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PRICE DISCRIMINATION AND PRICING TO MARKET BEHAVIOUR OF BLACK SEA REGION WHEAT EXPORTERS

Gulmira Gafarova[1], Oleksandr Perekhozhuk, Thomas Glauben

Abstract

As a result of some recent changes in the international wheat market, market shares of leading wheat exporters have recently altered. The Black Sea region countries – Kazakhstan, Russia and Ukraine (KRU) – have become important wheat exporters, since they implemented substantial restructuring in total agricultural production, consumption and trade in the 1990s, and subsequently achieved a massive increase in grain production during the 2000s. Consequently, the pricing behaviour of these countries has become a key issue. By applying the pricing-to-market model to annual wheat exports, this study analyses the price discriminating behaviour of the KRU exporters in foreign markets during 1996-2012. The results demonstrate that even though the KRU countries are able to exercise price discrimination in different importing countries, they usually face perfect competition in most destinations.

Keywords

fixed-effects model, price discrimination, pricing-to-market, wheat export

1 Introduction

As one of the world's important food staples, wheat plays a central role in fulfilling an increasing population's demand for foodstuffs. The major wheat suppliers – Argentina, Australia, Canada, the United States, the European Union (EU) and the Black Sea region (KRU) – determine the world wheat prices and significantly affect global food security. Since the breakdown of the Soviet Union, Kazakhstan and Ukraine have achieved important improvements in the agricultural production and so, together with Russia, could provide the world market with 38.9 million tons of wheat in 2011/2012 marketing year (PEREKHOZHUK, 2013). More precisely, because of two reasons – moving to open-market economies in the 1990s; and the massive increase in grain production during the 2000s, the KRU countries could reach a leading position in grain exports (LIEFERT et al., 2013). Although Russia was a former net wheat importer, it became a wheat exporter in 2002 and then was ranked the fourth biggest wheat exporter in the world only six year later in 2008 (Pall et al., 2013). Currently Kazakhstan is a leading country in wheat production in Central Asia, and behind Russia and Ukraine, it is the third biggest wheat producer in the CIS economies (OECD-FAO, 2012: 129). Moreover, Kazakhstan is the largest wheat exporter in the South Caucasus and Central Asia. The average market shares of Kazakhstan are 55% in Azerbaijan, 75% in Turkmenistan, 83% in Uzbekistan, and more than 90% in Kyrgyzstan and Tajikistan for the period from 1996 to 2012 (cf. Fig. 1).

Ukraine takes locational advantages of its geographical proximity to the EU and the MENA[2] countries. Almost one-fourth of the world's wheat export was provided by the KRU countries alone in 2013 (BURKITBAYEVA and KERR, 2013), and it is expected that, this strong position will further develop, since these countries still have the potential to expand grain areas and in-

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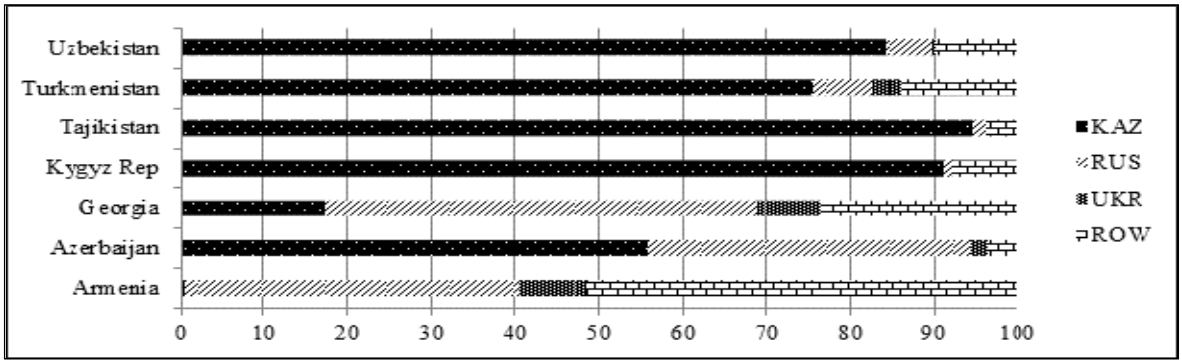
[2] The Middle East and North Africa region refers to: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, West Bank and Gaza, and Yemen.

crease wheat yields (TOTHOVA et al., 2013). Additionally, due to their geographical locations – e.g. being close to the EU and MENA countries, steady domestic market, and close relationships between domestic and world prices, the KRU countries have a good chance to be important players in the international grain market in the future (LIOUBIMTSEVA, 2010). Moreover, an agreement to create a grain pool (so called Grain-OPEC) by the Black Sea countries would further increase the competitiveness of the region and strengthen the rising position of KRU in the world wheat market (PALL et al., 2013).

Figure 1: Average market shares of KRU in South Caucasus and Central Asia, 1996-2012, %



Source: Own calculations based on UN COMTRADE data

Figure 2 makes clear how the world's wheat export switched from traditional exporters to the Black Sea region countries during 1996-2012. The KRU countries started to become important players in the world wheat market in 2002. Although the export share of KRU was only 4% in 1996, it increased to 20% in 2012, a share which was higher than the share of most other exporters, including the USA, but slightly smaller than the share of the EU-12[3]. It is predicted that this upward trend will continue and KRU will account for 30% of world wheat exports by 2021 (USDA, 2012: 28).

Although Russia and Ukraine have got direct access to the world wheat market through the Black Sea, Kazakhstan does not have this advantage, since it is landlocked country. Additionally, transportation and logistics problems, scarcities of inputs, a lack of managerial abilities and others are still the major problems for them (BURKITBAYEVA and KERR, 2013).

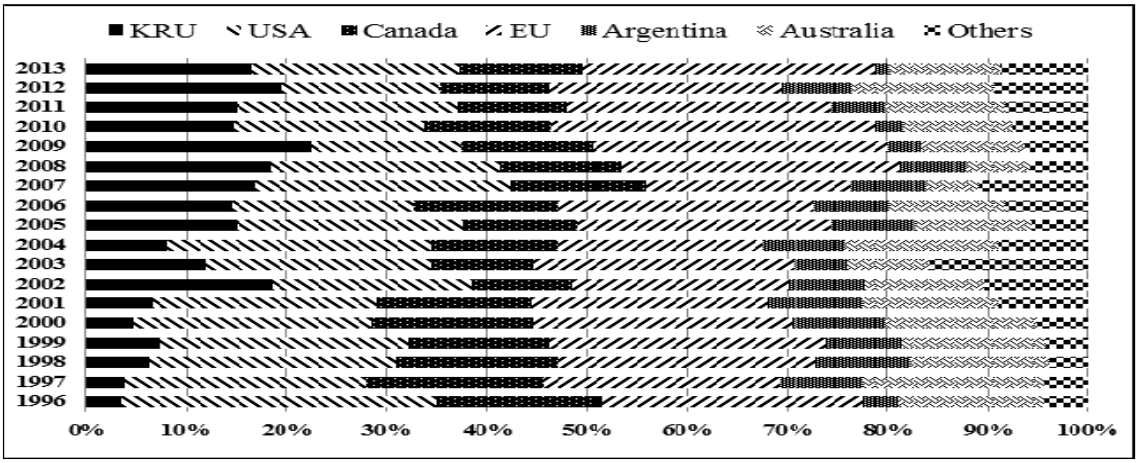
Figure 3 illustrates that, due to their enormous production potential, the importance of the KRU countries in the international wheat market increased after 2002. However, because of a severe winter in Ukraine and Russia in 2003, and a harsh drought in Kazakhstan in 2004, KRU faced a significant decline in grain production in these years (LIOUBIMTSEVA, 2010). More precisely, Ukraine experienced a poor harvest in 2003, and could only produce 4.3 million tons of wheat. After 2003, due to favourable weather conditions and new wheat stocks, Ukraine could again improve its wheat exports and reached its peak (12.9 million tons) in 2009 (FAO/EBRD, 2010: 4-15). Similar to the weather effect, export restrictions additionally limited wheat trade, and declined market shares of the KRU countries[4]. In detail, Ukrainian wheat exports dropped by 77.4% between 2006-07, whereas Kazakh and Russian wheat exports increased by 53.4% and 47.9%, respectively, since main trading partners of Ukraine (Egypt, Israel, Italy, Tunisia and Yemen) switched to import from other exporters, particularly, from Kazakhstan and Russia

[3] EU-12: Belgium, Bulgaria, Czech Rep., Denmark, France, Germany, Hungary, Latvia, Lithuania, Poland, Romania and UK.

[4] To secure the domestic market with enough wheat supplies during the high price peaks in 2007/08 and 2010/11, Russia introduced export taxes on wheat in 2007/08 and, export ban in 2010-11. During both price phases Ukraine set export quotas, (GOETZ et al., 2013: 214), while Kazakhstan applied export bans in 2008 (KIM, 2010: 13).

(DOLLIVE, 2008). Hence, the export restrictions isolate the country from global wheat market, which in turn decline global wheat supply, which again in turn raises world wheat prices and, as KNETTER (1993) puts it, cause price discrimination in the international trade.

Figure 2: Market shares of the major wheat exporting countries (%), 1996-2012

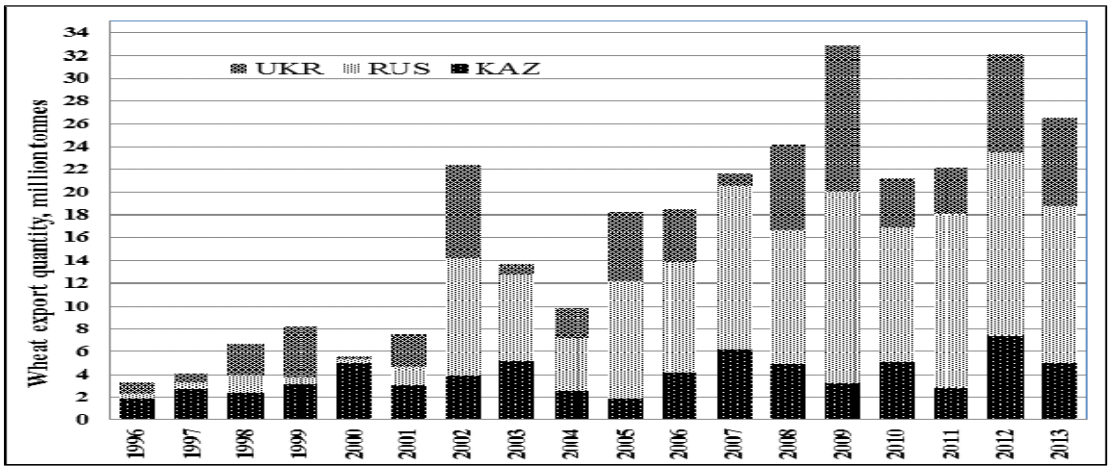


Source: Own calculations based on FAOSTAT data for 1996-2011 and UN COMTRADE data for 2012

The main goal of this study is to test price discriminatory behaviour of KRU wheat exporters in selected foreign markets during 1996-2012. How do KRU exporters adjust their prices in response to variations in exchange rates? How do pricing strategies differ among the exporting countries?

The remaining content of this paper is organized as follows: Section 2 describes the background of the study and summarizes previous literature. Section 3 presents the empirical model and designs an econometric analysis to test the exporter's behaviour. The data analysis and the results of panel unit root tests are described in Section 4. Section 5 presents the estimation results from the fixed-effects model. The final section of the paper provides general conclusions.

Figure 3: KRU annual wheat export quantity, 1996-2012 (mln tons)



Source: Own calculations based on FAOSTAT data for 1996-2011 and UN COMTRADE data for 2012

2 Background of study and relevant literature review

One of the characteristics of the new trade theory is imperfect competition. Under this condition a profit-maximizing exporter has a chance to exercise price discrimination in an import market only when the importer's residual demand elasticity is inelastic (due to absence of other suppliers or inelastic demand). Otherwise, i.e. in the case of elastic residual demand, price discrimina-

tion cannot occur (PALL et al., 2013). HENCE, CAREW and FLORKOWSKI (2003) argue that an ability to price discriminate depends both on the elasticity of demand that the exporter faces in the different importing countries, as well as its relationship to the common marginal cost. Moreover, LAVOIE and LIU (2007) argue that exchange rate movements affect the pricing behaviour of the exporter in an imperfect competitive market and cause price discrimination, since it creates large gaps between the prices set by the seller and those paid by the buyer. Therefore, the exporters use the opportunity to set different mark-ups across destinations to adjust exchange rate changes.

KRUGMAN (1987) was the first who introduced this special type of price discrimination, pricing-to-market (PTM), and claimed that in the case of imperfect competition prices are not always equal marginal cost. More precisely, if the exporting country's currency depreciates, import prices do not change equivalently and thus relative world prices can be affected. As a result, the export price implicitly contains a destination-specific mark-up over marginal cost, i.e. exporters charge the importing countries based on their demand characteristics (PALL et al., 2013).

There have some empirical studies that have applied PTM models to agricultural products to examine the exporters' pricing behaviour. By investigating mainly the pricing strategies of U.S., Canadian, Australian and some European agricultural food (especially, grain) exporters in different time periods, most studies (KNETTER, 1989, 1993; CAREW, 2000; BROWN, 2001; GRIFFITH and MULLEN, 2001; GLAUBEN and LOY, 2003; LAVOIE, 2005; JIN, 2008) has found evidence that the investigated grain exporters exercise PTM behaviour, meaning that they implement price discrimination measures (set different prices) to achieve a different mark-up of prices over marginal cost in some destination countries due to exchange rate volatility. More precisely, by applying the PTM framework to quarterly data, PICK and PARK (1991), PICK and CARTER (1994) confirm that the U.S. and Canadian wheat exporters were exercising price discrimination in some destinations during the 1980s and 1990s. However, JIN and MILJKOVIC (2008) argue that the investigated exporting countries gain less market power in wheat markets than in soybean markets. In their study, CAREW and FLORKOWSKI (2003) differentiate the pricing strategies between U.S. and Canadian wheat exporters, and conclude that the U.S. stabilizes local currency prices, whereas Canada amplifies the effect of exchange rate changes in the destination markets. Market power may not also have a large role in the export pricing of U.S. wheat exporters, admit PATTERSON and ABBOTT (1994).

Aside from PALL et al. (2013), who consider the PTM model for the first time for Russian wheat exporters, to our knowledge, no other study has analysed the pricing behaviour of the three main wheat exporters of the Black Sea region in the world wheat market. PALL et al. (2013) conclude that even though Russia exports wheat to many destinations on a large scale, it can exercise PTM behaviour only in few of them. Put otherwise, Russia is unlikely to exert significant market power in the world wheat market since it faces perfect competition in most importing countries.

3 Modelling Approach

To test the relationship between export prices and destination specific exchange rates, the PTM model, which was introduced by KRUGMAN (1987) for the first time and developed later by KNETTER (1989) to determine the presence of price discrimination in international trade, will be applied in this study. The PTM model is estimated by using a fixed-effects model for each of the exporting countries separately:

$$\ln p_{it} = \lambda_i + \theta_t + \beta_i \ln e_{it} + u_{it}, \forall \mathrm{i} = 1, \dots, \mathrm{N} \text{ and } \forall \mathrm{t} = 1, \dots, \mathrm{T} \quad (1)$$

where, p_{it} is the wheat export price measured in the exporting country's currency to importing country i in period t; λ_i and θ_t represent country and time effects, respectively; e_{it} is the destination-specific exchange rate expressed as foreign (local) currency per unit of the exporting

country's currency in period t. The parameter β_i denotes the elasticity of the domestic currency export price with respect to exchange rate. A significant negative β means that the exporter stabilizes the local currency prices, while a positive β indicates that the exporter amplifies the effect of exchange rate changes. Specifically, positive coefficients of the exchange rate variable show that the demand for wheat imports gets more inelastic as export prices increase in response to the depreciation of the importing country's currency relative to the exporting country's currency. On the contrary, negative coefficients of the exchange rate variable indicate an increasingly inelastic demand for wheat imports as export prices decrease because of the depreciation of the importing country's currency relative to the exporting country's currency (JIN and MILJKOVIC, 2008). And finally, u_{it} is an i.i.d. error term $N(0, \sigma_u^2)$.

With respect to the model parameters, KNETTER (1989) distinguished three alternative model scenarios: first, the competitive market, where changes in the exchange rate do not influence export prices ($\beta = 0$) and there is no country effect ($\lambda = 0$), so that the export price ($\theta_t \neq 0$) is the same across destinations. The second and third situations introduce imperfect competition with price discrimination across destination countries. The second model can be described as price discrimination with constant elasticity of demand with respect to the domestic currency price in each of the importing countries. In this model, the mark-up over marginal cost is constant but can change over time and across destinations ($\lambda \neq 0$ and $\theta \neq 0$). Hence, the time effects capture the changes in marginal cost and the country effect measures the mark-ups in different destinations. Also, shifts in bilateral exchange rate do not affect export prices across destinations ($\beta = 0$). The third model is called the price discrimination with varying elasticity of demand with respect to domestic currency price in each of the importing countries. More precisely, fluctuations in the exchange rate vary the demand elasticity, and this changes the optimal mark-up (by a price-discriminating monopolist) over marginal cost across destination markets ($\lambda \neq 0$). Hence, export prices depend on the exchange rate ($\beta \neq 0$), exactly the situation that is called "pricing to market".

In summary, "…how exchange rates affect commodity export prices depends on how changes in currency values are transmitted to foreign currency prices" (CAREW and FLORKOWSKI, 2003: 139). Depending on the elasticity of demand, changes in the exchange rate have different effects on export prices. If the elasticity of demand with respect to price is constant, then changes in the exchange rate will not have any effects on the optimal mark-up charged by the exporter, but it will change the price paid by the importing country. However, if the elasticity of demand with respect to price is not constant, then shifts in the exchange rate will change the optimal mark-up charged by the exporter, i.e. the local currency price paid by the importing country will change.

4 Data Analysis and Descriptive Statistics

The model in equation (1) is applied to the wheat market to test for non-competitive market structure in the wheat exports of Kazakhstan, Russia and Ukraine. Three panel data sets for Kazakhstan, Russia and Ukraine cover the period 1996-2012, and consist of average annual exchange rate and annual export unit value for wheat. The harmonized code description for wheat is categorized as "wheat and meslin" (HS code[5]: 1001) and includes durum wheat, and wheat except durum wheat and meslin. The quantity and value data are provided by the United Nations Commodity Trade Statistics Database (UN COMTRADE), and are used to generate the export unit value (export price) of the commodity x, measured in units of a currency per metric ton: $UV_{x(i,j)} = \frac{V_{x(i,j)}}{Q_{x(i,j)}}$, where i and j denote the exporting and importing countries, respectively. The disadvantage of using export unit value as export price is that it usually aggregates data on products employed for different uses, meaning that unit values do not include quality issue, and assumes qualities of the products shipped to different destinations are the same and do not

[5] For commodity classifications and quantity measurement see IMTS (2011: 31-37, 45-46).

change over time (LAVOIE and LIU, 2007). Hence, significant PTM results might be a signal of product differentiation, but not price discrimination. More precisely, as the price data used in this study represent export unit value, but not real export prices, it might be concluded that the differences in the prices exported to different destinations result from the pricing strategies of the exporters, but not quality differences (FEDOSEEVA, 2013). In contrast, KNETTER (1989) argues that, as different qualities of wheat are shipped to various countries, country dummies would already cover the issue of quality. The same goes for quality changes which are common across countries: they would be captured by time effects (LAVOIE and LIU, 2007).

According to export database of UN COMTRADE, the export data include export quantity and value data, which are recoded as the FOB-type value (Free on Board). Under the International Commercial Terms (Incoterms) FOB-type value includes the transaction value of the goods and services performed to deliver goods to the border of the exporting country[6]. Hence, the export price data used in this study are FOB price and significant variations in export prices for different destinations cannot be explained by different transportation costs. The export prices for Kazakh, Russian and Ukrainian samples are defined, in KZT, RUB and UAH per metric ton, respectively.

The average annual nominal exchange rate data (buyer's currency per unit of seller's currency) are available from the International Financial Statistics of the International Monetary Fund (IMF), the online exchange rate source OANDA, and the Russian Federal State Statistics Service (ROSSTAT). The model comprises $T * N$ observations. In order to avoid singularity problems, $T - 1$ time dummies (θ_t) and $N - 1$ country dummies (λ_i) are included in a pooled cross-sectional–time-series model. As intercept countries we choose countries that have seaports and highly competitive wheat markets: Turkey for Kazakhstan, Israel for Russia and Ukraine. Importing countries are selected based on data availability, number of observations (more than 3), geographical location and relative importance to the exporting country. The number of destination countries varies across three KRU exporting countries: 48, 71 and 65 for Kazakhstan, Russia and Ukraine, respectively[7]. As the data are unbalanced panel, not every selected importing country buys wheat from Kazakhstan, Russia and Ukraine in the observed years.

5 Estimation Results and Discussion

The null hypothesis of the constant elasticity model is rejected if there is a significant relationship between export prices and nominal exchange rate in at least one importing country. Non-zero coefficients of the exchange rate variable indicate violations of the constant elasticity model, which in turn confirms the existence of price discrimination.

As this study is based on panel data, we have to check for nonstationarity, a procedure particularly necessary in case of a large number of observations and long time periods (BALTAGI 2005, p. 237). To this end, we perform the Augmented Dickey-Fuller and Phillips-Perron panel unit root test on KRU wheat export prices and nominal exchange rates. Moreover, as the data are unbalanced panel data, the Fisher-type panel unit root test is applied in this study. Panel unit root tests check the null hypothesis of nonstationarity [I(1)] against the alternative of stationarity [I(0)]. The results of tests with drift, demean, and demeaned with drift indicate the rejection of null hypothesis of nonstationarity, meaning that none of the panels contains a unit root. Hence, this rejection might not only lead to the conclusion that there exists a linear long-run relationship between wheat export prices and destination-specific exchange rates, but it also confirms the existence of "pricing-to-market". As the unit-root process is rejected, we can apply the fixed-effect model to our panel data.

[6] For statistical value of exported goods and terms of goods delivery see IMTS (2011: 39-41, 97-99).

[7] Because of page limit, the summary statistics, unit root tests, and F-test tables are not reported here, but are available by the authors upon request.

Additionally, the Wooldridge test for autocorrelation in panel data is conducted and results reject the null hypothesis of no serial correlation. So, we assume first-order autocorrelation in the data.

To check the joint significance of both country effects and exchange rate effects in each of the data sets separately, two types of F-tests are employed. The null hypotheses of all country effects are equal and all exchange rate effects are zero (the case of perfect market) are rejected, which in turn means that the KRU wheat exporters set country-specific mark-ups and exercise PTM behaviour in at least one of the importing countries.

Tables 1-3 separately present the estimation results of the fixed-effects model for all KRU countries along with the R-squared coefficients and adjusted R-squared values (in brackets). The R-squared values are 0.30, 0.65 and 0.50, respectively for Kazakhstan, Russia and Ukraine, thus indicating that country and time effects, as well as destination-specific exchange rates explain most of the variation in prices for Russia and Ukraine. All the statistical tests and models are checked by using the STATA software (version 13). According to the results, there is evidence of PTM in 7 out of 48; 20 out of 71; and 17 out of 65 countries that import wheat from Kazakhstan, Russia and Ukraine, respectively.

Kazakh wheat exporters are sensitive to exchange rate changes and stabilize local currency prices in 5 out of 7 destination countries, while in Lithuania and Sudan they amplify the effect of exchange rate changes (cf. Table 1). This means, the inelastic demand for Kazakh wheat allows Kazakh exporters to set higher prices as the Kazakhstani tenge becomes more expensive due to currency depreciation in the importing countries.

Table 1: Estimation results for Kazakhstan

Destinations	λ	β	Destinations	λ	β
Afghanistan	0.11 [0.23]	-0.23 [-0.82]	Lithuania	1.24 [1.72]	0.40*[1.98]
Albania	-2.34**[-2.15]	-7.93**[-2.60]	Malaysia	0.00 [0.00]	-0.08 [-0.40]
Algeria	0.01 [0.01]	-1.84 [-0.93]	Moldova	-2.75 [-1.09]	-1.24 [-1.15]
Azerbaijan	1.92 [1.52]	0.40 [1.56]	Mongolia	0.92 [1.03]	-0.08 [-0.19]
Belarus	0.43 [1.23]	0.09 [1.62]	Morocco	4.71 [0.98]	1.73 [0.97]
Cyprus	1.48 [1.39]	0.28 [1.39]	Netherlands	-2.40 [-0.75]	-0.63 [-0.91]
China	3.25 [0.51]	0.95 [0.47]	Norway	0.68 [0.77]	0.19 [0.65]
Dominica	1.17 [1.33]	0.30 [1.36]	Pakistan	0.17 [0.39]	-0.27 [-0.62]
Egypt	-0.89 [-0.99]	-0.27 [-1.00]	Poland	-1.47 [-1.22]	-0.45 [-1.46]
Estonia	0.49 [0.73]	0.19 [0.70]	Portugal	-2.29 [-0.79]	-0.48 [-0.85]
Finland	1.16 [0.65]	0.21 [0.59]	Romania	0.90 [1.41]	0.20 [1.35]
Georgia	-1.03 [-0.54]	-0.24 [-0.55]	Spain	0.30 [0.31]	0.07 [0.37]
Germany	1.06 [0.78]	0.20 [0.75]	Sudan	2.64**[2.74]	0.66**[2.61]
Greece	-1.83*[-1.84]	-0.37*[-1.85]	Sweden	-0.42 [-0.52]	-0.24 [-0.96]
Indonesia	2.55 [1.19]	-0.43 [-0.84]	Switzerland	1.21 [0.76]	0.26 [0.74]
Iran	1.06**[2.81]	-0.09 [-1.01]	Tajikistan	-0.50**[-2.21]	-0.12**[-2.29]
Ireland	-2.40 [-1.05]	-0.49 [-1.04]	Tunisia	-0.20 [-0.06]	-0.04 [-0.05]
Israel	0.07 [0.03]	0.00 [0.00]	Turkey	-	-0.08 [-1.29]
Italy	-0.36 [-0.34]	-0.08 [-0.40]	Turkmenistan	0.34 [0.26]	0.04 [0.14]
Jordan	-9.15 [-1.68]	-1.70 [-1.64]	UAE	-2.38 [-1.01]	-0.68 [-1.05]
Kyrgyz Rep	-0.18 [-1.01]	-0.31 [-1.65]	UK	-11.27 [-1.33]	-2.18 [-1.32]
Latvia	0.17 [0.11]	0.02 [0.07]	USA	-0.39 [-0.24]	-0.10 [-0.29]
Lebanon	1.97***[4.52]	-0.57**[-2.72]	Uzbekistan	-0.62**[-2.77]	-0.10**[-2.25]
Libya	-9.86 [-0.76]	-2.08 [-0.76]	Venezuela	-17.62 [-0.85]	-3.54 [-0.87]
Constant		9.41***[30.82]			
Observations	451				
R-sq. (Adj. R-sq.)	0.30 (0.11)				

Notes: Values in parentheses are t-statistics. Asterisks ***, ** and * denotes statistical significance at the 1, 5 and 10 percent levels, respectively. Turkey is treated as the intercept.

Similarly, Russian exporters amplify the effect of exchange rate changes in most 16 out of 20 countries, while they are sensitive to exchange rate fluctuations in the Democratic Republic of Congo, Moldova, Poland and Turkmenistan (cf. Table 2). On the contrary, Ukrainian exporters

tend to adjust the prices to stabilize the effect of exchange rate changes in 10 out of 17 countries, except in Algeria, Belgium, Bulgaria, Estonia, Latvia, Thailand and Uzbekistan (cf. Table 3).

Additionally, Kazakh exporters practice price discrimination with constant mark-up cant λ, insignificant β) against Iran (exporters charge higher price mark-ups than Turkey). Similarly, Russian exporters achieve price discrimination with constant mark-up in Iraq, Lithuania, North Korea, Romania, Switzerland and Tanzania, whereas Ukrainian exporters are able to do so in Indonesia, Kenya, Lithuania, Morocco, Portugal, Saudi Arabia and Spain. Russian wheat exporters charge higher prices (significant positive λ) in most destinations except in Iraq. In contrast, Ukraine sets higher prices in all countries (with significant λ), except Portugal and Spain. Consequently, it might be concluded that Russia and Ukraine possess enough market power to charge higher prices in most destinations, since the positive coefficient of the country dummy represents the strong market position of the exporter in importing countries (JIN and MILJKOVIC, 2008). Significant positive coefficients of the country dummy indicate that exporting countries can charge relatively higher prices by shipping higher quality of product to high-income countries (KNETTER, 1989). Consequently, this may explain why Russia achieves comparatively higher mark-ups in Denmark, Finland, Germany, Sweden and Switzerland, because these importing countries belong to the group of developed countries and can afford to import higher quality of wheat.

However, these results contradict those of PALL et al. (2013), who state that Russia mainly exports undifferentiated quality of wheat to less-developed countries, consequently, cannot gain market power due to product differentiation, but can charge higher prices in countries with poor access to the world wheat market.

For the remainder of the importing countries, the null hypothesis of competitive pricing cannot be rejected (λ and β are insignificant). Here, Kazakhstan in 40; Russia in 45 and Ukraine in 41 countries either face perfect competition, or get common mark-up of their competitors in imperfect markets.

6 Concluding Remarks

The results of this study indicate the evidence of PTM behaviour of the Black Sea region wheat exporting countries in some of the investigated destinations. The differences in the extent of mark-ups in different destinations might be due to several reasons, namely different pricing policies, quality differences and the importance of world trade for the individual exporting country (CAREW and FLORKOWSKI, 2003). In order to defend their market share, Kazakhstan and Ukraine therefore stabilize their local currency prices (charge lower prices) in those destinations where they export large quantities to destinations (like, Egypt and Greece). The other reason for higher wheat export prices in high-income countries might result from the different quality of the exported wheat, as is observable for Russian and Ukrainian wheat exports to some European countries.

Kazakhstan as the most important wheat exporter to Central Asian countries (with a market share of more than 90% of total wheat imports) exercises price discrimination in this region, except in the Kyrgyz Republic and Turkmenistan. More precisely, Kazakhstan stabilizes its local currency prices in Tajikistan and Uzbekistan, but faces competition in the Kyrgyz Republic and Turkmenistan. In all Central Asian countries, except Turkmenistan, Kazakhstan charges relatively low prices for exported wheat. On the contrary, Russia price discriminates by stabilizing local currency prices when exchange rates are fluctuating, whereas Ukraine receives higher mark-up and amplifies the effect of exchange rate in Uzbekistan.

Table 2: Estimation results for Russia

Destinations	λ	β	Destinations	λ	β
Afghanistan	1.15 [1.36]	-1.26 [-1.06]	Malaysia	0.55 [0.44]	0.20 [0.32]
Albania	0.25 [0.51]	-0.14 [-0.33]	Malta	0.44 [1.10]	0.09 [0.81]
Algeria	0.33 [0.29]	-0.40 [-0.34]	Mauritania	3.03 [1.34]	-1.28 [-1.21]
Armenia	-0.79 [-1.65]	0.37**[2.36]	Moldova	-0.17 [-0.55]	-0.98**[-2.20]
Austria	-0.15 [-0.25]	-0.04 [-0.24]	Mongolia	-0.98 [-0.96]	0.35 [1.36]
Azerbaijan	0.74**[2.88]	0.17*[2.00]	Morocco	0.29**[2.45]	0.15**[2.71]
Bangladesh	-0.39 [-1.10]	0.49 [1.45]	Mozambique	0.18 [0.95]	0.28 [0.72]
Br. Virgin Isl.	0.05 [0.37]	-0.03 [-0.30]	Netherlands	-0.68 [-0.44]	-0.18 [-0.39]
Bulgaria	0.20 [0.97]	-0.03 [-0.28]	Nigeria	0.67 [0.57]	-0.47 [-0.66]
Cyprus	0.65**[2.24]	0.16*[1.77]	North Korea	0.37*[1.75]	0.12 [0.94]
Denmark	0.53***[3.43]	0.31***[2.97]	Norway	-0.58 [-0.55]	-0.37 [-0.56]
DR Congo	2.67***[10.27]	-0.79***[-7.03]	Oman	3.57***[3.01]	0.78**[2.72]
Egypt	0.37 [1.12]	0.16 [0.85]	Pakistan	-0.25 [-0.89]	0.47***[6.03]
Eritrea	-0.01 [-0.04]	-0.23 [-0.51]	Peru	1.39***[4.59]	0.50***[3.46]
Estonia	0.02 [0.17]	0.06 [0.56]	Poland	0.13 [0.78]	-0.22*[-1.86]
Ethiopia	0.33*[1.81]	0.42***[3.64]	Rep of Yemen	-0.66 [-0.62]	0.40 [0.76]
Finland	3.05***[6.37]	0.81***[4.55]	Romania	4.55*[1.75]	1.92 [1.66]
Georgia	0.66 [1.46]	0.18 [0.99]	Rwanda	0.75 [0.45]	-0.22 [-0.41]
Germany	4.07**[2.53]	1.11**[2.48]	Saudi Arabia	2.59***[3.45]	1.29***[3.50]
Greece	1.05 [1.56]	0.29 [1.42]	South Korea	0.07 [0.15]	-0.00 [-0.01]
Hungary	1.33 [1.61]	-0.49 [-1.67]	Spain	-1.19 [-0.63]	-0.32 [-0.59]
India	-1.38*[-2.02]	3.06**[2.20]	Sudan	0.49 [0.77]	0.14 [0.49]
Indonesia	1.51 [0.46]	-0.24 [-0.44]	Sweden	0.78***[5.63]	0.58**[2.57]
Iran	-2.07 [-1.48]	0.36 [1.55]	Switzerland	0.46*[1.91]	0.13 [1.14]
Iraq	-0.74*[-2.00]	0.26 [1.52]	Syria	-0.48 [-1.26]	-0.59 [-1.47]
Israel	-	-0.00 [-0.02]	Tajikistan	0.87 [0.86]	0.27 [0.66]
Italy	-0.19 [-0.29]	-0.05 [-0.31]	Tanzania	1.62*[1.96]	-0.39 [-1.47]
Japan	-1.32***[-5.79]	1.48***[7.80]	Thailand	-0.02 [-0.12]	0.28 [0.80]
Jordan	1.18 [0.58]	0.28 [0.51]	Tunisia	2.54***[22.27]	0.78***[14.59]
Kenya	0.40 [0.77]	-0.24 [-0.47]	Turkey	0.34 [0.63]	0.08 [0.39]
Kyrgyz Rep	0.72 [1.31]	-0.32 [-0.54]	Turkmenistan	-1.10 [-1.33]	-0.82**[-2.83]
Latvia	-0.30 [-0.41]	-0.13 [-0.66]	UAE	0.43 [0.50]	0.16 [0.38]
Lebanon	-0.30 [-0.84]	0.10 [1.38]	Uganda	1.13 [0.56]	-0.23 [-0.45]
Libya	0.95 [0.61]	0.29 [0.57]	UK	-6.42 [-1.70]	-1.76 [-1.71]
Lithuania	0.43*[1.81]	0.16 [1.32]	Uzbekistan	1.12 [1.31]	-0.14 [-0.53]
Constant	8.07***[50.04]		Vietnam	-0.53 [-0.16]	0.09 [0.18]
Observations	660				
R-sq. (Adj. R-sq.)	0.65 (0.55)				

Notes: See Table 1. Israel is treated as the intercept.

Considering KRU wheat exports to the South Caucasus region, the results are different from those of Central Asia; Kazakhstan in Azerbaijani and Georgian, Ukraine in the whole South Caucasian wheat market face perfect competition and fail to exercise price discrimination. As the number of observations for Armenia was less than three, this country was excluded from the Kazakhstan dataset. In contrast, Russia price discriminates in Armenian and Azerbaijani wheat market (also receives higher mark-ups in Azerbaijan), i.e. it amplifies the effect of exchange rate changes, but face perfect competition in the Georgian wheat market. The reason why all KRU countries face perfect competition in the Georgian wheat market might be due to diversification policy of the government that recently started to import equally from each of the KRU countries.

One of the interesting findings of this study is that the Black Sea region wheat exporters either compete with other wheat exporting countries, or tend to stabilize local currency prices in their most important wheat importing countries like Egypt, Italy, South Korea, Spain, the Netherlands, Turkey, China, Republic of Yemen, USA, Vietnam and Nigeria. Specifically, Egypt, the world's biggest wheat importer, buys wheat in large quantities from Russia. However, Russia faces competition in this destination together with Kazakhstan, while Ukraine stabilizes its wheat export prices in Egyptian pound.

Table 3: Estimation results for Ukraine

Destinations	λ	β	Destinations	λ	β
Albania	0.78 [1.42]	-0.08 [-0.58]	Lithuania	**0.31*[1.84]**	0.02 [0.12]
Algeria	-0.13 [-0.24]	**0.18*[1.89]**	Malaysia	0.07 [0.88]	-0.10 [-0.99]
Armenia	0.57 [0.84]	0.06 [0.65]	Mauritania	**1.96**[2.17]**	**-0.40**[-2.33]**
Austria	-0.02 [-0.10]	0.05 [0.95]	Moldova	**1.52***[3.54]**	**-0.96*[-1.78]**
Azerbaijan	0.14 [0.50]	0.10 [0.73]	Morocco	**0.19*[1.82]**	-0.02 [-0.52]
Bangladesh	0.61 [1.24]	-0.10 [-0.90]	Myanmar	**0.24***[3.09]**	**-0.54**[-2.21]**
Belarus	-0.35 [-0.78]	0.22 [1.36]	Netherlands	-0.02 [-0.06]	0.01 [0.06]
Belgium	**0.39*[1.91]**	**0.34***[3.00]**	Nigeria	-0.43 [-0.33]	0.24 [0.70]
Bermuda	-0.12 [-0.84]	-0.01 [-0.10]	North Korea	0.06 [0.60]	0.13 [0.78]
Br. Virgin Isl.	-0.11 [-0.53]	-0.02 [-0.15]	Peru	-0.59 [-0.78]	-1.68 [-0.93]
Bulgaria	**0.81***[3.56]**	**0.43*[1.89]**	Philippines	0.01 [0.02]	0.10 [0.87]
Cyprus	-0.22 [-0.85]	0.00 [0.04]	Poland	**0.16**[2.30]**	**-0.14*[-2.03]**
Djibouti	**2.29***[3.20]**	**-0.54**[-2.22]**	Portugal	**-0.46**[-2.26]**	-0.10 [-1.10]
Egypt	**0.09**[2.29]**	**-0.34***[-3.01]**	Rep of Yemen	0.94 [0.68]	-0.10 [-0.35]
Eritrea	**1.06***[3.87]**	**-0.85*[-2.05]**	Saudi Arabia	**0.26*[1.89]**	0.24 [0.81]
Estonia	-0.22 [-0.77]	**0.35*[2.10]**	Slovak Rep	0.24 [0.46]	0.09 [0.49]
France	-0.28 [-1.04]	-0.09 [-0.74]	South Africa	0.19 [1.70]	-0.03 [-0.14]
Georgia	0.20 [1.05]	0.02 [0.16]	South Korea	0.31 [0.35]	0.07 [0.76]
Germany	0.22 [0.70]	0.18 [1.72]	Spain	**-0.42**[-2.18]**	-0.10 [-1.11]
Greece	**-0.45**[-2.27]**	**-0.18**[-2.48]**	Sri Lanka	-1.34 [-0.55]	0.69 [0.75]
Hungary	0.14 [0.23]	0.10 [1.05]	Sudan	-0.07 [-0.38]	-0.16 [-0.83]
India	0.55 [0.92]	-0.08 [-0.50]	Switzerland	-0.29 [-1.55]	**-0.24**[-2.51]**
Indonesia	**2.61*[1.83]**	-0.22 [-1.43]	Syria	0.23 [1.63]	-0.06 [-0.45]
Iraq	0.55 [0.87]	0.04 [0.47]	Tajikistan	0.38 [1.73]	0.09 [0.29]
Ireland	-0.17 [-0.70]	-0.13 [-0.74]	Thailand	**-1.66**[-2.55]**	**1.40**[2.92]**
Israel	-	-0.12 [-0.97]	Tunisia	-0.00 [-0.00]	0.02 [0.20]
Italy	-0.14 [-0.73]	0.05 [0.78]	Turkey	0.77 [1.46]	0.39 [1.12]
Jordan	0.37 [0.66]	0.20 [0.99]	Uganda	2.69 [1.13]	-0.31 [-0.93]
Kenya	1.21 [1.73]	-0.29 [-1.61]	UAE	0.02 [0.23]	-0.06 [-0.37]
Latvia	0.55 [1.33]	**0.36*[2.10]**	UK	-0.17 [-0.58]	-0.00 [-0.11]
Lebanon	0.74 [1.12]	0.03 [0.50]	USA	0.02 [0.05]	0.13 [0.85]
Libya	**-0.64**[-2.57]**	**-0.32**[-2.19]**	Uzbekistan	**1.45***[3.20]**	**0.44*[1.94]**
Constant	**6.44***[182.14]**		Vietnam	2.57 [0.99]	-0.18 [-0.81]
Observations	605				
R-sq. (Adj. R-sq.)	0.50 (0.36)				

Notes: See Table 1. Israel is treated as the intercept.

The results of this study confirm the findings of previous studies on pricing behaviour in the international wheat market. In fact, many studies have found evidence of pricing-to-market behaviour in wheat importing countries. Our findings are, in general, supported by the empirical study of Pall et al. (2013) who, by estimating a PTM model on the basis of quarterly time series data, could prove price discrimination for Russian wheat exporters only in a few importing countries. The general conclusion is that the KRU countries are able to exercise price-discriminating behaviour in some destination markets, but in most destinations they usually face perfect competition.

Finally, future research may incorporate the pricing behaviour of the KRU countries by using firm-level data since it presents clearer picture of the competitive structure of the wheat market.

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