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PRESENT:

Through this letter we state that **GÓMEZ-GÓMEZ, Alma Alicia, BAUTISTA-MARTINEZ, Laura and LUQUEZ-GAITAN, Carlos Ernesto** has been published in ECORFAN Journal-Republic of Peru, with an article entitled "**Competitiveness of grain oats in Mexico since 1996 to 2017**", with keywords "*Relative trade balance, Tradability, Competitive advantage*" in Volume 7 Number 13 with **ISSN: 2414-4819**, at pages 17-24 segment. Journal edited by ECORFAN-Mexico, S.C. Holding Republic of Perú. (2021). **DOI: 10.35429/EJRP.2021.13.7.17.24.**

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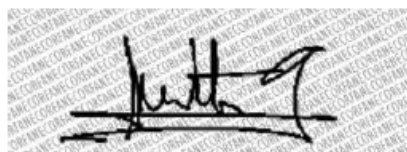
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Regards.



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Competitiveness of grain oats in Mexico since 1996 to 2017

Competitividad de la avena grano en México de 1996 al 2017

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Abstract

Oatmeal is one of the most important due to the diverse use it has. The objective was an analysis of the competitiveness of grain oats in Mexico through the study of its main indicators in the period from 1996 to 2017. Production shows a decrease from 106,214 tons in 1996 to 72,091.81 tons in 2017. The main states Producers are Chihuahua, State of Mexico, Durango, Zacatecas, and Hidalgo, together they account for 96% of the total production nationwide. Indicators such as the relative trade balance (BCR), the tradability indicator (Tij) and the trade dependency coefficient (Glij) were analyzed. The BCR for Mexico in this period ranged between -0.998 and -0.995, there is no comparative advantage in the international market. The tradability indicator fluctuated between -0.28504 and -0.64688, the sector is considered an importer. Oats are uncompetitive.

Relative trade balance, Tradability, Competitive advantage

Resumen

La avena es uno más importantes debido al uso tan diverso que tiene. El objetivo fue un análisis de la competitividad de la avena grano en México a través del estudio de sus principales indicadores en el periodo de 1996 al 2017. La producción presenta una disminución de 106,214 toneladas en 1996 a 72,091.81 toneladas en el 2017. Los principales estados productores son Chihuahua, Estado de México, Durango, Zacatecas e Hidalgo, en conjunto suman un 96% de la producción total a nivel nacional. Se analizaron indicadores como la balanza comercial relativa (BCR), el indicador de transabilidad (Tij) y el coeficiente de dependencia comercial (Glij). La BCR para México en este periodo osciló entre -0.998 y -0.995, no existe ventaja comparativa en el mercado internacional. El indicador de transabilidad fluctuó entre -0.28504 y -0.64688, el sector se considera importador. Se considera que la avena no es competitiva.

Balanza comercial relativa, Transabilidad, Ventaja competitiva

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Introduction

Oats were introduced to Mexico in the late twenties of the twentieth century by a group of Mennonites, from then on it acquired a singular importance mainly in the states of: Mexico, Coahuila, Zacatecas, Chihuahua among others. At an international level, data from the United States Department of Agriculture (USDA) show that oats occupy the seventh place among the grains and cereals produced in the world. The sowing season defines not only the yield and other agronomic aspects of the crop, but also the expression of some quality attributes, presence or absence of harmful organisms in the seed, so the one that allows obtaining the best yields and quality (Forsberg and Reeves, 1995).

Grain oats are unique in their uses and attributes compared to most other grain cereals. First, it is used with the whole grain; in contrast, the germ and large portions of the bran are removed from other grains before being introduced to manufacturing processes. Second, the oats are processed at high temperatures to inhibit the enzymes that catalyze the oils in the grain to preserve the product against rancidity. Edible products from processed oats include rolled or rolled oats, oatmeal, pasta, and some cereals. The oat grain has an excellent balance of amino acids and fiber and the highest level of protein.

The cultivation of oats is of great importance in Mexico, since its sown area has increased in the last 15 years. Oats are grown in Mexico mainly for forage production and to a lesser extent for grain production. Approximately, the cultivation of oats represents 4.5% of the total world production of small grain cereals, but it is one of the most widespread foods for livestock feed (Sánchez, 1988: 38).

Of the thirteen oat-producing states in Mexico, four account for 96% of the volume and almost 98% of the production value, the main being Chihuahua, which accounts for 63% of the volume and 71% of the value generated. They are followed in importance by the State of Mexico, Hidalgo and Zacatecas. The price of oats has increased by 28% between May 2011 and May 2014, reaching \$ 5,050 per ton in the last month mentioned.

In the international panorama, according to the United States Department of Agriculture (USDA), among the main producers of grain oats worldwide are Russia (22%), Canada (14%) and the United States (6%), which together contribute 42% of total world production. Mexico produces only 0.39%.

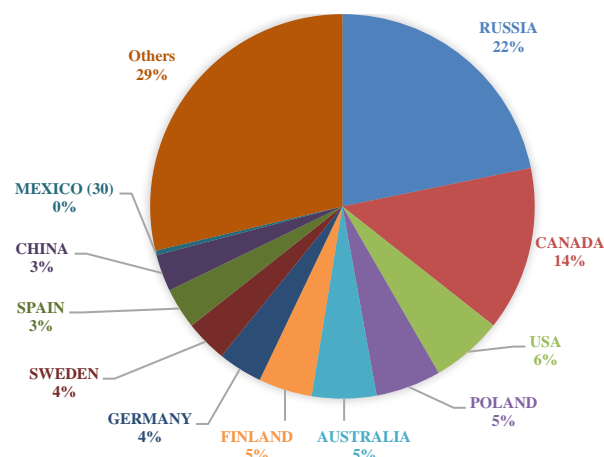


Figure 1 World average distribution of production 1996-2017

Source: Own elaboration with information from FAOSTAT 2020

In terms of exports, the main highlighted countries include Canada (55%), Finland (13%) and Sweden (10%). Mexico only exports 0.0051%.

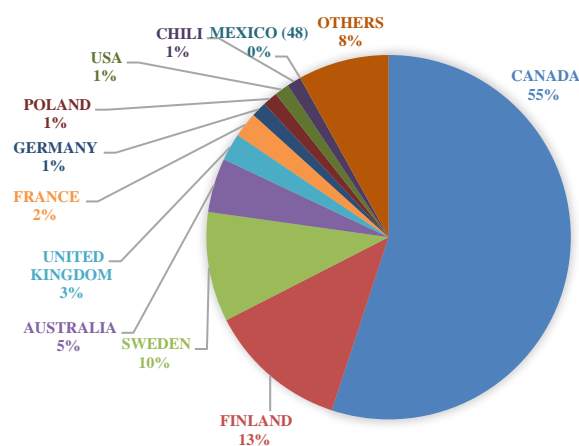


Figure 2 World distribution of exports, average for the period 1996-2017

Source: Own elaboration with information from FAOSTAT 2020

The main importing countries of grain oats are the United States (61%), Germany (8%) and Mexico (3%) in third place, which shows a negative trade balance if cereal imports are taken into account.

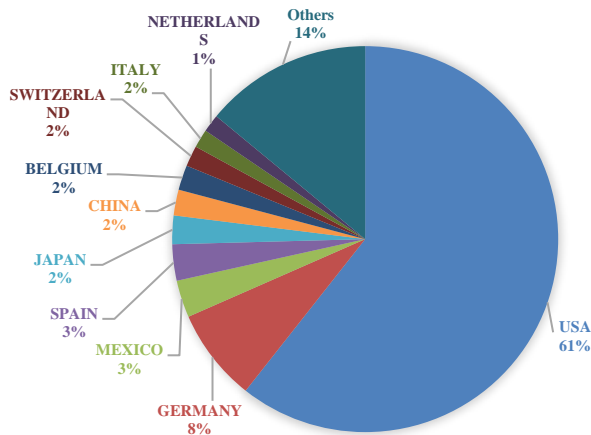


Figure 3 World distribution of average imports from 1996-2017

Source: Own elaboration with information from FAOSTAT 2020 Comparative advantage

The theory formulated by David Ricardo in 1817 that explains the origin of the enormous profits that free trade generates beyond the explanation given by the theory of absolute advantage. The theory of comparative advantage is an explanation of international trade based on differences in labor costs between producing countries.

Comparative advantage refers to the ability of a country (or region) to produce a good or service at a lower cost in relative terms, that is, in relation to other goods or services, which are also produced in the country and compared to the relative cost of producing it in other countries (or regions).

Competitiveness

The concept of competitiveness acquires a crucial importance, especially in manufacturing activities. Although there is no single conceptualization of competitiveness, various approaches refer to its multiple determining factors; factors that, in one way or another, influence the ephemeral and robust nature of the competitive position of companies and / or entire sectors of production (Porter, 2009).

Competitiveness analysis continues to refer to the concept of "comparative advantages", despite the fact that modern theory no longer considers it relevant. Recent theories move from the concept of "competitive advantages", based on cost reduction and product differentiation, that is, on the ability to innovate, the State being responsible for creating a favorable environment and stable macroeconomic policies.

Competitiveness indicators

According to Hernández (2008), the indicators adopted for the measurement and comparison of competitiveness refer to 4 blocks:

In the first place, the indicators of "revealed" competitiveness that indicate the capacity of the products or agro-productive chains to maintain or penetrate markets, these are:

Trade balance balance

The trade balance is the difference between the monetary value of exports and imports in the economy of a country during a certain period. A positive balance is known as a trade balance surplus, which consists of exporting more than what is imported. A negative balance is known as a trade deficit. The trade balance is sometimes divided into products and services (Bobadilla, 2014).

Relative trade balance indicator

The relative trade balance measures the relationship between the balance of a product's trade balance (exports minus imports) and the total sum of a country's exports and imports. With this indicator it is possible to identify net importing countries, which are possible potential markets; It also makes it possible to identify net exporting countries, which is indicative for the supply of products or to rule them out as possible markets. Additionally, this indicator allows a measurement of the degree of existing comparative advantage or disadvantage and its evolution over time depending on the behavior of the indicator (Nazif, 1997).

The tradability indicator

It measures the relationship between net exports (exports minus imports) and apparent consumption (domestic production plus imports minus exports). For foreign trade, it is used to track the gain or loss of the export capacity of the country that produces the good. This is built on two other sub-indicators, the degree of export openness that indicates the share of exports of a product over apparent consumption and this refers to the degree of penetration in a specific market, and degree of import penetration, which shows the relationship between imports of a good or sector and its apparent domestic consumption (Schwartz, Ibarra, & Adam, 2007).

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Trade dependency ratio

It is the proportion of apparent consumption that is supplied with imports, for this coefficient, it is necessary to analyze at least the statistics of five consecutive years, as this indicator is greater than the competitiveness of the production chain, which is lower, also called index of import penetration degree (Schwartz, Ibarra, & Adam, 2007).

Materials and methods

The information for this thesis was obtained from the statistical database of the Food and Agriculture Organization of the United Nations (FAO), the Agrifood and Fisheries Information System (SIAP) and the Agrifood Information System for Consultation (SIACON) of Mexico for the period 1996-2017. The main indicators used are the growth rate and the competitiveness indices.

The production variables (planted area, harvested area, production value, production, yield) and trade variables (import and export) were analyzed. For the results, the following indicators were analyzed: Relative Trade Balance Indicator (BCR), Transability Indicator (IT) and the Trade Dependence Coefficient (CDC).

Growth rate

The percentage growth rate is a useful indicator to observe whether the quantity of a variable is increasing or decreasing in a particular area. The main variables analyzed were exports, imports, harvested area, yield and production volume. The calculation procedure is:

Formula:

$$TC = \frac{VF - VI}{VI} * 100 \quad (1)$$

Where:

VF = Final value; VI = Initial value.

Competitiveness indices

Competitiveness indicators in the international market were calculated, which were the relative trade balance, the tradability indicator and the trade dependence coefficient.

Trade balance balance

The balance of the trade balance is determined by making the difference between the monetary value of exports and imports in the economy of a country during a certain period.

Formula:

$$SBC = X - M \quad (2)$$

Where:

SBC = Balance of the Trade Balance; X = exports; M = imports

Interpretation:

We speak of a trade surplus when the balance is positive, that is, when the value of exports is higher than that of imports, and of a trade deficit when the value of exports is lower than that of imports. If net exports are zero, its exports and imports are exactly the same, the country is said to have balanced trade.

Relative trade balance

The relative trade balance measures the relationship between the balance of a product's trade balance (exports minus imports) and the total sum of a country's exports and imports.

Formula:

$$BCR_i = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \quad (3)$$

Where:

BCR_i = Relative trade balance of country j with respect to product i; X_{ij} = Exports of product i by country j to the world market; M_{ij} = Imports of a product i by a country j to the world market or a specific market.

Interpretation:

If BCR: -1 and 0, the country is a net importer of the product and lacks a competitive advantage

If BCR: 0 and 1, the country is a net exporter of the product and has a competitive advantage

Tradability indicator

It measures the relationship between net exports (exports minus imports) and apparent consumption (domestic production plus imports minus exports).

Formula:

$$T_{ij} = X_{ij} - M_{ij} / Q_{ij} + M_{ij} - X_{ij} \tag{4}$$

Where:

T_{ij} = Indicator of tradability; X_{ij} = Exports of product i from country j ; M_{ij} = Imports of product i from country j ; Q_{ij} = Domestic production of product i of country j .

Interpretation of the model

When the indicator is greater than zero, the sector is considered an exporter, since there is an excess supply, that is, it is a competitive sector within the country.

When the indicator is less than zero, the sector is a substitute for imports, since there is an excess demand.

Trade dependency ratio

It is the relationship established between the value of exports and the value of production over a period of time.

Formula:

$$G_{ij} = M_{ij} / Q_{ij} + M_{ij} - X_{ij} \tag{5}$$

Where:

G_{ij} = Degree of import penetration of product i in country j ; M_{ij} = Imports of product i from country j ; Q_{ij} = Domestic production of product i of country j ; X_{ij} = Exports of product i of country j .

Interpretation of the model

As this indicator is higher, the competitiveness of the production chain is lower. If the indicator has a range between 0 and 1, it means that as the indicator approaches zero, the competitiveness of the sector or productive chain is greater, and that imports can become zero, even managing to dedicate part of the national production for export.

Results and Discussion

Trade balance balance

According to Figure 4, in which the graphs of imports, exports and the balance of the trade balance were superimposed, it can be determined that the balance of the trade balance of oats in Mexico is negative, that is, that exports, throughout the study period, are less than imports by far. Therefore, since the graph of the balance of the trade balance is below the plot of exports in the period from 1996 to 2017, our country can be considered as a net importer of grain oats.

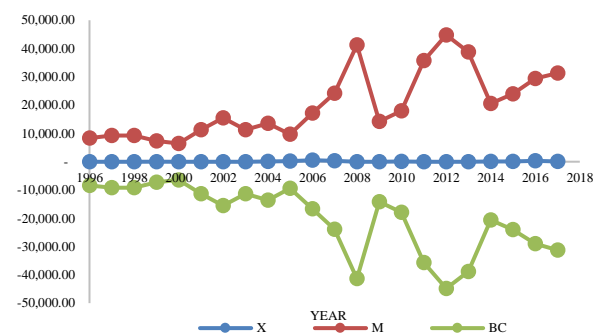


Figure 4 Behavior of the balance of the national trade balance 1996-2017 (thousands of dollars)
Source: Own elaboration with information from FAOSTAT 2020

Exports of oats in the period from 1996 to 2017, had an almost constant behavior and imports had a growing trend over the years. Given that imports are greater than exports in all years, therefore, the balance of the trade balance is negative and makes Mexico a country with a deficit in production for domestic consumption of barley.

Variable / year	1996	2001	2007	2012	2017
Exports	9.00	15.00	336.00	4.00	77.00
Imports	8388.00	11336.00	24236.00	44814.00	31283.00
Balance of trade	-8379.00	-11321.00	-23900.00	-44810.00	-31206.00

Table 1 Behavior of the value of oats exports and imports in Mexico, 1996-2017 (thousands of dollars)
Source: Own elaboration with information from FAOSTAT 2020

Production behavior

Production has had an almost constant trend throughout the period from 1996 to 2017. The lowest production occurs in 2000 with 31,884.76 tons, a point that is well below the trend line and the highest point registered in 2006 with 152,496.16 tons nationwide

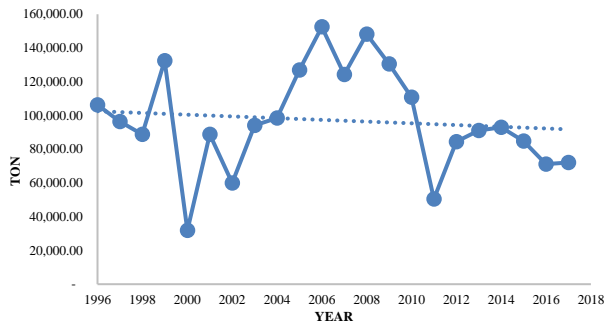


Figure 5 National production of grain oats in Mexico 1996-2017

Source: Own elaboration with information from SIAP 2020

Regarding the harvested area of grain oats in Mexico, in the study period, it has had a decreasing trend, the damaged area has been highly fluctuating, on the other hand, yields have increased as well as production.

Value / year	1996	2000	2005	2010	2015	2017
Harvested area (ha)	64181.00	22725.50	76461.00	66475.50	47254.98	43310.10
Damaged area (ha)	196.00	53398.00	7082.00	1377.00	1388.00	31.00
Performance (ton / ha)	1.29	1.19	1.77	1.90	1.68	2.42
Production (ton)	106214	31884.76	126989.05	110902.64	84788.78	72091.80

Table 2 Behavior of harvested, damaged area, yield and oat production in Mexico, 1996-2017

Source: Own elaboration with data from SIAP 2020

Competitiveness indices

Likewise, the calculations of indicators such as the relative trade balance (BCR), the Tradability indicator (IT), the Trade Dependence Coefficient (CDC) were carried out, obtaining the following results:

Relative Trade Balance Indicator

The relative trade balance in the study period shows an almost constant trend in the commercialization of grain oats, going from -0.998 in 1996 to -0.955 in 2017. According to the theory, if the relative trade balance is between -1 and 0 in a given period, the country is a net importer of the product in question and therefore lacks a competitive advantage in the international market. That is, Mexico does not produce enough grain oats, so it is necessary to import large quantities to meet national demand.

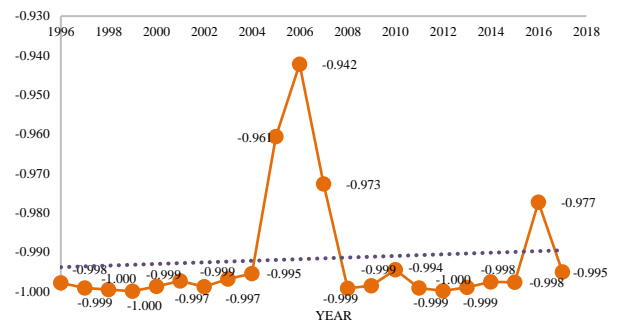


Figure 6 Behavior of the relative trade balance, Mexico 1996-2017

Source: Own elaboration with information from FAOSTAT 2020

Tradability indicator

As can be seen in Figure 7, the results of the indicator throughout the period are negative and therefore less than zero, which means that the sector is a substitute for imports, given that there is excess demand.

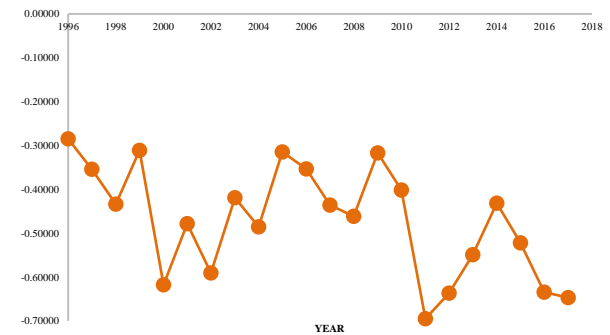


Figure 7 Behavior of the tradability index, Mexico 1996-2017

Source: Own elaboration with information from FAOSTAT 2020

Trade dependency ratio

This coefficient represents the proportion of apparent consumption that is supplied with imports, according to what can be observed in Figure 8, throughout our analysis period, the results obtained in the indicator are increasingly greater than 1, which is This means that the competitiveness of the oat production sector is lower, and that, therefore, imports cannot be dispensed with, since they are the main source of supply for national demand.

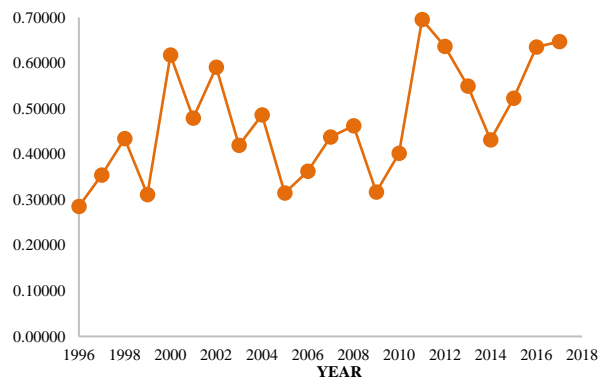


Figure 8 Behavior of the trade dependency ratio, Mexico 1996-2017

Source: Own elaboration with information from FAOSTAT 2020

Conclusions

According to the results obtained from the analysis of trade variables, exports have a decreasing trend, going from 49 tons at the beginning of the period to 36 tons at the end of the study period, on the other hand, imports have had an increasing trend since 42,395 tons in 1996 to 132,099 tons in 2017. Therefore, the balance of the relative trade balance is negative and in deficit, given that imports are, to a great extent, greater than exports.

The results of the relative trade balance are between -0.998 and -0.995, which is why it is concluded that Mexico is a net importer of grain oats, given that the quantities of imported cereal are much greater than the quantities that are exported, which indicates that the national product is insufficient to supply domestic demand and therefore there is no production that can be destined for the international market.

With regard to the tradability indicator, the results obtained are less than zero, which indicates that the sector is a substitute for imports, given that there is an excess demand, and therefore, it follows that oat production grain is not a competitive activity in the international market. On the other hand, the results obtained in the commercial dependence coefficient are greater than 1 in all the years of the period studied, this implies that most of the apparent consumption is covered by imported product, and the competitiveness of the oat production sector it is very low, so imports cannot be dispensed with and therefore there is no production necessary to export to the international market.

Finally, it is concluded that, based on the results obtained from the competitiveness indicators analyzed in this work, Mexico has a trade deficit balance, since it imports much more than it exports, which makes it a clearly importing country. Thus, it does not have the conditions or productive capacities to generate a surplus, since it requires foreign product to cover the national demand and this in turn leads to the country having a great comparative disadvantage in the production of grain oats.

According to the results, the trade variables are negative and therefore the competitiveness indicators are also negative, but it is important to note that the production variables, at the national level, are positive, so at this point, it would be profitable to implement policies that provide oat producers with the conditions and support necessary to increase both the quantity and quality of the national product, and thus be able, in the future, to put Mexican oats on the international market.

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