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An econometric analysis of market power in Azerbaijani wheat market:
Evidence from Kazakhstan and Russia

*Gulmira Gafarova**, *Oleksandr Perekhozhuk*** and *Thomas Glauben****

**PhD Student at Leibniz Institute of Agricultural Development in Transition Economies (IAMO)
Halle (Saale), Germany. Corresponding author, gafarova@iamo.de*

***Research Associate at IAMO, Halle (Saale), Germany, perekhozhuk@iamo.de*

****Director and Head of the Department of Agricultural Markets, Marketing and World
Agricultural Trade at IAMO, Halle (Saale), Germany, glauben@iamo.de*

Abstract

Azerbaijan is a net-importer of wheat with average self-sufficiency ratio of 55%. In order to meet the domestic needs completely, Azerbaijan imports wheat mainly from Kazakhstan and Russia. The objective of this study is to investigate the extent of market power exercised by the Kazakh and Russian exporters in Azerbaijani wheat import market. Toward this aim, we apply the Residual Demand Elasticity approach, and fit the model with monthly time-series data covering the period from January 2004 to December 2013. Total export quantity of an exporting country and population of an importing country are selected as excluded variables in this analysis. The empirical results demonstrate that the Russian exporters exercise market power in Azerbaijani wheat market, but the Kazakh exporters face perfect competition. Moreover, we argue that the Ukrainian exporters are able to constraint both Kazakh and Russian exporters' market powers in Azerbaijani wheat market.

Keywords: agricultural trade, market power, residual demand elasticity, wheat market

JEL codes: L13, Q11, Q17, Q18





1. Introduction

Since the early 2000s, the shares of the main wheat exporters have been dramatically changed in the world market. As the new wheat exporters, namely Kazakhstan, Russia and Ukraine (KRU), appeared in the world market at the beginning of the 2000s, the shares of traditional wheat exporters were significantly affected (Gafarova et al., 2014). Due to the geographical locations and the historical trade relationships, the South Caucasian region¹ has been the main trade partner of the KRU countries. Azerbaijan is listed as top ten wheat trade partner for Kazakhstan and Russia. Azerbaijan is considered as middle-income country, and the contribution of the agriculture sector to the total gross domestic product (GDP) in 2014 was only 5.0% (AZSTAT, 2015). Wheat and wheat products are the main staple foods and play important role in providing population's demand for protein and energy in Azerbaijan. Azerbaijan cannot produce wheat in needed quantities, and thus imports it mainly from Kazakhstan and Russia. The average self-sufficiency ratio of wheat for Azerbaijan is accounted around 55% for the period 2010-2013 (AZSTAT, 2014, p.21).

Figure 1 in the Appendix shows how the monthly bread and wheat flour prices are fluctuating from 2004 to 2013 in Azerbaijan. In general, they are shifting similarly to the same direction, and the historical high food prices in 2007/08 and 2010/11 are visible.

Geographically Azerbaijan is situated on the west coast of the Caspian Sea, and shares it with Kazakhstan, Iran, Russia and Turkmenistan. Azerbaijan possesses land borders with Russia and being close to Russia is an advantage for Azerbaijan, in terms of less transportation costs for the imported wheat. Kazakhstan exports wheat to Azerbaijan by railway through Russia, and by cargo ships through the Caspian Sea.

Figure 2 in the Appendix describes how the market shares of the main wheat exporters change from 2004 to 2013 in Azerbaijani wheat market. The UN Comtrade statistics indicate that, Kazakhstan and Russia are strong wheat exporters in Azerbaijani wheat market, but Ukraine

¹ The South Caucasian region refers to Armenia, Azerbaijan and Georgia.



possesses only small share. Although Russia was a leading exporting country until 2007, due to the wheat export tax policy implemented by the government from November 2007 till July 2008, its share decreased for the short time period (Goetz et al. 2013, p. 214). However, next year starting from April, Kazakhstan set export restrictions on wheat and it lasted until September (Kim 2010, p. 13). As a result of this policy the Kazakh share decreased significantly. Later due to a small wheat crop, Russia banned wheat export from September 2010 till March 2011 (Goetz et al. 2013, p. 214).

Hence, we argue that by using their higher market shares Kazakh and Russian wheat exporters are able to exercise market power and affect the wheat prices exported to Azerbaijan. The objective of this study is to investigate the extent of market power exercised by the Kazakh and Russian wheat exporters in Azerbaijani wheat market. More precisely, by using a residual demand elasticity (RDE) approach, this paper targets to examine whether the Azerbaijani wheat import market is competitive. To our best knowledge, there is no study which investigated the magnitude of market powers of the Kazakh wheat exporters in any export destination by using the RDE approach. Hence, the contribution of this study is that, it focuses on the investigation of the behaviour of the Kazakh wheat exporters in Azerbaijan by using monthly time series data for the latest 10 years, and gives comparison with Russia and Ukraine.

The rest of the paper is organized as follows. Section 2 offers an overview of the relevant theoretical literature. The empirical model is outlined in Section 3. Section 4 presents the results of the data analysis, and the regression results are described in Section 5. The final section of the study is reserved to present the general conclusions.

2. Relevant literature

There are some studies which argue that the RDE model has some advantages over the other trade models, since it does not require very detailed data on all price elasticities of demand, marginal costs and etc. (Goldberg and Knetter, 1999, p.33). Moreover, instead of dealing with the structural demand system involving all firms in an industry, RDE focuses only on the estimation of a single equation (Poosiripinyo and Reed, 2005, p.137). The original RDE model



was introduced by Baker and Bresnahan (1988), but later was developed by Goldberg and Knetter (1999).

Despite its advantages, few studies to date applied RDE model to determine the market power of the exporters in the destination countries' agricultural products markets (cf. Table 1 in the Appendix). Most of the studies were directed to an analysis of market power, especially, in the beer (Baker and Bresnahan, 1988; Goldberg and Knetter, 1999; Glauben and Loy, 2003) and meat markets (Reed and Saghaian, 2004; Poosiripinyo and Reed, 2005; Felt et al, 2011).

The literature pertaining to the market power analysis in the grain market remains quite limited. Very few studies focused on an investigation of wheat markets in different destinations (Carter et al., 1999; Yang and Lee, 2001; Cho et al., 2002; Pall et al., 2014). However, except Pall et al. (2014), majority of them concentrated on the analysis of market power of the traditional wheat exporting countries (Argentina, Australia, Canada, the United States and the European Union). For instance, Carter et al. (1999) for 1970-1991, and Yang and Lee (2001) for 1993-1999 analysed if Australia, Canada and the United States have market power in Japanese and South Korean wheat markets, respectively. They found out that the United States has a significant market power in both wheat markets, Australia has only in South Korean wheat market, but Canada has in none of them. Pall et al. (2014) dealt with the analysis of market power exercised by the Russian wheat exporters in the selected destinations over the period 2002-2009. The authors find out that the Russian exporters obtain a market power in 5 out of 8 importing countries, including Azerbaijan. However, no study until today analysed the magnitude of market power of the Kazakh wheat exporters in main destination markets. Hence, this paper focuses on an investigation of the behaviour of the Kazakh and Russian wheat exporters in their two main destinations, and gives comparison across the importing countries.

3. Modelling approach

In general it is accepted that higher market share is a sign of higher market power, *ceteris paribus*. However, in some cases this relationship does not hold. For example, in the case of elastic demand, where the price equals marginal cost, the exporter country does not possess any



market power, even it gets higher market share. Vice versa, in the case of differentiated products, the exporter country achieves higher market power and sets higher mark-up over prices, even it has small market share.

Consequently, in order to measure a market power indirectly, the relationship between market power and exporting country's inverse residual demand elasticity should be found (Baker and Bresnahan, 1988). RDE, which is a measure of market power, represents the relationship between an export price and quantity, by taking into account the supplies of the competitors. In the case of perfect competitive market, the residual demand is elastic and mark-up is zero. It means the exporter does not have any market power, the changes in the export quantity do not alter the export price and the residual inverse demand function will be horizontal. The export price might only be changed by the competitors' costs. In the case of imperfect market, an exporting country has a market power and there is negative relationship between export price and quantity. The degree of market power increases as the slope of residual demand gets steeper.

In order to build the relationship between an export price and quantity, let's assume exporter i sells a product in the importing country and its inverse residual demand depends on the its own quantity exported, Q_i ; other competitor's export quantities, Q_j ($i \neq j$); and vector of demand shifters of importing countries, Z :

$$P = P(Q_i, Q_j, Z) \quad (1)$$

Then the profit maximization problem for the exporter i will be as the following:

$$\max_{Q_i} \pi_i = Q_i P_i(Q_i, Q_j, Z) - e_i C_i(Q_i, W_i) \quad (2)$$

where, e_i is the exchange rate between the importing and competitor countries' currencies, and C_i denotes the exporting country's cost function, which depends on exporting country's export quantity and the cost shifters of competitors, W_i .

From the first order condition for profit maximization, marginal revenue should equal to marginal cost:

$$P_i + Q_i \left[\frac{\partial P_i}{\partial Q_i} + \left(\frac{\partial P_i}{\partial Q_j} \right) \left(\frac{\partial Q_j}{\partial Q_i} \right) \right] - e_i MC_i = 0, \quad \text{for any } (i \neq j) \quad (3)$$



In the case of perfect competitive market, the terms inside the brackets are zero, and export price equals marginal cost. If the terms are not zero, it is possible to measure the degree of market power through the inverse demand relationship and the first-order conditions (Baker and Bresnahan, 1988).

Goldberg and Knetter (1999) introduce the reduced form of the above equation, which allows evaluating the degree of market power without having detailed cost shifters of the competitors:

$$\ln P_{mt}^{ex} = \lambda_m + \eta_m \ln \hat{Q}_{mt}^{ex} + \alpha'_m \ln Z_{mt} + \beta' \ln W_{mt}^N + \varepsilon_{mt} \quad (4)$$

where, m and t denote destination market and time, respectively; N is a number of competitors in a specific market; α' and β' are vectors of parameters; and \hat{Q}_{mt}^{ex} is the instrumented quantity exported. Export prices, P_{mt}^{ex} and demand shifters of m number of destinations, Z_{mt} , are expressed in destination country's currency. Different studies use time trend or real GDP as the demand shifters. The cost shifters of N competitors can be divided into two parts: first, a part that does not vary by destination and expressed in the competitors' currency (producer price), and second, a part that is destination-specific (exchange rate). As the above equation is expressed in double-log form, the coefficients are explained as the elasticities and ε_{mt} , an error term is i.i.d.

The main coefficient in the equation (4) is η , that is the inverse of residual demand elasticity. In the case of perfect competitive market $\eta = 0$, exporter faces a perfectly elastic demand curve, the export price is not affected by the change in quantity exported, but by the costs of the competitors, and consequently, it means the exporter does not have any market power and it is price taker. However, in the case of imperfect market, $\eta < 0$, the exporter is a price maker and it has a market power, and it increases as the absolute value of η gets larger.

β' , which are the coefficients of the cost shifters, indicate whether the competitors' products are perfect or imperfect substitutes to the exporter's product. In the case of significant $\beta' > 0$ the competitor country's product is a perfect substitute, meaning that if the competitor's costs increase the exporter can raise the export price. On the contrary, in the case of significant $\beta' < 0$ the competitor exports a product which is an imperfect substitute to the exporter's product.



The RDE approach, which was introduced by Baker and Bresnahan (1988) and later developed by Goldberg and Knetter (1999), is applied in this paper to check if Kazakhstan and Russia exercise market power, and which country has a strong position in Azerbaijani wheat market. The paper also considers the effect of third country. This approach represents the effect of export quantity, cost shifters and demand shifters on export price, by taking into account the reactions of the competitor countries (Glauben and Loy, 2003).

4. Data and descriptive statistics

The equation (4) above is applied in order to test the extent of market power that Kazakhstan and Russia are able to exercise in Azerbaijani wheat import market. The study covers different datasets for two combinations, namely Kazakhstan-Azerbaijan and Russia-Azerbaijan. The monthly time-series data for export quantity and value are collected from the Global Trade Information Services (GTIS) database for the period from January 2004 till December 2013. This database includes the product with HS-6 digit code of 100190 until December 2011 and 100199 after January 2012. The export unit price, which was calculated by dividing the export values to the export quantities, was used as proxy for export price.

Real GDP and wheat flour price of an importing country are the demand shifters in this study. Nominal GDP data is collected from the Central Bank of the Republic of Azerbaijan (CBAR), and deflated by the overall CPI across the estimated period, taking January 2004 as the base period. Wheat flour price data is from Food Price Monitoring and Analysis (FPMA) Tool published by the FAO. Competitor countries' exchange rate relative to an importing country and average producer price of wheat are the cost shifters. They both are expressed in exporting countries' currencies. Nominal exchange rate data is taken from CBAR. Producer price data for Kazakhstan, Russia and Ukraine are collected from the Agency of the Republic of Kazakhstan on Statistics (KAZSTAT), the Russian Federal State Statistics Service (ROSSTAT) and FPMA Tool, respectively. Summary statistics of all the variables are presented in Table 2 in the Appendix.



5. Estimation results

In order to check the extent of market power exercised by the Kazakh and Russian exporters in Azerbaijani wheat market individually, the RDE model is separately estimated for 2 combinations. The two-step instrumental variable efficient generalized method of moments (GMM) approach is applied to estimate these combinations. The total export quantity (TEQ) of an exporting country and the number of population of an importing country are treated as excluded instruments in this analysis.

The RDE estimation results by two-step instrumental variable efficient generalized method of moments (GMM) estimator are listed in Table 3 in the Appendix. According to the theory, the quantity coefficients, which are considered as the residual demand elasticities, are zero in the case of perfectly competitive market. On the contrary, if the residual demand elasticities are negative, the exporters have market power in the destinations. As all the quantity coefficients are negative, it means exporters face a negatively sloped demand curves (Reed and Saghaian, 2004). However, only the result for Russia is statistically significant. This suggests that the Kazakh exporters face perfect competition, but the Russian exporters are able to exercise market power and affect the wheat prices in Azerbaijani wheat market over the estimated period. More specifically, Russia gains a 12% profit margin over cost in Azerbaijan.

The profit margins of the exporting countries are constrained by the supply of the other competitors. The producer price of the competitor countries, and the bilateral exchange rates between importing country and competitor countries are considered as the cost shifters. In the Kazakh case, the effect of the Russian destination-specific exchange rate (NER_RUB) on wheat prices is not significant, but the effect of the Russian producer prices (Producer price_RUS) is positive and significant at 1% level in both destinations. This means, the Kazakh market power is constrained by the Russian exporters in Azerbaijani wheat market. Similarly, as the Ukrainian producer prices are positive and statistically significant at 5% level only in Azerbaijan, it is concluded that Ukraine restricts the market power of Kazakh exporters in Azerbaijan. However, Russia constraints the Kazakh exporters' market power more significantly than Kazakhstan.



Similarly, in the Russian case, the estimated coefficients of the cost shifters (NER_KZT and NER_UAH) are both statistically significant. It means, the Russian exporters' market powers are restricted by both Kazakh and Ukrainian wheat exporters. However, Kazakhstan restricts the Russian exporters' market power more significantly than Ukraine.

Moreover, real GDP in Azerbaijan, which is the demand shifter, is positive but not significant in both cases. That means that an increasing income in Azerbaijan does not have significant effects on demand for the Kazakh and Russian wheat. The coefficient of the other demand shifter, wheat flour prices, is statistically significant only in the case of Russia. This suggests that an increase in wheat flour prices in Azerbaijan pushes demand for the wheat imported from Russia, and hence increase the export prices of the Russian wheat.

Although the time range is the same for all samples, due to the export restriction policies on wheat, that were applied by the Kazakh and Russian governments on different periods, the number of observations is not the same. The R-squared is quite high for both cases. As the selection of a proper instrumental variable is important in the IV estimation, first stage F -test for excluded instruments and Hansen J statistics were checked. The results of the F -test rejected the null hypothesis that instruments were correlated with the included endogenous variable. And, the results of the Hansen J statistics failed to reject the null hypothesis that instruments are orthogonal to the errors. Therefore, both tests confirm that selection of the total export quantity of an exporting country and the number of population of an importing country are proper excluded variables.

The results achieved in this paper are consistent in spirit with previous study by Gafarova et al. (2014). The authors also find out that only the Russian wheat exporters exercise market power in Azerbaijani wheat market, but the Kazakh exporters face perfect competition and are not able to affect the export prices. On the contrary, Glauben et al. (2014) achieve that Kazakhstan, Russia and Ukraine cannot exercise market power in the South Caucasian region and they usually face perfect competition.



6. Conclusions

The results of extended IV two-step efficient GMM estimator confirm that Azerbaijani wheat market is not perfectly competitive. Although, the Kazakh wheat exporters face perfect competition in Azerbaijani wheat market, the Russian exporters are able to exercise market power in this market. The analysis of the Kazakh and Russian wheat exporters' performances in Azerbaijani wheat market indicate that competitor countries' exchange rates and average producer price of wheat significantly affect the export prices set by the Kazakh and Russian exporters. Both exporting countries significantly intervene to each other's market powers in Azerbaijan. In the same way, Ukraine constraints the market powers of both Kazakh and Russian exporters in Azerbaijani wheat market. Moreover, the real GDP of Azerbaijan does not play an important role in boosting the wheat export prices from any exporting countries. However, there is positive relationship between the wheat flour prices in Azerbaijan and the Russian wheat export prices to Azerbaijan.

Further empirical analysis is required to extend this research in terms of the number of importing countries, since Kazakhstan and Russia own strong positions not only in Azerbaijan, but also in other countries of the South Caucasus and Central Asia.

The results motivate to argue that, Russia is not price taker in Azerbaijani wheat market. This study clarifies that imperfect competition exists in the Azerbaijani wheat import market. Therefore, the policy implication of this study is to address the trade negotiations between the importing and the other exporting countries (non KRU) in order to improve the competitiveness of the domestic wheat market through the diversification policies. Moreover, in order to decrease the import dependency level of wheat, the domestic wheat production has to be stimulated in Azerbaijan.



References

- AZSTAT, 2014. Food Balances of Azerbaijan, 2014. Statistical yearbook. Baku: The State Statistical Committee of the Republic of Azerbaijan.
http://www.stat.gov.az/source/food_balances/indexen.php (accessed November, 2014).
- AZSTAT, 2015. Production of the GDP, 2015. The State Statistical Committee of the Republic of Azerbaijan. http://www.stat.gov.az/source/system_nat_accounts/indexen.php (accessed April, 2015).
- Baker, J. B., Bresnahan, T. F., 1988. Estimating the Residual Demand Curve Facing a Single Firm, *International Journal of Industrial Organization*, 6, 283-300.
- Carter, C.A., Maclaren, D., Yilmaz, A., 1999. How Competitive is the World Wheat Market?, Working Paper, No.99-002, Department of Agricultural and Resource Economics, University of California.
- [CBAR](http://en.cbar.az/pages/publications-researches/statistic-bulletin). Central Bank of the Republic of Azerbaijan, Statistic Bulletin. Baku. Various issues, 2005-2014. <http://en.cbar.az/pages/publications-researches/statistic-bulletin> (accessed April, 2015).
- Cho, G., Jin, H.J., Koo, W.W., 2002. The Competitive Structure of U.S. Grain Exports in Asian Countries, *Selected Paper AAEA Conference*, Long Beach, C.A.
- Felt, M-H., Gervais, J-P., Larue, B., 2011. Market Power and Import Bans: The case of Japanese Pork Imports, *Agribusiness*, 27(1), 47-61.
- Gafarova, G., Perekhozhuk, O., Glauben, T., 2014. Price discrimination and pricing-to-market behaviour of Black Sea region wheat exporters. Contributed paper presented at the XIV Congress of the European Association of Agricultural Economists, August 26-29, Ljubljana, Slovenia.
- Food Price Monitoring and Analysis (FPMA) Tool. FAO Global Information and Early Warning System. Online database <http://www.fao.org/statistics/databases/en/> (accessed November, 2014).
- Glauben, T., Imamverdiyev, N., Perekhozhuk, O., Prehn, S., 2014. Competitive Structure of Kazakhstan, Russia and Ukraine in world wheat market: Gravity model approach, Contributed paper presented at the XIV Congress of the European Association of Agricultural Economists, August 26-29, Ljubljana, Slovenia.
- Glauben, T., Loy, J-P., 2003. Pricing-to-Market versus Residual Demand Elasticity Analysis of Imperfect Competition in Food Exports: Evidence from Germany, *Journal of Agricultural and Food Industrial Organization*, 1, 1–19.
- Goetz, L., Glauben, T., Bruemmer, B., 2013. Wheat export restrictions and domestic market effects in Russia and Ukraine during the food crisis. *Food Policy*, 38, 214–226.



Goldberg, P. K., Knetter, M. M., 1999. Measuring the intensity of Competition in Export Markets, *Journal of International Economics*, 47, 27-60.

GTIS. Global Trade Information Services, Inc. (GTIS) Global Trade Atlas. Online database <http://www.gtis.com/gta/> (accessed January, 2015).

KAZSTAT, Agency of the Republic of Kazakhstan on Statistics. Online database <http://www.stat.gov.kz> (accessed November, 2014).

Kim, J., 2010. Recent Trends in Export Restrictions. Organisation for Economic Co-operation and Development. OECD Trade Policy Papers, No. 101, OECD Publishing.

Pall, Z., Perekhozhuk, O., Glauben, T., Prehn, S., Teuber, R., 2014. Residual demand measures of market power of Russian wheat exporters, *Agricultural Economics*, 45(3), 381-391.

Poosiripinyo, R., Reed, M., 2005. Measuring market power in the Japanese chicken meat market, *Journal of International Agricultural Trade and Development*, 1(2), 135-148.

Reed, R., Saghaian, S.H., 2004. Measuring the Intensity of Competition in the Japanese Beef Market, *Journal of Agricultural and Applied Economics*, 36(1), 113-121.

ROSSTAT. Russian Federal State Statistics Service. Online database http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/en/main/ (accessed December, 2014).

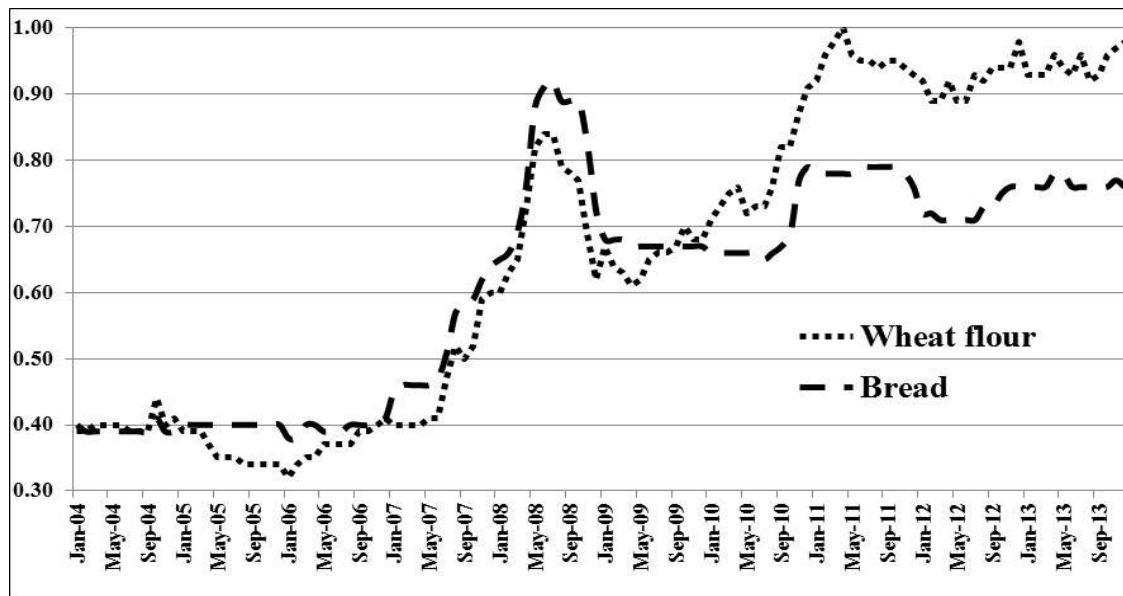
Tasdogan, C., Tsakiridou, E., Mattas, K., 2005. Country Market power in EU olive oil trade, *South-Eastern Europe Journal of Economics*, 2, 211-219

Yang, S.R., Lee, W.J., 2001. Exporters' Market Power in Agricultural Import Markets in Korea, Presentation for Selected Paper Session, *American Agricultural Economics Association*, Chicago.



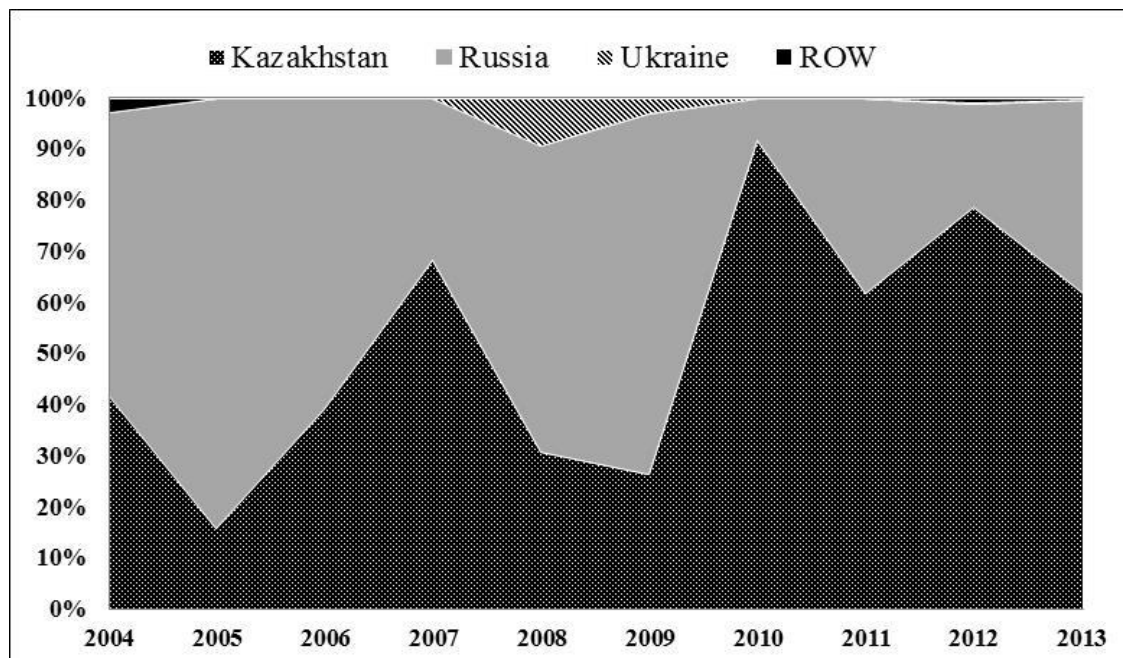
Appendix

Figure 1. Development of bread and wheat flour prices in Azerbaijan from Jan 2004 to Dec 2013, (USD/kg)



Source: Own calculations based on data provided by FAO GIEWS database

Figure 2. Annual shares of KRU and ROW in Azerbaijan, (%)



Source: Own calculation based on UN COMTRADE database

Table 1. Selected studies applying RDE model

Authors	Journal (Year)	Exporting country/firm	Importing country	Product	Period	Data	Method	Results
Baker and Bresnahan	IJIO (1988)	Anheuser-Busch Pabst Coors	n/a	beer	1962-82	A	3SLS	loses most of market power no market power market power
Carter et al.	WP (1999)	Australia Canada USA	Japan	wheat	1970-91	Q	2SLS	no market power no market power market power
Goldberg and Knetter	JIE (1999)	Germany USA	Canada France UK USA Australia Canada Germany Japan Italy UK	beer kraft linerboard paper	1975-93 1973-87	A	OLS IV SUR 3SLS	market power highest market power market power smallest market power market power market power no market power market power no market power no market power
Yang and Lee	CP for AAEA (2001)	Australia Canada USA China USA	South Korea	wheat corn	1993-99 1991-99	Q	TPM SSMS GK MLM	market power no market power market power no market power no market power
Cho et al	CP for AAEA (2002)	Indonesia Japan Korea Malaysia Philippines Singapore	USA	wheat	1073-94	A	SUR	no market power no market power market power market power market power market power
Glauben and Loy	JAFIO (2003)	Germany	Belgium Canada France Italy UK USA	Beer Cocoa chocolate sugar confectionary	1991-98	M	GK	no market power no market power no market power no market power no market power no market power

Table 1. Continued

Authors	Journal (Year)	Export country /firm	Importing countries	Product	Period	Data	Method	Results
Reed and Saghaian	JAAE (2004)	Australia Canada New Zealand USA	Japan	Beef: chilled and frozen (chuck, loin, ribs)	1992-00	M	ISUR	market power in all, except chilled chuck market power in chilled loin and frozen ribs market power in all, except frozen loin market power in frozen ribs
Poosiripinyo and Reed	JIATD (2005)	Brazil China Thailand USA	Japan	chicken meat (whole birds, legs with bone, other cuts)	1988-02	M	Lerner index GLS	market power in whole birds and legs with bone no market power no market power market power in other cuts
Tasdogan et al.	SEEJE (2005)	Greece Italy Spain	EU	olive oil	1970-01	A	2SLS	market power market power market power
Felt et al	AB (2011)	Canada Denmark USA	Japan	pork	1994-06	M	GMM	market power market power market power
Pall et al.	AE (2014)	Russia	Albania Azerbaijan Egypt Georgia Greece Lebanon Mongolia Syria	wheat	2002-09	Q	IVPPML /GMM	market power/ market power no market power/ market power no market power/ market power market power/ market power market power/ market power no market power/ no market power no market power/ no market power no market power/ no market power
Xie and Zhang	MRE (2014)	Canada Chile	USA	whole salmon/ salmon fillet	1995-12	M	GMM	market power/no market power no market power/market power

Notes: **Data:** A=annual, M=monthly, Q=quarterly. **Journal:** AAEE=American Agricultural Economics Association, AB=Agribusiness, AE=Agricultural Economics, CP=Conference Paper, IJIO=International Journal of Industrial Organization, JAAE=Journal of Agricultural and Applied Economics, JAFIO=Journal of Agricultural and Food Industrial Organization, JIATD=Journal of International Agricultural Trade and Development, JIE=Journal of International Economics, MRE=Marine Resource Economics, SEEJE=South-Eastern Europe Journal of Economics, WP=Working Paper. **Method:** GK=Goldberg and Knetter (1999) approach, GLS=Generalized Least Squares, GMM=Generalized method of moments, ISUR=Iterative Seemingly Unrelated Regression, IV=Instrumental variables, IVPPML=Instrumental variable Poisson pseudo maximum-likelihood estimator, MLM=Multinomial Logit Model, OLS=Ordinary Least Squares, SSMS=Steady-state market share, SUR=Seemingly Unrelated Regression, TPM=Transition Probability Matrix, 2SLS=Two-stage least squares, 3SLS=Three-stage least squares.

Table 2. Summary statistics

Variable	Kazakhstan				Russia			
	MEAN	CV	MIN	MAX	MEAN	CV	MIN	MAX
EUV	162.37	0.31	73.88	310.40	169.08	0.33	90.56	320.00
EQ	58322.10	0.82	260.00	206062.00	48470.69	0.88	68.00	164760.00
NER AZN_KZT	0.01	0.15	0.01	0.01	0.01	0.15	0.01	0.01
NER AZN_RUB	0.03	0.14	0.02	0.04	0.03	0.14	0.02	0.04
NER AZN_UAH	0.14	0.29	0.09	0.19	0.14	0.29	0.09	0.19
PP KAZ	20910.57	0.33	11535.00	34326.00	21028.64	0.34	11535.00	34326.00
PP RUS	4708.26	0.36	2300.15	9592.90	4607.02	0.38	2207.00	9593.00
PP UKR	1193.13	0.42	474.00	2190.00	1146.27	0.45	445.00	2190.00
GDP	5221.13	0.67	529.79	12316.62	5283.86	0.66	529.94	12316.62
Wheat flour price	541.11	0.31	290.00	790.00	535.57	0.31	290.00	790.00
TEQ	361884.34	0.63	84519.00	1017888.00	1155161.19	0.66	3461.00	3035092.00
Population	8900314.94	0.04	8349100.00	9467043.00	8903722.16	0.04	8349100.00	9467043.00

Notes: EUV is the export unit value, expressed in importing countries currency; EQ is the export quantity, expressed in tons; AZN is the currency code for the Azerbaijani Manat; KZT is the currency code for the Kazakhstani Tenge; RUB is the currency code for the Russian Ruble; UAH is the currency code for the Ukrainian Hryvnia; NER AZN_KZT, NER AZN_RUB and NER AZN_UAH are the destination-specific exchange rates in KZT, RUB and UAH, respectively; PP KAZ, PP RUS and PP UKR are the average producer price of wheat, respectively for Kazakhstan, Russia and Ukraine; GDP is the gross domestic product, expressed in AZN; Wheat flour price is the retail price of wheat flour, expressed in AZN/ton; TEQ is the total export quantity of the exporting country, expressed in ton; Population is the number of population, for the beginning of the year.

Table 3. RDE estimation results by extended IV two-step efficient GMM estimator

Variable	Kazakhstan	Russia
Export quantity	-0.01 [-0.29]	-0.12*[-1.78]
NER KZT	1.61***[4.62]	0.87*[1.94]
NER RUB	0.25 [0.78]	-0.97 [-1.04]
NER UAH	-	0.80*[1.72]
Producer price_KAZ	0.66***[5.66]	0.32 [1.22]
Producer price_RUS	0.33***[3.71]	0.34 [1.61]
Producer price_UKR	0.22**[2.10]	-
GDP	0.02 [0.60]	0.03 [0.77]
Wheat flour price	0.07 [0.56]	0.51***[3.25]
Constant	2.86***[2.85]	-0.45 [-0.33]
Observations	108	106
R-sq.	0.87	0.61
First stage <i>F</i> -test for excluded instruments	11.10***	5.61**
Hansen J statistics	1.54	0.11

Notes: All variables except the categorical variables are expressed as natural logs. The natural log of total export quantity of the exporting country and population of the importing country are used as excluded instruments. Values in parentheses are t-statistics. Asterisks ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels, respectively.