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Study of the Production, Import, and Export of Intermediate Inputs in Ecuador's Manufacturing Sector and their impact on the Ecuadorian Incorporated Product

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Abstract

This paper seeks to identify the production, import, and export of intermediate inputs of the manufacturing sector in Ecuador, for which we worked with secondary data, using an exploratory and descriptive study, data were collected from the economic sectors of ISIC 29, 30, and 10. Subsequently, we proceeded to use the econometric technique of panel data, included in a set of multivariate tools for the analysis of the dependence between variables. As a result, a strong relationship of imports for the final process of good was evidenced, generating structural imbalances with this practice. It was possible to corroborate a high dependence on intermediate inputs, which affects the internal development of the industry and the Ecuadorian productive matrix.

Keywords: *Production matrix, Substitutability, Fiscal Sacrifice, Productivity, Intermediate inputs.*

INTRODUCTION

In Ecuador, the national productive matrix has not been developed; therefore, there is no study of the true value added of the products manufactured in the country, even for those of entirely national manufacture and imported components. The existing methodology for statistical studies does not allow for the identification of the number of Ecuadorian products incorporated in the productive processes developed within the country, mainly for the manufacturing industry sector of goods such as vehicles, televisions, cell phones, processed food, non-metallic products, and others, being an issue that involves the economic development of Ecuador within the framework of the national policy.

In the country, the importance of companies maintaining a high level of incorporated Ecuadorian products should be considered an object of analysis, which will result in an

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improvement of the economy, which can be used as a policy instrument and for the establishment of the baseline reference, to establish different productive objectives in the Ecuadorian manufacturing sector.

It is for this reason that due to the fragile internal system of the industries of developing countries, the idea of the economic theory of the model of import substitution by industrialization (ISI), accepted by different Latin American countries proposed by the premise of the Cepaline model, arose (Hobbs, Kerr, y Klein, 1998).

The author (Hobbs J. E., 2001) mentions that the Latin American countries had two relevant conditions to be able to accept the doctrine proposed by the ECLAC model, namely:

- The existence of an elastic supply in the industrial structure.
- The growth effect linked to the new strategy will overcome the depressive effect of the contraction of export activities.

Different economic schools proposed different theories within the framework of import substitution, one of them was the developmental theory, which lacked historical support, focused on mercantilism, and linked to the internal commercialization of a country, leaving aside the international negotiation relations (Fulton et Holmlund 1999; Pearce, 1997).

In effect, the thinking behind this theory was inward growth, since they promoted the theory that Latin America's backwardness was due to its total dependence on imports of intermediate inputs and was only characterized by exporting primary products without a process of industrialization.

During the 1960s, ECLAC's vision, while becoming a formula for public intervention that underlay the dualistic vision of the coexistence of traditional and modern sectors, was harshly criticized because it mythologized the influence of feudalism on underdevelopment, ignoring the fact that it is a historical product of capitalist expansion and the appropriation of surpluses by minorities (Fearne, 1998); This criticism also extended to the scant analysis of the systems of domination and social forces for the transformation of the countries of the region (Obschatko, 1997).

Import substitution is a development strategy that can benefit the growth of the domestic market, where the driving force is the expansion of local industry and the State plays a crucial role through indicative planning, the construction of State-owned industries in key sectors, the allocation of credits and the astute application of temporary protectionist policies in the foreign trade sector (North y Bárcena, 1993).

Economic models of production

The economic theory of production deals with this particular subject and its objective is to provide the entrepreneur or manager with the necessary information for the company to efficiently organize its production process, using efficiently those limited and costly productive factors and thus maximizing the profits or benefits of the owners (Vargas, 2014).

Within the theory, production is based on the productive forces and the relations of production, which is how Karl Marx's model was born. The economic model outlined by Marx points to production as the central axis and starting point of the economic process (Enríquez, 2017).

"In development theories, the manufacturing industry - productive sector is of vital importance for the development of countries, since the stagnation or internal and external growth of the economic sector depends on these industries" (Gómez, 2011).

Production and negotiation a tools of great importance and indispensable in foreign trade, for this reason, it is necessary to know the international negotiation processes so that

there is an orderly economy where the balance between supply and use of goods is productive through the implementation of the input-output matrix modeling. It can be used to study various topics, such as the composition of added value, price analysis, calculation of import requirements, etc (Hurtado y Martínez, 2017).

Technique Panel data

"Panel data are those that arise from the observation of the same cross-section or cross-section with N individuals over time" (Sancho and Serrano, 2004).

On the other hand, for Gutierrez (2008), the reason for the use of the panel data technique is that it takes advantage of the information provided by the cross-sectional variability and estimation of the parameters in a response function by exploiting the information of an independent variable.

The panel data technique is used in different areas, so in the work done by Arboleda and Alonso (2016), an econometric model was estimated to determine the effect of marketing actions on sales of personal care products in Colombia, to structure the study of a linear model was used with panel data and a limited database, in this study 2 tests were used: fixed effects and random effects, in their findings they observed that the fixed effects test was the most suitable due to the estimates, significance and a high r-squared.

METHODOLOGY

For the percentage of Ecuadorian products incorporated in national production, a statistical analysis was performed by the manufacturing sector using the International Standard Industrial Classification (ISIC at 2 digits), i.e. the random selection was used to group companies with the same characteristics and productive activity.

Table 1. Generalized model

Variables	Description
y_{it}	Percentage of PEI in a given product.
x_{it}	Independent variables: imported and local intermediate products.
β_{1i}	Vector of parameters or elasticity coefficients.
v_{it}	Vector of panel errors

Source: Own elaboration 2022.

In the first instance, the necessary variables were established, be they investments in productive resources, to collect information on the levels of raw material imports of the sectors under study, framed within a methodological framework using the "Panel Data" technique. The technique is framed within the regression analysis, included in the set of multivariate tools destined for the analysis of the dependence between variables, all of them measured (endogenous and exogenous) preferably on a strictly quantitative scale. The idea is to represent using the following equation, the relationship of variables mentioned above, which would be expressed in the following way:

$$y_{it} = \eta_{it} + \beta_{1i} x_{1it} + \beta_{2i} x_{2it} + ... + \beta_{ki} x_{kit} + v_{it} \quad (1)$$

$$y_{it} = X_{it}^{T} \beta_{it} + u_{it}$$

$$i=1,\ldots\ldots, N;\ t=1,\ldots..., T$$

$$\hat{\beta} = \frac{\sum_i \Delta X_i \Omega^{-1} \Delta Y_i}{\sum_i \Delta X_i \Omega^{-1} \Delta X_i} \quad (2)$$

Table 2. Simplified Equation

Variables	Description
ΔX_i	Differentiated coefficient matrix (Independent variables: imported and local intermediate products)
ΔY_i	Differentiated coefficient matrix (Percentage of PEI in a given product).

Source: Own elaboration 2022.

This study accessed the databases of the Super Intendencia de compañía (SUPERCIAS), Ministerio de Producción (MIPRO), and Servicio Nacional de Aduana del Ecuador (SENAE), which allowed structuring a representative sample (size and significance) of the manufacturing sector, to measure the contribution of these in the sectoral Gross Value Added, the equation (3) would represent the expression of the sectoral relationships with their respective parameters, therefore, it would be the formula of the PEI.

$$\begin{bmatrix} y_{i1} \\ y_{i2} \\ \Delta y_{i2} \end{bmatrix} = \begin{bmatrix} x_{i1} \\ x_{i2} \\ \Delta x_{i2} \end{bmatrix} \beta + \begin{bmatrix} 0 \\ 0 \\ \Delta x_{i2} \end{bmatrix} \alpha + \begin{bmatrix} v_{i1} \\ v_{i2} \\ v_{i3} \end{bmatrix} \quad (3)$$

$$i = 1, \ldots\ldots N$$

Table 3. Equations in matrix form

Variables	Description
y_i	PEI Participation
X_i	Panels of independent variables
ν_{it}	Panel error vector

Source: Own elaboration 2022.

For the respective estimates, a ranking was developed, identifying the inconsistencies of the possible estimators, starting from the most basic estimation by ordinary least squares, and then differentiating and balancing the corresponding panel. The respective table shows the potential estimates with their differences and problems.

Table 4. Model of different tests.

Model	Formula	Problems
MCO	$y_{it} = a_{it} + \alpha k_{it} + \beta l_{it} + \gamma m_{it} + \theta p_{it} + \varepsilon_{it}$	Parameters are not consistent (Endogeneity) Correlation between productivity and inputs
Fixed Effects: First Differences	$\Delta y_{it} = \alpha \Delta k_{it} + \beta \Delta l_{it} + \gamma \Delta m_{it} + \theta \Delta p_{it}$	Often, excessively low estimates are obtained for capital

	$+ \Delta\varepsilon_{it}$	Constant error over time (a very strong assumption)
Fixed Effects: Intragroup	$y_{it} - \bar{y}_i = \alpha(k_{it} - \bar{k}_i) + \beta(l_{it} - \bar{l}_i) + \gamma(m_{it} - \bar{m}_i) + \theta(p_{it} - \bar{p}_i) + (u_{it} - \bar{u}_i)$	Often, excessively low estimates are obtained for capital
Random Effects	$y_{it} - \lambda\bar{y}_i = \beta_0(1-\lambda) + \alpha(k_{it} - \lambda\bar{k}_i) + \beta(l_{it} - \lambda\bar{l}_i + \gamma(m_{it} - \lambda\bar{m}_i) + \theta(p_{it} - \lambda\bar{p}_i) + (\varepsilon_{it} - \lambda\bar{\varepsilon}_i)$	Individual effects are correlated with the regressors (productive factors) the estimator is inconsistent
GMM: Arellano and Bond	$\Delta y_{it} = \Delta\beta_0 y_{i,t-1} + \Delta\beta_1 x_{it} + \Delta\beta_2 w_{it} + \Delta e_{it}$, si g=1	Small overestimate of capital and intermediate inputs
Levinsohn and Petrin	$\rho_t(k_{it}, m_{it}, p_{it}) = a_{it} + \alpha k_{it} + \gamma m_{it} + \theta p_{it} + \mu_{it}(k_{it}, m_{it}, p_{it})$	Parametric model that seeks to solve all problems

Source: Own elaboration 2022.

RESULTS

Analysis of the Motorcycle manufacturing sector (ISIC 30) using the Arellano-Bond correction.

When estimating the respective equation, by POLS, FE, RE, FGLS, and PCSE; the last two methods are used; to correct possible autocorrelation and heteroscedasticity problems in the OLS estimations. Table 5 shows the econometric results of the degree of materialization and participation of intermediate domestic goods, using a non-scalar equation. Estimates from five different econometric methods are shown; however, only those from the respective ISIC and maximum likelihood estimation are discussed, due to the methodological implications raised in their origins.

This result is statistically significantly different from the Wald F test and the null hypothesis H =1 was rejected, suggesting that large sectors or components are "indispensable" inputs for production. According to the volumes of inputs, all the methodologies reported in Table 5 have the same results, sign, and significance, being the estimation of the statistics, robust to any of the applied methods.

Table 5. Arellano-Bond one-stage estimates using 27 observations; dependent variable CIF

Variable	Coefficient	Standard deviation	Statistician t	p-value	
DCIF(-1)	0.53303	0.236437	2.2544	0.02417	**
const	2.42656e+06	1.33129e+06	1.8227	0.06835	*
BASE_IMPONIBLE	-2.15886	2.29021	-0.9426	0.34586	
VALOR_CFR	-3.97243	4.41105	-0.9006	0.36782	

IVA	-4.97411	2.65724	-1.8719	0.06122	*
ADVALOREM	2.41828	1.85009	1.3071	0.19117	
FOB	6.49374	3.45912	1.8773	0.06048	*

Source: Own elaboration 2022.

Sum of squares of residuals = 5.44898e+015DStandard deviation of residuals = 1.6506e+007 AR error contrast (1): z = -1.6196 (p-value 0.1053)

AR error contrast (2): z = -0,922924 (p-value 0,3560)

Sargan over-identification contrast:

Chi-square (9) = 15.6477 (p-value 0.0746).

Wald (joint) contrast

Chi-square (6) = 1.08388e+006 (p-value 0.0000)

The estimated model contains the results of the scale effect, considered using the Arellano and Bond test. Similarly to the results without scaling, we only discuss those of the differenced estimation, due to the methodological implications discussed in the respective table. Along these lines, the behavior of the different ISICs have the same sign and follow the same direction, obtained in the undifferenced model. Moreover, the differenced statistic minus one is statistically significant, different from that of the Wald F test; the null hypothesis H = 1 was rejected, suggesting that large sectors operate in a non-competitive and continuous environment. For small sectors, the H statistic is 0.67; the hypotheses H = 0 and H = 1 were also rejected, which means that small sectors operate in a scenario of relative concentration of their production, similar to medium sectors. These results are in line with those obtained by Apergis et al. (2016) and Sun (2011), who mention that the results estimated in equations of evolution of domestic, versus imported, scaled composition are quite similar and the degree of sector do not change from one to the other.

Analysis of the Motorcycle Manufacturing Sector (ISIC 30) using Weighted Least Squares Regression

The results obtained in the Model, estimation by weighted least squares, evidence the results of model 1, in particular, the independent variables in the panel denote the incidence, and correspondence, of the imported intermediate goods in the composition of the final good; making more robust the estimation versus the first one of Arellano and bond, making practically one the determination coefficient. Finally, as a check, it is evidenced that there is heterogeneity, and balance in the panel; so the process gains in reliability and stability, within the established methodology.

Table 6. MC estimates weighted using 42 observations; dependent variable CIF

Variable	Coefficient	Standard deviation	Statistic t	p-value	
const	5744.18	1389.22	4.1348	0.00020	***
BASE_IMPONIBLE	-0.0104647	0.00436122	-2.3995	0.02172	**
VALOR_CFR	0.962472	0.0101099	95.2005	<0.00001	***
IVA	-0.015652	0.00612772	-2.5543	0.01502	**
ADVALOREM	0.020309	0.00625394	3.2474	0.00252	***
FOB	0.0494678	0.00987711	5.0083	0.00001	***

Source: Own elaboration 2022.

Statistics based on weighted data:

The sum of squares of residuals = 39.358.

The standard deviation of the residuals = 1.0456

R2 = 1

Corrected R2 = 1

F-statistic (5, 36) = 9.83896e+007 (p-value < 0.00001)

Akaike's information criterion = 128.462

Schwarz Bayesian information criterion = 138.888

Hannan-Quinn criterion = 132.284

Statistics based on the original data:

Mean of Dependent var. = 1.03125e+008.

The standard deviation of the Dependent var. = 1.56282e+008

The sum of squares of the residuals = 4.53323e+010

The standard deviation of the residuals = 35485.7

Analysis of the vehicle manufacturing sector (ISIC29) using 3 models

In the comparison of model 1 versus model 2 and model 3, concerning ISIC 29, it could be observed that of greater adjustment, significance and representativeness is the weighted least squares model, after the iteration process of lags seen in model 1 up to twenty lags; The same that presents a coefficient of determination of almost one, which implies the degree of representativeness and importance of the result variables, taxes, as a referent of the local productive activity; however the ad-valorem, has strong representativeness; which gives indications to think of the degree of collection is strongly correlated with the aggregate productive activity; in the national composition.

About model two, without lags, it is determined that regardless of the serial correlation, the variables both CIF value and taxes have a direct influence on the levels of national composition, being the three models tested highly significant in their variables. The contribution of the signs of the coefficients, in their positivity and negativity, show the direction of the relationship established in the three models, showing the balance and equilibrium of the structured panel.

Model three in the weighted estimation, shows consistency, and correlativity, guaranteeing the previous in models one and two, the weighting adjusts the possible problems of endogeneity, it is noteworthy that the third estimation is developed by maximum likelihood, confirming the efficiency of the parameter estimated by ordinary least squares.

In summary, the validity and reliability of the three modelings are conclusive in the determination of the influence of the mediating variables, resulting from the tax activity in this case, towards the participation of the national composition in the aggregation of value of the production of final goods.

Table 7. ISIC 29 estimations using 3 tests.

Model 1: Estimation by fixed effects						**Model 2: Estimation without lags**						**Model 3: Least squares estimation evaluated**					
Variable	***Coefficient***	***Standard deviation***	***Statistic t***	***p-value***	***p. value***	***Variable***	***Coefficient***	***Standard deviation***	***Statistic t***	***p-value***	***p. value***	***Variable***	***Coefficient***	***Standard deviation***	***Statistic t***	***p-value***	***p. value***
FOB	1.81465	indefinite	indefinite	indefinite		BASE_IMPONIBLE	0.00794945	0.00338151	2.3509	0.02486	**	const	3159.01	2761.32	1.144	0.26061	
IVA	2.1018	indefinite	indefinite	indefinite		VALOR_CFR	0.995757	0.00163448	609.2183	<0.00001	***	BASE_IMPONIBLE	0.0069827	0.00154182	4.5288	0.00007	***
ADVALOREM	-0.181395	indefinite	indefinite	indefinite		IVA	-0.0230956	0.0199377	-1.1584	0.25502		VALOR_CFR	0.996009	0.000697081	1428.8276	<0.00001	***
BASE_IMPONIBLE	-0.988491	indefinite	indefinite	indefinite		ADVALOREM	0.00208687	0.0025149	0.8298	0.41261		IVA	-0.0187448	0.00923563	-2.0296	0.05028	*
CIF_1	0.00156944	indefinite	indefinite	indefinite		CIF_1	9.69E-06	0.000273311	0.0355	0.97192		ADVALOREM	0.0022295	0.00111971	1.9912	0.05455	*
dt_2	1.42E+06	1.84E+06	0.7731	0.45229								CIF_1	8.52E-05	0.000125928	0.6765	0.5033	
dt_3	634950	1.16E+06	0.5453	0.59416													
dt_4	-1.22E+06	348851	-3.4939	0.00358	***												
dt_5	-1.06E+06	275369	-3.8527	0.00176	***												
dt_6	1.10E+06	1.24E+06	0.8883	0.38937													
dt_7	-2.81E+06	1.62E+06	-1.7335	0.10497													
dt_8	-3.12E+06	1.40E+06	-2.2197	0.04347	**												
dt_9	-426962	1.22E+06	-0.3492	0.73213													
dt_10	-846144	226831	-3.7303	0.00224	***												
dt_11	-764502	410794	-1.861	0.08387	*												
dt_12	1.10E+06	1.46E+06	0.7568	0.46171													
dt_13	-153148	392248	-0.3904	0.70209													
dt_14	-109715	409266	-0.2681	0.79255													
dt_15	-69384.9	391837	-0.1771	0.86198													
dt_16	-255097	526236	-0.4848	0.63534													
dt_17	-200670	486356	-0.4126	0.68615													
dt_18	-200777	486435	-0.4128	0.68604													
dt_19	-242615	513219	-0.4727	0.64369													
dt_20	-183620	523032	-0.3511	0.73076													

Source: Own elaboration 2022.

R2 = 0,999668	R2 = 1	Heteroskedasticity likelihood ratio test
R2 corrected = 0,999076	R2 corrected = 1	Null hypothesis: units have the same variance of the disturbance.
Statistic F (25.14) = 1687.19 (valor p < 0.00001)	Statistic F (6.33) = 6.55615e+007 (valor p < 0.00001)	Contrast statistic: Chi-square(1) = 18.0111 with p-value = 2.19617e-005

Analysis of the food manufacturing sector (ISIC 10) using two models

Concerning ISIC 10, in the comparison of model 1 versus model 2, comparing the CIF and FOB value, considering fixed effects and 42 lags, concerning ISIC 29, under the maximum likelihood method. Where the results are effectively positive, with an R2 of 0.99996, this given to the iteration of the residuals the representativeness and importance of the result variables, taxes, as a referent of the local productive activity; however, the ad-valorem, has a strong correlation; so a potential causality with the aggregate productive activity is inferred; in the national composition.

About model two, estimation by maximum likelihood, as an alternative mechanism, without lags; it was determined that indistinctly of the serial correlation, the variables both CIF value and taxes, keep direct influence with the levels of national composition, being these two models tested highly significant in their variables, as a set or balanced panel in fixed effects. The contribution of the signs of the coefficients, in their positivity and negativity, show the direction of the relationship established in the two models, showing equilibrium.

In summary, ISIC 10 in terms of its validity and reliability is highly significant, the two subsequent modelings are conclusive in determining the influence and potential causality, towards the participation of the national composition in the aggregation of the value of the production of final goods.

Table 8. ISIC 10 Estimates Using 2 Tests.

Model 1: Fixed effects estimations using 42 observations, dependent variable FOB.

Variable	Coefficient	Standard deviation	Statistic t	p-value	p. value
CIF	5.39092	1.383	3.898	0.00042	***
BASE_IMPONIBLE	0.158702	0.0459727	3.4521	0.00147	***
VALOR_CFR	-4.57075	1.3986	-3.2681	0.00243	***
IVA	0.143579	0.0653278	2.1978	0.03467	**
ADVALOREM	-0.0954403	0.0705081	-1.3536	0.18454	

R^2 = 0,999996

R^2 corrected = 0.999995

F-statistic (6. 35) = 1.44162e+006 (p-value < 0.00001)
Durbin-Watson statistic = 1.30318
Log-likelihood = -590.564

Akaike information criterion = 1195.13

Model 2: Maximum likelihood estimation, dependent variable CIF

Variable	Coefficient	Standard deviation	Statistic t	p-value	p. value
const	-1218.91	3087.92	-0.3947	0.69531	
BASE_IMPONIBLE	-0.000352038	0.00259935	-0.1354	0.893	
VALOR_CFR	0.963652	0.00607934	158.5127	<0.00001	***
ADVALOREM	0.00715351	0.00297094	2.4078	0.02115	**
FOB	0.0371232	0.00638098	5.8178	<0.00001	***

Mean of the dependent var. = 1.03125e+008
Standard deviation of the dependent variable . = 1,56282e+008
Log-likelihood = -484,107
Akaike information criteria = 978,214
Schwarz Bayesian information criterion = 986,902
Hannan-Quinn Criterion = 981,399

Schwarz Bayesian information criterion = 1207.29 Hannan-Quinn criterion = 1199.59	Heteroscedasticity likelihood ratio test by groups - Null hypothesis: units have the same variance of the disturbance Contrast statistic : Chi- square (1) = 36.1656 with p-value = 1.8124e-009

Source: Own elaboration 2022.

DISCUSSION

According to Vásquez Orozco (2010), exports are very important for the country as long as they are stable over time since they are part of economic growth; however, imports should be considered an important component in the development of a country as long as they are relatively tolerable, otherwise an unfavorable trade balance will be created for the countries.

Salazar, Morales, and Martínez (2020), state that the manufacturing industry is a very important industry for the GDP of many countries; they also state that the greater the demand for manufactured products, the greater the profitability obtained by exporting products, which is why the sector under study is fundamental for the development of the country; however, it has been underdeveloped because it depends on intermediate inputs for the production of a final good, leading to deficits over a period of years. For this reason, Ordoñez and Hinojosa (2014) propose a state policy to transform the productive matrix to generate added value and similarly reduce imports. This in turn would imply generating diversification in finished products.

Payares (2012), in his research Estimation of land value potential in Barranquilla, questions the selection of a panel model with fixed effect since Egger (1999) identifies some difficulties associated with the model when spatial variables are involved, which is why he considers using another maximum likelihood test for the redundancy of the fixed effects, this test verifies the hypothesis of equality between coefficients different from zero, i.e. considers different tests for its modeling, this to verify the relevant estimates. This corroborates and approves the use of different tests used in this work and in strengthening the findings.

In this way, it can be evidenced that the different tests implemented in this paper support the results found and can foresee a strong dependence of imports on local final products.

CONCLUSIONS

For the Ecuadorian case, it could be demonstrated that manufacturing industries are fundamental for the development of the economy, in recent years there has been exponential growth, in developed countries the manufacturing sector is very dynamic and standardized which creates competitive advantages over developing countries, especially in Latin American countries, especially in Ecuador, where it can be corroborated by the literature a high dependence on intermediate inputs for the production of local products which leads to the country not industrializing and depending on imported inputs.

On the other hand, the high rate of imports leads to a deficit in the trade balance, especially when most of the industries function as assemblers and in other cases their finished products have around 80% of imported intermediate products, thus affecting the growth or evolution of the country's industrialization.

The vehicle manufacturing industry is one of the largest importers of intermediate products, especially from the Asian continent, so as a state policy a clause should be

implemented in which companies implement Ecuadorian products or a minimum percentage of the goods. This would be a functional device to boost the domestic industry for the production of intermediate goods for other sectors.

This paper was structured by ISIC (2 digits) making a conglomerate of companies by their economic activity, using the simple random method, the representative companies of ISIC 29, 10, and 30 were chosen, showing that in each group of companies, there is a high dependence on intermediate inputs, obtaining that the factors of more weight are technologies for the production of automobiles, motorcycles and food products.

The results of ISIC 30 using the econometric modeling developed Data panel under the Arellano Bond and Weighted Least Squares tests evidenced a high statistical significance which implies high participation of intermediate components in the ISIC of analysis and a high serial correlation of the data, in general the variables participating in the panel which are: CIF, ADVALOREM, FOB VAT, CFR VALUE, TAXABLE BASE, show an interaction in economic context implies a high balanced correlativity of imports for the manufacturing activity of this segment.

On the other hand, the ISIC 29 was tested with fixed effects, weighted least squares, and weighted least squares: fixed effects, weighted least squares, and estimations without lags, proving to be appropriate for the analysis of this sector; however the least squares test was the most optimal with an r2 equal to 1 in which the variables used were relevant for the study, this sector is the most representative, implying a high correlativity of imports, the validity and reliability of the three modelings are conclusive in determining the influence of the mediating variables, resulting from the tax activity in this case, towards the participation of the national composition in the value addition of the production of final goods.

Finally, for ISIC 10, two tests were used: fixed effects and maximum likelihood estimations using 42 observations to strengthen the results obtained from the contrast of the models, both tests proved to be significantly explanatory for the study, however, the fixed effects model for ISIC 10 was the most suitable for its explanation, demonstrating a high dependence on foreign intermediate products.

The different tests show the dependence on imported inputs and to that extent no value is added to the development of the industry, visualizing a high dependence on intermediate inputs.

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