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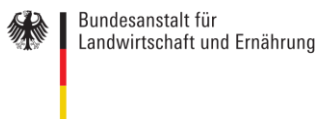
# PRICE DAMPING AND PRICE INSULATING EFFECTS OF WHEAT EXPORT RESTRICTIONS IN KAZAKHSTAN, RUSSIA, AND UKRAINE

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# **Price Dampening and Price Insulating Effects of Wheat Export Restrictions in Kazakhstan, Russia, and Ukraine**

## **Abstract**

This study analyzes the domestic price effects of export controls for all 3 KRU countries during the 2007/08 as well as the 2010/11 commodity price peaks. We develop two indicators to measure the strength of the export controls' price dampening and price insulating effect within a non-linear long-run price transmission model. Our analysis comprises 11 cases of export controls, distinguishing regional price effects within Russia. We observe heterogeneity in the dampening and insulating effects of the export controls among the KRU and among the regions of Russia. Our model identifies the strongest domestic price effects during the export ban in North Caucasus (Russia), which were transmitted to Central, Black Earth and Volga regions by wheat flows from North Caucasus. For Ukraine the strongest price effects are observed during the export tax system 2011. The price effects identified for the 2006/7, 2007/8 and 2010/11 export quota systems are comparable to those observed for Central, Black Earth and Volga region. Contrary, our results do not identify any price effects of the export ban in Russia on Ural and West Siberia. We also do not find price decreasing effects during the export ban in Kazakhstan and the export tax system in Russia 2007/8. Concluding, the effectiveness of export controls in the KRU to dampen and decouple domestic wheat prices from world market price developments is generally rather limited.

Keywords: export controls, market integration, price transmission, crisis policy, Russia

## **1 Introduction**

During the recent price booms on world agricultural markets in 2007-2008 and 2010-2011, many countries aimed to insulate their domestic markets from price developments on the world market and to stabilize domestic prices through trade policy interventions. Exporting countries implemented export controls by decreasing or even banning exports, and importing countries reduced or even completely eliminated import restrictions (Martin and Anderson, 2012). Trade-oriented policy measures were the most widely spread policy response to high world market prices, and aimed to curb domestic food price inflation. For example, during the 2007-2008 food crisis, roughly 37 countries implemented export barriers and 59 countries removed import restrictions (FAO, 2008).

Among these countries were the three large grain exporting countries of Kazakhstan, Russia and Ukraine (KRU), all of which were members of the Former Soviet Union. The importance of the KRU for world grain exports has increased substantially in recent years and is expected to increase further. The KRU countries have large areas of abandoned agricultural land which could

be re-cultivated, requiring substantial investments in the grain sectors. Kazakhstan implemented a wheat export ban in 2008, Russia wheat export taxes in 2007-2008 and an export ban in 2010-2011, and Ukraine established a wheat export quota system in 2006-2008 and 2010-2011.

This study expands previous studies by analyzing the domestic price effects of export controls for all 3 KRU countries during the 2007/08 as well as the 2010/11 commodity price peaks. Our study is unique in capturing the price effects for 6 regions within Russia. We develop two indicators to measure the strength of the export controls' domestic price damping and price insulating effect within a price transmission model framework. Differing from previous studies we choose a rather simple non-linear model framework which allows to be implemented in the context of multiple regime changes and regimes of short duration. Our analysis comprises 11 cases of export controls aiming to shed further light on the factors determining the strength of the export controls' domestic price effects.

The theoretical background of domestic price effects of export controls is explained in section 2 which is followed the description of the observed wheat price developments in the KRU in section 3. Section 4.1 addresses the estimation approach and presents the two indicators to identify the domestic price effects of export controls. The data base of our analysis is described in 4.2 and estimation results are presented. Results are summarized and conclusions are drawn in section 5.

## **2 The economics of export controls**

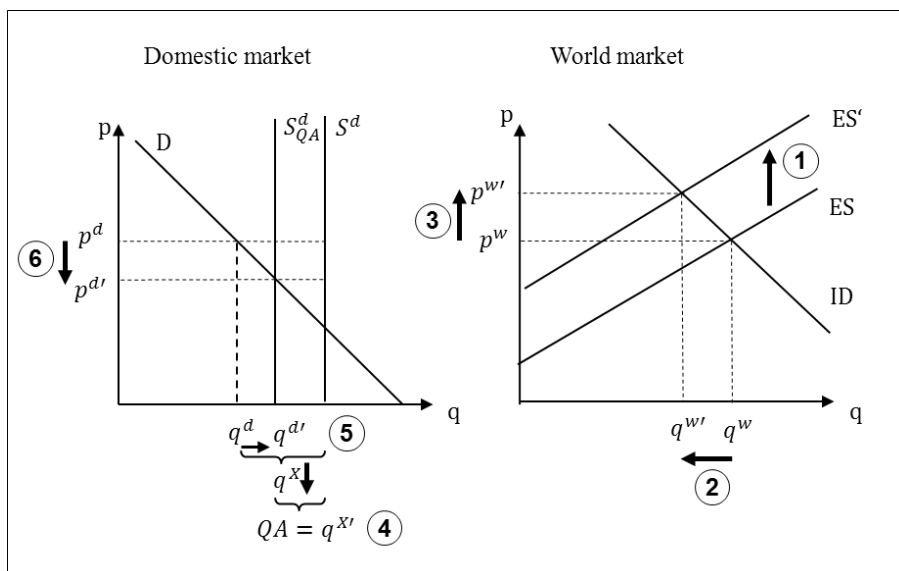
Export restrictions aim to decrease the level of the price prevailing on the domestic market and to insulate the domestic price from world market price developments. Export controls may also have accidental feed-back effects on the world market price level and may induce additional price volatility. In this study we focus on export controls' domestic price effects.

By decreasing the export quantity, export controls increase domestic supply thereby decreasing the price on the domestic wheat market. In general, the price effects of an export quota system, an export tax and even an export ban could be similar, depending on the size of the quota and the level of the tax. If the size of the export quota is almost zero, and the export tax is very high, both instruments can even become prohibitive.

The price level effects induced by export controls can be theoretically explained within a market diagram. As an example, Figure 1 illustrates the domestic price and quantity effects of an export quota within a partial equilibrium framework. Suppose that we observe a situation on the world wheat market similar to 2006, when adverse weather conditions led to a relatively low wheat harvest in Ukraine and Australia (Grueninger and von Cramon-Taubadel, 2008) reducing world wheat export supply. This can be depicted graphically by the movement of the export supply (ES) of wheat on the world market from ES to  $ES'$  (Figure 1, 1). Thus, the amount of wheat traded on the world market decreases from  $q^w$  to  $q^{w'}$  (2), and that the world market price increases from  $p^w$  to  $p^{w'}$  (3). If Ukraine implements an export quota the size of QA, Ukrainian wheat exports decrease from  $q^x$  to  $q^{x'}=QA$  (4). Suppose that the export controls are implemented at the beginning of the harvest; thus, the domestic supply  $S^d$  is fully inelastic, and the domestic supply of wheat increases from  $q^d$  to  $q^{d'}$  (5). As a result, the domestic price level

decreases from  $p^d$  to  $p^{d'}$  (6). The more exports are reduced compared to the open trade regime, the larger the increase of supply on the domestic market, and the more the domestic price should decrease. In general, if export restrictions are imposed after the farmer has already decided on his production, the domestic supply elasticity is rather low and thus the damping domestic price effect is relatively strong compared to the case when the size of production might be adjusted.

**Figure 1: Domestic price level effect of an export quota**



Note: Labels in figure 4 are explained within the text.

Source: Own illustration.

Besides damping domestic prices, export controls aim to separate domestic prices from world market price developments temporarily to prevent that high prices prevailing on the world market are transmitted to the domestic market. If arbitrage activities become restricted or even prohibited, domestic prices become to some degree insulated from world market price developments, and the importance of domestic factors for domestic price determination increases, whereas the influence of world market price developments decrease. The domestic price damping and the price insulating effect can both be identified within a price transmission model capturing the transmission of price changes from the world market to the domestic market (see section 4).

### 3 Wheat export restrictions in the KRU and domestic price developments

This section provides an overview on the export controls implemented in the KRU and describes induced price and export developments observed on their domestic wheat markets, given the theoretical considerations in the previous section.

Export restrictions were introduced in Kazakhstan during the food crisis of 2007-2008, whereas trade remained open during the 2010-2011 international commodity price peak. In light of the high world market prices and strongly increasing wheat exports, the government introduced a grain export licensing system in September 2007. Though, grain and bread price increased significantly in September 2007. Therefore, the Kazakh government formed a stabilization fund

for wheat intervention and signed a Memorandum of Understanding with grain traders proclaiming that domestic wheat prices should not be increased until the new harvest. When domestic wheat prices continued to increase strongly, the government introduced an export ban on April 15, 2008 which remained in force until September 1, 2008. Figure 2 shows regionally differentiated wheat producer prices for the provinces South Kazakhstan, North Kazakhstan, East Kazakhstan, Pavlodar, Almaty, Akmola, Kostanay and Aktobe. Figure 2 further shows that instead of wheat, traders exported wheat flour during the export ban. However, the export ban was not successful in damping domestic wheat prices. Rather, Kazakh wheat prices further increased during the export ban although world market and Russian wheat prices decreased. One exception is Almaty province where wheat prices remained constant. For some provinces the wheat price was temporarily even higher than the wheat world market and the domestic Russian wheat price.

Wheat exports in Russia were limited by an export tax of 10 % that was established in November 2007. The export tax was increased to a prohibitive level of 40 % in December 2007. The government announced in February 2008 that export taxes would be prolonged for three months until July 2008. Also, wheat exports to other CIS<sup>1</sup> countries were prohibited in April 2008. Finally, export taxes were removed in July 2008. Russia again restricted wheat exports during the 2010-2011 commodity price peak. In August 2010 wheat exports became forbidden by an export ban. The Russian government extended the export ban first in February 2011 until July 2011. In March 2011 the government publicly considered its extension up to September 2011. Nevertheless, the export ban was cancelled in July 2011.

Figure 4 shows regionally differentiated wheat prices for the regions Black Earth, Central, North Caucasus, Ural, Volga and West Siberia of Russia. It becomes evident that the export tax in Russia was only partially successful in damping domestic wheat prices. In particular, early 2008 domestic prices increased in all of the 6 regions beyond the world market price level. In contrast, domestic wheat prices were continuously lower than world market prices during the export ban 2010/11, but the strength of the price damping effect varied significantly among the districts. Black-Earth, Volga and Ural were the districts which were most severely hit by the droughts in 2010 whereas grain production in North Caucasus was even higher than the previous year (Figure 6). Usually, grain exports are supplied to the world market via ports in North Caucasus; therefore grain flows are observed from the major grain production regions of Russia towards North Caucasus. Contrasting, substantial amounts of wheat were traded within Russia during the wheat export ban 2010/11. In particular, North Caucasus exported substantial amounts of grain to Central, Black Earth, Volga and Ural, and West Siberia exported grain to Ural, Volga and Central district. Table 1 gives the interregional grain transport quantities by rail during the export ban. It should be pointed out that in addition to rail transport, grain is transported by truck. Therefore, it can be assumed that the interregional grain export quantities were actually even higher. Table 1 also gives the average wheat producer price level prevailing in the different districts, and interregional rail transport costs for North Caucasus and West Siberia during the export ban.

**Table 1: Interregional grain export quantities and transport costs Russia**

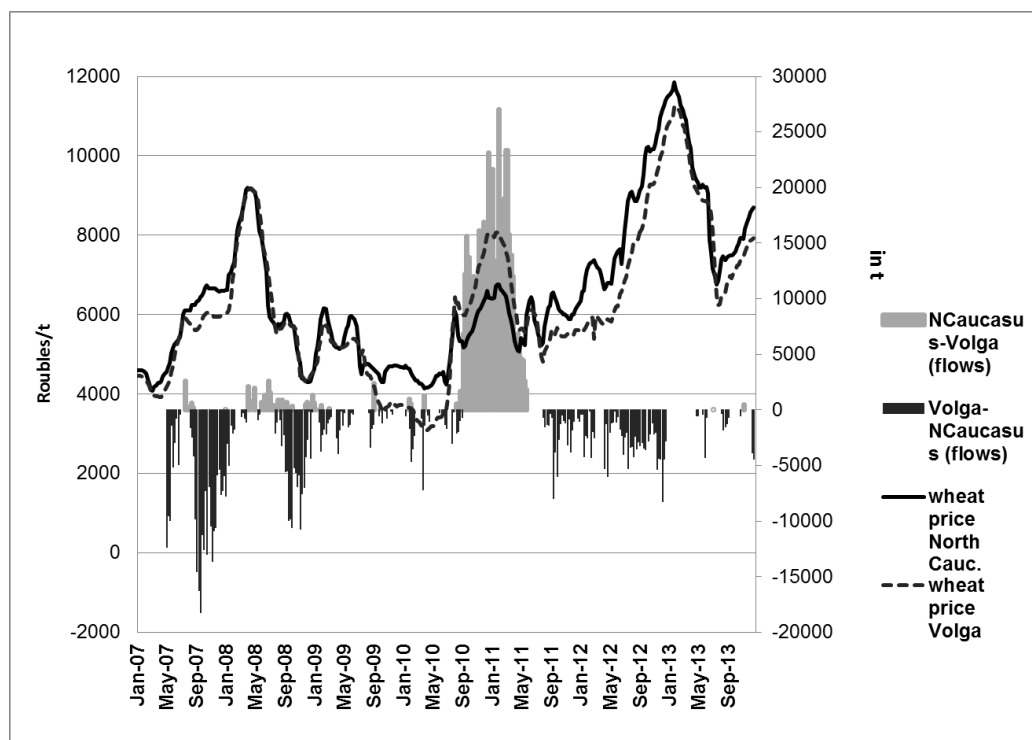
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<sup>1</sup>Commonwealth of Independent States (CIS). The CIS is comprised of nine members (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan and Uzbekistan), one participating member (Ukraine) and one unofficial associate member (Turkmenistan).

	North Caucasus	West Siberia	Black Earth	Central	Volga	Ural
<b>Regional trade</b>						
<b>Exports North Caucasus to... (in t)</b>	2,494,506 (total)		534,336	1,205,324	453,936	300,910
<b>Exports West Siberia to... (in t)</b>		1,180,827 (total)		73,107	101,444	1,006,276
<b>Total imports</b>			534,336	1,278,431	555,380	1,307,186
<b>Transport costs &amp; prices</b>						
<b>Exports North Caucasus to ...</b>			626	780	688	982
<b>Transport costs exports from West Siberia to ...</b>			(1355)	1311	1228	1073
<b>Avg. wheat producer price during export ban</b>	5,951	6,358	6,698	6,711	6,802	7,306

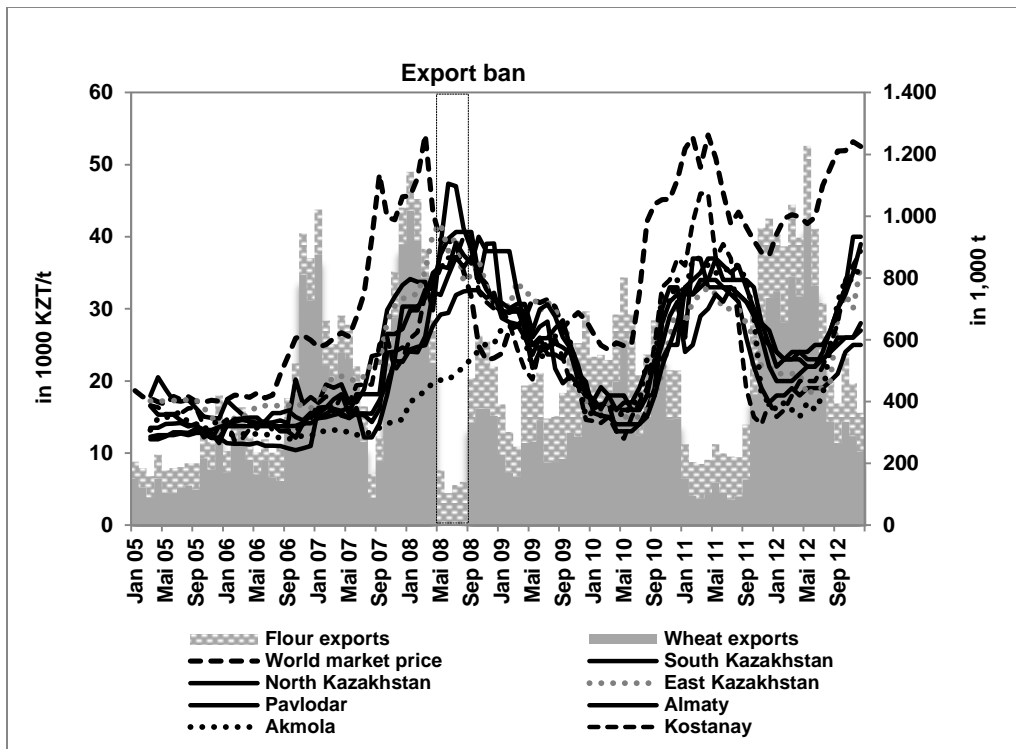
Sources: Rosstat 2013.

**Figure 2: Interregional grain trade flows North-Caucasus-Volga, 2007-2013**



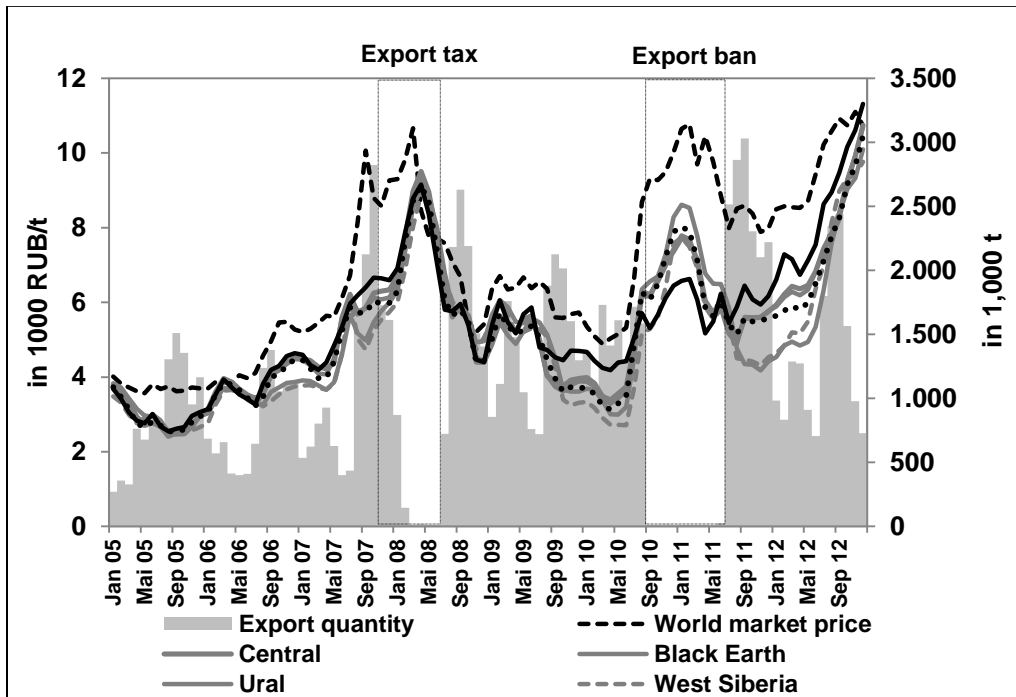
Sources: Rosstat.

**Figure 3: Development regional wheat prices and exports Kazakhstan**



Sources: APK-Inform (2013), GTIS (2013), HGCA (2013).

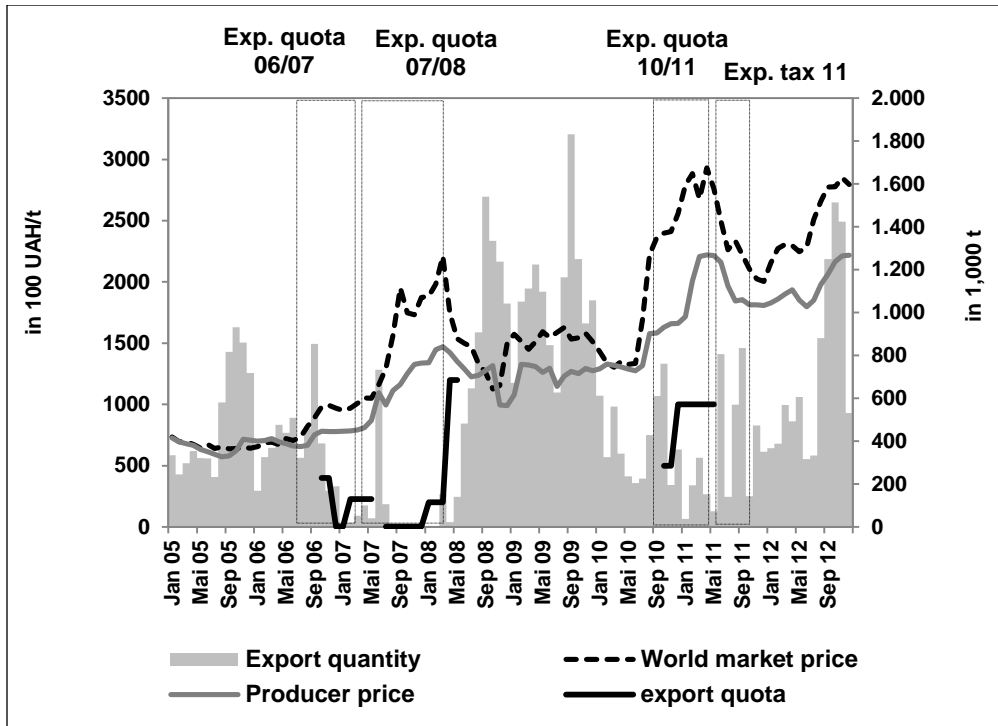
**Figure 4: Development regional wheat prices and exports Russia**



Sources: GTIS (2013), HGCA (2013), Rosstat (2013).

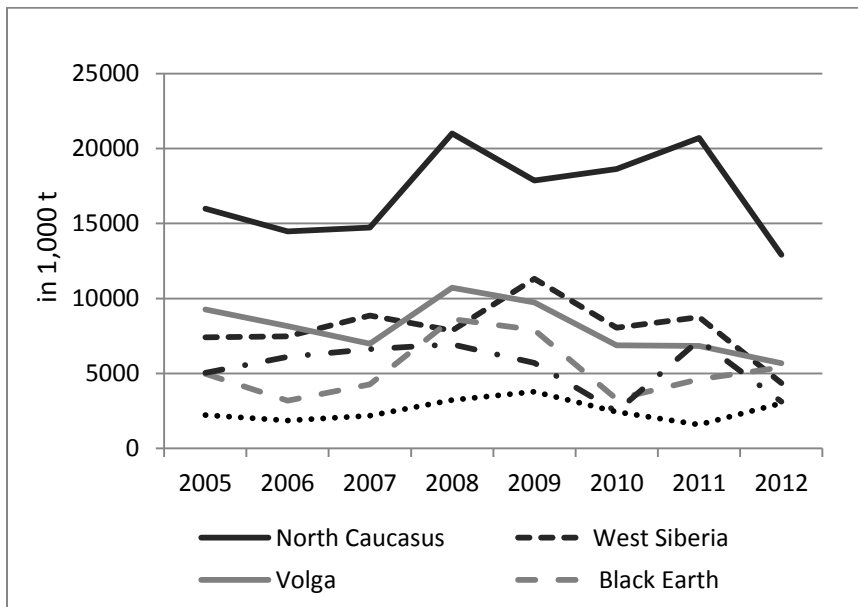
**Figure 5: Development prices and exports Ukraine**





Sources: APK-Inform (2013), GTIS (2013), HGCA (2013), Rosstat (2013).

**Figure 6: Regional grain production development in Russia**



Sources: Rosstat (2013)

An export quota system was implemented in Ukraine during both world market price peaks within a governmental licensing system (Figure 5). Export quotas varying between 3,000 tons

and 1.2 million tons were in force from October 2006 to April 2007 and again from June 2007 until May 2008, as well as from October 2010 until May 2011 (Figure 6). In addition, Ukraine implemented wheat export taxes of 9 % in July 2011, which were removed in October 2011. The size of the quota was changed repeatedly and the quota system was extended multiple times. For example, the export quotas were set at 400,000 tons for November and December 2006, and then reduced to 3,000 tons, valid from January to July 2007. An increase of the quota to 230,000 tons was announced in February 2007, but it was never realized. Further, the export quota was abandoned in May 2007, but reintroduced at the prohibitive level of 3,000 tons in July 2007. In March/April 2008 the size of the quota was increased to one million tons, and finally the export quota system was removed in May 2008, when an extraordinarily large harvest was expected.

The three export quota systems implemented in Ukraine 2006/7, 2007/8 and 2010/11 greatly differed. The size of the export quota was lowest 2006/07 whereas it was highest during the 2010/11 export quota system. In 2010/11 wheat export amounted about 40% of the exports of the previous year. The large export quota in spring 2008 could not be utilized by the traders because the quota was issued before it was approved by the parliament (Wikileaks). Further, according to traders' information, the distribution of the export quotas in 2010 was not transparent. A state company received the majority of the licenses, while foreign trade companies could not obtain any licenses in a legal way. Thus, it can be expected that the export quota systems' effects on the domestic wheat prices differ.

Although theory suggests that wheat export restrictions decrease the domestic wheat price, domestic wheat prices in the KRU generally continued to increase in times of export controls, given that the world market price further increased simultaneously. This indicates that domestic wheat prices remained related with the wheat world market price, and that the price and that price changes on the world market continued to be transmitted to the domestic market. Empirically, we observe domestic wheat prices in the KRU increasing in parallel to increasing world market prices during export controls, but rising to a lesser extent than when trade was freely possible.

The domestic price and the world market price might remain related even in times of export controls due to several factors. One reason might be black trade despite export restrictions which keeps domestic prices related to the world wheat market price. A second reason might be the temporary nature of export controls. Traders know that export restrictions will be removed in the near future, and therefore the world market price remains highly relevant information. In particular, world market prices might influence traders' decision if they should sell their wheat today at relatively low domestic prices compared to the world market price or take some risk and keep it in storage expecting that they will be able to sell the wheat on the world market at higher prices in the future. And third, and as a proposition for the previous argument, due to internet price data sources available to farmers in the KRU, domestic grower prices might even directly be related with the world market price developments through the information on world market prices, in the absence of physical trade, and in the absence of a wheat export price.

#### **4 Quantifying domestic wheat price effects**

#### 4. 1 Estimation approach

The domestic price effects of export restrictions can be identified and quantified within a price transmission model that captures the price difference and the transmission of price changes from the world market to the domestic market. According to the law of one price (Fackler and Goodwin, 2001), prices in two spatially separated markets, in the context of this study the world and a domestic wheat markets, differ at most by trade costs, given that the markets are efficient and functioning well. We conjecture that wheat export controls induce a regime change in the long-run price equilibrium relationship, and thus that two long-run price equilibria exist.

We use the following regime-switching model to capture the influence of export controls on price transmission:

$$p_t^d = \begin{cases} \alpha^f + \beta^f * p_t^{wm} + u_t^f & (\text{free trade regime}) \\ \alpha^r + \beta^r * p_t^{wm} + u_t^r & (\text{restricted trade regime}) \end{cases} \quad (1)$$

with  $p_t^d$ ,  $p_t^{wm}$  the domestic and the world market price,  $\alpha^f$ ,  $\alpha^r$  the intercept parameters of the free trade and the restricted trade regime,  $\beta^f$ ,  $\beta^r$  the long-run price transmission parameters and  $u_t^f$  and  $u_t^r$  the residuals of the free trade and the restricted trade regime, respectively. The intercept represents the price difference or price margin between the two price series, and the slope parameter gives the corresponding long-run price transmission parameter. We hypothesize that 1) the long-run price equilibrium under export controls is characterized by a larger value of the intercept parameter, corresponding to the domestic supply effect, and 2) by a smaller value of the slope parameter, reflecting the price insulating effect, compared to the free trade regime.

We use the available information on export restrictions to determine the regime classification.

Whenever exports are restricted temporarily, observations are attributed to the “restricted trade regime”, whereas all observations belong to the “free trade regime” otherwise. We distinguish two export control regimes for Russia, differentiating between the export tax system and the export ban, whereas four export control systems (export quota 06/07, export quota 07/08, export quota 10/11, export tax 11) are accounted for in the regime-switching model regarding Ukraine. We are estimating the regime-switching models by splitting the dataset according to the distinguished regimes and estimate the regime-specific long-run equilibrium relationships following Engle and Granger (1987)<sup>2</sup>. Supposed the domestic and the world market prices are cointegrated, the OLS regression yields a consistent and highly efficient (e.g. Stock 1987) estimates of the long-run equilibrium parameters. It should be pointed out that our model approach is characterized by an instantaneous switch from the “free trade” to the “restricted trade regime” and does not capture a gradual transition process.

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<sup>2</sup> Alternative estimation methods include the short-run dynamics in the model to estimate the long-run equilibrium parameters. For example, Johansen (1988) suggests a fully specified error correction model which is estimated by Maximum Likelihood, or Banerjee et al. (1986) favour an unrestricted error correction model accounting for the short-run dynamics. For a comparison of methods see Gonzalo (1994).

It can be assumed that although wheat export controls were implemented abruptly, some traders might have already reacted before their implementation. Traders' price behaviour is influenced by expectations. Thus, traders expecting further increasing world market prices and that export restrictions will be implemented<sup>3</sup>, might be willing to buy wheat only at lower prices (relatively to when trade were open) although export controls are not yet implemented. Due to political uncertainty, expectations about the exact date of the implementation of export quotas and the quota size differs among traders, traders' price expectation vary, the point in time at which traders change their price behaviour might differ as well which might be reflected in a gradual transition process.

We measure the influence of the export controls by two indicators: 1) We assess the price insulating effect by calculating the % change in the long-run price transmission elasticity in the restricted trade regime compared to the free trade regime as

$$\text{Price insulating effect} = \frac{\beta^f - \beta^r}{\beta^f} * 100 \quad (2)$$

assuming that the change in the long-run price transmission elasticity is resulting from export controls. As it was pointed out in section 2, if arbitrage becomes restricted, price changes on the domestic markets become increasingly determined by domestic factors, and less by changes of the world market price.

2) As our second indicator we estimate the overall effect of export controls on the domestic price level. We assume that under free trade conditions, the difference between the world market and the domestic market price is equal to trade costs, regardless of the level of world market prices. Thus, we implicitly assume that high and low world market prices are transmitted to domestic prices at the same degree. When exports become restricted, the difference between the domestic and the world market price may change. We assess the price level effect of export restrictions as follows

$$\text{Price level effect} = \left( \sum_{tf=1}^n \left( \frac{p_{tf}^{wm} - p_{tf}^d}{p_{tf}^d} \right) / n \right) - \left( \sum_{tr=1}^m \left( \frac{p_{tr}^{wm} - p_{tr}^d}{p_{tr}^d} \right) / m \right) \quad (3)$$

with  $tf=1, \dots, n$  and  $tr=1, \dots, m$  comprising all observations belonging to the free trade (f) regime and the restricted trade (r) regime, respectively. Basically, the price level effect of the export controls is calculated as the average change in the difference between the world market and the domestic market price in the restricted trade regime when compared to the free trade regime. If we find the price difference increasing (meaning that the price level effect is positive), we follow that the domestic price level was damped by the export controls.

Alternatively, the domestic price effect could be estimated as the change in the price margin in the restricted trade regime compared to the free trade regime according to

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<sup>3</sup> For example, when the wheat export ban was implemented by Russia in August 2010, the establishment of an export quota system by the Ukrainian government was immediately discussed by the media in Ukraine. The wheat export quota was announced and implemented in Ukraine not until the beginning of October 2010.

$$\text{Price margin effect} = \alpha^r - \alpha^f \quad (3)$$

The disadvantage of this indicator is that if the intercept parameter is not statistically significant it cannot be estimated.

We assume the stronger the price level and the price margin effect, the higher is the export controls' effectiveness.

## 4.2 Data and estimation results

We apply the regime-switching model of long-run price equilibrium to weekly wheat ex warehouse price series of milling wheat of class III for Russia and Ukraine (2005-2012) comprising 417 observations. Our analysis of the monthly wheat producer price series for Kazakhstan (2005-2012) comprising 96 observations (APK-Inform, 2013, Rosstat, 2013) is of linear nature and is restricted to the free trade regime. A reliable estimation of the parameters for the restricted trade regime is not possible based on 5 monthly observations (the export ban lasted only 5 month). In our analysis we include district-specific data for Russia for the districts North Caucasus, Black Earth, Central, Volga, West Siberia and Ural. We use the FOB price of wheat (French soft wheat, class 1) in Rouen, France (HCGA) as the relevant world market price<sup>4</sup>. We find our data series integrated of order 1 and all price pairs cointegrated (Table 2). The results of the price transmission analysis are presented in Tables 3-5. It presents the parameters (intercept and slope) characterizing the long-run price equilibrium during free trade regime, when trade is not restricted by temporary export controls, compared to when trade is closed and the amount of exports is limited temporarily. Besides, the price insulating effects, the domestic price level effect and the price margin effect of export controls are presented whenever the respective parameters are statistically significant at least at the 10% level. However, since our data series are not stationary, and the model is estimated in levels, standard error estimates might be biased and the t-statistics are not reliable. This has to be accounted for when interpreting the indicators<sup>5</sup>.

In general, our results suggest that the wheat markets of the districts of Russia are strongest integrated with the world market price in times of free trade. The long-run price transmission parameters vary between 0.98 (North Caucasus) and 0.86 (West Siberia) for Russia, with the exception of Ural (0.77), followed by Ukraine with 0.82. In contrast, the Kazakh wheat market integration is lowest, with a long-run price transmission parameter varying between 0.72 (Kostanay) and 0.42 (South Kazakhstan); compare tables 3-5.

In the case of Russia we focus on the domestic price effects of the export ban (2010/11). We find strongly heterogeneous price effects among the regions. Since the intercept parameter is not statistically significant in the export ban regime for Volga, West Siberia and Ural, we base our

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<sup>4</sup> We would prefer an FOB wheat price at one of the Black Sea ports as the world market price. However, a continuous price series is not available due to export controls in Russia and Ukraine. Therefore we use a French FOB price which is governed by the price developments of the MATIF. According to traders, MATIF prices are increasingly relevant for wheat trade in the Black Sea region.

<sup>5</sup> In the future we will correct the standard errors of the long-run equilibrium parameters by e.g. using Feasible Generalized Least Squares (Cochrane and Orchard 1949) or according to Engle and Yoo (1991) or Parks and Phillipps (1988).

assessment on the indicators for the price insulating and the price level effect. The price insulating effect is strongest in North Caucasus amounting -60% and weakest in Volga district with -19%. For West Siberia and Ural the price transmission elasticity increases. Price damping effects are identified for North Caucasus, Central, Black Earth and Volga which were strongest in North Caucasus and lowest in Volga. A price damping effect is also observed for West Siberia but not for Ural when compared to the free trade regime.

In Ukraine we observe a price insulating effect during the three export quota systems implemented in 2006/7, 2007/8 and 2010/11, where the effect was strongest during 2006/7 and lowest during 2010/11. The price insulating effect during the export tax system cannot be assessed due to missing significance of the slope parameter. The price margin effect was stronger during the 2006/7 quota compared to the 2007/8 quota. The domestic price level effect indicates a price damping effect for all 4 export control regimes, however it was strongest during the 2010/11 export quota and lowest during the export tax system in 2011. On average, the price insulating effect amounted 31%, whereas the price was damped by 16%.

**Table 2: Johansen's cointegration test results**

	cointegr. vectors	specification	rank test	p-value
Kazakhstan (Akmola)	1	1 lag, constant	34.65	0.0002
Russia – North Caucasus	1	2 lags, constant	19.07	0.0714
Russia -Central	1	2 lags, constant	19.90	0.0546
Russia -Black Earth	1	2 lags, constant	20.72	0.0415
Russia -Volga	1	3 lags, constant	20.85	0.0397
Russia –West Siberia	1	3 lags, constant	20.16	0.0500
Russia -Ural	1	3 lags, constant	19.99	0.0530
Ukraine	1	2 lags, constant	48.26	0.0000

Source: Own estimations.

**Table 3: Domestic price effects of the export ban (2010/11) in Russia**

	North Cauc.	Central	Black Earth	Volga	West Siberia	Ural
Long-run price equilibrium free trade regime (335 obv.)						
intercept	-0.04	0.58***	0.47***	0.66***	0.91***	1.71***
slope	0.98***	0.91***	0.92***	0.89***	0.86***	0.77***
Long-run price equilibrium export ban regime (47 obv.)						
intercept	5.21***	3.58**	2.91*	2.36	-0.94	0.87
slope	0.38**	0.57***	0.64***	0.70***	1.06***	0.87***
Export ban: Price insulating eff. <sup>1</sup>	-61%	-37%	-30%	-21%	+20%	+11%
Export controls: Price margin effect	5.25	3	2.44			-0.84
Export ban: Domestic price level eff. <sup>1</sup>	-42%	-17%	-15%	-12%	-13%	+4%

<sup>1</sup>compared to free trade regime; \*\*\* <1%, \*\*, 5%, \*10% significance level; Source: Own calculations.

**Table 4: Domestic price effects of export restrictions in Ukraine**

	Export control regime					Free trade regime
	quota 2006/7	quota 2007/8	quota 2010/11	tax 2011	average	
nb. of obv.	30	53	38	17		279
Long-run price equilibrium						
intercept	3.55***	3.45***	1.74	6.53***		1.19***
slope	0.46***	0.5***	0.74***	0.13		0.82***
Export controls: Price insulating eff. <sup>1</sup>	-44%	-39%	-10%	-	-31%	
Export controls: Price margin effect	2.36	2.26	0.55	-	1.72	
Export controls: Domestic price level eff. <sup>1</sup>	-11%	-20%	-23%	-6%	-15%	

<sup>1</sup>compared to free trade regime; \*\*\* <1%, \*\*, 5%, \*10% significance level; Source: Own calculations.

**Table 5: Integration of regional markets in Kazakhstan in world wheat markets under free trade conditions**

	South K.	North K.	East K.	Pavlodar	Almaty	Akmola	Kostana y	Aktobe
Long-run price equilibrium free trade regime (89obv.)								
intercept	1.628***	0.605** *	0.9738** *	1.133** *	0.972** *	0.879***	0.558** *	1.884***
slope	0.420***	0.669** *	0.579***	0.540** *	0.591** *	0.600***	0.720** *	0.330***

\*\*\* <1%, \*\*, 5%, \*10% significance level; Source: Own calculations.

## 5 Discussion and Conclusions

This study has provided an overview on the domestic price effects of export restrictions for wheat that were implemented by the KRU during the two recent commodity price peaks. We have developed two indicators to assess the export control's effect on the domestic wheat price level and its price insulating effect. We observe heterogeneity in the damping and insulating effects of the export controls among the KRU and among the regions of Russia.

In particular, the export ban in Kazakhstan 2008 and the export tax system in Russia 2007/8 did not unfold a price decreasing effect compared to the free trade situation. Domestic wheat prices in Russia even increased beyond the world market price in all districts, and a price damping effect also did not unfold in Kazakhstan during the export ban. The strongest price decreasing effects, concurrently with strong price insulating effects, were observed during the export ban in North Caucasus (Russia). The price damping and price insulating effects were transmitted from North Caucasus to Central, Black Earth and Volga district by substantial wheat flows from North Caucasus. North Caucasus experienced a yield increase in 2010 compared to the previous year and due to the export ban it was forced to deliver its supply surplus to other regions within Russia. The North Caucasian grain was primarily delivered to Central district, followed by Black Earth and Volga explaining the decrease in the price damping and price insulating effect from Central to Volga district. Though, our results identify an increase of integration in the world wheat market in West Siberia and in Ural. Also, a price damping effect is identified for West Siberia, whereas our results suggest price increasing effects in Ural, which has to be interpreted with care. Ural experienced the largest supply deficit compared to the other regions of Russia, and obtained grain inflows from North Caucasus and West Siberia of over 1.3 million tonnes. Thus, according to economic theory it can be assumed that regional prices in Ural were actually dampened by the wheat inflows and might have otherwise increased e.g. even beyond the world market price level. West Siberia was characterized by a supply surplus and delivered wheat primarily to the grain deficit Ural and Volga districts which according to economic theory has risen the price level in West Siberia itself. Nonetheless, a price damping effect but not a price insulating effect is identified by our indicators.

Several factors have led to the further increase of wheat prices in Kazakhstan even when wheat exports were forbidden by the export ban. First, the size of grain production in 2007 was overestimated and when the corrected estimation was published early 2008 prices started to increase strongly. The immediate implementation of the export ban for wheat did not reduce domestic demand for wheat. Instead, this induced Kazakh traders to process wheat into flour to export. Although flour export remained officially unrestricted, the government imposed indirect measures to prevent that large amounts of flour were exported. In particular, a shortage of railway wagons was created. Indeed large amounts of flour had to remain in stocks. Prices were further increasing when news on a bad harvest in Eastern Kazakhstan in 2008 occurred in the media (UkrAgrConsult 2014, APK-Inform 2014).

For Ukraine the strongest domestic price effects are identified for the 2006/7 and 2007/8 export quota whereas they were lowest during the 2011 export tax system.

Decreased domestic wheat prices and foregone export revenues create economic losses and additional costs to farmers and traders, and thus reduce incentives for investments in grain production. Regarding Russia, it can be assumed that the largest economic losses were created



among the producer and traders in North Caucasus, Russia's primary grain production region. This is particularly problematic since the KRU bear high additional grain production potential and could play a significant role in heightened global grain production and trade, assuming they make substantial investments in grain production. The EBRD estimates that investments of 1,000-2,000 US \$/ha are required to fully mobilize the grain production potential in Ukraine (Harmgart, 2011).

Concluding, the effectiveness of export controls in the KRU to dampen and decouple domestic wheat prices from world market price developments is generally rather limited. The export ban damped wheat prices in the port region of North Caucasus by 42% which was transmitted to the Central region around Moscow where wheat prices damped by 17%. According to our estimations, this resulted in the damping of bread prices in Moscow by 3%. Thus, given the high economic losses caused by export restrictions in the country itself, and considering the additional losses caused by feed-back effects on world market prices, the efficiency of export restrictions to dampen domestic food price inflation becomes rather questionable.

Instead of aiming to insulate domestic agricultural prices from world market developments, governments should allow domestic prices to increase, and help poor consumers to cope with high food prices. Consumer-oriented crisis measures, food subsidies, food vouchers and direct income transfers can be better targeted and cause less additional economic costs.

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