Prices, Macro-Economic and Poverty Situation", Working Paper 1, February, Food and Agriculture Organization of the United Nations.

Ghoneim Ahmed (2008), Can Trade Policy Save Egypt from the World Food Crisis? Mimeo, paper submitted to Social Contract Center Project.

Helmy, Omneia (2005), "The efficiency and equity of subsidy policy in Egypt", Egyptian Center for Economic Studies (ECES) Working Paper, no. 105 (in Arabic).

Helmy, Omneia (2008), Price Subsidy or Building Capacities in Egypt, ECES Policy Viewpoint no. 21, The Egyptian Center for Economic Studies, July (in Arabic).

ICPS (2007), "Free Trade between Ukraine and the EU: An impact assessment", International Centre for Policy Studies, Kiev.

IFPRI (2008), "Food and Financial Crises: Implications for Agriculture and the Poor", International Food Policy Research Institute, December.

Industrial Modernization Center (2007), "Egypt Agricultural Export Strategy Final Report", Cairo, April.

Kheir El-Din, Hanaa, Tarek Abdelfattah Moursi, and Nihal El-Magherbel (1996), "Macroeconomic and Sectoral Effects of Trade Policies in Egypt: A General Equilibrium Approach", Paper presented at the Conference of the Economics Department, Faculty of Economics and Political Science, Cairo University, January.

Löfgren, Hans (2001), "Less Poverty in Egypt Explorations of Alternative Pasts with Lessons for the Future", Trade and Macroeconomics Division, International Food Policy Research Institute. Available at http://www.ifpri.org/divs/tmd/dp/tmdp72.htm.

Löfgren, Hans and Moataz El-Saïd (1999), "A General Equilibrium Analysis of Alternative Scenarios for Food Subsidy Reform in Egypt", Trade and Macroeconomics Division, International Food Policy Research Institute. Available at http://www.ifpri.org/publication/general-equilibrium-analysis-alternative-scenarios-food-subsidy-reform-egypt.

Löfgren, Hans, Rebecca Lee Harris and Sherman Robinson (2002)," A standard computable general equilibrium (CGE) model in GAMS", Technical Guide: Microcomputers in policy research, International Food Policy Research Institute (IFPRI).

National Democratic Party (2008) "Investment and Employment", The NDP Fifth Annual Conference in Cairo, November.

Piętka-Kosińska, Katarzyna (ed.) (2009), "Agriculture Income Assessment for the Purpose of Social Assistance: the Case of Ukraine", CASE Network Studies and Analyses No. 399.

Ravnskov, Uffe (2005), Dietary fat is not the villain, British Medical Journal, Rapid response to Zatonski and Willett (2005), http://www.bmj.com/cgi/eletters/331/7510/187.

UNDP (2008), Food Security and Agriculture in Arab Countries: Facts, Challenges and Policy Considerations, United Nations Development Program, League of Arab States.

USDA (2008), Egypt Grain and Feed- Egypt Officially Suspends Rice Exports, Global Agriculture Information Network- GAIN Report Number: EG8006- July.

USDA (2009), Agricultural Economy and Policy Report- Egypt - Global Insight 2007, February.

WASDE (2010), World Agricultural Supply and Demand Estimates, WASDE – 480, 10 March, United States Department of Agriculture.

World Bank (2007), Ukraine: Poverty Update, Report No. 39887.

World Bank (2008), Competitive agriculture or state control: Ukraine's response to the global food crisis, policy note available at http://siteresources.worldbank.org/INTUKRAINE/Resources/WorldFoodCrisisandRoleofUkraine.pdf.

World Bank (2009a), Global economic prospects. Commodities at the crossroads, The World Bank, Washington, D.C.

World Bank (2009b), Economic Growth, Inequality and Poverty: Social Mobility in Egypt between 2005 and 2008. Draft Policy Note.

WFP (2008) "Draft Vulnerability Analysis and Food Subsidy Program in Egypt. A Panel

Survey", October, Word Food Program.

Zatonski WA, Willett W. (2005), "Changes in dietary fat and declining coronary heart disease in Poland: population based study", British Medical Journal; 331: 187-8.

Annex 1

CGE model for Egypt

The computable general equilibrium model designed for this study is based on a class of CGE models that has been extensively applied to developing countries to study the impact of different policies on growth, economic structure and performance, and income distribution. In particular, the model draws on the work of Dervis et al (1982), Lofgren (2001), Lofgren and El Saïd (1999) and Kheir-El-Din et al (1996).

Model Basic Structure

The core model is basically neoclassical; however, it includes some structuralist features that depart from the Walrasian paradigm providing a better representation of the Egyptian economy. Such features include the assumption of mark-up-pricing for subsidized food products and accordingly fixed domestic prices for such products. The model also assumes imperfect substitutability between goods traded internationally and domestic output. Structuralist features extend to the factors' markets where existence of wage rigidities and immobility of capital and land are assumed. Regarding labour, the nominal wage rate is assumed to be determined exogenously according to institutional mechanisms. This corresponds to the Keynesian assumption of short-run predetermined nominal wages implying the presence of involuntary unemployment. Thus, the model deviates from the neoclassical full employment assumption and allows for the presence of unemployment which is a major feature characterizing labour markets in Egypt. National Keynesian unemployment is endogenously determined as the difference between the aggregate labour demand from activities and from the exogenously given aggregate labour supply. Due to the assumption of perfect labour mobility and the fact that most of the unemployed workers in Egypt are new entrants to the market and therefore cannot be assigned to any sector, the model does not solve for sectoral unemployment rates and determines only the national rate of unemployment (Kheir-El-Din et al. 1996).

Capital and land stocks are assumed to be sectorally fixed implying factor immobility. This assumption is compatible with the short-run nature of the model where capital may be regarded to be less mobile than labour (Dervis et al. 1982). Further, immobility implies that rental rates will differ across sectors reflecting the fact that capital is heterogeneous i.e. a unit of capital has a different composition across sectors. For both factors, the model assumes

full utilization with flexible rental rates. Due to market forces, rental rates are determined endogenously in each sector. However, the neoclassical assumption regarding all factors to be paid according to their marginal productivity is retained. Incorporating both neoclassical and structuralist characteristics allows the model to be classified as a "Neoclassical - Structuralist" model.

The model is of a short-run nature implying that the results of the comparative static analysis experiments may be interpreted as a relatively short-run equilibrium effects to an exogenous policy change. Regarding its time dimension, the model is static. It solves equilibrium values in one period. For each period it generates a set of relative prices of commodities and factors that equate supply and demand in the corresponding markets. The model also allows for the determination of consumer price index indicating inflation.

Social Accounting Matrix as data base for the model

A Social Accounting Matrix (SAM) for Egypt for 2006/2007 was constructed as data base for the model. An updated input-output table was estimated for this year on the basis of the input-output table for 2002/2003, which was constructed at the Ministry of State for Economic Development (MOED). This table consists of 22 sectors producing goods and services.

The updated table was adjusted to conform to the objectives of the study, therefore more details on production and consumption of food were included and non-food manufactured products were grouped in one sector. Disaggregation of sectors explicitly reveals subsidized food products.

Model Characteristics

The model disaggregation by institutions, factors and activities is shown in Table A1.1.

Table (A1.1): Disaggregation of factors, institutions and activities

Actors	Elements
3 Factors of production	Labour, Capital and Land
22 sectors (activities and commodities)	Wheat, paddy rice, maize, other crops, oil crops, vegetables and fruits, sugar crops, bovine, chicken and other meat.
Agricultural products**:**	Subsidized bread, subsidized flour, other subsidized food products (including subsidized processed rice, edible oil, and sugar), non-subsidized rice, non-subsidized processed food.
Processed food**:**	Crude oil and extractions, beverages and tobacco, textiles, chemicals and petroleum products, other industries.
Manufacturing products**:**	Construction and electricity, hotels and restaurants, transportation and communication and other services.
Services**:**	
13 Institutions:	10 households (rural and urban disaggregated by quintile), companies, government and Rest of the world.

Characteristics of food products as modelled in the 2006/07 SAM are highlighted in Table A1.2.

Table (A1.2): Characteristics of food products according to SAM 2006/07

Characteristics	No private consumption	No imports	No exports	No imports no exports (non-tradable)
Sectors	Paddy rice, sugar crops, oil crops and crude oil	Paddy rice, sugar crops, subsidized bread, non-subsidised rice, construction, and hotels and restaurants	Paddy rice, sugar crops, subsidised bread, subsidised flour, subsidised food.	Paddy rice, sugar crops, subsidised bread.

Economic decision making is modelled as an outcome of decentralized optimization by producers and consumers. Concerning production, producers (activities) are assumed to maximize their profits subject to technological constraints. Technology in each sector is specified by a constant elasticity of substitution (CES) production function combining primary

factors: labour, land and capital. Like most CGE models, intermediate input demands are modelled as fixed input-output technology (Leontief function). Table (A1.3) presents the main features of the model.

Table (A1.3): Model Features

Feature	Treatment
Time frame	Static with updating specific exogenous variables and parameters to be solved in various years other than the base year
Theoretical basis	Neo-classical structuralist
Production technology	Primary factors: CES Intermediate inputs: Leontief functions
Household consumption demand	LES (Linear expenditure system)
International prices	Exogenous
Import demand	Endogenous (through CES domestic supply function)
Export supply	Endogenous (through CET production function)
Export demand	Downward sloping
Export transformability and import substitution	Imperfect
Land and capital	Fixed supply with endogenous rental rates
Labour	Fixed wages with endogenous national unemployment rate

Finally, a set of macro equilibrium conditions are imposed to close the model. They present the closure rules of the model or the system constraints that the whole economy must satisfy. For each market a variable should be specified through which its' movements equilibrium is brought between the supply and demand sides. These are divided into nominal and real system constraints. Nominal constraints cover markets for commodities and factors of production whereas real ones refer to government, rest of the world and savings-investment accounts.

For all commodities, price flexibility achieves equilibrium in each market. However, imports and domestic output of subsidized food products are the only exceptions. For subsidized

food products prices are assumed to be fixed and mark-up pricing serves to clear the market. In the case of imports, supply is infinitely elastic at fixed world import prices. The quantity supplied adjusts to equal the quantity demanded. Therefore, imports' domestic market is the only market that clears through quantity adjustment.

Market equilibrium for immobile factors of production (land and capital) is achieved through changes in their relevant prices. In the labour market, existence of Keynesian unemployment is assumed. Fixed labour supply is set to be equal to the sum of sectoral labour demand, fixed government labour demand and unemployment. The national level of unemployment serves to achieve equilibrium in the labour market in the sense of equating national fixed labour supply with aggregate labour demand.

Table (A1.4) summarizes the way in which real and nominal constraints in the model are brought into balance. For example, the balance between savings and investment is achieved by setting total investment to be equal to the sum of domestic and foreign savings. This means that total savings determine the level of investment in the model. Moreover, foreign savings endogenous variations are assumed to achieve the balance of the current account given the assumption of fixed nominal exchange rate.

Table (A1.4): Closure rules

Constraint	Equilibrating variable
Goods markets (perfect competition)	Prices (except for the domestic output of subsidized food where equilibrium is reached via variations in the mark-up pricing variable and imports where the market adjusts through changes in the quantity supplied).
Factor markets	Capital and land: prices (full employment) Labour: national unemployment rate
Government account	Government savings
Current account	Foreign savings
Savings-investment	Investment (savings driven model)