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# **Trade diversion and high food prices - The impact of the Russian pig meat import ban**

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# **Trade diversion and high food prices - The impact of the Russian pig meat import ban**

## **Abstract**

In this paper we analyze the impact of the Russian ban on import of pig meat originating in the EU on the domestic pig meat price developments in Russia. We use a regime-switching price transmission model in order to identify possible changes in the long-run equilibrium between the pig meat prices of Russia and its main non-EU trading partners. Our results indicate the reduction of transaction costs in pig meat trade between Russia and its main non-EU trading partners, followed by the increase in transmission of price changes in the long-run. Though, our results indicate completely opposite results concerning domestic price relations between wholesale and end consumer pig meat prices in Russia. Overall, faced with the scarcity of pig meat on the domestic market, Russian consumers bear the biggest burden from the ban in the medium term by being faced with the significant increase in end consumer pig meat prices.

**Keywords:** import ban, pig meat, price transmission, Russia.

**JEL classification:** C22, I31, P22, Q11, Q17, Q18.

## **1. Introduction**

In response to the West's economic sanctions, the Russian government announced on 6 August 2014 an import ban on most foods and agricultural products from the European Union (EU), the United States of America (USA), Norway, Canada and Australia. Nevertheless, restrictions in agricultural imports started even earlier, in January 2014, when Russia implemented a ban on import of pig meat originating in the EU.

Russia is one of the world's largest food importers and thus has a great importance in a global food trade. Namely, Russia imports more than 50 % of its foods: notably meat, fruits, vegetables, fish and dairy products. The import value in 2013 was well above 40 billion USD. Russia, with some 13 % of the EU agricultural export volume (just under 16 billion USD), is the second most important sales market of the European food industry. As regards products affected by the ban, EU countries delivered in recent year approx. 20 % (ca. 1 billion USD/year) of pork exports and up to 40 % (ca. 200 million USD/year) of their beef exports to Russia. Major dairy export products include butter, cheese and curd products which take up almost one quarter of total

exports. Russia is also one of the most important sales markets for various vegetables (tomatoes, cabbage and carrots) and fruit (apples, apricots, citrus fruit). Up to 50 % of EU exports are sold to Russia. At the same time the EU is a key exporter to world markets (e.g. dairy products and pork, with up to 20 % of world trade). Russian imports also absorb a not insignificant portion of global trade (up to 15 %) with products such as frozen beef, fruit and butter.

Concerning pig meat exports to Russia, several cases of the African swine fever (ASF), detected in wild boars at the Lithuanian and Polish border with Belarus, were the main cause for Russia to implement the ban on import of pig meat originating in the EU in January 2014. As a consequence, the EU pig meat exporters completely lost their market share in Russia. Denmark and Germany were among the biggest EU pig meat exporters to Russia, accounting for almost 27 % of the total Russian pig meat imports in 2013. On the other hand, other non-EU trading partners of Russia (i.e. Brazil, Canada and USA) got the opportunity to increase their pig meat exports under the pre-defined quota.

This paper analyzes the impact of the Russian import ban on the domestic pig meat prices in Russia. We aim to identify those effects within a price transmission approach. Our research questions are: How did the import ban affect price transmission between Russia and its main non-EU trading partners? What are the domestic pig meat price effects in Russia?

The contribution of this paper is two folded. First, we contribute to the growing literature that investigates the impact of trade oriented policy measures (e.g. export and import restrictions) on domestic and international agricultural markets (e.g. Djuric et al., 2015; Götz et al, 2013; Martin and Anderson, 2012). Second, with our analysis we aim at identifying possible effects of the current global trade diversion on the selected agricultural sector which might provide useful insides for policy makers.

This paper is structured as follows. Detailed description of the Russian import ban is described in section 2. Section 3 provides theoretical expectations and methodological approach. Empirical results are presented in section 4. Section 5 provides conclusions.

## 2. Russian pig meat import ban

Russia's import of pig meat is quantitatively limited within a tariff rate quota (TRQ). Exporters are obliged to register and apply for licenses which are allocated country-specific by the Russian Ministry of Industry and Trade. For example, prior to 2014, EU exporters were allowed to export up to 365,000 t pig meat to Russia.

Since Russia has joined the WTO in 2012 import tariffs were reduced significantly. Namely, in-quota import tariff of 40 % for live pigs was reduced to 5 % in 2013. In 2014, it was further reduced to zero. At the same time out-of-quota tariff was reduced from the average 68.3 % to 65 % (Table 1). The average size of the quota for pig meat import amounted to 453,300 t per year in the period 2011-13. In 2014 the size of the pig meat import quota was reduced to 430,000 t without specifying quotas for the different exporting countries.

**Table 1: Russia, pig meat import tariff quota**

	Average 2011-13	2014
<b>Tariff quota</b>	453,300	430,000
<b>In-quota tariff (%)</b>	5	0
<b>Out-of-quota tariff (%)</b>	68.3	65

Source: OECD-FAO.

As already mentioned, prior to the pig meat import sanctions in January 2014, the EU was the main pig meat exporter to Russia. Besides the EU, other main pig meat exporters were Brazil, Canada, Chile and USA accounting for 38 % of Russia's total pig meat import in 2013.

The first major trade diversion came along with the tensions between the Western countries and Russia concerning growing conflict in Ukraine. The first measure that had an impact on the import of the pig meat in Russia was the Russian import ban imposed on EU live pigs, pig meat, and meat products at the end of January 2014. As already mentioned, the decision was made according to the four cases of ASF detected in wild boars at the Lithuania and Polish border with Belarus. Right after the ban, the EU Member States implemented veterinary and sanitary measures in order to ensure that meat imported to Russia satisfies the necessary sanitary conditions. It is interesting to observe that the EU was criticizing Russia for implementing the ban on perfectly healthy products coming from the EU where at the same time Russia was recording numerous cases of ASF not only detected in wild boars but also in pig farms affecting

almost half a million pigs (European Commission, 2014). Nevertheless, despite the EU efforts, Russia did not remove the ban. Faced with the significant immediate losses in pig meat export, the EU decided to use the possibility to start the WTO's dispute settlement procedure by requesting the establishment of a panel. This action of the EU also did not have any effect on the Russian ban.

After the Russian government imposed the import ban on pig meat originating in the EU at the end of January 2014, total pig meat import of Russia reduced by about 14 % (about 4,500 t). In the short run, pig meat import was switched from the EU trade partners to the already existing non-EU trade partners such as Brazil, Canada, Chile, USA, and Serbia. At this time, Russia's partners of the Customs Union (i.e. Belarus and Kazakhstan) did not record any increase in pig meat export to Russia. Thus, the non-EU trading partners got the increase in import quotas which they certainly used considering that their share in the total Russian pig meat import increased: Brazil increased the share from 21 % in 2013 to 38 % in 2014; Canada recorded the highest increase in total share from 13 % in 2013 to 40 % in 2014; Chile from 2.84 % to 3.24 %; USA from 1 % to 4 %; and Serbia from 0.02 % to 3 %.

Further on, trade relations between the EU and Russia worsened even more due to the growing conflict between Russia and Ukraine. In August 2014 Russia imposed a one year import ban on selected agricultural products originating in countries that had imposed economic sanctions to Russia in March 2014 (USDA, 2014). Besides the EU, imports of selected agricultural products were also forbidden from USA, Canada, Australia and Norway. This time the effects of the second ban did not have high impact on the EU pig market because export of meat already stopped in February. In the meantime, between the first ban in January and the second ban in August, EU pig meat exporters already redirected their shipments towards Asian markets. The highest impact of the second ban should actually be expected in Canada and USA because they took over the market share of the EU traders after the ban in January 2014 (US Meat Export Federation, 2014). Certainly, the second import ban was beneficial to Brazil, Chile, Serbia, Belarus, and Kazakhstan because they could significantly increase their exports to Russia in order to fulfil the import demand.

For the reason of data availability we further refer only to the ban on import of pig meat originating in the EU which was imposed in January 2014. In order to identify the effects of the

ban, we consider the theoretical expectations and utilize the price transmission analysis explained in the following section.

### **3. Theoretical expectations and methodology**

This study investigates the domestic price effects of Russia's import ban of pig meat originating in the EU on domestic pig meat prices in Russia. We use a price transmission approach to capture these price effects on Russian domestic markets. We analyze transmission of changes in pig prices between the Russian domestic market and other primary non-EU trading partners, i.e. Brazil, Canada and the USA, serving as the reference markets. We assume that price developments in the reference markets were not influenced by Russia's import ban towards the EU.

#### *3.1. Theoretical short-run welfare effects of an import ban*

As mentioned before, Russian import ban on pig meat originating in the EU was not referring to other non-EU trading partners of Russia. Also, the annual import quota for pig meat import was not reduced after the ban. Thus, in the theoretical model we do not account for total insulation of the Russian pig meat market nor we account for the import quota reduction. Here we want to present what are the short- and medium-run domestic price and welfare effects in the case when Russia imposes an import ban towards one of the main trading partners (i.e. EU).

Figure 1 (A), depicts the usual situation of pig meat import to Russia. Considering that Russia is a net importer of the pig meat, assuming that the import quota is not binding and that the in-quota tariff is set to zero<sup>1</sup>, world market price<sup>2</sup> ( $p_w$ ) for pig meat will be transmitted to the Russian domestic market. Thus, import price ( $p_i$ ) of meat is lower than it would be without import ( $p_0$ ). This might not be the case if the in-quota tariff is high. For the given import price, domestic supply will be equal to  $q_s$ , while the demand will be equal to  $q_d$ . The difference between  $q_d$  and  $q_s$  will be equal to the amount of pig meat that is imported.

Now we consider the case when Russia imposes an import ban on pig meat originating in the EU. Since the EU is the largest pig meat exporter to Russia, the short-run effect of the ban would be reduced total volume of pig meat import to Russia (Figure 1, B). For how much the import

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<sup>1</sup> During the observed period in-quota tariff for pig meat in Russia was set to zero (see Table 1, section 2).

<sup>2</sup> World market price would be an average price of pig meat reported on the reference markets (e.g. EU, Brazil, Canada, and USA).

volumes will be reduced in the short run greatly depends on the possibility of Russian non-EU trading partners to increase their exports of pig meat to Russia, or how fast the new non-EU exporters will appear. Considering that each exporter of pig meat to Russia has to obtain the license, the entrance of new exporters is very unlikely in the short run. Thus, in the short run it is not expected that EU import volumes could be completely replaced. Consequently, domestic pig meat prices in Russia are expected to increase ( $p'_i$ ). From the welfare point of view, implementation of the import ban would be beneficial for the Russian domestic pig producers who are able to achieve higher price domestically. Thus, they would gain a short-run welfare benefit ( $B'BEE'$ , Figure 1 - B). On the other side, domestic consumers will experience a short-run welfare loss ( $B'BFF'$ ) because they have to pay higher price for meat compared to the case A (without import ban). Overall, the national welfare loss would be equal to  $E'EFF'$ .

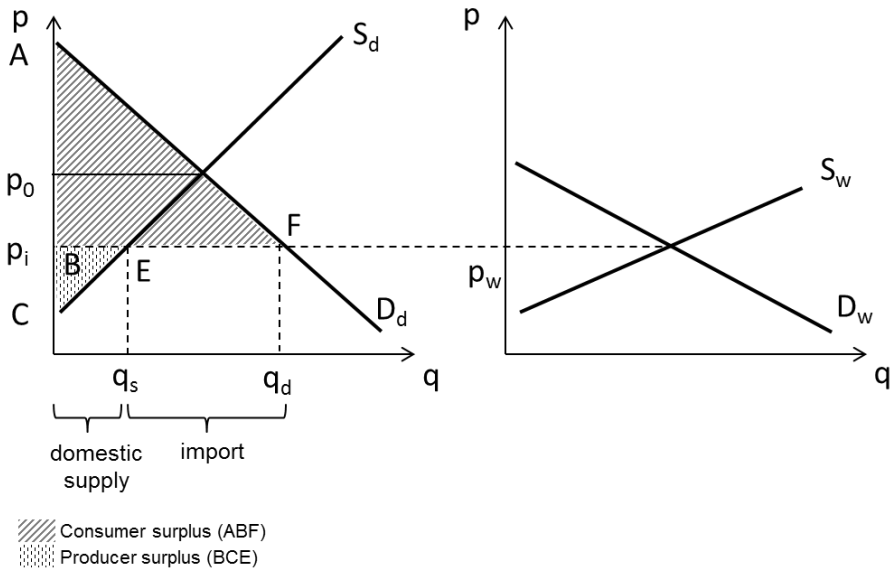
Concerning the short-run effects of the Russian import ban on the EU pig meat prices, it is certainly expected that the domestic supply of pig meat will increase, especially in those EU Member States to which Russia was one of the main exporting markets (i.e. Denmark and Germany). Consequently, domestic pig meat prices should decrease in the short run. The level of the price decrease will depend on the volume of meat that was initially exported to Russia (small share in total pig meat export will certainly have smaller price decreasing effect). The medium-run effects will greatly depend on ability of the EU pig meat exporters to find other markets for their product.

The medium-run effects of the Russian pig meat import ban on the domestic Russian pig meat prices will greatly depend on the volume of pig meat being exported to Russia from the non-EU trading partners, or on the possibility of domestic pig producers to increase the production. Thus, in the medium run it is expected that import volumes should increase, either by increased export by the existing non-EU partners (e.g. Brazil, Canada, and USA) or by the appearance of the new non-EU trading partners. Consequently, increased pig meat import should have a price decreasing effect on the Russian domestic pig meat market. On the other side, the major non-EU pig meat exporters to Russia will face an increased demand on their domestic markets due to the increased export to Russia. Consequently, it is expected that their domestic pig meat prices will increase in the medium run. The level of increase will greatly depend on the volume of pig meat being exported to Russia and other exporting destinations, and also on the ability of domestic pig producers to increase the production.

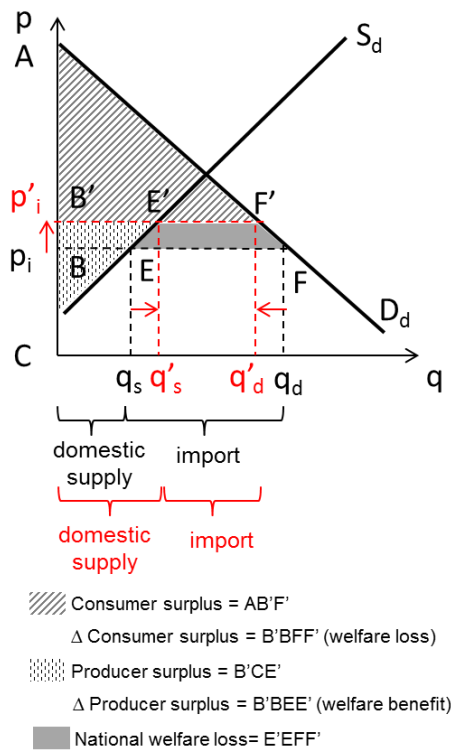


**Figure 1: Theoretical domestic welfare effects of an import ban imposed to the mayor importer**

**A) Regular import of pig meat from world market to Russia**



**B) Import ban on pig meat originating in EU (short-run effects)**



Note: labels are explained within the text.

Source: own illustration.

### 3.2. Methodology

From the theoretical model presented in the previous section, and relying on the Law of One Price<sup>3</sup>, we expect that import ban should cause the regime change in transmission of price changes from the reference markets (i.e. Brazil, Canada, and USA) to the domestic market in Russia. In order to identify these effects we use the following regime-switching model:

$$p_t^d = \begin{cases} \alpha^f + \beta^f * p_t^{rm} + u_t^f & (\text{free trade regime}^4) \\ \alpha^{ib} + \beta^{ib} * p_t^{rm} + u_t^{ib} & (\text{import ban regime}) \end{cases} \quad (1)$$

where  $p_t^d$  and  $p_t^{rm}$  present pig meat prices on the Russian domestic and the reference markets, respectively;  $\alpha^f$  and  $\alpha^{ib}$  present the intercept parameters within the free trade and import ban regime, respectively;  $\beta^f$  and  $\beta^{ib}$  are the long-run price transmission parameters; and  $u_t^f$  and  $u_t^{ib}$  are residuals.

For each of the regimes the two main parameters are intercept ( $\alpha$ ) and slope coefficient ( $\beta$ ). Reeling or our theoretical expectations we hypothesize that the implementation of the import ban should cause the change in both intercept and slope coefficients in the import ban regime compared to the free trade regime. In the case of the largest<sup>5</sup> non-EU exporters of pig meat to Russia (e.g. Brazil, Canada, and USA), we expect the following change in model parameters that are estimated for the import ban regime: 1) Margin, i.e. intercept, between the pig meat prices of the largest non-EU pig meat exporters to Russia, and domestic pig meat prices in Russia, is expected to decrease; The main argument is that increased pig meat trade volumes between the Russian main non-EU trading partner and Russia might contribute to the decrease in transaction costs. 2) The transmission of pig meat price changes from the Russian main non-EU trading partner to the Russian domestic pig meat prices should improve, i.e. slope should increase. In the case of the domestic price relations between the wholesale pig meat prices and end consumer pig meat prices in Russia we do not expect significant change of the price transmission parameters in the import ban regime because the import of pig meat to Russia was not completely banned.

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<sup>3</sup> The price of the same product at two specially separated markets should differ at most by trade costs, assuming that the markets are fully efficient and well-functioning (Fackler and Goodwin, 2001).

<sup>4</sup> Considering that 2014 import quota for pig meat import to Russia was not binding we refer to this regime as to free trade regime.

<sup>5</sup> By volume of export.

We use the official date of the pig meat import ban to determine the regime classification. Thus, we split the dataset to the period before the import ban in January 2014, where all observations are attributed to the free trade regime (264 observations), and to the period after where all observations are attributed to the import ban regime (26 observations). The switch between the regimes is instantaneous which corresponds to the fact that Russian ban was sudden and immediately implemented. For each of the regimes we estimate the regime-specific long-run relationship following the procedure provided by Engle and Granger (1987).

Following Götz et al. (2014), we use the results obtained from the price transmission analysis to calculate price insulating and price margin effects<sup>6</sup>. Implementation of the import ban towards the main trading partner certainly causes restriction in arbitrage activities. If the country completely closes the border for import, price changes on the domestic market will greatly depend on the domestic factors. Nevertheless, in the case of Russia limitation to the EU import was actually opportunity to other trading partners. Thus, by calculating the price insulating effect (equation 2) we are able to identify the degree to which changes in pig meat prices in Russia react to changes on the world market in different regimes. Also, by calculating the margin effect (equation 3), we are able to identify if market access of certain trading partners improved due to the import ban imposed towards EU.

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

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

### 3.3. Data

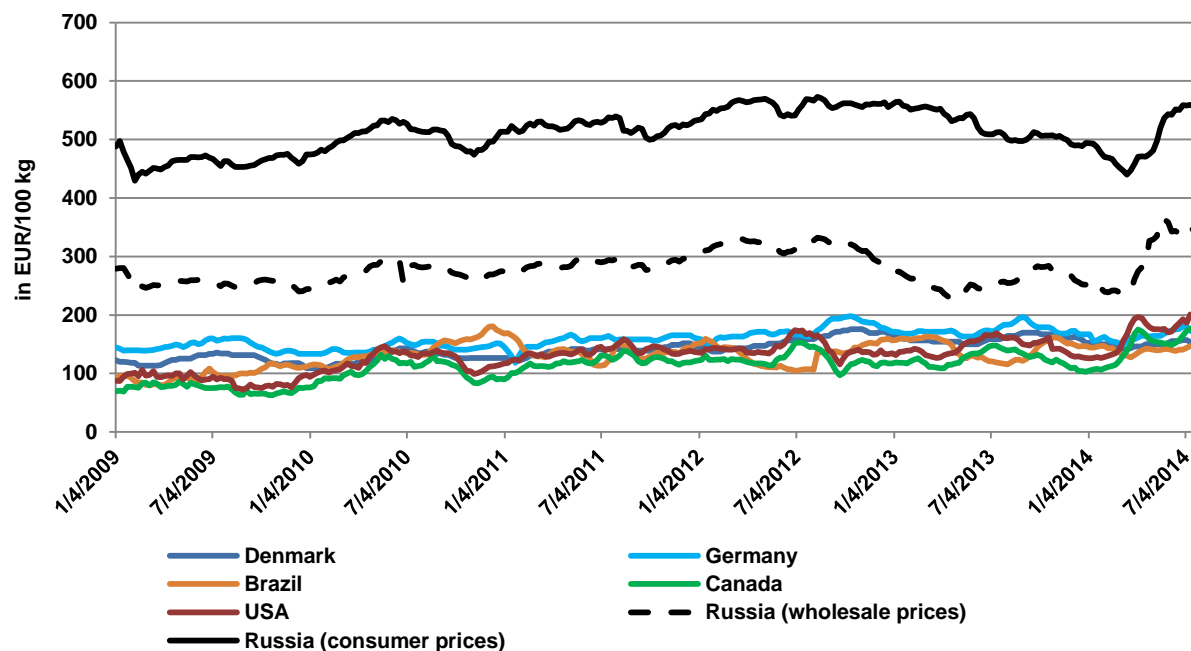
We use weekly wholesale pig meat prices expressed in EUR per 100 kg of a dead weight (i.e. carcass) for Denmark, Germany, USA, Canada, Brazil, and Russia (Figure 2). From the EU countries we selected Denmark and Germany because they have the highest share in EU's pig meat export to Russia (24 and 22 %, respectively). On the other side, the pig prices for Canada, USA and Brazil are selected first as a world reference price for pig meat, and second because they represent the main exporters of pig meat to Russia after the import ban in January 2014. In

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<sup>6</sup> For detailed explanation of the indicators see Götz et al. (2014).

addition, we use weekly end consumer pig meat prices for Russia. All price series cover the period from January 2009 to August 2014 (290 observations per country).

**Figure 2: Weekly pig carcass prices in selected countries, 2009-2014**



Source: BPEX, Irish Food Board, ROSSTAT, own illustration.

#### 4. Empirical results

Our preliminary results from the price transmission analysis indicate that the price margin between domestic pig meat prices in Germany and domestic pig meat prices in Russia was the smallest compared with other selected Russian trading partners ( $\alpha^f=4.044$ , Table 1). At the same time, the long-run price transmission elasticity was also highest for Germany ( $\beta^f=0.331$ ). Very similar results are obtained for Denmark (Table 2). These results are not surprising considering that Germany and Denmark had the biggest share in pig meat export to Russia compared to other selected trading partners. Thus, high trade volumes contribute to the reduced transaction costs. On the other side, the highest margin and lowest transmission of price changes was recorded for Brazil.

Concerning the Russian domestic pig meat market, our results indicate relatively high margin between the wholesale and end consumer pig meat prices. In general, about half of the price changes on the wholesale level were transmitted to the retail level prices in the long run. This

result is not surprising considering that Russia is a net pig meat importer and thus retailers need to account for the level of the import price.

**Table 2: Short-run price effects of Russian import ban**

Regime	Free trade regime (301 observations)					
	EU <sup>#</sup>		World			Russia
Country	Denmark	Germany	Brazil	Canada	USA	
intercept $\alpha^f$	4.269***	4.044***	5.077***	4.669***	4.572***	3.269***
slope $\beta^f$	0.274***	0.311***	0.112***	0.204***	0.217***	0.528***
Import ban regime (37 observations)						
intercept $\alpha^{ib}$	-	-	0.291	2.010***	1.688***	3.616***
slope $\beta^{ib}$	-	-	1.093***	0.737***	0.779***	0.455***
Price effects						
price margin effect			-4.787	-2.659	-2.884	+0.347
price insulating effect			+793%	+361%	+359%	-14 %

Note: # Price transmission results for Denmark and Germany are only shown as a reference for the free trade regime. \*\*\*<1% significance level.

Source: own calculation.

The results of the import ban regime indicate tremendous change between international (non-EU) and Russian price relations. Margin of Brazil, Canada and USA dropped almost for a half indicating that the transaction cost for importing pig meat to Russia were drastically reduced. In addition, the transmission of price changes from these three countries to the Russian domestic market increased significantly, reaching almost perfect transmission as in the case of Brazil (Table 2). At the same time, margin between the wholesale and end consumer pig meat prices in Russia increased while the transmission of price changes decreased for 10 %. The obtained results for Russia are in contrast to our theoretical expectation, and thus might indicate that retailers set the price of the end consumer pig meat prices relying less on the price changes on the wholesale level. Overall, obtained results indicate the appearance of trade diversion with short-run price effects not only on the domestic pig meat prices in Russia but also on the domestic markets of the main trading partners.

Right after the implementation of the import ban in January 2014, EU<sup>7</sup> pig meat prices started to fall compared with the rest of the world. Concerning Denmark, pig meat prices for carcass

<sup>7</sup> Recorded pig meat price decrease in Denmark and Germany cannot be solely associated with the Russian ban; there are many other domestic and international factors that influenced the pig meat prices on the EU market which are not considered in this paper.

decreased for 3 % within two weeks after the implementation of the Russian ban reaching the lowest level of 1.34 EUR/kg in March 2014. A bit higher price decrease of 6 % is recorded in Germany reaching the three-year minimum of 1.45 EUR/kg of pig meat carcass at the end of February 2014. In the second half of March 2014, pig meat prices started to grow in all EU countries as a consequence of the increased export activities towards Asian markets (e.g. Taiwan, Philippines, South Korea, and Japan), and by the ability of traders to store the non-exported pig meat.

As already mentioned, import of pig meat was managed by the existing non-EU trading partners after the EU traders lost their share in Russian market. In the first month after the ban, in February 2014, Brazil increased pig meat export to Russia for 25 %. Also, Canada doubled the export of pig meat to Russia within one month; reaching the highest share in Russian pig meat import of 46 % in February 2014. Significant increase in import of pig meat from the non-EU countries can also be seen by the number of the additional companies that obtained import licenses in 2014 (Table 3).

**Table 3: Number of companies licensed for pig meat import to Russia for selected countries**

Country	until 2014	Additional number of enterprises		Total
		January – August 2014	After August 2014	
Canada	27	+5	+4	36
USA	169	+9	+1	179
Brazil	3	+5	+20	28
Chile	2	+4	+3	9
Serbia	3	+1	+3	7

Source: Russian Federal Service for Veterinary and Phytosanitary Surveillance.

Concerning domestic price effects in Russia, end consumer pig meat prices did not change immediately after the ban, but they rather had continuous decreasing trend until April. The expected theoretical effects<sup>8</sup> of the import ban could not be identified right after the ban since it was not referring to all of the importers, and thus the import did not stop completely. The real effect of the ban was identified from April 2014 where domestic market started facing scarcity of pig meat. Consequently, end consumer meat prices increased for 18 % until June 2014<sup>9</sup>.

<sup>8</sup> See section 3.1.

<sup>9</sup> Significant price increase could partially be associated to the significant Ruble depreciation in 2014. In our analysis we did not account for the effects of the exchange rate on domestic pig meat prices.

## 5. Conclusions

In the light of the political crisis in Ukraine in 2014, agricultural trade relations between Russia and its main trading partners is reaching the worst relations since the Cold War. The relations with one of the most important trading partner, the EU, started to shake in January 2014 when Russia imposed an import ban on all pig meat products. The second ban was implemented by Russia in August 2014, this time affecting not only the EU but also other major trading partners such as Canada and USA.

After the EU completely lost the share on the Russian pig meat market in January 2014, the existing Russian non-EU trading partners (i.e. Brazil, Canada, and USA) took over the leading position in pig meat export to Russia. Significant increase in quantities of pig meat exported to Russia, originating from Brazil, Canada, and USA, contributed to the reduction of the transaction costs in pig meat trade between these three countries and Russia. This is indicated in our price transmission results by the significant decrease in the long run intercept in all three cases. Moreover, our results indicate that pig meat prices in Brazil were almost completely transmitted to the domestic wholesale pig meat prices in Russia. On the contrary, the transmission of the Russian domestic wholesale pig meat price changes to the end consumer pig meat prices was reduced indicating that domestic retail prices of pig meat were set more independently from the domestic wholesale prices. Faced with the reduced domestic supply domestic end consumer pig meat prices in Russia started to increase sharply on weekly level.

Overall, we argue that the Russian ban on pig meat imports originating in the EU had only short-run, almost immediate price effects on the domestic markets of the main trading partners. Nevertheless, in the medium term domestic markets managed to adjust and thus stabilize domestic prices. On the contrary, faced with the significant shortages on the domestic market the end consumer meat prices in Russia increased significantly. The main problem arise in finding reliable trade partners who are able to offer good quality pig meat for reasonable price once the main trading partners are out of the market. Thus, the biggest losers in the medium run are Russian consumers who are faced with the fact that they have to pay high price for meat products. In the long run, the domestic effects of the import ban will greatly depend on the duration of the ban and ability of Russia to secure sufficient domestic supply (Glauben, 2014).

For our further research we plan to extend our analysis in order to account also for the second import ban in August 2014. Thus, we plan to account for additional products whose import to Russia was banned (e.g. milk, cheese, fruits and vegetables), and which are of great importance for the Russian trading partners and for Russia itself. In addition, we plan to use more sophisticated price transmission models (e.g. Markov-switching vector error correction model) in order to catch the behavior of trading partners and to assess the impact of the ban on the domestic Russian market in more details.

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ROSSTAT – Russian Federal State Statistic Service, online database,  
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