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Impact of Russia and Ukraine on the international price formation and the EU markets - A Model based analysis

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Abstract

This paper examines the effect of the future developments of Russian and Ukrainian agricultural sectors and their impact on the world market prices for arable crops. Employed in the study is AGMEMOD, a partial equilibrium economic model of EU agriculture at the Member State level that has been extended by Russia and Ukraine to gain quantitative insights. Vital for the project has also been the integration of an endogenous world market price module including a stylized Rest of the World (ROW) model. In Russia and Ukraine, there is a strong focus on plant production in general and on grain based animal production; Russia and Ukraine are mostly net-exports of those products. Under the baseline, in Russia prices for crops and oilseeds are below the world market price level. In general, the removals of the trade measures in Russia and Ukraine are projected to induce world market prices of cereals and oilseeds to decline.

Keywords: Partial equilibrium model, price formation, Russia, Ukraine

1. INTRODUCTION

In the recent years, Russia and Ukraine became big players in the international trade of agricultural products, which is true for the demand and supply side. On the demand side there is a surge in imports of animal products while, on the supply side, the countries have turned into large grain exporter. Between 2000 and 2009, the combined Russian and Ukraine imports of milk products and meat products, respectively, doubled in volume, and grew by more than five times in value. In contrast, the combined exports of cereals increased by 18 times in volume, and 26 times in value. Changes for both countries, a turnaround since the Soviet period, were driven by sloppy demand and production in the domestic animal sectors due to tremendous cuts in subsidies which, in turn, reduced dramatically cereal and oilseed domestic use. Recently the tenuous position of both countries with the respect to the international trade was demonstrated. In 2010, due to forest fires and a record drought, Russia lost one third of its crop harvest, as around 10 million hectares of agricultural land were devastated or burnt. Therefore, the country put a ban on grain exports starting on 15 August 2010 lasting until July 2011, which had important effects on trade of agri-food commodities. Subsequently, the Ukraine, also introduced quotas for its wheat exports that were damaged by severe droughts as well.

Imports from Russia and the Ukraine to the EU are normally limited, so export bans have only limited direct impacts on the EU domestic cereal markets. However, the bans have added to instable world grain markets. Thus, the EU, indirectly, is affected by the grain export bans of

its neighbours Russia and the Ukraine. Simulations of Russia's and Ukraine's domestic agricultural and of trade policies allow to study impacts on the agricultural markets of both countries, and, via their trade, on the world markets prices of different agricultural commodities.

To assess the impact, we apply the AGMEMOD model for policy simulations are concerning different trade decisions for the Russian and Ukrainian agricultural sectors. AGMEMOD is an econometrically estimated, dynamic, multi-product partial equilibrium model, which has been built up as a system that integrates 27 EU Member State models and neighbouring countries like Russia and Ukraine. Based on common country model templates, it covers country specific characteristics in order to reflect a country's specific agricultural situation. A separate region covers the Rest of the World and the world market price formation based on its supply and demand.

The paper is structured as follows: A first section deals with the characteristics of the Russian and Ukrainian agricultural, and thus, providing insights into the future potentials of production and trade of these regions. In a second section the model applied to drive world market price effects is described. Details on the simulations and the results can be found in section 4 and 5 while concluding remarks are presented in section 6.

2. FOOD AND AGRICULTURE IN RUSSIA AND UKRAINE

In the Russian Federation, agriculture is mostly concentrated in the European part of the country, in areas with the highest population density, only a short distance to the major domestic markets. In 2009, Russian agriculture accounted for about 10% of total employment and 4% of national GDP. Agri-food exports comprise around 7% of total exports, remaining quite stable since 2000, while the share of agricultural imports decreased from 20% to 15% during the last decade. However, the Russian Federation is not self sufficient with food products, and its negative trade balance of agricultural products accounts for 8 billion $ mostly due to low production of meat and dairy products. Russian production structure is quite divers. In 2008, peasant farms contributed 21% to Russia's total grain production, 29% to sunflower seed and 10% to sugar beet output while corporate farms produced the remainder. In contrast, household plots produced respectively 84% and 71% of the country's potato and vegetable supplies and, in addition, these plots also produced 52% of the milk and 43% of the meat, with the rest coming from corporate farms. Here the contribution of peasant farms is negligible.

Around half of arable land in Russia is occupied by grains and oilseeds. Due to market regulations, grain areas were reduced in 2010 in favour of oilseed areas. Hence, at the same time, Russia has a huge potential of arable production with about 44% of fallow land. The main oilseed is unambiguously sunflower seed. Although livestock production has been strongly supported since 2006, policy measures had only limited impact on production. The number of dairy cows is declining and the number of total cattle as well. During the last years pig production has been increased driven by governmental supports of live animal purchases. But, with the end of the support program, the trend was reversed in 2010. Poultry production displays a stable growth still supported by new government program opened for 2010-2012. The

sheep and goat sectors have grown and benefitted from the subsidies during the past years, as well.

Next to the EU, Russia is the second biggest world producer of oats and it is one of the biggest sunflower seed and rye producers in the world. Meat is the main livestock product which, in turn, has been dominated by poultry since 2008. The highest growth is observed in the wheat and sunflower seed sectors while the fastest growing livestock sector is poultry. Productivity growth is very slow. Sharp fluctuations suggest a big affect of weather variations and, thus, a need for better risk management. It also indicates potential of yield improvements.

Given Russia's relatively static domestic production and growing consumer demand, its agri-food imports are substantial and are still increasing. One-third of US exports of frozen poultry and two-third of Brazil's pork exports go to Russia. The Russian Federation also imports considerable amounts of dairy products. Supported by the appreciation of the Ruble, imports become more affordable while those exchange rate changes undermine the competitiveness of non-energy exports. Despite this, Russia developed from a grain importer to the third largest grain exporter after EU and USA, a development strengthened by the slacking feed demand. Almost all produced sunflower seeds are used domestically. Despite the implemented Tariff-Rate Quotas (TRQs), meat continues to be Russia's major agri-food import product.

Tight supplies and the growing demand increased all agricultural prices in Russia, nearly reaching the world market price levels. Due to the implementation of diversified agricultural policies, the production is mostly affected by ad-hoc or regional policy measures. Russian state policy in general is more oriented towards consumers to provide a reasonable food price level. Support transfers to agriculture fell to 2% of the GDP in 1994, but rebound and increased with the launch of a two-year National Project in 2006 and its prolongation with a five-year state program in 2008–2012. Focus of the support is to improve agricultural efficiency. Market price support is mostly enacted by border measures, while input subsidies and output payments are the dominant policy instruments in Russia (Table 1). Applied domestic measures are mostly input subsidies, including interest rate subsidies, both at federal and regional levels. Prominent border measures are the export taxes on cereals and sunflower seed, a variable import duty for raw sugar, as well as TRQs for meat. During the surge of food prices in 2006–2007, the Russian government applied additional measures to limit in vain exports and to control food prices. In 2009 the state enterprise "United Grain Company" was established in order to enable the state to govern the domestic grain market by exports restrictions. On August 15, 2010, Russia imposed an export ban on grains as a reaction on the significant drop of its harvest due to drought and forest fires. It was removed in July 2011.

In the Ukraine, agricultural land occupying 69% of the Ukrainian territory mostly located in the Eastern part of the Ukraine where land productivity is higher. With shares of 17% and 7%, the Ukrainian agricultural sector contributes significantly to its respective national employment and GDP, although its importance declined between 1990 and 1999 by over 50%

for the output share, respectively 25% for the GDP share driven by macroeconomic instability, sharp agricultural policy reversals and ad hoc interventions.

In the Ukraine around two thirds of arable land is planted with grains and oilseeds. With respect to area, the most important grains are soft wheat, barley and maize. Like in the Russian Federation, the main oilseed in the Ukraine is sunflower seed; however, rapeseed and soya are cultivated as well. Since the transition period, the total dairy cow number has decreased and herewith has induced a reduction in the cattle herds. In contrast, the number of pigs and sheep fluctuate from year to year and is remaining at the level of the year 2000, while, at the same time, poultry production has been increased more than four times. Agricultural output of the Ukraine was 153.8 billion UAH (14.1 billion €) in 2009, with crops accounting for 60% and livestock for 40% of the output value (in prices of 2005). Grains, potatoes and vegetables comprise more than two thirds of the crop output value. In the animal sectors meat output prevails whereas, in particular, poultry dominates since 2006.

Table 1: Border and budgetary payment measures of Russian and Ukrainian agricultural policy in 2010

	Russia	**Ukraine**
Production quota	-	Sugar beets (A quota)
Direct Payments (per tonne/per ha/per animal)	Poultry, sheep, pigs, rape seed, flax	Pigs, poultry, flax, sugar beet
Input subsidies (fuel, seeds, fertilizers)	Crops	Crops
Credit support	Various sectors	Various sectors
Intervention purchases	Cereals	Cereals
Minimum price		Milk, cattle, pigs, sheep
Import duties (euro/kg)	Beef, pork, poultry	Milk products, tomatoes
Import tariffs (% rate)	Pork, poultry	Cereals, oilseeds, vegetable oils, oilseed meals, beef, pork, sheep meat
Quota tariff rate (tonnes)	Beef, pork, poultry, sugar	Sugar
Export duties	Cereals	Oilseeds
Export quota (tonne)	Cereals	Oilseeds, sunflower seed, sunflower oil, wheat, barley, maize, rye

Source: OECD, WTO, World Bank.

During the transition period, Ukrainian agricultural production withered, which was driven by the decline in real per capita income during the transition period. Effects in animal production were higher due to the higher income elasticities. The lower meat production affected the feed demand, which dropped as well. Hence, the grain production recovered in 2000-2002. Besides Russia and EU-27, the Ukraine is one of the biggest sunflower seed producer and one of the major vegetable oils exporters. In the Ukraine commercial sales of agricultural production amounted between 77% for oilseeds and 10% of vegetables; respectively between 52% for meat and 42% for milk in animal production.

Quantities available for export and export capacity increased significantly in the Ukraine due to the extension of the required infrastructure, such as the export capacity of its commercial seaports. Accordingly, the Ukrainian grain export shares rose significantly between 2002 and 2009. In 2010, the Ukrainian grain production was around 32 million tons. In the agri-food sector, Ukraine's main trading partner is the EU, both in terms of import and export. CIS countries and the Middle East countries absorb an increasing share in Ukraine's exports as well, while Russia's role as the third main export destination is decreasing. The Ukraine's agricultural imports come mainly from the EU, as well as from Russia and other CIS countries.

The Ukraine provides one of the lowest levels of producer support among transition economies. The main domestic policy measures include input subsidies through tax concession, credit availabilities for agricultural producers and direct payments based on animal numbers and agricultural areas. Domestic market support measures are mostly minimum prices. Poultry, beef, pig, and sugar are the most protected sectors. Export quotas are being removed, though indicative prices and export taxes still restrict a few selected products. For live cattle, mutton, sheep, for example, the Ukraine applies minimum export prices. In 2008, the Ukraine acceded to the WTO, which led to a considerable change in its trade policy measures. WTO commitments capped customs duties at bound rates ranging between 0% and 30%. Thus, import tariffs decreased, especially for poultry, sunflower, and sugar. In 2010, however, the Ukraine, as the world's biggest barley exporter, introduced quotas for its grain exports that were damaged by severe droughts. The measure was removed again in 2011.

Given the importance of the Russian and Ukrainian agricultural sectors, a removal of trade barriers will influence global agricultural commodity markets as well as domestic agricultural markets. This paper provides a model based quantitative assessments of the possible implications of a removal of trade barriers on these markets. AGMEMOD (AGricultural MEmber States MODelling) has been used to conduct this quantitative analysis.

3. AGMEMOD AND SPECIFIC MODELS OF RUSSIA AND UKRAINE

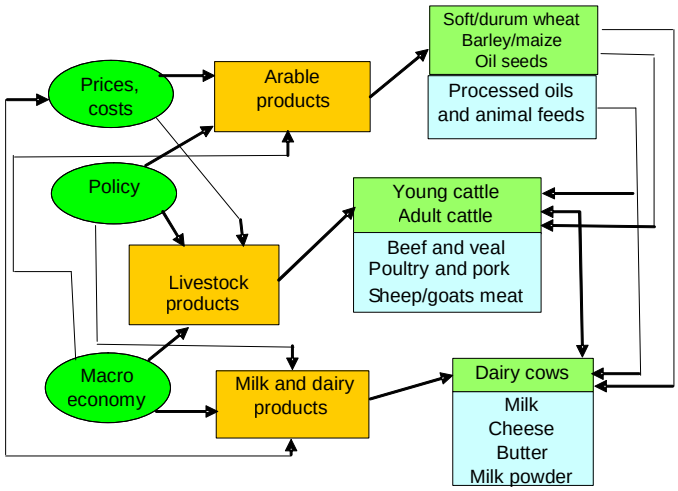
AGMEMOD is a dynamic, partial, multi-country, multi-market equilibrium modelling system, which can provide significant detail on the main agricultural sectors in each EU Member State. The system has largely been econometrically estimated at the individual Member State level but it produces aggregated EU results as well. In the cases where estimations were neither feasible nor meaningful, the model parameters have been calibrated. The individual country models contain behavioural responses of economic agents on the agricultural markets due to changes in prices, policy instruments and other exogenous variables. These econometrically estimated, country specific, economic models of agricultural commodity markets provide a sound basis for analysing impacts of a future accession of current candidate countries. Commodity prices adjust so as to clear all the markets considered, while projections for supply, use and prices of commodities are projected and simulated to a 10 years' time horizon. To solve the modelling system in prices, all commodity supply and utilisation balances at both the EU and Member State levels must hold and take into account the international trade

and other commitments of the EU. Projections are validated by standard econometric methods and through consultation with experts who are familiar with the agricultural markets in the regions under study. Both review types may result in a revision of model structures, parameter estimates and underlying policy assumptions. (Salamon et al., 2008). For Russia and Ukraine, detailed country models are set-up requiring detailed sets of agricultural policy instruments and data on agricultural markets forming the AGMEMOD version 5.0, which can be used to gain the impacts on agricultural markets of changes in policy measures.

3.1. Russian and Ukraine country models within AGMEMOD

The Russian and the Ukrainian country models developed as part of this project consist of different supply and demand sub-models for commodities contributing the majority of the agricultural output in Russia and the Ukraine. In general, cereal and oilseeds with their derived products (oils and cakes), sugar beet, potatoes, livestock (cattle, beef, pig meat, poultry, sheep and goats), and dairy products (raw milk, butter, milk powder and cheese) have been represented (see Figure 1). Hence, in the following we will put a special focus on arable crops. For each of these commodities, production as well as supply, demand, trade, stocks and domestic prices have been derived by econometrically estimated or calibrated equations.

Figure 2: Linkages between commodity markets in Russian and Ukrainian models



Source: own compilation

To ensure that the results of the Russian and Ukrainian AGMEMOD models make economic sense and are coherent from a policy perspective, they have been validated by standard econometric methods and through consultation with the partners, who are familiar with agricultural markets in Russia and the Ukraine. From this perspective, the performance of the Russian and the Ukrainian commodity market models in determining the baseline projections had primacy in the evaluation of the modelling system's performance. The resulting baseline outcomes were used to evaluate the trade scenario analysis conducted.

3.2. Specification of the endogenous price formation

In developing and estimating the Russian and Ukrainian AGMEMOD models the maintenance of analytical consistency has been achieved via the adherence to the agreed common AGMEMOD templates. To overcome the limitations of an exogenous world market price, the AGMEMOD model has been extended with an endogenous price formation on the world market. To achieve this objective, a new regional module covering the Rest of the World (ROW) has been introduced in a stylized way; parameters of the behavioural supply and demand equations have been synthetically derived from other existing partial equilibrium models, such as ESIM and FAPRI. The ROW's production and consumption is determined directly by world prices without any wedges between world and producer or consumer prices. Forming the AGMEMOD Version 5.1 it determines the net-trade position of all regions covered in the model, including the ROW aggregate[1].

The approach applied for the AGMEMOD builds on the representation of price formation at national level. AGMEMOD distinguishes between key market price countries and those countries where domestic prices are derived from changes in the key market price countries and world market prices do not affect the level of domestic prices directly. Econometrically estimated price formation equations allow depicting domestic price formation affected by the level of prices in the key market country and degree of self sufficiency on the domestic market.

With this presentation it is possible to illustrate the development of domestic prices within a price band equivalent to import (cif) and export (fob) prices. In a net export situation of both the key market country and the individual country it is expected that the domestic price in the individual country will be at the lower export price level. In a situation, however, where both the key market country and the individual country are net importers domestic price would determined by the import prices. At last, if the net trade position of key market country differs from the individual country, the level of domestic prices in the individual country will be in between the upper import price and lower export price level. Related to the above described model extension additional data will be compiled which, in principle, covers commodity balance data for the ROW; however, the size of the ROW may vary per case. To deal with this feature, the updated AGMEMOD database 5.1 will not include data for the ROW, but on the World total. In turn, the ROW database, which will differ per study, will be automatically calculated in an internal data pre-process depending on the selected regions to be analyzed.

Compared to previous AGMEMOD version this model version covers total global supply and demand for all commodities presented in the model. Consequently the new model version is a closed model where via endogenous price formation demand and supply for each product has to be in equilibrium at market clearing prices. For those products which are modelled as tradeable goods market clearing is reached at global level with a variable (single) world market

1. [1] Due to its internal structure, AGMEMOD's dairy sector hinders the implementation of the above described approach thus the dairy sector currently can not reflect effects of an endogenous world market price formation.

price. This approach does not mean that prices are the same all over the world, but national prices for traded goods determined by changes in world prices are, at the same time, also affected by domestic policies and market conditions. Prices for those products which not traded internationally are only determined at national or regional level, and may differ considerably between different regions.

Table 2 provides an overview of those equations which are related to the representation of the Rest of the World aggregate and to model the price transmission between world and the key-price country markets. World market prices are modeled in USD (Eq. 1) and we assume that the 'domestic' market price in ROW (PDrow,it) is equivalent to the level of world price (PWit). For most markets in the EU AGMEMOD defines key market countries, e.g. France for soft wheat. World prices are affected either by changes in exchange rates of national currency against the USD or by trade policies (Eq. 3-4). Domestic prices in key market countries are affected by national policies, import and export prices of traded goods but also by the self sufficiency ratio (SSR) of the total EU markets. Market prices in non-key markets are derived from the domestic market prices for the corresponding key market country and the SSR in the individual country. Also national policies of the specific country may affect the level of domestic prices in non-key countries. Domestic price formation for non EU Member States modelled in AGMEMOD is directly determined by world prices (equation 2-4). Net exports are generally defined as total supply minus total use (Eq. 6). For tradable commodities, the market clearing condition requires world net exports to equal zero (Eq. 7), and for non-tradable goods, domestic markets must clear (Eq. 8). For some products specific quantity trade policies like export subsidy limits and TRQs apply. Since these quantities cannot be allocated unambiguously to individual member states of the EU, the trade share for all products is modelled for the EU layer and not for individual members.

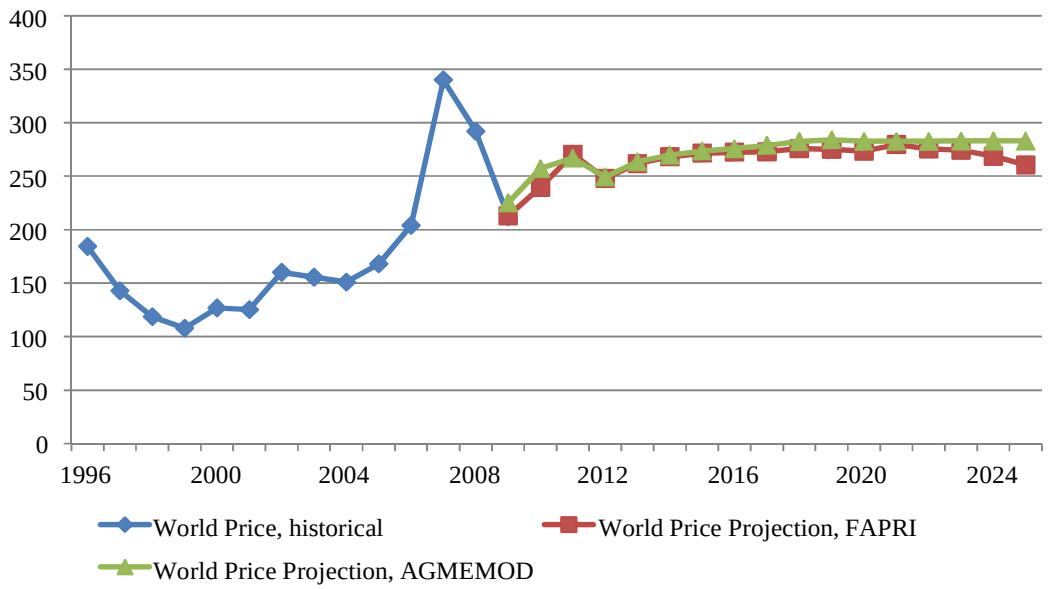
Table 2: Overview of Price Equations in the extended AGMEMOD model

Price equations			
(1) World market price	PW_{it}	=	$PD_{row,it}$
(2) Export price in key market country	$PX_{k,it}$	=	f (PW_{it}/$exrate_k$, Quant Subs $Exp_{k,it}$)
(3) Import price in key market country	$PM_{k,it}$	=	f (PW_{it}/$exrate_k \cdot (1+tar\_ad_{c,it})$, $TRQ_{k,it}$)
(4) Domestic price in key market country	$PD_{k,it}$	=	f ($PX_{k,it}$, $PM_{k,it}$, $SSR_{EU,it}$, nat $pols_k$)
(5) Domestic price in non-key market country	$PD_{nk,it}$	=	f ($PD_{k,it}$, $SSR_{nk,it}$, nat $pols_{nk}$)
Market balances			
(6) Net exports	$NETEXP_{c,it}$	=	$SUPPLY_{c,it} - USE_{c,it}$
World market clearing			
(7) World market clearing condition	$\sum_c NETEXP_{c,it}$	=	0
Domestic market clearing			
(8) Domestic market clearing condition for non tradeables	$SUPPLY_{c,nt}$	=	$USE_{c,nt}$

Remarks: it = tradeable good, nt = non-tradeable good, c = country, k = key market country as presented in AGMEMOD, nk = non-key market country as presented in AGMEMOD.

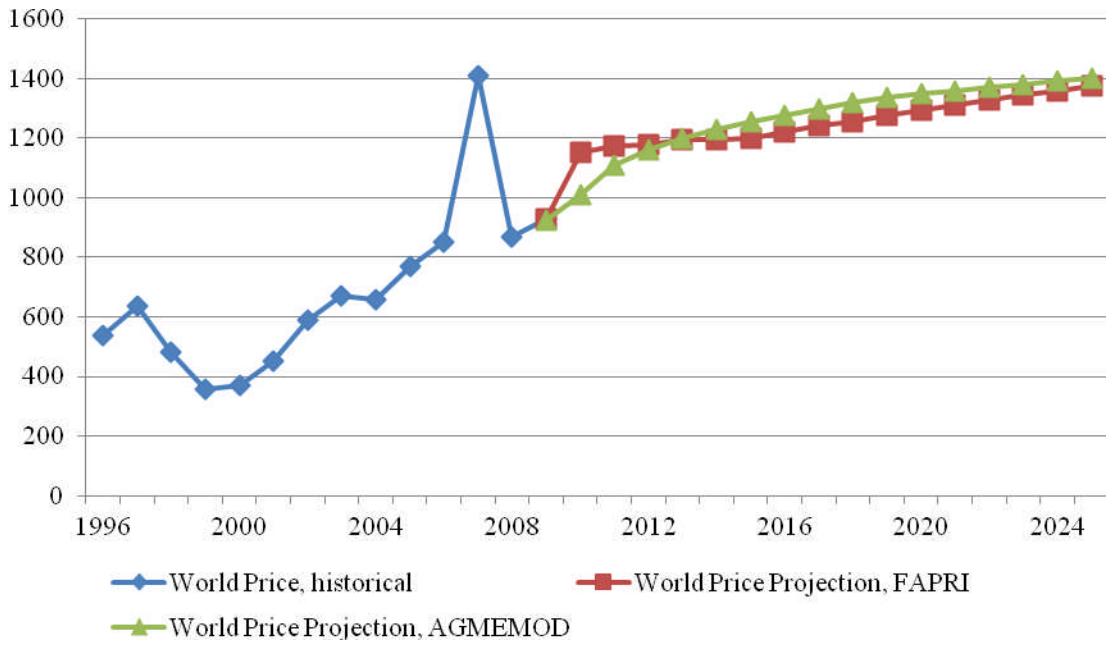
For this study, the most recent FAPRI world price projections were used to calibrate the development world market prices in the AGMEMOD baseline. All calibration in AGMEMOD has been achieved in adjusting shifters of ROW supply and demand; parameters explicitly modelled in AGMEMOD have not been affected by this calibration procedure. Figure 2 and Figure 3 illustrates the fit of the world price projection with AGMEMOD for soft wheat and rape seed.

Figure 2: World Market Price for Soft Wheat, USD/ t, 1996-2025



Source: AGMEMOD version 5.1 (2012).

Figure 3: World Market Price for Rapeseed Oil, USD/ t, 1996-2025



Source: AGMEMOD version 5.1 (2012).

Therefore, the period between 2009 and 2011 replicates observed price in both models. For most years between 2012 and 2023 the relative difference in world prices in AGMEMOD and FAPRI is small.

Oilcake prices, however, are expected to decline over time which is mainly due to the fact that oilseed markets are driven by oil demand for food and biodiesel and not by demand for the co-product cake.

4. SIMULATIONS AND RESULTS

4.1. Simulations

Projections are generated from year 2007 to 2025 based on quantitative and qualitative assumptions on macroeconomic and other variables reported. For this paper three separate scenarios for the baseline and the trade scenarios are developed. Under the baseline, the key assumption is that the current agricultural and trade policy in the EU27, the Ukraine and Russia remain in place, as far as it has been politically decided. For the EU it means that the Health Check and dairy quota abolition are simulated, and also trade measures remain unchanged. However, under the trade scenarios Russia respective Ukraine existing trade measures from January 1, 2015 on are removed. All other domestic policy measures remain unchanged, both under the Baseline and the Trade scenarios.

4.2. Baseline results for Russia and Ukraine

In the following baseline description we focus on the cereal oilseed complex as these commodities are the most important one for Russia and Ukraine.

The Russian grain market is influenced by state purchasing and selling of intervention stocks. In cases of strong export demand export taxes are applied for wheat, barley, rye and oilseeds. Due to high transaction cost and quality differences, Russian cereal and oilseed markets remain still partly separated from the world markets. In Russia, prices for all cereals and oilseeds are projected to remain below the world price level (see Table 3). As demand for arable crops is to increase prices are projected to increase; however, they do not completely reach world market levels, although the differential to the world market will be diminishing. Growth in the yields per hectare is projected to be small for crops due to relative low prices which will limit the input use. All crops are subjected to considerable weather driven yield variations, which are expected to reoccur in the projection period. Under the baseline, a shift from the area planted with cereal to oilseed area is projected to be driven by stronger international demand for oilseeds. Because of similar requirements concerning soils, wheat is affected the most. Russia has a huge potential for growth as about 44% of the agricultural area is fallow land, though it requires some investment before it will be turned into productive land again. Since 2001, Russia has turned from a grain importer to the third largest grain exporter behind the EU and USA. Although self-sufficiency rates decline in the course of the projection period, Russia is expected to remain self-sufficient for the main cereals as well as for sunflower seeds and rapeseeds. A downward trend for cereals is due to projected increase of domestic demand for feed. Although policy intends to stimulate the livestock and dairy sector, the incentives are too low, thus growth in domestic feed demand is limited. Hence, the growth rates in the poultry sector are considerable; and to a lower extend in the pork sector as well, leading to higher feed demand of wheat and barley.

Table 3: Selected Baseline results for Russia and Ukraine

			Russia			Ukraine	
		2010	2025	2010-2025 % change pa	2010.0	2025.0	2010-2025 % change pa
Total grains							
Production	1,000 ton	91031.3	83667.0	-0.01	43316.8	55283.3	0.02
Area	1,000 ha	43167.5	35655.3	-0.01	15053.0	14546.9	0.00
Domestic Use	1,000 ton	75273.5	83512.7	0.01	27546.1	35980.7	0.02
Soft wheat							
Production	1,000 ton	53128.1	49390.3	0.00	14910.5	17960.5	0.01
Area	1,000 ha	23383.8	19315.7	-0.01	4940.0	4820.0	0.00
Yield	ton/ha	2.3	2.6	0.01	3.0	3.7	0.01
Domestic Use	1,000 ton	42359.5	47326.0	0.01	11489.6	11734.8	0.00
Price	euro/100kg	247.4	150.5	-0.03	59.6	26.5	-0.05

Net-trade	1,000 ton	10768.6	2064.3		3420.9	6225.7	
Barley							
Production	1,000 ton	18760.8	16835.2	-0.01	12319.7	15696.1	0.02
Area	1,000 ha	9675.5	8001.5	-0.01	4368.7	4305.8	0.00
Yield	ton/ha	1.9	2.1	0.01	2.8	3.6	0.02
Domestic Use	1,000 ton	15128.3	16676.5	0.01	7173.4	10610.7	0.03
Price	euro/100kg	224.7	138.8	-0.03	65.3	33.9	-0.04
Net-trade	1,000 ton	3632.5	158.7		5146.3	5085.4	
Maize							
Production	1,000 ton	6037.8	5707.5	0.00	11884.9	14826.2	0.01
Area	1,000 ha	1710.4	1412.8	-0.01	2590.0	2478.1	0.00
Yield	ton/ha	3.5	4.0	0.01	4.6	6.0	0.02
Domestic Use	1,000 ton	5330.5	7080.4	0.02	6568.7	11449.1	0.04
Price	euro/100kg	316.7	196.5	-0.03	65.1	28.5	-0.05
Net-trade	1,000 ton	707.2	-1372.9		5316.2	3377.1	
Total oilseeds							
Production	1,000 ton	8151.8	13142.7	0.03	9724.3	11251.7	0.01
Area	1,000 ha	7568.6	11305.1	0.03	6701.2	5598.4	-0.01
Domestic Use	1,000 ton	8330.3	13504.5	0.03	5007.0	5041.0	0.00
Rapeseed							
Production	1,000 ton	803.7	1230.7	0.03	2177.4	3312.7	0.03
Area	1,000 ha	717.6	980.7	0.02	1379.8	1332.6	0.00
Yield	ton/ha	1.1	1.3	0.01	1.6	2.5	0.03
Domestic Use	1,000 ton	696.2	1097.9	0.03	428.6	568.1	0.02
Price	euro/100kg	781.8	435.5	-0.04	192.6	73.4	-0.06
Net-trade	1,000 ton	107.5	132.8		1748.9	2744.6	
Sunflower							
Production	1,000 ton	6437.0	10543.3	0.03	6311.4	6319.6	0.00
Area	1,000 ha	6015.9	9208.1	0.03	4466.8	3390.1	-0.02
Yield	ton/ha	1.1	1.1	0.00	1.4	1.9	0.02
Domestic Use	1,000 ton	5913.5	10004.5	0.04	3940.2	3670.5	0.00
Price	euro/100kg	511.4	364.1	-0.02	96.0	47.1	-0.05
Net-trade	1,000 ton	523.5	538.8		2371.2	2649.1	

Source: AGMEMOD version 5.1 (2012).

Under the baseline, the Ukrainian cereal prices follow the respective world market prices; however, in general, they are only half of the levels at the EU and world markets as Ukraine is a large crop exporter of crops. Therefore, Ukrainian domestic prices are not affected by the high import tariffs. During the severe droughts in 2006, 2007 and 2010, the government reduced import tariffs levied on cereals and introduced an export quota for cereals this dampened the impact on the domestic cereal and oilseeds prices. Total grain areas harvested and especially oilseed areas are projected to increase due to a cultivation of additional areas not been planted so far. Concerning oilseeds, in particular, the land is allocated to rapeseed and soybeans. The rapeseed is intended for the EU biodiesel industry, while the additional soybean area is projected to increase the protein-availability to satisfy increasing feed demand. Following observed trends, expected further yield growths are due to the use of higher-yielding seed

varieties and the cultivation using better irrigation possibilities. Highest increases are projected for maize; hence, all yields are subject to significant variations due the weather conditions. Under the baseline, the Ukraine remains self-sufficient for total cereals and oilseeds, although the rates are projected to decline in the course of time reflecting the increased feed demand for cereals. The rise in the self-sufficiency rate for rapeseeds is caused by the demand of the world biodiesel industry; Ukraine is a large net-exporter of soft wheat, maize and barely, with production growth mostly driven by yield increases and partly by an increasing cultivation. Higher feed use reflects expected increases in beef and poultry production and lead to a declining net-export position under the baseline.

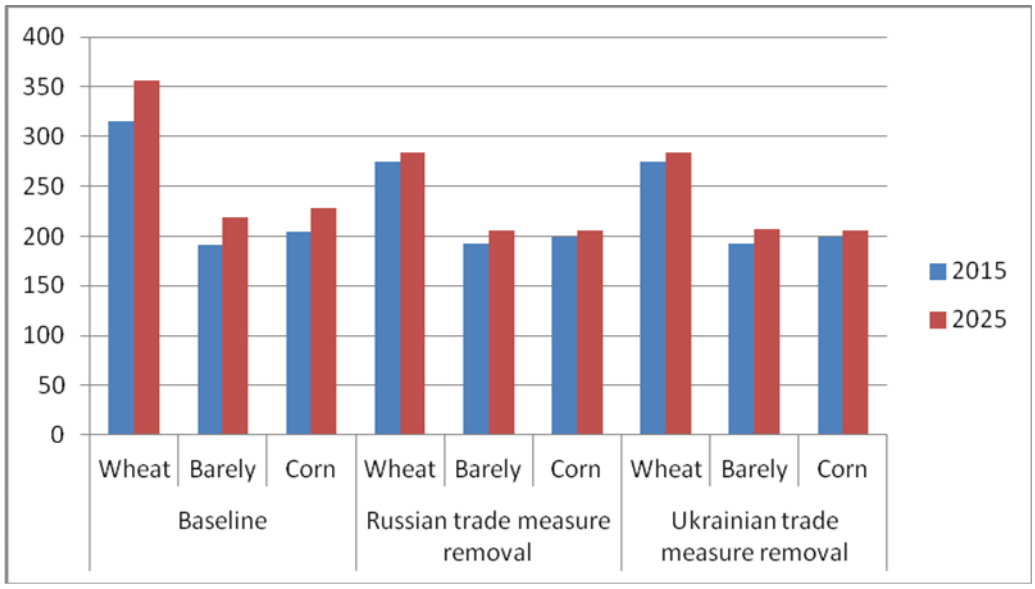
4.3. Results of the Trade Scenarios

Under the Trade scenarios Russia and Ukraine, respectively, will remove their trade measures. As under the baseline, under the trade scenarios outcomes will not reflect on the still ongoing Doha Development Round debate of the WTO. In the following, results deal with the impact these trade measure removals have on the world market prices, and in particular the effects on the arable crops, cereals and oilseeds respectively, are regarded.

Russia and Ukraine are significant producers of arable crops, both export considerable amounts of cereals and oilseeds, although in the case of Russia the net-trade declines over the projection period. Agriculture in both regions faces quality problems and transaction inefficiencies, so their domestic prices do not reach the world market price levels. A removal of trade measures will lead to increased exports to the world market affecting the world market prices negatively. This concerns cereals and oilseeds alike; however, the impact on the wheat price is significantly higher than for the other cereals (see Figure 4). Probably this is due to the displacing of other cereals by wheat, a process which is limited by the higher production requirements of wheat. Quiet low effects occur for barley. Immediately after the removal the barely price even increase slightly. In the course of time, the impacts on the world market prices are even getting higher, as the net-trade of Russia and Ukraine are projected to grow. This development does not consider any production growth due to productivity gains based on higher input. When the impacts of the trade measure removal of both countries are compared, the results are quite comparable.

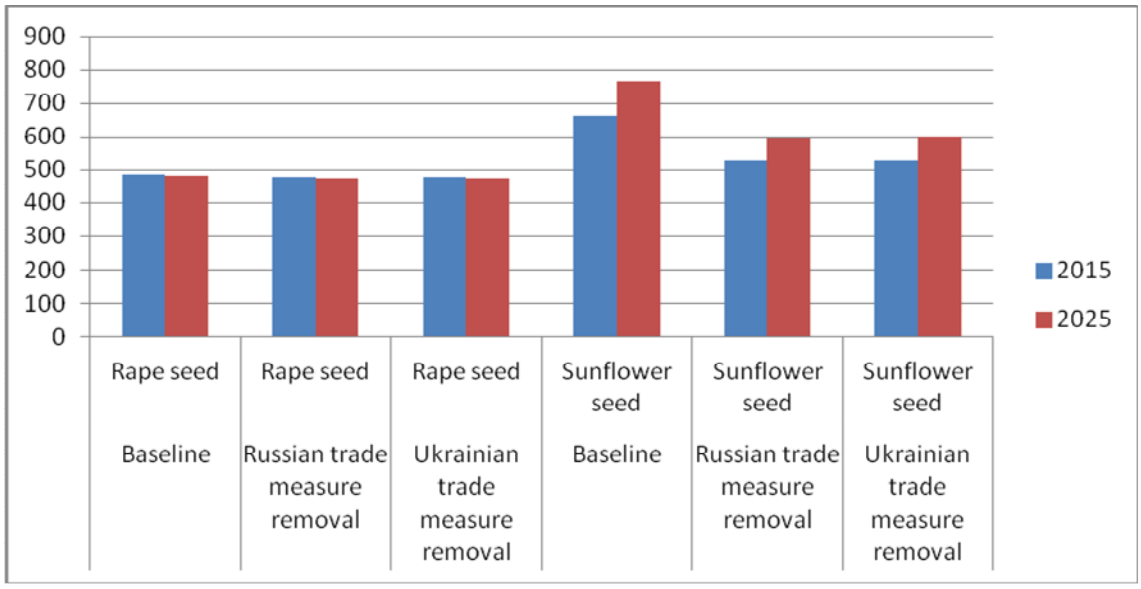
Quite comparable to the outcome for cereals are the effects on the world market for oilseeds. As in Russia and Ukraine only sunflower seed and rape seed are major oilseeds those two products are regarded in the Figure 5, but effects on the products are quite different. As trade measures do not play a significant role in the case of rapeseed their removal does not have any real impact on the world market prices of rapeseed although both countries are net-exporters of rapeseed. In contrast to rape seed, impacts with regard to sunflower seeds are quite high. In both cases, world market prices decline with the removal of the trade measures. When compared to cereals and to a much lower extent rape seed the simulations do not indicate that the prices differences will increase over time.

Figure 3: World Market Price for cereals under different scenarios, USD/ t, 2015 and 2025



Source: AGMEMOD version 5.1 (2012).

Figure 6: World Market Price for oilseeds under different scenarios, USD/ t, 2015 and 2025



Source: AGMEMOD version 5.1 (2012).

5. CONCLUDING REMARKS

This paper examines the effect of the future developments of Russian and Ukrainian agricultural sectors and their impact on the world market prices for arable crops. Employed in

the study is AGMEMOD, a partial equilibrium economic model of EU agriculture at the Member State level that has been extended by Russia and Ukraine to gain quantitative insights. Vital for the project has also been the integration of an endogenous world market price module including a stylized Rest of the World (ROW) model.

In Russia and Ukraine, there is a strong focus on plant production in general and on grain based animal production; however, Russia and Ukraine are mostly net-exports of those products. Under the baseline, in Russia prices for crops and oilseeds are below the world market price level and the price EU level. Furthermore, the assumption that future policy variables remain as currently defined means that the relationship between supply and demand on the Russian and Ukrainian market does not change fundamentally.

In general, the removals of the trade measures in Russia and Ukraine are projected to induce a decline in world market prices of cereals and oilseeds. Due to the more pronounced measures in the case of wheat and sunflower seed the effect on the prices are here highest. With rising production in Russia and Ukraine due to price increases the impacts may be higher in the course of the simulated period. These results also indicate that export measure may also affect world market prices significant.

As concerns all simulations and projections, the results are based on several explicit and implicit assumptions. To the extent that such assumptions, ex post, are found to have been ill-founded, the model outcome and the policy implications will be affected. The conditional nature of all projections should be recalled by users of model applied in policy analysis and otherwise. In this context, following points are to be emphasised:

- although the latest available projections concerning the macroeconomic variables (especially GDP growth, population, inflation rate, exchange rates) have been used, in face of the debt crisis and the Stability and Growth Pact considerable uncertainties remain with respect to the future economic prospects.
- energy prices are not explicitly represented in AGMEMOD. Although EU Bioenergy Mandates have been considered in AGMEMOD's baseline, their real extent is heavily influenced by the economic environment and by what approach they will be implemented in the different Member States. For Russia and Ukraine no bioenergy strategy was considered.
- weather conditions are always assumed to be normal, and thus, reflect long-run averages. As weather varies constantly from the average, prices will fluctuate the projected levels, depending on the weather deviation. Impacts of weather condition is considerable in Russia and Ukraine.
- With respect to the future development of the agricultural sector in Russia, one has to account for the potential that Russia may invest more heavily in the sector in future. Also Ukraine provides scope for agricultural growth potential; however, in both countries institutional improvements are needed;
- Explicit policies in the ROW are not modelled.

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