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## FACTOR ANALYSIS INFLUENCING GLOBALIZATION LEVEL IN COLOMBIA

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### ABSTRACT:

Beyond the debate on the positive or negative factors of globalization and its importance in Latin American countries, this research focuses on finding macroeconomic variables to measure the degree of globalization in Colombia. The different variables related to exports, foreign exchange transactions and the volume of business of international portfolios are part of the analysis of this study. Through a technique of reducing dimensions, it was concluded that the variables that have the greatest impact on globalization in Colombia are the dollar amount of exports, amount of foreign exchange income to the country, percentage of participation of Colombian exports in World Gross Domestic Product (WGDP) and business volume in the MILA integrated market.

### 1. INTRODUCTION:

Globalization as a very narrow concept, is established as an integration process of different nations in distinct aspects: economic, financial, political, cultural, and environmental (Kozikowski, 2013), by means of a free capital movement that allows financial

markets and multinational corporations a stronger dominance over national economies (Soros, 2002) due to development promotion in production, investment, and consumption, when the exports of a country drive these areas (Stiglitz, 2008). The globalization process is understood as an increase of market competition, leading to the creation of new needs for companies and local economies aimed to be able to adjust to the scenario of a growing global competition, i.e., it presents challenges for the productive and business system of every country (León Segura & Sorhegui Ortega, 2004). There are other broader definitions such as that from Hopper *et al.* (2017) that define globalization as an increasing mobility of goods, services, basic products, information, people, and communications across national borders where technologies, information, global stock markets, futures, debt, derivatives, and interest rate swaps have accelerated.

There is a wide literature on globalization, having great defenders and great detractors among the distinct authors. According to Torres (2011), globalization brought with it technological development, a surprising advancement in communication, and a significant reduction in transportation costs. Nonetheless, authors such as Soros (2002) establish that despite its great benefits, the great globalization problem has to do with the accelerated development of international financial markets versus the slow development of international institutions, in addition to the little attention to social interests.

On the one hand, nations were expected to have greater equal economic growth (Kumar De, 2014). However, over the last decades certain difficulties have emerged such as people isolation by global markets, since these are favorable for wealth increase but not for meeting social needs (Soros, 2002); price volatility that make planning difficult in the long term; contagion effect in capital flight; tendency towards deflation; increase in distributive inequality; conflict exacerbation (Kozikowski, 2013); an increase in environmental degradation and economic inequality (Borghesi & Vercelli, 2003); along with loss of state legitimacy (Grabendorff, 2017). On the other hand, authors such as Georgiadis & Mehl (2016) establish that financial globalization has an ambiguous effect on the efficacy of monetary policy, since this is weakened due to the exposure to world financial cycles, but it is also strengthened with the long positions in foreign currency of the countries.

### **1.1 Globalization in Colombia:**

From the globalization phenomenon from the 1940s, Latin American countries in general began their own process, beginning with the momentum to an Import Substitution Industrialization (ISI) that included a series of protection measures of a tariff and administrative nature aimed to achieve a greater consolidation of the internal market to support the manufacturing processes (Torres, 2011). This managed to resist the large waves of capital that fluctuated towards the hegemonic countries. The policy allowed production diversification. However, by the 1980's, this closed-type economy had led to an increase in prices and a substantial decrease in quality, innovation, savings, and investment, which

structurally slowed down economic growth. Thus, internal financial crises were presented (Kalmanovitz, 2007).

The fall of the ISI model led the Colombian government to consider a trade openness that would liberate trade and thus eliminate protectionist barriers, even keeping in mind the disadvantages to the national production that this would entail in the 1990s. The grand opening took place then in 1991, eliminating quantitative restrictions on imports, reducing tariffs and simplifying foreign trade procedures (Foreign Policy, 2005).

According to Román Jaimes (2016), Colombia is considered an emergent world country, with an incipient economy of agricultural exploitation, evolved in mining production only as raw material, and to a lesser scale, in energy production, tourism, and services, suggesting that the regions in each of the departments were not prepared for this global openness. For the afore mentioned reason, the interest of this research study is focused on measuring the globalization level of the country considering the historical information comprised between 1997-2017.

## **1.2 Measurement of globalization:**

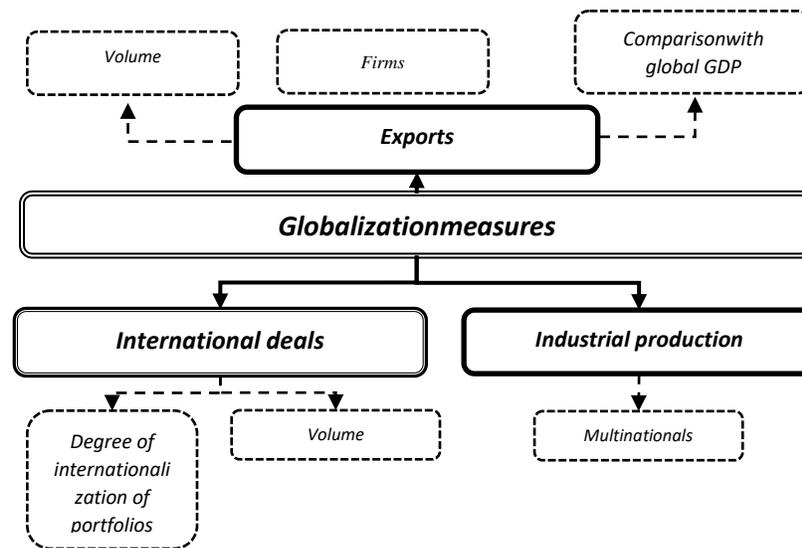
For Asongu (2017), the measurement debate on globalization seen as a reward for trade openness in countries from a threshold, can be analyzed from three perspectives. The first one, in favor of globalization based on theoretical motivations from this, which regarding the theory, allows an efficient allocation of capital and an international risk distribution bringing benefits such as access to foreign capital, economic growth, and greater economic stability. The second perspective, based more on the globalization antithesis, is based on determining its negative effects, since authors such as Kose *et al.* (2011) cited by Asongu (2017) have argued that the relative stability experienced by developed countries is traceable to less volatile production, compared to developing countries that experience more volatile production. And a third perspective, based on scientific evidence such as that from Kose *et al.* (2011) who, in variables such as financial depth and institutional quality with clearly identifiable thresholds, found that the cost-benefit compensation of financial openness significantly improves once these threshold conditions are met.

The contribution from Asongu (2017) consisted of measuring financial globalization taking into account the variations in financial development and its initial conditions by analyzing data from 53 countries in Africa from 1996 - 2011 with data taken from the World Bank, considering as variables: Dynamics of the depth of financial development from the point of view of the world economic and financial system, efficiency of each country at the banking and financial system level, financial activity level and size of financial globalization. On the other hand, Kumar De (2014) evaluated the level of co-integration among various nations of all continents regarding their globalization, using a series of data from countries

of different continents between 1970 and 2007, finding the existence of co-integration among the selected nations, being the European countries the most cointegrated.

According to authors such as Kozikowski (2013), globalization is more developed in financial markets than in the product market and proposes the following globalization measures, indicated in Figure 1.

- Export share in world gross domestic product (GDP).
- Growth rate of exports compared to the economic growth rate.
- Percentage of industrial production attributed to multinational companies located in the country.
- Number of transactions in international financial markets.
- And finally, internationalization level of investment portfolios.



**Figure 1. Globalization Measures.** Source: (Kozikowski, 2013)

**2. METHODOLOGY:**

The methodology used in this research was quantitative, not experimental. The globalization level of the country was analyzed through a Principal Component Analysis (PCA) considering as measurement variables data proposed by Kozikowski (2013) with information taken from a time series between 2007 and 2019 (only available information). Each element considered in the measurement was called a variable and analyzed in the SPSS 26 software.

The data series for the statistical analysis were taken from different funding sources as indicated below:

**Exports:** Table 1 indicates Colombia's exports in FOB dollars.

**Table 1. Export variables used to measure Globalization**

<b>Year</b>	<b>Exports (\$USD)</b>
2007	\$ 30.279.238.918
2008	\$ 36.786.375.287
2009	\$ 32.846.326.710
2010	\$ 39.713.336.400
2011	\$ 56.914.939.110
2012	\$ 60.125.165.918
2013	\$ 58.826.371.009
2014	\$ 54.856.754.567
2015	\$ 36.017.521.665
2016	\$ 31.768.340.981
2017	\$ 38.021.860.310
2018	\$ 41.904.777.398
2019*	\$ 39.501.676.892

Source: (DANE, 2021)

Other export measurement variables were proposed in addition to the export information in amounts such as number of companies that export and number of declarations as shown in Table 2:

**Table 2. Companies and number of export declarations**

<b>Year</b>	<b>Company</b>	<b>Declarations</b>
2007	11.442	428.053
2008	11.305	405.614
2009	10.730	390.770
2010	9.437	387.606
2011	9.555	389.094
2012	9.744	38.657
2013	10.257	383.084
2014	10.509	902.518
2015	10.848	886.242
2016	11.150	895.047
2017	11.292	960.722
2018	11.454	990.230
2019*	10.431	942.931

Source: (DIAN, 2021)

On the currency side, Table 3 shows total amount of foreign currency inflows to the country as a measure of Globalization.

**Table 3. Business volume in foreign currency to the country 2007-2019**

Year	Total Amount Traded Income US\$
2007	405293934928
2008	502592420209
2009	459923916527
2010	469481520704
2011	500430373242
2012	505667693797
2013	587238176266
2014	484139787404
2015	414171606381
2016	437075766331
2017	411478532224
2018	419459420187
2019*	363721749217

Source: (Superintendencia Financiera Colombia, 2021)

Regarding portfolio internationalization level, transaction volume carried out in the MILA integrated market was consulted as the only reference of the internationalization level of investment portfolios, although it is worth clarifying that it was created and launched from year 2013.

**Table 4. MILA Traded Volume**

Year	Amount
2013	\$ 140.985.581,00
2014	\$ 204.236.374,00
2015	\$ 45.185.336,00
2016	\$ 45.140.443,00
2017	\$ 124.494.281,00
2018	\$ 47.528.569,00
2019	\$ 17.412.104,00

Source: (Bolsa de Valores de Colombia, 2021)

### 3. RESULTS AND DISCUSSION:

The analysis began with the data standardization in SPSS, estimating the “z” value for each variable since they were variables with different measurement units. Subsequently, to determine if the selected variables were correlated, and define the variable to be selected

for each globalization measurement component, the correlation matrix (Table 5) and its determinant were elaborated, since it was necessary that these were highly correlated.

**Table 5. Correlation matrix**

		Z-score: % of World GDP	Z-score: Exports (\$USD)	Z-score: Number of Exporting Companies	Z-score: Num. of declarations	Z-score: Total amount income US\$	Z-score: Volumen negociado MILA
Correlation	Z-score: % of World GDP	1.000	.858	-.820	-.728	.625	.355
	Z-score: Exports (\$USD)	.858	1.000	-.650	-.677	.806	.756
	Z-score: Number of Exporting Companies	-.820	-.650	1.000	.627	-.479	-.329
	Z-score: Num. of declarations	-.728	-.677	.627	1.000	-.888	-.353
	Z-score: Total amount income US\$	.625	.806	-.479	-.888	1.000	.654
	Z-score: Volumen negociado MILA	.355	.756	-.329	-.353	.654	1.000
Sig. (unilateral)	Z-score: % of World GDP		.007	.012	.032	.067	.218
	Z-score: Exports (\$USD)	.007		.057	.048	.014	.025
	Z-score: Number of Exporting Companies	.012	.057		.066	.138	.236
	Z-score: Num. of declarations	.032	.048	.066		.004	.219
	Z-score: Total amount income US\$	.067	.014	.138	.004		.056
	Z-score: Volumen negociado MILA	.218	.025	.236	.219	.056	
a. Determinante = 3.099E-8							

Although some correlations were low, first a principal components analysis was established to finally determine the implicit factors in the globalization level of Colombia and how the variables selected in the study were favorable or not to this measure and thus, be able to refine the ones that do not contribute.

**Table 6. Communalities**

	Initial	Extraction
Z-score: % of World GDP	1.000	.779

Z-score: Exports (\$USD)	1.000	.891
Z-score: Num. of declarations	1.000	.603
Z-score: Number of Exporting Companies.	1.000	.740
Z-score: Total amount income US\$	1.000	.790
Z-score: Volumen negociado MILA	1.000	.445
Extraction method: analysis of major components.		

The communalities in Table 6 indicate the variance proportion of each variable that can be explained by the factorial model obtained. The variables with the lowest commonality are the ones that least explain the model, i.e., in this case, the variable “Volume traded MILA” is the one that least explains the model variance.

Table 7 of total variance explained indicates the eigenvalues of the variance-covariance matrix and the variance percentage that each one represents.

**Table 7. Total explained variance**

Component	Initial autovalues			Sums of charges squared from extraction		
	Total	% de variance	% accumulated	Total	% de variance	% accumulated
1	4.247	70.791	70.791	4.247	70.791	70.791
2	.913	15.211	86.002			
3	.578	9.636	95.638			
4	.232	3.873	99.511			
5	.029	.489	100.000			
6	2.028E-6	3.380E-5	100.000			
Extraction method: analysis of major components.						

Each eigenvalue expresses the variance amount that it explains for each factor. Since by default both factors and eigenvalues greater than 1 are extracted, it means that in this model a single factor is extracted that explains the 70.791% variance from the original data, although it is possible to extract 6.

Finally, Table 8 shows how the variables explain the component that we call “Globalization Level”, positively driven by the variables: Amount of exports, amount of income in foreign currency, percentage of the country's share in world GDP, and turnover in international portfolios. On the contrary, globalization level is negatively affected by number of declarations and number of companies that export which can be eliminated from the model, eventually leaving the matrix of components, which explain the 76.235% variance of the level of globalization.

**Table 8. Component matrix**

	Component 1
Z-score: Exports (\$USD)	.944
Z-score: Total amount income US\$	.889
Z-score: % of World GDP	.882
Z-score: Num. of declarations	-.860
Z-score: Number of Exporting Companies.	-.777
Z-score: MILA Negotiated Volume	.667
Extraction method: analysis of major components.	

#### 4. CONCLUSIONS:

Globalization can be observed from distinct angles such as political, social, economic, cultural, among others, so thinking about how to measure it is an interesting challenge. Nonetheless, at least from the economic viewpoint, some authors have proposed that some variables influence, to a greater or lesser extent, the level of globalization of a country. Such is the case Kozikowski (2007) who in his book states that among the globalization measures, there are, the export share in world gross domestic product (GDP), growth rate of exports compared to the economic growth rate, percentage of industrial production attributed to multinational companies located in the country, and the amount of transactions in international financial markets.

Considering the above, different variables in this study were analyzed with their national statistics and then refined using the technique of the study of correlations and reduction of dimensions called Principal Component Analysis. Out of six variables analyzed, in the end it was found that the Globalization level of the country is positively affected by the variables:

- Exports (Amount in USD)
- Income amount of foreign currency to the country
- Percentage share of Colombian exports in world gross domestic product (GDP).
- And the business volume in the MILA integrated market.

These results confirm what is proposed in the theory and allow opening the doors to new research on new variables that can be analyzed to find out if they positively affect globalization in other different countries.

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