UOT: 338.4, 339.5

THE INTERNATIONAL COMPETITIVENESS
OF AZERBAIJANIAN HORTICULTURE

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Abstract

In the paper the past and future international competitiveness of Azerbaijanian horticulture is assessed by calculating domestic resource cost (DRC) ratios using data for 2015–17 as a base. Future international competitiveness is estimated for 2020 under two scenarios: baseline (current productivity), dynamic improvements in productivity. The analysis indicates that staying at the same level of productivity will have a negative impact on the international competitiveness of Azerbaijanian horticulture. To maintain competitiveness in the arable sector, Azerbaijan will need to achieve dynamic improvements in productivity, which is possible according to estimations of Agricultural Economics Research Center. The research is implemented based on plant growing products due to higher competitiveness rates compared to livestock sector's products.

Keywords: Azerbaijan, agriculture, competitiveness, DRC, export.

Introduction

The decline in oil prices, has resulted with the decline in the Azerbaijani economy (for the first time since 1995). 3.1 per cent decrease in GDP in 2016 required immediate actions. The Azerbaijani government implemented economic reforms and adopted strategic roadmaps for the development of economy. As a result, in 2017 non-oil exports increased by 24 percent compared to 2016 and amounted $ 1.5 billion (SSCRA, 2019). The main share in the export of non-oil sector of Azerbaijan goes to agricultural products. So, in 2017, 33 percent of Azerbaijan's non-oil exports accounted for fruits and vegetables. The most exported product in the non-oil sector was tomato worth $ 151.6 million. Generally, in 2017, 3 of the 5 most exported non-oil sector products from Azerbaijan belonged to agriculture. These products, along with tomatoes, were hazelnut kernels worth $ 114.5 million and persimmons worth $ 90.9 million. That's why, competitiveness of agricultural products has been studied in this article. Few researches implemented in this direction revealed that the

international competitiveness of different crops varies. After independence the first research in this direction was implemented by World Bank project in 2002 (ADPSA, 2003) and according to the results of the research there were not many products which could be internationally competitive. This previous work used data from the mid–late 1990s and was predominantly concerned with questions of transition such as the impact of land reform and market liberalisation on international competitiveness. Later a new research has been made in the framework of USAID Private Sector Competitiveness Enhancement Program in Azerbaijan taking into account new conditions (USAID, 2009). But in both cases the research was mainly focused on analysis of present situation.

At present situation where the economy is more integrated and where food security of the country and competitiveness is given special priority there is need for analysis based on the most recent data. This article seeks to tackle several questions. First, how internationally competitive was Azerbaijanian agriculture the last 15 years? Second, how may international competitiveness change in future? This article addresses these questions by calculating Domestic Resource Cost (DRC) ratios for the last 15 years and presenting estimates for 2020 and 2025 under different scenarios.

Crop production was chosen because of the share of this sector in export is significantly higher compared to livestock production and Azerbaijan has potential to increase the export. For example, in 2017 total exported value of livestock products (HS code 01-05) amounted 12.6 million US $, while for plant breeding sector (HS code 06-14) it amounted 518.4 million US$(SSCRA, 2019c), which is 41 times higher.

The article is structured as follows. First we describe the DRC ratio. Then we analysed current state of agricultural production and main problems. In the next step we produce projections for 2020 under different scenarios taking into account the effects of price change and changes in productivity. Conclusions are drawn in the final section.

Literature review

Competitiveness is one of the main calls of the XXI century. It is also a primary focus for governments and entrepreneurs in any country (IER, 2009). The literature analysis lets us conclude that there is a disagreement about competitiveness definition.

There is no universal definition of competitiveness, partly reflecting the term's application to many different levels of the economy, from the individual firm to whole economies (Harvey, 2017).

International researches highlight that competitiveness is both a test of the economy and a chance to further enhance economic performance.

Some researchers believe that the concept of competitiveness applies most appropriately to firms and products. Others identify the national competitiveness as an important determinant of firms'overall competitiveness or analyse it from the sectoral perspective. International researches highlight that cities drive economic growth and enhance national competitiveness (Balkyte, 2010). Competitiveness literature surprisingly focuses mainly on industrial-based and technology-based economies rather than agricultural sector, the most important economic sources of developing countries' welfare (Lombana, 2006).

But, Gorton M., Davidova S., Banse M., Bailey A., Jarka S., Ratinger T. and other researchers implement wide investigations in the field of competitiveness of agriculture and related problems.

They are mainly focused on post-socialist countries. Also, Thorne F., Gillespie P.R., Donnellan T. and etc. researched competitiveness of Irish Agriculture.

In addition Harvey D., Hubbard C. and others have research works on competitiveness of Agri-Food Sector of EU.

Also, the COMPETE project was established to support the EU in its aim to define and foster competitiveness of European food supply chains on domestic and international markets. The project involves a set of research activities to analyse current competitiveness and identify its determinants and thus provide policy recommendations for a prosperous EU agricultural sector (Tocco, 2015).

Competitiveness of agriculture of Azerbaijan has mainly been investigated in the frameworks of World Bank, USAID and UNPD projects. In 2019 Agricultural Economics Research Center also implemented a research on assessment of economic efficiency of production of agricultural products in Azerbaijan based on DRC, NPC and EPC ratios (AERC, 2019).

The data of Farm Data Monitoring System (FDMS) was used as the main data for the analysis. FDMS data is the most appropriate local dataset for the analysis from different points of view. First of all, FDMS data is one of the main official datasets which is run under the Ministry of Agriculture of Azerbaijan since 2014. Also, assessment of economic efficiency of agricultural production is the main objective of FDMS (F. Fikratzade, Kh. Majidova, 2016).

In this article, data of 4 thousand farms collected by Agricultural Economics Research Center (in FDMS) was analyzed and the most competitive agricultural products are defined and prognosis are prepared.

Theoretical bases of competitiveness

Competitiveness theory has a long history of development, evolving from Adam Smith's comparative advantage to Michael Porter's competitive advantage (Cho and Moon, 2002). Over the last decade, the term of competitiveness has been widely used. Generally, the structural elements and separate issues of this concept have been addressed by scientists and economists in different stages of history.

Competitiveness can be observed from different scales. At the firm, or micro-economic level there exists a reasonably clear and simple understanding of the notion of competitiveness based on the capacity of firms to compete, to grow, and to be profitable. At this level, competitiveness explains the ability of firms to consistently and profitably produce products that meet the requirements of an open market in terms of price, quality, etc. In addition to this approach, it is reasonable to add the product level too. As different products can be produced by different firms and have different levels of competitiveness. Especially, in agriculture it is important as agricultural produce is closely connected to natural-climatic conditions.

Competitiveness is also referred at the macro-economic level. At the macro-economic level the concept of competitiveness is much more poorly defined and more strongly contested. Despite the fact that improving a nation's or region's competitiveness is frequently presented as a central goal of economic policy, arguments abound as to precisely what this means and whether it is even sensible to talk of competitiveness at a macro-economic level at all (EC, 2003).

Putting the above mentioned two concepts together, we could develop a competitiveness concept for agriculture where we could consider national competitiveness for separate agricultural products.

Different researches have been implemented to define the sectors with comparative adavantage. The main methods used in these researches are based on calculations of Domestic Resource Cost, Nominal Protection Coefficient, Effective Protection Coefficient, Revealed Comparative Advantage and Net Export Ratio. Price competitiveness and quality competitiveness are two main factors which determine the competitiveness in international market. Our research is mainly focused on price or cost competitiveness and doesn't take into account the quality competitiveness. DRC ratio is used for competitiveness analysis and it is calculated based on cost coefficient. There are different versions of DRC concepts (IER, 2009).

From this point of view the research implemented by Agricultural Economics Research Center in 2019 is also one of the best soruces showing the effectiveness of DRC concept from different sides. The authors note DRC ratio as one of the best practical tools for assessment of efficiency of reforms implemented by state. This note is argued by the possibility to use DRC ratios for assessment the results of tax, subsidy and other economic steps taken by state (ARC, 2019).

Methodology: Domestic Resource Cost (DRC) Ratios

Practically DRC concept is applied as one of the main tools for estimations of comparative advantage of national economy in whole, as well as in sectorial level. This concept builds upon the notion of effective protection, but extends it through the use of opportunity costs of domestic resources rather than the resources' domestic market price (FAO, 1987). The DRC ratio compares the opportunity costs of domestic production to the value added it generates (Tsakok, 1990). The criteria of the DRC thus indicates the cost of the production factors (and non-tradable goods) necessary for the production of the equivalent of one foreign currency unit (EC, 1997).

The estimation of DRCs has been perceived as useful in comparing the competitiveness of unlike production systems and assessing the comparative advantage of alternative activities (Monke and Pearson, 1989).

Gorton M., Davidova S., Banse M., Bailey A., Jarka S., Ratinger T. and others used this method in their researches about Hungary (Gorton and etc, 2006), Poland (Gorton and etc, 2001), Czech Republic (Gorton and etc, 2000) etc.

The DRC expresses the effective income (the cost) of the non-tradable production factors (the "domestic resources" of the economy) devoted to the potential net earning of one currency unit of "tradable resources" (EC, 1997).

The difference between tradables and non-tradables is also critical insofar as the exchange rate is concerned. Both numerator and denominator of the DRC are given in the same currency by multiplying the latter by the economic opportunity cost of foreign exchange, or the shadow exchange rate, which expresses the marginally efficient rate at which non-tradable primary factors of production may be transformed into tradable value added. Multiplying the denominator of the DRC by this rate converts the shadow prices of tradable outputs and inputs, expressed in foreign currency, into their opportunity cost at the margin in terms of domestic factors of production. Once this is done, the numerator and denominator of the DRC may be compared to see whether activity j is more or less efficient than the activity that, at the margin, is just efficient. If the DRC is less than one, the domestic resource cost per unit of value added is less for activity j than for the marginally efficient activity, so the country has a comparative advantage in activity j. If the DRC is greater than one, the opposite is true and the country does not have a comparative advantage (USAID, 2009).

DRC analysis measure the economic resource costs of production based on "social prices", i.e. prices of goods that reflect the true economic value absent of price distortions from taxes, subsidies, price controls, import tariffs, or other government policies (Yercan and Isikli, 2006).

In all approaches, DRC ratio is calculated more or less in the same way. Trying to generalize the different approaches the following formula will be used in this research:

$$DRC_j = \frac{\Sigma \, f_{sj} \, P *}{P *a - \Sigma_{ij} P *} \quad ... (1)$$

where

f_{sj} *is a technical coefficient relating non-tradable primary factor s (land, labor, capital) to output j,*
$P *$ *is the economic opportunity cost of non-tradable factor s, P * is the world market price of tradable output j,*
P_i *is the world market price of tradable intermediate input i, a_{ij} is an technical coefficient relating input i to output j.*

Domestic resource cost (DRC) is an indicator of the efficiency with which a country's factors of production (land, labor, and capital) are converted into useful output. More precisely, we define the DRC for a given economic activity as the ratio of the economic opportunity cost of the domestic, non-tradable resources used in the production of output j to the value added that is created measured in world market prices, which equal the shadow prices or economic opportunity cost of tradable goods.

However, it should be taken into account that DRC is sensitive to the selection of shadow prices for non-tradable inputs, exchange rate and international prices (Gorton et al, 2006).

In our calculations, social prices are relating with the outputs and tradable inputs as border prices (export/ import parity prices (EC, 1997)) and most adjust these prices to the farm level. The social cost of labour, land and other non-tradable inputs is typically measured as it would be in the most profitable alternatives.

Results and Discussions

Ten agricultural products (tomato, hazelnut, persimmon, apple, pomegranate, grape, potatoes, cotton, cucumber, cabbage) with the highest share in export of agricultural products of Azerbaijan are chosen for the analysis.

For the current analysis of the situation DRCs were estimated for ten commodities (*Horticultural crops - hazelnut, persimmon, apple, pomegranate, grape, potatoes, tomato, cucumber, cabbage and cotton*) which were chosen because of their importance to the total agricultural export of Azerbaijan (*Horticulture is defined as that branch of agriculture concerned with growing plants that are used by people for food, for medicinal purposes, and for aesthetic gratification. Fruits, vegetables, tree nuts, nursery crops and floricultural crops are all considered to be horticultural crops* (USDA, 2020). *Cotton is a field crop but it has an important share of total agricultural export in Azerbaijan. For this reason, cotton is also added to this list*).

In estimating DRCs for each commodity a number of assumptions were made relating to the social prices for output and tradable inputs, the social costs of non-tradable domestic resources and the choice of production structures.

Social prices for outputs and tradable inputs are measured as border prices (export/import parity prices) and adjusted to the farm level. For products for which Azerbaijan was a net exporter an average f.o.b. export parity price was taken as the unadjusted reference price.

The social prices for tradable inputs are based on border prices and the data for Azerbaijan were taken from national statistical office and state office of customes. The adjustment of prices from border to farm took account, where appropriate, of handling charges, transport, storage and maintenance costs. Private input prices and quantities, together with information on yields, were taken from Azerbaijanian Farm Data and Monitoring System (*FDMS is a simplified version of EU FADN*) data. This dataset provides useable information on over 4000 agricultural enterprises. FDMS was established by the The Azerbaijan Research Institute of Economy and Organization of Agriculture (Shalbuzov and Huseyn, 2014). At present the FDMS is modified and run by Agricultural Economics Research Center (AERC, 2020).

The prices of non-tradable resources were measured in terms of the opportunity costs of land, labour and capital employed in the production. In the case of land, the opportunity costs can be indicated by the social rental value in the second best alternative. But even in this case, there is often a problem in identifying a single second best alternative according to the level of risk, income, demand, price stability over time and other factors. For example, vegetable crops usually are more profitable compared to staple food crops, but still many producers continue to grow food crops because of their greater price and demand stability over time. In this situation land of identical quality produces a variety of crops. To take account of this, an average of suitable commodity alternatives for deriving shadow land prices was taken.

In case of capital, the economic cost of fixed asset has been indicated by the interest rate that could be earned if the amount invested in the asset were invested in the financial market as the second best alternative.

For labour the wage rate in the second best alternative, mainly in non-agricultural occupations (for example a taxy driver) is taken. And as current agricultural producers are not professional specialists alternative occupations are almost always of unskilled character. That's why the social value of labour was calculated the weights to the average wage rates of unskilled workers in non-agricultural occupations in the country excluding Baku. Wages in Baku are much higher than in regions and were not seen as a useful guide for alternative returns to agricultural labour.

For current analysis of the situation DRCs were estimated for ten commodities (hazelnut, persimmon, apple, pomegranate, grape, potatoes, tomato, cucumber, cabbage, cotton) for 2015-2017.

Table 1. DRC calculations for chosen commodities

N	Product	DRC (average for 2015-2017)	2020 (Expected)	
			Effects of price change	**Effects of yield change**
1	Potato, fresh	0.110	0.142	0.206
2	Tomato (Greenhouse)	0.032	0.166	0.211

3	Cucumber (Greenhouse)	0.045	0.147	0.204
4	Grape	0.217	0.289	0.355
5	Apple	0.206	0.284	0.389
6	Hazelnut	0.370	0.133	0.246
7	Cabbage	0.127	0.200	0.217
8	Pomegranate	0.405	0.257	0.341
9	Persimmon	0.690	0.124	0.268
10	Cotton	0.775	0.371	0.405

Source: Authors' own calculations based on FDMS data

DRC analysis have been made for export market. Also, the calculations have been made for irrigated and non-irrigated lands.

First of the commodities analized is fresh potato. According to the results, in country level potato production is competative for export market, where DRC ratios is 0.110.

The next product chosen for analysis is tomato. According to the results of calculations tomato is very competitive. The same situation is observed for cucumbers. Country average of DRC ratio for cucumbers 0.045 respectively. The next of the most important products for export is cotton. The country average of DRC ratio for cotton amounts 0.775.

The next group of products analysed belong to perennial crops. Grape is one of the most popular products. According to the results of calculations, the country average of DRC ratio is 0.217. In case of apple, calculated DRC ratio was 0.206. Hazelnut production is very competitive in export market as well. DRC ratio for hazelnut was 0.370.

One of the products with high level of competitiveness in export market is pomegranate. DRC for pomegranate amounted 0.405 which shows the great advantages for production of this product for export market.

The last of the products analysed is persimmon. According to DRC calculations persimmon is very competitive in export market. The DRC ratio for persimmon amounted 0.690 which shows the potential and advantage of this product in export market.

Also, the projections have been calculated based on the same methodology, taking into account the future possible changes in price and yield of products affected by state policy. Average prices for 2020 have been taken from OECD-FAO Agricultural Outlook (2015; 2016; 2017; 2018; 2019) and local price collection system for agricultural products (PI, 2020). The possible changes in yield are calculated according to average yield change in the country based on the data from State Statistical Committee (SSCRA, 2019a; SSCRA, 2019b; SSCRA, 2019d; SSCRA, 2016). In the table below the results of DRC calculations are given.

As we can see from the table these products will remain competitive in 2020. The best indicators for 2020 are observed in case of persimmons, hazelnuts, fresh potato cucumber and tomato with DRC ratios of 0.124, 0.133, 0.142, 0.147 and 0.166 respectively taking into account the price effects. With effects of yield change these products are still competitive but comparatively lower. According to the results of calculations, the effects of price changes will be more positive compared to yield changes. It is mainly connected with the increase in production costs as increase of yield per hectare requires increase of production costs (better irrigation systems, better seeds, fertilizers and so on).

Conclusion

According to the strategic roadmap on national economy non-oil export is targeted be increased to $ 450 per capita in 2025, against $170 per capita in 2015(SRPNE, 2016). The total population of the country is expected to be over 10,5 million in 2025, it means the non-oil export will increase to 4.7 billion.

Also, export of agricultural products will be strongly supported in coming years (SPSEDRRA, 2019). Different support measures and promotion actions are to be implemented according to the stratecig roadmap on agriculture (SRAAPPS, 2016).

As we can see from the analysis, Azerbaijan's fresh fruits and vegetables are quite competitive for export market and especially for the Russian market. As the DRC ratios for the chosen products remain under 1, Azerbaijan needs to become a WTO member state. In coming years the membership will give great advantages to country. International integration will assist the specialization of agricultural production as this will stimulate production of more efficient products which are economically competitive in international market.

The following factors make this competitiveness more solid:

> *First of all, favorable climate conditions allow farmers to take advantage of high prices in Russia after production there has declined seasonally;*

> *The second factor is the capacity to produce these products on small farms using relatively labor-intensive techniques and relatively cheap labor force;*

> *The third factor is the existence of an extensive network of Azeri traders within Russia, which cater to the lower end of the market in green bazaars and small shops;*

> *Finally, Azeri agricultural products are known for the high quality and best taste among Russian customers.*

Future prospects

In line with above mentioned conclusions the following advantages should also be taken into account as these factors will have considerable impact on future agriculture.

At present the government policies to support agriculture include a number of elements. First of all, farmers get subsidies per hectare. Starting from 2020 the basis amount of subsidies per hectare is defined as 200 manats per hectare. Also, different ratios for different products will be calculated by special subsidy commission. The ratios will differ depending on the natural conditions of the regions and the specifications of the products. The final amount of subsidies will be calculated by multiplying the ratio to basic amount. Thus, for 2020 subsidies have been calculated as follows: potato 240 manats/ha, cotton 220 manats/ha, vegetables 240 manats/ha, sorgo 100 manats/ha etc.. In case of vineyards situation is different. For new vineyards the amount of subsidies will be 600 manats/ha per year during first 4 years. The amount of subsidies for vineyards over 4 years is 240 manats/ha. Production of cotton, is promoted by extra 0.1 manats payment per kg (MoA, 2019).

Also, the government provides input support (irrigation water, elite seeds, fuel and fertilizers, machinery and (imported) animals) to farmers through the state-owned company Agroleasing

(AGROLIZING, 2019). But, it is planned to privatize this company and start a new mechanism. In line with this, in 2020 Agro Insurance Fund will start its activities and will subsidy 50% of state insurance payments.

Another instrument in agricultural policy is the granting of tax exemptions. Farmers are free from paying taxes - also no value added tax is charged on agricultural products sold by farmers.

All of above mentioned support measures will be continued in coming years.

In near future the local producers will be able to benefit from number of new advantages. One of these advantages will be available through agroparks. To encourage agro-processing investment as well as to create impact at large scale, Azerbaijan started to establish agro-based clusters – Agroparks. It is planned to establish 51 agroparks in 33 regions (MoE, 2019):). Here, the residents will use One Stop Shop to ease export procedures, residents will be offered the ready-to-use infrastructure, residents will be exempt from customs duties and VAT on imports of machineries and equipment etc. In general the agroparks will play a role of a hub for production, logistics and sales of agricultural products.

Thus, the chosen products with suitable DRC ratios are expected to expand due to higher level of competitiveness.

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Azərbaycanın bitkiçilik məhsullarının beynəlxalq rəqabətqabiliyyətliliyi

Xülasə

Məqalədə 2015-17-ci illərin göstəriciləri bazis götürülərək Daxili Resurs Xərci əmsalı (DRX) əsasında Azərbaycanda istehsal olunan bir sıra bitkiçilik məhsullarının keçmiş və gələcək dövrlər üçün beynəlxalq rəqabətqabiliyyətliliyi qiymətləndirilmişdir. 2020-ci il üçün seçilmiş bitkiçilik məhsullarının beynəlxalq rəqabətqabiliyyətliliyi cari məhsuldarlıq və məhsuldarlıqda dinamik artım ssenariləri üzrə hesablanmışdır. Təhlillər nəticəsində müəyyənləşdirilmişdir ki, məhsuldarlıq göstəricilərinin mövcud səviyyədə qalması qarşıdakı illərdə bitkiçilik məhsullarının beynəlxalq rəqabətqabiliyyətliliyinə mənfi təsir göstərəcəkdir. Bitkiçilikdə rəqabətqabiliyyətliliyi qorumaq üçün məhsuldarlıq göstəricilərinin yüksəldilməsi əsas şərtdir. Aqrar Tədqiqatlar Mərkəzinin apardığı hesablamalara görə, məhsuldarlıq göstəricilərinin yüksəldilməsi üçün potensial imkanlar mövcuddur. Araşdırma bitkiçilik məhsulları üzrə aparılmışdır. Bunun da əsas səbəbi, hesablamalara əsasən, Azərbaycanda heyvandarlıq məhsulları ilə müqayisədə bitkiçilik məhsullarının beynəlxalq rəqabətqabiliyyətliliyinin daha yüksək olmasının müəyyən edilməsidir.

Açar sözlər: *Azərbaycan, kənd təsərrüfatı, rəqabətqabiliyyətlilik, DRX, ixrac.*

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Международная конкурентоспособность продуктов растениеводства Азербайджана

Резюме

В статье прошлая и будущая международная конкурентоспособность растениеводческих продуктов Азербайджана оценивается путем расчета коэффициентов стоимости внутренних ресурсов (DRC) с использованием данных за 2015–2017 годы в качестве основы. Будущая международная конкурентоспособность оценивается на 2020 год по двум сценариям: по базовому уровенью производительности и по динамическому повышению производительности. Анализ показывает, что сохранение прежнего уровня производительности отрицательно скажется на международной конкурентоспособности продуктов растениеводств Азербайджана. Для сохранения конкурентоспособности в земледелческом секторе Азербайджану необходимо добиться динамичного повышения урожайности, что возможно по оценкам Центра Аграрных Исследований. Исследование проводится на основе продукции растениеводства из-за более высокой конкурентоспособности по сравнению с продукцией животноводства.

Ключевые слова: *Азербайджан, сельское хозяйство, конкурентоспособность, ДРК, экспорт.*