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Impacto de la aplicación del acuerdo comercial entre Ecuador y la Unión Europea en la carga tributaria y recaudación por importaciones de vehículos

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Abstract: In 2017, the trade agreement with the European Union came into effect, which establishes, among other things, a progressive reduction of the tax burden levied on imports from its member countries. The present research aims to determine whether the implementation of this agreement affected the amounts collected by the taxes: ICE, FODINFA, VAT and Tariff, as well as the total values obtained from vehicle imports. Taxes show a variation rate of less than 0.08% before the agreement was in force, but exceed 0.1% after the application of the agreement. The hypothesis test yielded a significant difference with $p<0.05$ in the means before and after the implementation of the agreement, considering a higher mean after the implementation of the agreement. However, although the collection of the tax burden for vehicle imports is higher after the implementation of the agreement with the European Union, this does not imply a significant difference in the total values of the amounts collected for vehicle imports.

Keywords: University, Society, Bibliometrics, SciMAT.

Resumen: En el año 2017, entra en vigencia el acuerdo comercial con la Unión Europea que establece entre otras cosas, una reducción progresiva de la carga tributaria gravada a las importaciones procedentes de sus países miembros. La presente investigación pretende determinar si la aplicación de este acuerdo afectó los montos recaudados por los tributos: ICE, FODINFA, IVA y Arancel, así como a los valores totales obtenidos de las importaciones de vehículos. Los impuestos muestran una tasa de variación inferior a 0,08% antes de la vigencia del acuerdo, pero superan el 0,1% después de la aplicación del mismo. La prueba de hipótesis arrojó una diferencia significativa con $p<0,05$ en las medias antes y después de la aplicación del acuerdo, considerando una media mayor después de la puesta en marcha del acuerdo. Sin embargo, aunque la recaudación de la carga tributaria para importaciones de vehículos es mayor después de la vigencia del acuerdo con la Unión Europea, esto no implica una diferencia importante en los valores totales de los montos recaudados por importaciones vehiculares.

Palabras clave: Universidad, Sociedad, Bibliometría, SciMAT.

INTRODUCTION

Since the 1990s the Organization of American States, the Development Bank and the United Nations Economic Commission for the Development of Latin America have suggested a steady evolution of taxation for Latin American countries to develop their economies Clemente et al., (2014). Regulatory entities in Ecuador since the year 2000, after the banking holiday, have constantly cancelled and created taxes to reduce the outflow of foreign currency for the importation of goods necessary to activate the internal economy.

For Mantovani & Santos, (2015) the tax burden lessens the impact that arises when neighboring countries devalue the currency, generates liquidity for the State and protects the sales of domestic producers. (Kato, 2013) With specific reference to vehicle imports, these are taxed with seven taxes that affect the sale price to the final consumer: the Foreign Exchange Outflow Tax, the Child Development Fund, the Merchandise Tariff, the Value Added Tax, the Special Consumption Tax, the Road Tax and the Motor Vehicle Property Tax.

Ochoa, (2016) imports of fully assembled vehicles for family transportation are the most demanded by the automotive industries that have the role of satisfying natural and legal persons. The automotive market drives the Ecuadorian economy by boosting the participation of other sectors. Según Sánchez & Martínez, (2018)It also generates significant amounts of foreign currency and is an example of how far the government can intervene to avoid harming a company's customers, employers and employees.

In 2017, the Trade Agreement between Ecuador and the European Union entered into force, the purpose of which is the bilateral and gradual liberalization of tariffs for several elements distributed in different categories. In reference to the automotive market, a gradual elimination of tariffs is established, in terms of 5, 7, 10 and up to 16 years. For example: During the government of Rafael Correa, a special consumption tax (ICE) of 40% was established for imported vehicles, the agreement with the European Union determines a 5% annual decrease of the ICE, so that for the current year (2021), European vehicles will pay 15% of this tax for their importation.

Gelabert & Martinez, (2012) in the country, vehicles of European origin represent between 2 and 3% of the total sales of the automotive sector. With the EU agreement, this economic segment has some benefits, especially the reduction of import tariffs. The products enter a gradual process of tariff reduction and, in the case of light vehicles, the tariff reduction will be over a period of 7 years. Kato, (2013) The agreement is not only about freeing tariffs, but also about allowing new markets to position themselves in the country; thus, there are already brands that want to produce or assemble vehicles of European origin in the national territory.

In this framework of the signing of this trade agreement, Ecuador reduced the tariff for Europeans from 40% to 20%. In exchange for

the elimination of 15% in Ad-valorem tariffs on assembled vehicle parts. Huerta, (2017) . However, imports of vehicles used for economic activities were limited, which could affect the tax burden, in addition to the fact that people with high purchasing power could import domestic vehicles with better technology and at a lower price.

Based on the above, it can be inferred that the tax burden constitutes a large part of the final price of the vehicle, as confirmed by the president of the Ecuadorian Automotive Association, who states that tariffs have increased to one of the highest levels in the world. Gil et al., (2010)This is confirmed by the president of the Ecuadorian Automotive Association, who assures that tariffs have increased to one of the highest levels in the world. "Today, more than 9 taxes directly affect the vehicle trade and 60% of the cost of a vehicle is due to taxes and regulatory charges".

Romero, (2016) Having reviewed important aspects regarding certain items that involve vehicle imports, we are concerned with mentioning that this research aims to identify the variations in tax collection, as well as the values collected for vehicle imports before and during the agreement with the European Union in a period between January 2011 and June 2021.

In order to achieve the above objective, the following specific objectives must first be met:

1. Identify the most important taxes applied to imports in the automotive sector and their variations over time.

2. Interpret the historical behavior of vehicle imports.

3. To compare tax collection, as well as the values collected for vehicle imports before and during the agreement with the European Union.

MATERIALS AND METHODS

The study was carried out with a quantitative approach, since numerical data will be analyzed for both the values collected for taxes and those recorded for vehicle imports.

All the data to be processed was requested from the National Customs Service of Ecuador (SENAE), consequently the research modality is non-experimental, because the study variables will not be directly influenced, they will simply be collected in their natural context in which they occur, and it will be studied if there are modifications in them before and after a certain event. This study was developed through the use of descriptive and inferential statistics.

The study variables will be:

- Values for tax collections on a CIF basis (Cost, insurance and freight; named port of destination) related to vehicle imports between January 2011 and June 2021.

- Amounts collected for vehicle imports between January 2011 and June 2021.

The most important taxes applied to vehicle imports are: Tariff, VAT, FODINFA and ICE, due to the fact that they are the ones registered by the National Customs Service of Ecuador. Next, we will observe, for

each of them, their rate of variation, their evolution over time and their analysis before and after the implementation of the trade agreement with the European Union.

To verify whether the agreement with the EU significantly affected the collection of the variables identified as the most important taxes on vehicle imports, a T-Student for paired samples will be applied, but not before verifying the normality of the data, an important requirement for a longitudinal study. To improve the robustness of the T-test, the data will be evaluated on a monthly basis within the established period (July 2012-June 2021).

We will apply the non-parametric Kolmogorov-Smirnov normality test for all variables before and after the implementation of the agreement with the EU, except for the ECI variable where Anderson Darling will be applied. The normality assumptions are as follows:

Taxes before the effectiveness of the agreement

H0: Tax burden data before the agreement with the European Union was in force fit a normal distribution.

H1: Tax burden data before the agreement with the European Union did not fit a normal distribution.

Taxes after the effective date of the agreement

H0: The data on the tax burden after the agreement with the European Union came into force fit a normal distribution.

H1: Tax burden data after the agreement with the European Union does not fit a normal distribution.

Once the normality of the data for all variables was verified, the T-test was applied under the following assumptions:

-Null hypothesis (H0) $\mu. = \mu.$: The collection of the different taxes before the trade agreement with the European Union is equal to the collection of the same taxes after the application of the agreement.

-Alternative hypothesis (H1) $\mu. \neq \mu.$: The collection of different taxes before the implementation of the trade agreement with the European Union is different from the collection of the same taxes after the implementation of the agreement.

Finally, the analyses applied to vehicle import taxes will also be applied to the variable corresponding to the amounts collected for vehicle imports during the period indicated.

We will review the aspects indicated above for each variable

According to Carbaugh (2009), this tax is applied specifically when a good crosses the border of a country. From July 2012 to June 2021, Ecuador registers the following evolution in this tax.

Table 1: Annual amounts collected **Tariff** (2012-2021).

Table 1
Annual amounts collected Tariff 20122021

Years	Collection (in dollars)	Percentage variation rate=current year/previous year-1	Average (before and after the agreement with the EU)
July 2012 - June 2013	219113502		
July 2013 - June 2014	212365829	-0.03	
July 2014 - June 2015	200125747	-0.06	
July 2015 - June 2016	94438615	-0.53	0.02% (before)
July 2016 - June 2017	160383174	0.70	
July 2017 - June 2018	347271652	1.17	0.29% (after)
July 2018 - June 2019	357013719	0.03	
July 2019 - June 2020	325291860	-0.09	
July 2020 - June 2021	340283311	0.05	
Total	2256287409		

Source: SENAE (2021). Prepared by: Authors.

Table 2
Calculation of the normality of the Tariff variable (2012-2021) before and after the agreement with the EU.

Formerly	Then
KS=0.172 p-value<0.010	KS=0.177 p-value<0.010

Table 2 Calculation of the normality of the **Tariff** variable (2012-2021) before and after the agreement with the EU.

Prepared by: Authors.

Table 3 . Paired T for the **Tariff** variable (2012-2021) before and after the agreement with the EU.

Table 3
Paired T for the Tariff variable 20122021 before and after the agreement with the EU

T-value	p-value
-7.49	0.000

Prepared by: Authors.

VAT (Value Added Tax)

Value added tax. In the area of imports, this tax is levied at two stages of the imported vehicle: in the first instance, the company must pay it

to nationalize the good, and subsequently the buyer of the vehicle pays it when it acquires the vehicle.

Table 4. Annual amounts collected **VAT** (2012-2021).

Table 4
Annual amounts collected VAT 20122021

Years	Collection (in dollars)	Percentage variation rate=current year/previous year-1	Average (before and after the agreement with the EU)
July 2012 - June 2013	187655358		
July 2013 - June 2014	174341777	-0.07	
July 2014 - June 2015	175473075	0.01	
July 2015 - June 2016	81633014	-0.53	0.01% (before)
July 2016 - June 2017	134179178	0.64	
July 2017 - June 2018	226530079	0.69	0.19% (after)
July 2018 - June 2019	259165329	0.14	
July 2019 - June 2020	232168003	-0.10	
July 2020 - June 2021	236809235	0.02	
Total	1707955048		

Source: SENAE (2021). Prepared by: Authors.

Table 5 . Calculation of the normality of the natural logarithm variable of **VAT** (2012-2021) before and after the agreement with the EU.

Table 5
Calculation of the normality of the natural logarithm variable of VAT (2012-2021) before and after the agreement with the EU.

Formerly	Then
KS=0.179 p-value<0.010	KS=0.145 p-value<0.010

Prepared by: Authors.

Paired t-tests for the **VAT**variable (2012-2021) before and after the agreement with the EU.

Table 5.2
Paired t-tests for the VAT variable (2012-2021) before and after the agreement with the EU.

T-value	p-value
-6.21	0.000

Prepared by: Authors.

FODINFA (Childhood Development Fund)

The purpose of this tax is to finance programs aimed at covering children's needs. The rate applied is 0.5% in this case to imported vehicles.

Table 7. Annual amounts collected **FODINFA** (2012-2021).

Table 7

Annual amounts collected FODINFA 20122021

Years	Collection (in dollars)	Percentage variation rate=current year/previous year-1	Average (before and after the agreement with the EU)
July 2012 - June 2013	6164876		
July 2013 - June 2014	5538173	-0.10	
July 2014 - June 2015	5671888	0.02	
July 2015 - June 2016	2453229	-0.57	-0.05% (before)
July 2016 - June 2017	3533734	0.44	
July 2017 - June 2018	7019062	0.99	0.26% (after)
July 2018 - June 2019	8040655	0.15	
July 2019 - June 2020	7096030	-0.12	
July 2020 - June 2021	7276122	0.03	
Total	52793769		

Source: SENAE (2021). Prepared by: Authors.

Table 8. Calculation of the normality of the **FODINFA** variable (2012-2021) before and after the agreement with the EU.

Table 8

Calculation of the normality of the FODINFA variable (2012-2021) before and after the agreement with the EU.

Formerly	Then
KS=0.122	KS=0.175
p-value<0.047	p-value<0.010

Prepared by: Authors.

Table 9. Paired t-test for the variable **FODINFA** (2012-2021) before and after the agreement with the EU.

Table 9

Paired ttest for the variable FODINFA 20122021 before and after the agreement with the EU

T-value	p-value
-5.86	0.000

Prepared by: Authors.

ICE (Special consumption tax)

This tax is determined according to the type of vehicle being imported, and ranges from 5% to 35%.

Table 10. Annual amounts collected **ICE** (2012-2021).

Table 10
Annual amounts collected ICE 20122021

Years	Collection (in dollars)	Percentage variation rate=current year/previous year-1	Average (before and after the agreement with the EU)
July 2012 - June 2013	128246040		
July 2013 - June 2014	134579763	0.05	
July 2014 - June 2015	140708736	0.05	
July 2015 - June 2016	76480388	-0.46	0.07% (before)
July 2016 - June 2017	127062366	0.66	
July 2017 - June 2018	209900246	0.65	0.12% (after)
July 2018 - June 2019	210101689	0.00	
July 2019 - June 2020	196492256	-0.06	
July 2020 - June 2021	177649043	-0.10	
Total	1401220527		

Source: SENAE (2021). Prepared by: Authors.

Table 11. Calculation of the normality of the natural logarithm variable of **ICE** (2012-2021) before and after the agreement with the EU.

Table 11
Calculation of the normality of the natural logarithm variable of ICE (2012-2021) before and after the agreement with the EU.

Formerly	Then
AD=2.655	AD=0.751
p-value<0.005	p-value<0.047

Prepared by: Authors.

Table 12. Paired t-tests for the **ECI** variable (2012-2021) before and after the agreement with the EU.

Table 12
Paired ttests for the ECI variable 20122021 before and after the agreement with the EU

T-value	p-value
-6.65	0.000

Prepared by: Authors.

Vehicle imports

The purpose of this section is to analyze the amounts collected from vehicle imports during the period indicated throughout the document.

Table 13. Annual amounts collected **from vehicle imports** (2012-2021).

Table 13
Annual amounts collected from vehicle imports 20122021

Years	Collection (in dollars)	Percentage variation rate=current year/previous year-1	Average (before and after the agreement with the EU)
July 2012 - June 2013	2112295208		
July 2013 - June 2014	2124991111	0.01	
July 2014 - June 2015	2117496064	0.00	
July 2015 - June 2016	1063063741	-0.50	-0.05% (before)
July 2016 - June 2017	1384216974	0.30	
July 2017 - June 2018	2221052358	0.60	0.09% (after)
July 2018 - June 2019	2286149745	0.03	
July 2019 - June 2020	1646864299	-0.28	
July 2020 - June 2021	1652648093	0.00	
Total	16608777593		

Table14 . Calculation of the normality of the natural logarithm variable of **vehicle imports** (2012-2021) before and after the agreement with the EU.

Table 14
Calculation of the normality of the natural logarithm variable of vehicle imports (2012-2021) before and after the agreement with the EU.

Formerly	Then
KS=0.178 p-value<0.010	KS=0.205 p-value<0.010

Prepared by: Authors.

Table 15. Paired t-test for the variable **vehicle imports** (2012-2021) before and after the agreement with the EU.

Table 15
Paired ttest for the variable vehicle imports 20122021 before and after the agreement with the EU

T-value	p-value
-1.25	0.218

Prepared by: Authors.

RESULTS

The annual results in the amounts collected for taxes show an average percentage variation rate of less than 0.08% and even negative in the case of the FODINFA variable, before the signing of the agreement with the European Union; however, after the agreement came into force, a variation of more than 0.1% is observed in all cases. (See Table No.1) (See Table No.4) (See Table No.7) (See Table No.10).

The normality tests for all variables showed that the sample data fit a normal distribution with a probability of 95%, both before and after the agreement with the European Union. (See Table 2) (See Table 5) (See Table 8) (See Table 11).

The average tax collection is higher after the application of the Agreement with the EU, this difference is significant given its p-value, therefore a decisive increase in the collection of these taxes can be observed after the application of the Agreement. (See Table No.3) (See Table No.6) (See Table No.9) (See Table No.12)

Regarding the amounts collected for vehicle imports during the study period, before the application of the agreement we observe a negative variation rate, while the opposite happens after the agreement is in force, clearly then we observe an increase in the variation rate. (See Table 13).

The normality test for vehicle imports showed that the sample data fit a normal distribution with a probability of 95%, both before and after the agreement with the European Union. (See Table 14).

The average collection of vehicle imports after the application of the Agreement with the EU is higher, however, this difference is not significant given its p-value. (See Table No.15)

CONCLUSIONS

After analyzing the data, it can be observed that the collection of taxes on vehicle imports is not constantly increasing, but rather it experiences positive and negative variations. However, in general, the rate of variation is higher after the implementation of the agreement with the European Union for all taxes.

The averages of the tax burden collection for vehicle imports: Tariff, FODINFA, VAT and ICE, show a significant difference after the agreement with the EU came into force; the average in all cases is higher

after the application of the agreement. With regard to the amounts collected from vehicle imports, these experienced a negative variation rate before the implementation of the agreement with the European Union, which grew to become positive after its entry into force. However, although the values for this collection increased, this growth is not statistically significant.

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