Price Damping and Price Insulating Effects of Wheat Export Restrictions in Kazakhstan, Russia, and Ukraine

Linde Götz and Ivan Djuric[1]

[1]Leibniz-Institute of Agricultural Development in Transition Economies (IAMO), Theodor-Lieser-Str.2, D-06120 Halle (Saale), Germany; contact: goetz@iamo.de

Poster paper prepared for presentation at the EAAE 2014 Congress
'Agri-Food and Rural Innovations for Healthier Societies'

August 26 to 29, 2014
Ljubljana, Slovenia

The authors gratefully acknowledge financial support by the Federal Ministry of Food and Agriculture and the Federal Office for Agriculture and Food (Germany).

Price Damping and Price Insulating Effects of Wheat Export Restrictions in Kazakhstan, Russia, and Ukraine

Linde Götz and Ivan Djuric

Abstract

This study analyzes the domestic price effects of export controls for all 3 KRU countries during the global commodity price peaks. We develop two indicators to measure the strength of the export controls' price damping and price insulating effect within a non-linear long-run price transmission model. Our analysis comprises 11 cases of export controls. Our results indicate heterogeneity in the damping and insulating effects of the export controls among the KRU where only two cases recorded the strongest effects: export ban in Russia (2010) and export tax system in Ukraine (2011).We argue that the effectiveness of export controls in the KRU 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 2007/08 and 2010/11, many countries aimed to insulate their domestic markets from price developments on the world market and to stabilize domestic prices through trade policy interventions (Martin and Anderson, 2012). For example, during the 2007/08 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. Kazakhstan implemented a wheat export ban in 2008, Russia wheat export taxes in 2007/08 and an export ban in 2010/11, and Ukraine established a wheat export quota system in 2006-2008 and 2010/11.

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.

2 Method

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:

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

with p_t^d, p_t^{wm} the domestic and the world market price, α^f, α^r the intercept parameters of the free trade and the restricted trade regime, β^f, β^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.

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)[1]. 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.

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.

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

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

with tf=1,…n and tr=1,…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

[1]Alternative estimation methods include the short-run dynamics in the model to estimate the long-run equilibrium parameters.

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

$$\text{Price margin effect} = \alpha^r - \alpha^f \quad (4)$$

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.

Data used for the analysis are weekly wheat ex warehouse price series of milling wheat of class III for Russia and Ukraine (2005-2012) comprising 417 observations. In our analysis we include district-specific data for Russia for the districts North Caucasus, Black Earth, Central, Volga, West Siberia and Ural. For Kazakhstan we use monthly wheat producer price series (2005-2012) comprising 96 observations. We use the FOB price of wheat (French soft wheat, class 1) in Rouen, France (HCGA) as the relevant world market price[2].

3 Results

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 with the long-run price transmission parameter of 0.98 (North Caucasus), followed by Ukraine with 0.82. In contrast, the Kazakh wheat market integration is lowest, with a long-run price transmission parameter of 0.72 for the Kostanay region; compare tables 1-3.

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 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.

Table 1: 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.[1]	-61%	-37%	-30%	-21%	+20%	+11%
Export controls: Price margin effect	5.25	3	2.44			-0.84
Export ban: Domestic price level eff.[1]	-42%	-17%	-15%	-12%	-13%	+4%

[1]compared to free trade regime; *** <1%, **, 5%, *10% significance level; Source: Own calculations.

In Ukraine we observe a price insulating effect during the three export quota systems implemented in 2006/07, 2007/08 and 2010/11, where the effect was strongest during 2006/07

[2]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.

and lowest during 2010/11 (Table 2). 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 2006/07 quota compared to the 2007/08 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: Domestic price effects of export restrictions in Ukraine

	Export control regime					Free trade regime
	quota 2006/07	quota 2007/08	quota 2010/11	tax 2011	average	
nb.ofobv.	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.[1]	-44%	-39%	-10%	-	-31%	
Export controls: Price margin effect	2.36	2.26	0.55	-	1.72	
Export controls: Domestic price level eff.[1]	-11%	-20%	-23%	-6%	-16%	

[1]compared to free trade regime; *** <1%, **, 5%, *10% significance level; Source: Own calculations.

Table 3: Integration of regional markets in Kazakhstan in world wheat markets under free trade conditions

	South K.	North K.	East K.	Pavlodar	Almaty	Akmola	Kostanay	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.

4 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.

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 tons. 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.

For Ukraine the strongest domestic price effects are identified for the 2006/07 and 2007/08 export quota whereas they were lowest during the 2011 export tax system.

Several factors have led to the further increase of wheat prices in Kazakhstan during 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. Prices were further increasing when news on a bad harvest in Eastern Kazakhstan in 2008 occurred in the media (APK-Inform, 2014).

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. 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.

References

APK-Inform (2014). AgriNews, various issues.

Engle, R.F. and Granger. C.W.J. (1987). Cointegration and Error Correction: Representation, Estimation and Testing, *Econometrica* 55: 251-76.

Fackler, P. and Goodwin, B. (2001). Spatial price analysis. In: Gardner, B., Rausser, G. (eds): *Handbook of Agricultural Economics*, Vol. 1B, Amsterdam, Elsevier, 971-1024.

FAO (2008). Crop Prospects and Food Situation, No 5, December 2008.

Harmgart, H. (2011). Financing Food – Challenges and Opportunities for the Transition Region. Keynote Presentation, IAMO-Forum 2011, June 23–24, Halle (Saale), Germany.

Martin, W. and Anderson, K. (2012). Export Restrictions and Price Insulation during Commodity Price Booms. *American Journal of Agricultural Economics* 94: 422–427.