KAZAKHSTAN'S REVEALED COMPARATIVE ADVANTAGES IN AGRICULTURAL EXPORTS

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Abstract

This paper evaluates the issue of revealed comparative advantages in the case of Kazakhstan's agricultural exports. The aim of this paper is to determine the changing pattern of comparative advantages of Kazakhstan's agricultural sector over period 2006-2016. Kazakhstan is a recent member of WTO. Therefore, as a being current member of WTO, it is necessary to examine the current competitiveness of agriculture exports. In order to assess the export competitiveness, we use the popular Balassa Revealed Comparative Advantages Index. According to our findings, a group of products have comparative advantages including cereals wheat and meslin, barley, wheat and meslin flour as well as cotton, oilseeds and sunflower seeds. Moreover, the regression analysis is used in the paper. The results show that GDP, GDP per capita and arable land have negative effects on the export competitiveness of agricultural products, while agricultural employment, exchange rate and WTO memberships are positively associated with comparative advantages.

Key words: Balassa Index, agricultural products, Kazakhstan, export, WTO membership

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1. Introduction

Kazakhstan plays an important role on world agricultural markets, with considerable export potential in the grain sectors. According to OECD (2015) analysis, the share of agriculture in the GDP of Kazakhstan in the period 2010-2015 changed slightly and was estimated at about 7%. At the same time, the share of agriculture in the total volume of exports was relatively stable and averaged 17.4% in the period 2010-2015.

It should be noted that lower trade barriers as a result of joining the World Trade Organization (WTO) may facilitate growth in the agricultural and food sector. Moreover, in order to take full advantage of the opportunities that the WTO membership provides, Kazakhstan needs to align the domestic regulatory framework governing trade with the international rules, and also needs to introduce complementary measures to improve the overall competitiveness of the agricultural sector. Being a recent member of WTO, Kazakhstan also has substantial opportunities to improve export competitiveness.

President of Kazakhstan N.Nazarbayev (2017) said in his recent message titled "The Third Modernization of Kazakhstan: Global Competitiveness", that the agrarian sector is seen as a "driver" of economic growth. In addition, Kazakhstan has vast environmentally sound agricultural land and is able to produce organic food. And Kazakhstan is already one of the

largest exporters of grain crops. According to the forecasts of the UN Food and Agriculture Organization (2015), the production of wheat in Kazakhstan will reach 14.7 million tons by 2025.

On the basis of the significance of the agricultural sector, the paper aims to describe which products have potential to export globally as well as to determine whether or not the patterns of comparative advantage for Kazakhstan agricultural trade have significant changes over the period 2006-2016. Furthermore, to estimate how WTO membership will impact comparative advantages.

2. Related Theories and Literature Review

The term of comparative advantages was initially introduced by the classical economist David Ricardo building on Adam Smith's principle of absolute advantages. David Ricardo (2005) suggested that comparative advantages exist if a country is better suited for production of one good over another country it means that its opportunity costs of production are relatively lower than in the other country.

Despite the fact, neo-classical economists Eli Heckscher and Bertil Ohlin (Feenstra, 2004) defined the idea of comparative advantages in a pattern founded on differences in resource endowments.

But, it should be taken into account that assessing comparative advantages and testing the Hecksher- Ohlin theory bring a few challenges as the relative costs under autarky are not noticeable. Given that reality, Balassa offers that it is no need to add all components of evaluating country's comparative advantage. As an alternative, Balassa(1965) imply that comparative advantage is "revealed" by observed pattern of trade.

Laursen(1998) reports that the popularity of the RCA measure lies on its relative simplicity, its capacity to use comparative set of data, like trade data based on SITC analysis, and its reliability as a measure of actual changes in the basic of real comparative advantages.
There should be pointed out that the methodology suggested by Balassa is more frequently used for empirical estimation of specialization and comparative advantage of countries, including Kazakhstan.

Researchers discussed on the topic of agricultural competitiveness in Kazakhstan. Espolov and Kerimova(2004) studied competitiveness Kazakhstan's agricultural products on CIS market, while Khatibi (2008) studies Kazakhstan's RCA on EU market where he found that though Kazakhstan demonstrates a revealed comparative advantage in certain sectors, its competitiveness has declining in nearly all industries.

3. Empirical Analysis

3.1 Mathematical formulas and equations

The purpose of our study is to define whether or not the patterns of comparative advantage for Kazakhstan agricultural trade have any significant changes over the period 2006-2016. In order to evaluate the extent of the export competitiveness, there have been different indices available. Among them, the Balassa Comparative Advantage Index (RCA) is the most widely used index. This paper contains a detailed analysis of Kazakhstan's foreign trade through is

the Balassa index. The Balassa Comparative Advantages Index is chosen for this study for several reasons. First, the index can enable us to conduct analysis using available data. Second, the index can be used to measure the export flows of Kazakhstan and world in general.

According to Balassa (1991) the Revealed Comparative Advantages index tries to determine whether a country has a "revealed" comparative advantage rather than to identify the major sources of comparative advantage. The index is calculated following way.

$$RCA_j^i = \left(\frac{X_{ij}}{\sum_{j=1}^{n} X_{ij}}\right) / \left(\frac{\sum_{j=1}^{n} X_{ij}}{\sum_{j=1}^{t}\sum_{j=1}^{n} X_{ij}}\right) \quad (1)$$

where
X ... presents exports,
i ..... a country,
j ..... a commodity and *n* is a set of countries,
t ..... a set of commodities.
Revealed Comparative Advantages (RCA) is based on export performance and observed trade patterns. It measures a country's exports of a commodity relative to its total exports. If RCA>1, then a comparative advantage is revealed. If RCA is less than unity, the country is said to have a comparative disadvantage in the commodity or industry.

In order to provide a more exact explanation about RCA, Hinloopen and Van Marrewijk (2006) have divided the theoretical range of the Balassa RCA values into four categories. (Table1).

Table 1. RCA Categories

Category A	0 < RCA < 1	Industries with a comparative disadvantages
Category B	1< RCA < 2	Industries with weak comparative disadvantages
Category C	2 < RCA < 4	Medium comparative advantages
Category D	4 < RCA	Strong comparative advantages

According to Porter's (1998) advantages theory the competitive advantages can be defined by low cost labor or access to natural resources. Each country can gain from trade by exporting products at a lower relative cost as compared to the other country. That's why it is important to include which factor is essential in order to have advantages on trade. Regarding to Voicilas(2013) , the competitiveness on grain sector depends on the following factors: crop yield, arable land and technology.

Kazakhstan is a recent member of WTO and a question arises: how will WTO accession affect export competitiveness on agriculture products. Trade theories assert that lowering tariffs contribute to increasing trade flows; but, empirical study on the impact of membership in WTO has given remarkably ambiguous outcomes. Rose (2004) reported on its empirical specifications that membership in WTO do not have any impact on export competitiveness. Tomz (2007) uses Rose's data , however includes de facto WTO membership, in order to get positive WTO trade effects.

Based on these studies we focus on four groups of explanatory variables: factor endowment (grain arable land), economic development factors (GDP, GDP per capita, agricultural employment), real exchange rates and policy variable (WTO membership).

We estimate the following equation:

$$RCA_{it} = \alpha + \beta_1 \ln GDPit + \beta_2 \ln GDP + \beta_3 \ln \text{arableland} + \beta_4 \ln exchangerate_{it} + \beta_5 WTO_t + u_i + \varepsilon_{it} \quad (2)$$

The indicators of competitiveness are represented by RCA on agriculture products. The standard proxy for economic development is the log of GDP per capita at PPP at constant 2016 international $(lnGDP/capita); market size is measured by log of GDP at PPP at constant 2016 international $ (lnGDP), the employment in agriculture in per cent of total employment (agricultural employment), lnexchangerate denotes the exchange rate between the US dollars and local currencies. These variables for empirical analysis are collected from the World Bank's (2016) World Development Indicator (WDI) database.

3.2 Data

The United Nations International Trade Statistics UN Comtrade data base is used for Kazakhstan's agricultural exports to world markets in the years 2006–2016.Moreover, in our paper have been used the World Integrated Trade Solution software which allowed us to access and obtain trade and tariffs information. These databases contain detailed information on Kazakhstan's agricultural sector, as well as the world trade. RCA indices have been calculated for HS product categories up to four digits of classification.

4. Results and Discussion

4.1 The pattern of revealed comparative advantage

Balassa's index (formula 1) was calculated on the basis of trade flows between Kazakhstan and the whole world. As shown in Figure 1, some agricultural products with major comparative advantages are subject to severe fluctuation. Particular these are the groups of agricultural crops**,** wheat and meslin, wheat and meslin flour, and barley. Also, it should be noted that export on cotton sector has also faced a big change over the period 2006-2016.
Over the period, comparative advantages in oil crops and oils, mainly sunflower seeds, safflower and sunflower oil are also observed.

The most important trends in values of Balassa's index are as follows: In the table, the numbers on bold indicates the cases where RCA is greater than one, which means this product group has a comparative advantage. Despite the grouping, RCA confirms the initial results that wheat and meslin flour are groups that have the most marked comparative advantages. If we depict more clearly, we found out that from 2008 till 2014, the amount of export on wheat and meslin has faced a severe fluctuation. This is due to the fact that in some period real exchange rate was considerable higher; accordingly the number for RCA was high as well. At the beginning of the period 2006, the second high value of the RCA index was observed in the barely product. However, their exports slightly decreased over the 2007/2008 and 2012/2013 periods. The reason of that is over 2007/2008 and 2012/2013 arable land was faced with drought, consequently it brings lowering the amount of export. However, in the following year, comparative advantages of barely was significantly increased.

On the other hand, there is also a gradual increase in revealed comparative advantage of the wheat and meslin group. It should be noted that over the period 2010-2012 the cotton sector has RCA index below than 1, and that the sector has comparative disadvantages. But, later the comparative advantages in cotton were observed. This is due to the fact that the demand for cotton has slightly increased.

With a slight simultaneous increase in Kazakhstan's exports of sunflower seeds, there is enormous growth in revealed comparative advantages as well.

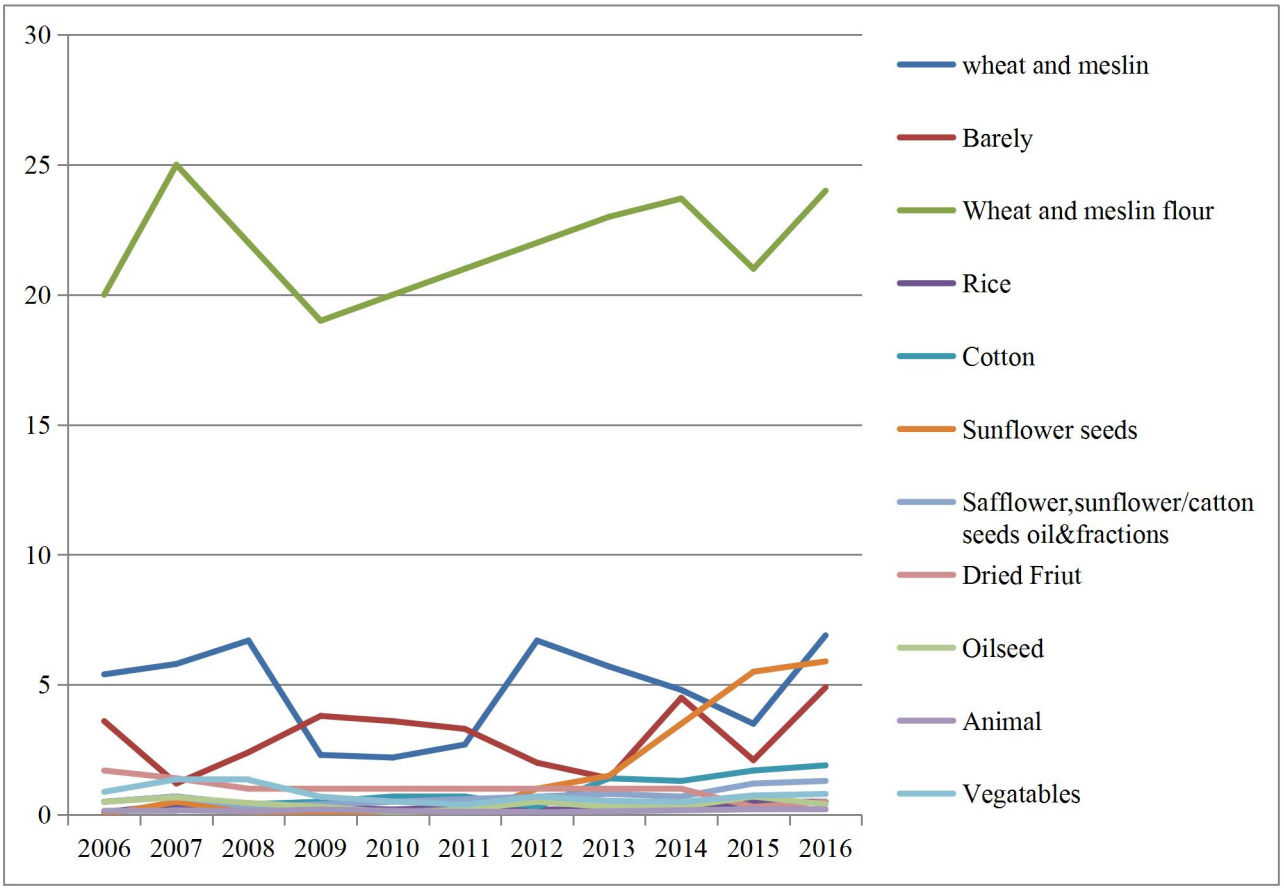
In 2006, Kazakhstan's dried fruit has considerable revealed comparative advantages. It should be noted that from 2008 till 2011, RCA for dried fruit was a constant1. However, there was a weakening of comparative advantages in this group in 2015/2016. It happened as a result of increasing competitiveness on dried fruit in Persian countries such as Iran, etc. Other agricultural products of Kazakhstan have comparative disadvantages.

Table 2. Revealed Comparative Advantages in Kazakhstan's agricultural exports (2006-2016)

Products	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Wheat and meslin	5,4	5,8	6,7	2,3	2,2	2,7	6,7	5,7	4,8	6,4	6,9
Barley	3,6	1,2	2,4	3,8	3,6	3,3	2	1,4	4,5	4,6	4,9
Flour (wheat and meslin)	20	25	22	19	20	21	22	23	23,7	21	24
Rice	0,1	0,4	0,2	0,3	0,2	0,3	0,2	0,2	0,2	0,5	0,5
Cotton	0,5	0,7	0,4	0,5	0,7	0,7	0,3	1,4	1,3	1,7	1,9
Sunflower seeds	0	0,5	0,1	0,1	0,1	0	1	1,5	3,5	5,5	5,9
Safflower,sunflower/cotton-seed oil&fractions	0,5	0,7	0,3	0,4	0,5	0,6	0,7	0,8	0,7	1,2	1,3
Dried friut	1,7	1,4	1	1	1	1	1	1	1	0,3	0,5
Oilseed	0,5	0,67	0,45	0,3	0,1	0,2	0,5	0,3	0,3	0,7	0,4
Animal	0,15	0,17	0,13	0,20	0,15	0,11	0,09	0,13	0,17	0,21	0,23
Vegetable	0,88	1,36	1,34	0,69	0,51	0,39	0,70	0,53	0,49	0,74	0,80

Source: Authors' own calculations based on Comtrade database with WITS (World Trade Solution) software

Figure 1.Dynamics of RCA on agricultural products in Kazakhstan (2006-2016)



Source: Authors' own calculations based on Comtrade database

4.2 Regression results

From regression analysis, the result illustrates that the agricultural exports are negatively associated with the economic size of a country in terms of GDP for each of comparative advantage indices, while exchange rate as well as agricultural employment has positive effects on agricultural exports. It shows exchange rate plays a big role on agricultural export products. Moreover, arable land, a factor of endowment has significant negative impacts on agricultural exports. Finally, according to our regression analysis, WTO membership is positively associated with the exports, which means that there is still a huge potential to improve export competitiveness on agricultural products.

Table 3.Regression Analysis

Models	RCA
lnGDP/capita	-0.385
lnGDP	-1.412***
agricultural employment	0.051***
lnarableland	-0.353***
lnexrate	0.235*
WTOmembership (dummy)	10.84***
Constant	31.45*

Standard errors in parentheses
*** p<0.01, ** p<0.05,*p<0.1

Source : Authors own calculation

5. Conclusion and Policy Recommendations

The Balassa index of revealed competitive advantages was calculated for Kazakhstan's agricultural products from 2006 to 2016. The findings conclude that Kazakhstan's agricultural products are competitive in terms of several product groups , mainly in wheat and meslin, wheat and meslin flour, cotton, sunflower seed, and oilseed. However, other agricultural products depicted a more pessimistic RCA result when we examine Kazakhstan's competitiveness over time. From our result it can be shown that from 2009 to 2011 the competitiveness of Kazakhstan has decreased significantly. This is due to the fact that after financial crisis in 2008, the Kazakhstan's economy was suffered where it impact on the agriculture exports as well.

According to regression analysis, it can be seen that the agriculture sector of Kazakhstan has still opportunities to develop and be one of the key sectors of national economy. This is because WTO membership has positive effect son comparative advantages. But, within the framework of the WTO, for Kazakhstan's trade opens not only opportunities as well as severe competition with other market. In this context, there are new tools of governmental support such as new Agro-industrial Development State Program for 2017-2021, Agrobusiness-2020 helps to soften the adjustment period for Kazakh agriculture sector. Moreover, by facilitating the investment into agriculture, cooperation, providing access to cheap financial instruments and developing agricultural science is the key to successful development of agricultural sector of Kazakhstan.

In general, the agricultural sector in Kazakhstan could be a harbinger of economic growth, but this requires a lot of support and attention from the state. In the meantime, only the financial assistance would not be able to completely change the course of events, since management, the implementation of the agricultural strategy and many other issues exist as well.

Development and structural reforms still remain on the agenda in the field of agricultural state policy. These factors must be taken into account when ascertaining the results of the sector to provide financial assistance, which will be able to revive the agriculture of Kazakhstan taking into an account the current system changes and economic conditions.

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