# **Determinants of economic integration in the Pacific Alliance 1990-2019**

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#### Abstract

The objectives of this research were: (a) To build the model that explains the intra-regional exports of the Pacific Alliance in the period 1990-2019; (b) To build the model that explains the intra-regional imports of the Pacific Alliance in the period 1990-2019; and, (c) To build the model that explains the coefficient of external openness of the Pacific Alliance countries in the period 1990-2019. Therefore, the positivist paradigm was applied, quantitative approach, substantive type, ex post facto non-experimental design and the method was hypothetical deductive. The data collection technique used was documentary analysis. The data were analyzed with the support of descriptive and inferential statistics. The results obtained showed three models, represented in the following equations: (a) Intraregional Export (X) = -406002,576 + 50,331 XT + 2,706 XNT - 28,769 IP - 13,667 PT - 15369,702 IPC; (b) Intraregional Imports (M) = -1030849.869 + 41530.637 IPC + 410.599 TC; and, (c) External Openness Coefficient (CAE) = 10.700 - 0.002 MBC + 0.157 TIR + 0.283 IPC - 0.004 TC. In conclusion, the research determined the three models that explain the variables that influence the integration process of the Pacific Alliance, based on the years from 1990 to 2019.

Keywords: Economic integration, Pacific Alliance, exports, imports, external openness coefficient.

## 1. Introduction

At the global level, Bertasiute et al. (2020) explained the significance of economic integration for nations, highlighting the impact of its implementation on society. This phenomenon is crucial for determining the equilibrium of a nation, as well as providing a stable economic dynamic for the country, with trade openness as the main factor. In addition, it seeks to eliminate obstacles between countries to ensure the competitiveness of companies at the international level.

Added to this, Corbella and Sarmento (2017) pointed out that it is a systematic process, where two or more nations decided to eliminate trade barriers with the objective of facilitating the exchange between them, at the level of goods and services. In addition, it favors the intensification of the flow of productive factors, macroeconomic coordination or monetary union; to generate economic growth among the participating countries. They also mentioned the theory of international trade, which emphasizes increasing returns to scale and the size of markets as determinants of the degree of integration of nations.

However, Gonzáles (2015) emphasized economic blocks such as the Southern Common Market (MERCOSUR) and the Andean Community of Nations (CAN-Comunidad Andina de Naciones), whose main effort was to achieve greater economic development of member countries. In spite of this, more disadvantages than real solutions to the problems of the nations were evidenced. It also highlighted the disadvantages of neoliberal free trade agreements or open regionalism, and urged recognition of the role of the state in balancing the market and society.

On the other hand, the World Economic Forum (2019) established the capacity of a country to generate economic development opportunities for its nationals, through the Global Competitiveness Index (GCI). According to the indicators of the 141 economies, the following stand out in Latin America: Chile ranked 33rd, Mexico 48th,

Uruguay 54th, Colombia 57th, Costa Rica 62nd, Peru 65th, Panama 65th and Brazil 71st; for the reason of macroeconomic stability, infrastructure, health, education, financial market, employment and among other variables associated with economic development.

At the national level, Alarco (2016) determined the impact that the signing of an FTA (Free Trade Agreement) has on a nation's economy based on structural break statistics. Said study was applied to Chile, Mexico and Peru; aiming to determine the link between the signing of trade agreements and economic growth. It highlighted that an FTA should be influential in increasing the GDP of these three nations. However, in practice the result was totally different, since, despite an increase in the volume of exports, there was no impact on the GDP growth of these economies. It should be noted that the highest rates of increase in production had been achieved before the entry into force of each FTA signed.

Similarly, Carhuaricra and Parra (2016) stated that foreign direct investment from Asia-Pacific Economic Cooperation (APEC) economies had a positive effect on Peru's exports. For that reason, knowing the impact of Foreign Direct Investment (FDI) for an economy should be among its priorities, since it will allow understanding the effect on its export capacity. In other words, it makes it possible to know whether these investments stimulate export-oriented industrialization. They also refer to the World Economic Forum's global competitiveness index, where it was observed that Peru's lowest indicators are innovation and technological preparation, both of which are important aspects taken into account for foreign investment.

Of equal importance, Cuba (2015) conducted an analysis on the deceleration of Peru's economy during the years 2004 - 2013. Among the reasons mentioned were the fall of the main metals, the evolution of the nominal exchange rate and the low percentage of private investment participation. In addition, he reflected on the growth of the Peruvian economy differentiating between the three regions (coast, highlands and jungle), with the first two being the most developed and dynamic as opposed to the rest of the country. It also highlighted that a repetitive factor is Peru's low international competitiveness, for which reason substantive improvements must be designed and implemented at an economic and productive sector level.

At the local level, in the Pacific Alliance block, there was no harmonized macroeconomic policy management criterion. Each of the member countries independently establishes its own guidelines for its economy in the absence of a regulatory mechanism or entity at the block level. This scenario hinders the integration process, since a coordinated management of macroeconomic policies is necessary to achieve stability in the participating economies and thus facilitate the integration process. On the other hand, there were other aspects in which facilities were provided, such as trade at the level of the block and the ease of capital movement between the four member countries. However, there was no clarity on those aspects that were determinant in the economic integration process of the Pacific Alliance or which models could allow a better explanation of this phenomenon as applied to the aforementioned block.

For the above reasons, three study problems were posed which are: (a) What were the determinants of intra-regional exports of the Pacific Alliance, in the period 1990-2019; (b) What were the determinants of intra-regional imports of the Pacific Alliance, in the period 1990-2019; (c) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external openness of the Pacific Alliance countries, in the period 1990-2019; (d) What were the determinants of the coefficient of external o

The justification lies in the possibility of generalizing the results of this research, since the proposed models can be applied to other economic integration processes, beyond the Pacific Alliance. Also, the results of this text contribute to explain the behavior of economic integration, trade, foreign investment and economic policies. Likewise, it suggests contributions that may lead to future research, since these models can be tested in other economic blocks. Finally, it is valid to state that it contributes to the definition of variables and concepts, starting from the theoretical framework to the results, because the latter allow a more detailed understanding of the relationships between these variables.

The objectives were: (a) to construct the model that explains the intra-regional exports of the Pacific Alliance in the period 1990-2019; (b) to construct the model that explains the intra-regional imports of the Pacific Alliance in the period 1990-2019; and, (c) to construct the model that explains the coefficient of external openness of the Pacific Alliance countries in the period 1990-2019. These objectives establish the scope of this research.

The hypotheses were: (a) there is a model that explains the intra-regional exports of the Pacific Alliance in the period 1990-2019; (b) there is a model that explains the intra-regional imports of the Pacific Alliance in the period 1990-2019; and, (c) there is a model that explains the coefficient of external openness of the Pacific Alliance countries in the period 1990-2019. These were contrasted in the results section.

## 2. Methodology.

## 2.1 Type and design of research.

The study was conducted under the quantitative approach, which Hernández et al. (2014) defined as an objective research that is generated thanks to a deductive process; in which measurement tools and statistical analysis are involved. In this research approach, previously formulated hypotheses are evaluated, it is associated with practices, norms and behavioral patterns of a population. It also measures phenomena, applies theories, and the process to be followed must be deductive, sequential, evidential and must analyze reality objectively. The quantitative approach generalizes precise results, and these must be replicated and controlled.

On the other hand, the type of research was substantive, according to Carrasco (2009) it was a type within the field of research, which seeks to provide an answer to scientific theoretical problems and factual problems happened in reality in a certain area of research. Likewise, according to Sánchez et al. (2018), this type of research was directed to the description, illustration, prediction of a reality, and if necessary, sometimes it must also rewrite it. The substantive research sought principles and laws that allow the alignment of a scientific theory, two subdivisions could be found within the substantive research: a) descriptive substantive; which consists of studying the reality of the phenomena; b) explanatory substantive; which is carried out with the aim of explaining the phenomena. Therefore, the present study responded to a substantive research that seeks to explain the phenomenon of economic integration applied to the Pacific Alliance.

The research design is ex post facto non-experimental, which according to Bisquerra (1989) consists of looking for the causes that produced them based on facts that have already occurred. It is oriented to a retrospective view of the phenomenon to be studied. Therefore, the present research was based on a series of data from years ranging from 1990 to 2019, with the aim of explaining the phenomenon of economic integration applied to the Pacific Alliance.

Regarding the method used, it is necessary to state what Behar (2008) commented on the hypothetical-deductive method, associating it with the verification of hypotheses based on theory and observation. In this sense, hypotheses were established and subsequently validated with the proposed models.

#### 2.2 Variables and Operationalization

#### 2.2.1 Conceptual definition

#### Variable 1: Economic Integration

Cosio (2020) conceptualized that economic integration entails a series of stages that culminate in total economic integration, this does not imply that all countries that begin an integration have the need to culminate at the last level to measure its success; all this is because depending on the objectives of the nation, it must be established which integration would be the most suitable to execute.

#### Variable 2: Trade

Amycos (2010) defined international trade as the set of activities that take place across borders between the world's economies.

## Variable 3: Foreign Investment

According to Zermeño (2004), Foreign Investment is the means by which external economic agents can enter international trade and land in a national market.

#### Variable 4: Economic Policies

According to Jiménez (2013) they are tools that intervene of the state in the economy, and are used to complete the objectives, mainly economic growth, market stability and employment.

#### 2.2.2 Operational definition

## Variable 1: Economic Integration

The variable has been broken down into two dimensions: (a) Intra-regional trade, the indicators are exports (X) and imports (M), the scale of measurement is interval; (b) Trade policy, the indicator is coefficient of external openness (CAE), the scale of measurement is interval.

# Variable 2: Trade

The variable has been broken down into two dimensions: (a) Exports, the indicators are traditional exports (XNT) and non-traditional exports (XNT), the scale of measurement is interval; (b) imports, the indicators are imports of consumer goods (MBC), imports of capital goods (MBK) and imports of intermediate goods (MBI), the scale of measurement is interval.

## Variable 3: Foreign Investment

The variable has been broken down into two dimensions: (a) foreign direct investment, the indicator has the same denomination (FDI), the measurement scale is interval; (b) portfolio investment, the indicator has the same denomination (PI), the measurement scale is interval.

# Variable 4: Economic Policies

The variable has been broken down into three dimensions: (a) Fiscal policy, the indicator is tax pressure (PT), the measurement scale is interval; (b) monetary policy, the indicators are real interest rate (IRR) and consumer price index (CPI), the measurement scale is interval; (c) exchange rate policy, the indicator is exchange rate (ER), the measurement scale is interval.

## 2.3 Population

At this point, according to Sánchez, Reyes and Mejía (2018) included the totality of units of analysis, being an important part of the study for obtaining the results and conclusions. Therefore, according to Hernández et.al (2014) one has a set of elements, whether individuals, objects or measures, which have some characteristics in common and which are observable in a given place and time.

For this, having a population made up of the macroeconomic data of the Pacific Alliance from 1990 to 2019, sampling does not apply. In other words, there is not a sample since the work will be done with the data extracted by each country analyzed in this research.

## 2.4 Data Collection Techniques and Instruments

## 2.4.1 Techniques

The technique applied in the research was documentary analysis, based on the information, databases and memories of the different central banks of each of the member countries of the Pacific Alliance (Chile, Colombia, Mexico and Peru). The objective of the application of this technique was to collect economic data from the aforementioned countries.

# 2.4.2 Instruments

The instrument used was the documentary analysis form. Its characteristics are described below:

Fact Sheet: Determinants of Economic Integration in the Pacific Alliance 1990-2019

Author: Ricardo F. Cosio Borda

## Year: 2020

Objective: Collect economic information of the Pacific Alliance member countries for the years 1990-2019.

Source: Databases and reports of the Central Banks of Chile, Colombia, Mexico and Peru. In addition to international organizations such as the International Monetary Fund and the World Bank.

## 2.5 Procedure

The procedure of the study began with the theoretical review of the variables, then the countries and economic data were selected to design the model, then descriptive statistics were applied for each variable, consequently, the model was designed and finally, the relationship and causality between the study variables was determined with the support of the structural equation.

## 2.6 Data analysis method

Data analysis in a research study consists of the operations to which the researcher must submit the data obtained in the previous collection, in order to achieve the objectives of the study. In the first phase of the research process, the researcher must organize the information collected so that it can be analyzed in a meticulous and analytical way, therefore it will be important to plan the main aspects of the analysis plan according to the confirmation of each hypothesis of study raised in the work, since these definitions will condition the data collection phase complementing each other the various points of the research study.

Descriptive statistics were applied, which allowed the construction of tables with data corresponding to the mean, standard deviation and minimum and maximum values. Finally, histograms were prepared with this information.

The data were also analyzed using inferential statistics, obtaining data on significance, standardized and nonstandardized coefficients. This allowed the generation of models to contrast the hypotheses and explain the behavior of indicators and variables in the framework of the economic integration of the Pacific Alliance.

## 3. Results

## **3.1. Descriptive results**

Figure 1 shows the evolution of exports in the countries of the block that make up the Pacific Alliance from 1990 to 2019, exports were led by Mexico, achieving a cumulative total of 112,084,044.12 thousand dollars; however, the lowest exports were recorded in 1990 with 212,753.74 thousand dollars and a peak in exports in 2011 with 4,593,256.75 thousand dollars. Continuing with the same logic is Chile, as the second leading country in exports within the economic block, for its part showed an accumulated 71,866,535.46 thousand dollars in which the highest

point was in 2011 with 4,593,256.75 thousand dollars and a minimum in 1990 with 212,753.64 thousand dollars. Colombia is the third country within the ranking in exports, with an accumulated total of 54,652,552.13 thousand dollars, showing a maximum in 2012 with 4,606,414.07 thousand dollars and a minimum of 294,253.24 thousand dollars. On the other hand, Peru is the country with the lowest share in exports, showing a cumulative total of 43,120,181.40, a maximum of 3,511,058.38 and a negative minimum of -4,852.63 thousand dollars. This symbolizes that, in the entire period of time analyzed, Peru is the country that contributed the least to intra-regional exports and is the country that, in the accumulated total, sold the least to the other member countries of the Pacific Alliance. Table 1 shows in more detail the above data, and also shows that the mean, average value of exports recorded in the study period, in the case of Chile is 2,395,551.18; Colombia, 1,821,751.74; Mexico, 3,736,134.89 and Peru, 1,437,339.38 thousand dollars. The standard deviation will show the degree of dispersion of the values entered, in the case of Chile it is 1,526,172.86; Colombia, 1,350,079.21; Mexico, 3,115,131.56 and Peru, 1,182,827.29 thousand dollars. All of the above made it possible to understand that Mexico is the country that has historically contributed most to the flow of intra-regional exports, while Peru is the country with the greatest limitations in this respect. This is due to the low level of specialization and value added of Peruvian exports.

Country	Chile	Colombia	Mexico	Peru
N				
Minimum	212753,73600000 0	294253,242000 000	262726,160000 000	- 4852,63040000 0
Maximum	4593256,7470000	4606414,07400	9371430,14400	3511058,37700
	00	0000	0000	0000
Mean	2395551,1820000	1821751,73800	3736134,80400	1437339,38000
	0000	000010	000000	000010
Std.	1526172,8690000	1350079,20800	3115131,56300	1182827,29100
	00000	0000000	0000000	0000000

**Table 1.** Descriptive statistics of Exports (in thousands of dollars) in the Pacific Alliance countries from 1990-2019.



Figure 1. Exports (in thousands of dollars) by country from 1990-2019

In relation to imports, Figure 2 shows that the country that stands out in imports within the economic block within the years of study (1990-2019) is Colombia with a total accumulated of 92,54,797.79 thousand dollars, in which the maximum in its exports was in 2012 with 6,870,749.36 thousand dollars and a minimum in 1990 with 318,605.11 thousand dollars. The second outstanding country is Chile with a total of 81,051,078.57 thousand dollars, having a maximum of exports, like the predecessor country, in 2012 with 6,870,749.36 thousand dollars and a minimum of 314,543.78 thousand dollars in 1990. Peru is the third country with a total of 66,452,831.72 thousand dollars, having a minimum of exports in 2008 with 4,090,074.69 thousand dollars and a maximum, ten years later of 4,880,050.87 thousand dollars. Mexico is the last country on our list with an accumulated total of 63,658,278.56 thousand dollars; the minimum of exports was in 1990 with 128,938.00 thousand dollars and the maximum in 2008 with 4,090,074.69 thousand dollars.



Figure 2. Imports (in thousands of dollars) by country from 1990-2019

Figure 3 shows that the maximum trade openness coefficient in the case of Chile was 57.61 in 2008; Colombia, 36.75 in 2011; Mexico, 10.59 in 2011 and Peru, 53.71. In relation to the minimum values, Chile showed 14.32 in 1992; Colombia, 10.87 in 1990; Mexico, 1.31 in 1990 and Peru, 2.36 in 2019.



Figure 3. maximum trade openness coefficient by country from 1990-2019

Regarding traditional exports, in Figure 4 the accumulated total for Chile, Colombia, Mexico and Peru was 1,059,225.00, 910,117.00, 2,114,170.00 and 472,335.27 million dollars respectively (1990-2019); in the case of Chile, it was 70,848.00 in 2011 and a minimum of 7.460.00 million dollars in 1990; regarding Colombia, a maximum of 87,661.00 in 2012 and a minimum of 4,587.00 million dollars in 1993; in the case of Mexico, a

maximum of 153,123.00 million dollars in 2011 and a minimum of 13,881.00 million dollars in 1991; Peru has a maximum of 35,896.34 in 2011 and a minimum of 2,258.61 million dollars in 1990.



Figure 4. Traditional exports (in millions of dollars) by country from 1990-2019

In Figure 5, analyzing non-traditional exports, Chile has with an accumulated total of 574,578.00 million dollars (1990-2019), with a peak in 2018 with 36,955.00 million dollars and a minimum in 1990 with 3,342.00 million dollars. Colombia maintained a cumulative total of 460,489.00 million dollars, the maximum point was in 2008 with 25,947.00 million dollars and a minimum in 1990 with 4,836.00 million dollars; Mexico obtained a cumulative total of 15,102,673.60 million dollars, generated a maximum of 1.096,139.00 million dollars and a minimum of 61,398.00 million dollars and in the case of Peru, it obtained a cumulative total of 169,660.42 million dollars, the maximum point is in 2019 with 13,874.58 million dollars and a minimum of 862.39 million dollars in 1991.



Figure 5. Non-traditional exports (in millions of dollars) by country 1990-2019

In relation to imports of consumer goods it can be observed in Figure 6 that in Chile a total of 21,095.82 million dollars was accumulated (1990-2019); in Colombia, 13,792.40 million dollars; in Mexico, 52,368.67 million dollars and in Peru, 176,520.44 million dollars. The maximum points in the four countries were recorded in 2019; Chile, US\$ 20,116.84 million; Colombia, US\$ 12,543.14 million; Mexico, US\$ 61,167.80 million and Peru, US\$ 5,859.56 million. In the case of Chile, 19.34 million dollars in 1990; Colombia, 13.15 million dollars in 1992; Mexico, 22.29 million dollars in 1991 and Peru, 338.27 million dollars in 1990.



Figure 6. Imports of consumer goods (in millions of dollars) by country from 1990-2019

Figure 7 shows the evolution of capital goods imports in which Chile's economy achieved a total accumulated (1990-2019) of US\$15,998.34 million; Colombia, US\$19,352.11 million; Mexico, US\$52,368.67 million and Peru, US\$176,520.44 million. In the case of Chile, Colombia and Mexico the maximum of imports of capital goods was recorded in 2019, having 15,070.92, 16,487.54 and 41,787.20 million dollars; in the case of Peru, it was recorded in 2013 with 13,663.65 million dollars. The lowest point in Chile was recorded in 2006 with US\$19.46 million; Colombia, US\$27.45 million in 2016; Mexico, US\$31.82 million in 1991 and Peru, US\$885.82 million in 1990.



Figure 7. Imports of capital goods (in millions of dollars) by country 1990-2019

In the case of imports of intermediate goods, it can be seen in Figure 8 that Chile achieved a total accumulated (1990-2019) of \$35,146.15 million; Colombia, \$27,346.54 million; Mexico, \$360,195.88 million and Peru, \$273,616.41 million. The peak of imports of intermediate goods in the case of Chile, Colombia and Mexico was in 2019 achieving 34,613.82, 23,653.44, 352,340.40 million dollars respectively; in the case of Peru, it was recorded in 2018 with 20,515.61 million dollars. The lowest point in Chile was recorded in 2006 with \$10.70 million; Colombia, \$25.90 million in 2014; Mexico, \$18.64 million in 2016 and Peru, \$1,333.42 million in 1990.



Figure 8. Imports of intermediate goods (in millions of dollars) by country 1990-2019

Figure 9 shows that foreign direct investment has shown negative amounts in the study period (1990-2019), only the Mexican economy has reached its peak in investments in the year 2012 with an amount of 1,142.11 million dollars; however, it closed in its most recent year, 2019 with -22,693.35 million dollars. On the other hand, the Peruvian economy has achieved its peak in the year 1992 with 79.00 million dollars and closed in 2019 with 0 million dollars just like the Chilean economy. It should be noted that the positive point achieved by Peru was in 1991 with 7.00 million dollars.



Figure 9. Foreign Direct Investment (in millions of dollars) by country 1990-2019.

Unlike foreign direct investment, portfolio investment shows a better scenario, showing positive values. Figure 10 shows that the only economy that achieved a positive accumulated total was Chile with US\$47,549.58 million (1990-2019), while Colombia, Mexico and Peru obtained negative figures, Colombia with -US\$47,826.12 million; Mexico, -US\$367,213.99 million and Peru, -US\$20,947.86 million. The high points in portfolio investment in Chile were US\$16,532.38 million in 2007; Colombia, US\$2,161.46 million in 2006; Mexico, US\$20,846.73 million in 2009 and Peru, US\$2,532.54 million in 2018. The minimum values in the case of Chile were -\$11,483.74 million in 2011; Colombia, -\$11,564.82 million in 2014; Mexico, -\$59,159.21 million in 2012 and Peru, -\$5,545.67 million in 2017.



Figure 10. Portfolio investment (in millions of dollars) by country 1990-2019

Regarding tax pressure, Figure 11 shows that the four economies of study showed an amount of 0 (percentage of GDP) in 2019 being, in addition, the minimum points with respect to the values entered (1990-2019). The maximum points in Chile were 78,796.16 in 2018; Colombia, 93,253.99 in 2013; Mexico, 274,708.33 in 2014 and Peru, 43,739.05 in 2014 (percentage of GDP).



Figure 11. Real interest rate (%) by country 1990-2019

With respect to the consumer price index and as shown in Figure 12 the maximum points in Chile, Colombia, Mexico and Peru were recorded in 2019 with values of 131.91, 140.95, 141.54 and 129.78 respectively. The minimum values were recorded in 1990, being in Chile 29.99; Colombia, 9.40; Mexico, 11.75 and Peru, 3.14.



Figure 12. Consumer Price Index by country 1990-2019

Figure 13 shows that Chile had a maximum exchange rate against the US dollar in 2019 with 702.90 Chilean pesos and a minimum of 304.90 Chilean pesos in 1990; Colombia had a maximum of 3.280.83 Colombian pesos in 2019 and a minimum of 502.26 Colombian pesos in 1990; Mexico had a maximum of 19.26 Mexican pesos in 2019 and a minimum of 2.81 Mexican pesos in 1990 and Peru had a maximum of 3.52 Peruvian soles in 2002 and a minimum of 0.19 Peruvian soles in 1990.



Figure 13. Exchange rate (UNM per US dollar) by country 1990-2019

# 3.2 Hypothesis testing

The study hypotheses propose the existence of three models based on intraregional exports, intraregional imports and the coefficient of external openness by which, through multiple regression analysis, we can determine that the entry criteria to be analyzed later must be less than or equal to 0.050 (<=.050), so that those greater than or equal to 0.100 (>=.100) will be eliminated. Table 15 shows the variables and their definitions for a better understanding of the tables and graphs that will be shown in the future.

NO.	Variables	Definition
1	Х	Exports
	Μ	Imports
	CAE	External Openness Coefficient
	XT	Traditional Exports
5	XNT	Non-traditional exports

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MBC	Imports of consumer goods
MBK	Imports of capital goods
MBI	Imports of intermediate goods
FDI	Foreign direct investment
IP	Portfolio Investment
PT	Tax Pressure
IRR	Real interest rate
IPC	Consumer Price Index
TC	Exchange rate

## Table 2. Variables / Data entry method

# 3.2.1 Hypothesis 1

The first study model is based on intra-regional exports (X), which shows a relationship with the other constants, which are the indicators that have been the object of analysis of this study, in which the degree of significance shown in column four of table 16 determines that the indicators that will be excluded for a better construction of the model will be the Foreign Direct Investment (FDI), the Real Interest Rate (RIR) and the Exchange Rate (ER) since their criteria are  $\geq$ =.100, on the contrary any constant with a significance value less than or equal to 0.050 (<=.050) are kept.

Model 1	Unstandardized coefficients		Standardized coefficients	t	Sig.
	В	Standard error	Beta		
(Constant)	-476424.714	190849.557		-2.496	.014
XT	50.682	5.178	.837	9.787	.000
XNT	2.826	.599	.351	4.721	.000
FDI	7.964	15.969	.029	.499	.619
IP	-27.172	7.661	142	-3.547	.001
PT	-13.066	3.346	430	-3.905	.000
IRR	5213.190	6525.121	.027	.799	.426
IPC	15557.216	2526.816	.259	6.157	.000
TC	6.360	79.780	.003	.080	.937

Dependent variable: X

Table 3. Model based on intra-regional exports

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		В	Standard error	Beta	_	
1	(Constant)	-406002,576	165570.768		-2.452	.016
	XT	50.331	4.933	.831	10.203	.000
	XNT	2.706	.529	.336	5.118	.000
	IP	-28.769	7.162	150	-4.017	.000
	PT	-13.667	3.086	450	-4.428	.000
	IPC	15369.702	2364.581	.255	6.500	.000

Dependent variable: X

#### Table 4. Summary of the first model as a function of intraregional exports

The reason and logic is that, although foreign direct investment is beneficial for a country because it allows the entry of foreign capital for certain economic or business purposes, it can affect the national currency and therefore

exports, given that, if the volumes of foreign investment are relatively high, it can lead to an oversupply of foreign currency or greater appreciation of the national currency as a function of foreign currency, i.e., the exchange rate will rise, causing a negative effect on exporters, This means that the exchange rate will rise, causing a negative effect for exporters, i.e., if previously they paid for their merchandise with "x" units of foreign currency and received 2000 units of local currency, now they will receive less than 2000 units of local currency for the same amount. The real interest rate can also be a negative agent for exporters, since if there is an economic phenomenon such as the depreciation of the local currency against the foreign currency, it can generate the same outcome.

#### Where:

Intraregional Exports (X) = -406002.576 + 50.331 XT + 2.706 XNT - 28.769 IP - 13.667 PT - 15369.702 IPC

The equation that precedes this paragraph determined the model that allows explaining intraregional exports and the values under which each constant must be multiplied. Likewise, Figure 14 presents in graphical terms all the constants that have a positive impact on intra-regional exports of the Pacific Alliance.



Figure 14. Summary of the relationship between Exports and the constants of study

## 3.2.2 Hypothesis 2

The second model of study is a function of imports (M), in which the model will work as long as it is determined only by two variables, which are the consumer price index (CPI) and the exchange rate (ER).

	Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
		В	Standard error	Beta		
1	(Constant)	-1071648.785	281820.225		-3.803	.000
	FDI	-31.029	16.488	120	-1.882	.062
	IPC	38638.020	3601.200	.682	10.729	.000
	TC	480.033	135.407	.212	3.545	.001

Dependent variable: M

 Table 5. Model based on intra-regional imports

In Table 5, the consumer price index is a key element for imports since it is often an indicator of inflation or deflation of an economy, this is justified in that the CPI measures the price variations of a certain basket of goods and services consumed by families, i.e., if families can acquire the same basket at lower prices in other countries, this will generate a greater import of the same. Unlike the export model, in which the exchange rate affected exporters, since they would receive less national currency for an amount of foreign currency; in this context, when the exchange rate rises, imports are positively affected, since goods or services will be purchased at better prices.

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Model		Unstandardiz	Unstandardized coefficients		t	Sig.
		В	Standard error	Beta	_	
1	(Constant)	-1030849.869	284020.447		-3.629	.000
	IPC	41530.637	3291.864	.733	12.616	.000
	TC	410.599	131.690	.181	3.118	.002

Dependent variable: M

 Table 6. Summary of the second model based on intraregional imports

Where: Intraregional Imports (M) = -1030849,869 + 41530,637 CPI + 410,599 TC

Table 6 and the equation that precedes this paragraph determined the model that allows explaining intraregional imports and the values under which each constant must be multiplied. Likewise, in Figure 15 we proceeded to present in graphical terms all the constants that have a positive impact on intra-regional imports of the Pacific Alliance.



Figure 15. Summary of the relationship between imports and the constants under study.

# 3.2.3 Hypothesis 3

The third model based on the coefficient of external openness shows that, due to the degree of significance, constants such as non-traditional exports (XNT), imports of capital goods (MBK) and portfolio investment (IP) have been eliminated.

Model		Unstandardized coefficients		Standardized coefficients	t	Sig
	Model		Standard error	Beta	- ι	Sig.
1	(Constant)	10,754	2.169		4.958	.000
	XT	.000	.000	.678	3.900	.000
	XNT	-3.300E-6	.000	062	307	.760
	MBC	002	.001	-1.030	-3.752	.000
	MBK	.000	.000	.058	.401	.689
	MBI	.000	.000	.524	2.538	.013
	FDI	.000	.000	166	-1.594	.114
	IP	-4.927E-5	.000	039	574	.567
	PT	.000	.000	-1.455	-4.429	.000
	IRR	.156	.071	.121	2.183	.031
	IPC	.267	.032	.672	8.250	.000
	TC	004	.001	233	-3.808	.000

Dependent variable: CAE

# Table 7. Model as a function of the external aperture coefficient

In Table 7, the coefficient of external openness shows the degree of internalization that an economy has in terms of other countries, the signing or creation of treaties or economic blocks has allowed economic units or trade alliances that have helped the globalization of an economy. In the third model, three constants were eliminated since non-traditional exports are those that are produced in the same country and sold to the world with an added value, it does not assume dependence on another economy because it suggests that there is a quantity of skilled labor and land to produce the same goods or services, in the case of imports of capital goods can also harm the coefficient of external openness since it indicates the entry of machinery to produce goods within a given nation, therefore the openness of a country may be limited or reduced; Finally, the portfolio investment can obtain profits while securing or preserving capital or assets, but there is a level of risk that implies the loss of the same.

	Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
		В	Standard error	Beta		
1	(Constant)	10.700	2.045		5.231	.000
	XT	.000	.000	.609	4.483	.000
	MBC	002	.000	964	-4.912	.000
	MBI	.000	.000	.530	2.811	.006
	РТ	.000	.000	-1.308	-10.526	.000
	IRR	.157	.071	.122	2.211	.029
	IPC	.283	.028	.713	10.130	.000
	TC	004	.001	234	-4.272	.000

Dependent variable: CAE

**Table 8.** Summary of the third model as a function of the external aperture coefficient

Where: Coefficient of External Openness (CAE) = 10.700 - 0.002 MBC + 0.157 IRR + 0.283 CPI - 0.004 TC.



Figure 16. Summary of the relationship between the external aperture coefficient and the study constants.

Table 8 and the equation that precedes this paragraph determined the model that allows explaining the coefficient of external openness in the economic block and the values under which each constant must be multiplied. Likewise, in Figure 16 we proceeded to present in graphic terms all the constants that have a positive effect on the coefficient of external openness of the Pacific Alliance.

## 4. Discussion

According to the results of this research, three models were determined to explain the three indicators of economic integration: (a) intra-regional exports; (b) intra-regional imports; and (c) coefficient of external openness. Together, these models explain the economic integration process of the Pacific Alliance considering data from 1990 to 2019. The first hypothesis to be tested consisted of determining the existence of a model that explains the intra-regional exports of the Pacific Alliance in the period 1990-2019. The model identified was the following: Intraregional Exports (X) = -406002,576 + 50,331 XT + 2,706 XNT - 28,769 IP - 13,667 PT - 15369,702 IPC. In other words, the

variables that affect intra-regional exports are traditional exports, non-traditional exports, portfolio investment, tax pressure and the consumer price index of each of the member countries of the economic block. This is in agreement with Cosio (2020) since, in a free trade zone stage such as the Pacific Alliance, the economies participating in the integration process must harmonize their trade policy and to explain this, the author uses traditional and non-traditional exports as indicators, coinciding with the model.

However, it conducted an analysis of other policies such as fiscal policy, where it determined that there is no harmonization in the tax burden indicator of the Pacific Alliance countries. This is contrary to what the aforementioned model considers, but this could be generated by the number of years under study, since the research with which the comparison is made takes 12 years as a reference, while the present text is based on a period of 29 years. Likewise, the other aspect to consider would be the magnitude of variables involved and their decomposition into indicators, which in the case of Cosio's study, considered economic integration, economic policies and state policies. The current text refers to four variables: economic integration, trade, investment and economic policies. The latter evidently leads to the fact that portfolio investment is not considered in the author's proposal, unlike in the present research, where it is considered.

On the other hand, this text shows similarity with the study by Paredes (2018) where he confirmed the positive impact of the Pacific Alliance agreement for Peru, especially in non-traditional exports, which is related to what is expressed in the model where this aspect is considered.

Additionally, in the results, in the section corresponding to descriptive statistics, the positive evolution of nontraditional exports in the member countries of the Pacific Alliance can be evidenced. In this sense, the inclusion of non-traditional exports as a necessary indicator to be considered in the equation shown above is ratified. Likewise, it is prudent to state that when considering this factor, traditional exports must also be included, as shown in the model, because the policies applied by the economies within the framework of an integration process, although they may have an emphasis on non-traditional exports to reduce dependence on certain industries and reduce the centralization of foreign trade benefits by certain companies; in the case of Latin American countries, particularly Chile, Colombia, Mexico and Peru, there is still a dependence on traditional sectors, which evidently means that a boost to exports of these products is also maintained. In other words, it is not a matter of reducing the incentives provided to traditional exports in order to favor non-traditional exports, but rather of establishing greater efforts and improving strategies for the growth of the sale of non-traditional goods to the international market and among the countries of the economic block.

Along the same lines, Rodríguez (2016) linked the influence of economic integration processes on exports. He specifically referred to the Peruvian case, determining that trade agreements and economic integration have a positive impact on exports in Peru. This, although limited to the Peruvian case, is similar to what was stated in the formula expressed previously, with the inclusion of exports, although in a disaggregated manner into traditional and non-traditional. It is also pertinent to mention that although the Peruvian case is the object of analysis of the comparative research in this paragraph, this can also be taken as a reference for countries such as Chile, Colombia and Mexico; especially due to the similar characteristics that these economies have with Peru.

Regarding theories, Baldwin (2017) through the Great Convergence stated that innovation is an important element in international trade, since it allows countries to generate competitiveness. Said aspect has a link with traditional and non-traditional exports; this because, if countries innovate in their productive processes, their industries are more competitive at the price level and for the quality of their products, this generates an increase in exports, due to the international demand for goods with such characteristics. In addition, in an integration process, this factor can potentially be more favorable, since in addition to these attributes of competitive goods, there are the tariff benefits that stimulate trade within the bloc. In the case of the Pacific Alliance countries, they have policies to favor the competitiveness and industrialization of their economies in order to have a better positioning at the international level. Likewise, on an economic block scale, we are talking about the sum of all the attributes, potentials and level of competitiveness of each of the member countries; this leads to the conclusion that in a process of economic integration it is necessary for growth to be achieved as a whole and not for a single country to stand out to the detriment of the rest.

The second hypothesis that was tested consisted of determining the existence of a model that explains the intraregional imports of the Pacific Alliance in the period 1990-2019. The model determined was the following: Intraregional Imports (M) = -1030849,869 + 41530,637 CPI + 410,599 TC. In other words, for the above, the variables that affect intraregional imports are the consumer price index and the exchange rate of each of the member countries of the economic bloc. In the case of the consumer price index, linked to inflation, it is a fundamental aspect, to determine the competitiveness of an economy in the international market, but it can also influence the need to acquire products at cheaper prices from other markets, especially those that have tariff and non-tariff benefits to enter the domestic market.

As expressed above, being an economic bloc, the Pacific Alliance guarantees the conditions for countries to import products from each other. This is consistent with what Vega (2015) stated regarding one of the objectives of forming an integration system, considering the growth of production as one of them, which not only stimulates exports, since it is produced to meet domestic demand and that of other target markets, but also generates the need for companies to demand greater resources and inputs, generating the need to import goods, especially those that are not produced in the country, due to the increase in productivity levels. To exemplify this last point, we could take as a reference the results of descriptive statistics where the evolution of imports of consumer, intermediate and capital goods is evidenced. These have a growing trend, including the case of capital and intermediate goods that supply the productive activities of national industries.

Similarly, Valladares and Gonzalo (2019) mentioned an important aspect that can be linked to the result of the testing of hypothesis 2, since the formula of the intraregional imports model considers more complex aspects than those established by the World Trade Organization, which is based on the exchange of goods and services. But it does not consider or contemplate aspects linked to other policies beyond trade. This is far from the considerations that should be taken into account in the framework of an economic integration process, where other policies such as fiscal and monetary policies are involved. This is why the authors stated that the Pacific Alliance has become a platform that shows a more innovative link for the participating countries, as opposed to the WTO. The latter is linked to what is established in the model presented, where the consumer price index and the exchange rate are considered; aspects of monetary and exchange rate policy, respectively.

Regarding the theoretical aspect, Sierralta (2014) in the evolutionary theory of international trade warned that in the eagerness of countries to enter the dynamics of international trade, they neglect certain industries and domestic markets; since they resort to importing goods and services that in case of having a newly created industry or in the process of growth; when faced with the high competitiveness of goods that meet the same need but that come from other foreign markets at more competitive prices and greater availability in quantity; can generate the disappearance or failure of such domestic industries. In this sense, the model presented above, linked to hypothesis 2, is logical to consider that countries should take into account variables that may affect intra-regional imports, in order to control this aspect and not harm their economy, it is not about being protectionist, but to ensure more equitable conditions for domestic companies and industries to compete in better conditions, without falling into a sponsorship by the state that then derives in unnecessary measures such as subsidies. This scenario can be guaranteed with the proper control of economic policies; therefore, the model considers the consumer price index as relevant, since it is linked to the monetary sphere and the exchange rate, which is essentially the objective of the exchange rate policy. On this last point, it is important to highlight the impact of the exchange rate on imports, since these can be stimulated by a drop in the price of the currency. In the case of the Pacific Alliance countries, it is taking the dollar into account. Therefore, the above is consolidated in yet another reason to consider the inclusion of the exchange rate in the formula presented in the testing of hypothesis 2.

The third hypothesis that was tested consisted of determining the existence of a model that explains the coefficient of external openness (CAE) of the Pacific Alliance in the period 1990-2019. The model identified was the following: Coefficient of External Openness (CAE) = 10.700 - 0.002 MBC + 0.157 IRR + 0.283 CPI - 0.004 TC. In other words, the variables that affect the CAE are imports of consumer goods, the real interest rate, the consumer price index and the exchange rate of each of the member countries of the economic block. The above is in agreement with Bartesaghi (2015) who analyzed as a cause of the stagnation of the Southern Common Market (MERCOSUR) the protectionist policies implemented by the member countries. In the same line, the Pacific Alliance being an economic block with some similar objectives with MERCOSUR, should control the trade policies applied by the countries that are part of the agreement, with the purpose of avoiding the stagnation expressed by the author in mention. This is in harmony with the considerations of the model presented above, which seeks to explain the variables that influence the coefficient of external openness (CAE), it is necessary to maintain a policy of openness, which favors that dynamism of exchange of goods at the intraregional level, characteristics of a free trade zone.

In this regard, Yin-Shi (2013) pointed out the interests of the United States, the European Union and China in Latin American economies. In the case of the first two countries, their interests are more long-term and go beyond the

economic. While in the case of China it is more directed towards trade, exports and imports of goods. This mention is linked to the coefficient of external openness, in the fact that the four economies that are part of the Pacific Alliance, stimulated by the interests of the aforementioned powers, have opened their markets. However, the great challenge lies in benefiting from this trade opening at the intraregional level and establishing production chains at the level of the four countries, in order to favor national industries and generate greater income from the international marketing of goods.

On the other hand, Zevallos (2015) highlighted the importance of trade agreements as contributors to a country's sustainable economic growth. According to this author's study, trade agreements generate growth in the business sector and foreign investment. This is related to the model presented above, since the real interest rate has an influence on the attraction of investments and the consumer price index is a fundamental aspect for consumption levels, i.e., it can help maintain the production levels of companies, since they are in harmony with market demand. Likewise, it is pertinent to mention that the Pacific Alliance was generated through an agreement, but with more ambitious connotations than just commercial, in this sense it is more complex to achieve the objectives set and requires greater efforts so that the countries can generate greater benefits.

Referring to the theories reviewed, Heckscher and Ohlin (1977) expressed the importance of specialization and the endowment of production factors as fundamental aspects to generate dynamism in international trade. At present, this is an aspect that continues to be applied; countries make use of these factors to organize their production system. In addition to the external openness shown by that country, an interesting flow of commercial exchange that favors the economic growth of the participants can be guaranteed. In this sense, having a model that allows explaining the coefficient of external openness as part of an economic integration process such as the Pacific Alliance, ratifies the importance of maintaining free markets among the participating countries and avoiding protectionist measures that harm the progress of the economic block and the achievement of joint objectives.

Based on the discussions presented in the preceding paragraphs, one of the main contributions of this research can be considered as what Villanueva (2015) considered about the role of the state, which should be characterized by a greater participation of the state and the development of sectoral policies that promote economies of scale, generating greater dynamism in trade exchange. In other words, the contribution of this research goes beyond analyzing trade exchange or economic integration as an isolated variable; but rather, in accordance with what the aforementioned author explained, it is necessary to consider other aspects, economic policies that go beyond the strictly commercial. Therefore, the three models presented in this paper include indicators related to fiscal, exchange rate and monetary policies. For each of these elements, the linkage and influence on intra-regional exports, intra-regional imports and the coefficient of external openness have been determined; the three together serve to explain economic integration, applied to the Pacific Alliance and considering a period of time that goes from 1990 to 2019.

Likewise, in order to determine these models, a fairly detailed descriptive statistical analysis had to be carried out. This generates a contribution linked to the amount of data obtained, which can serve as a basis for future research. In addition to this consideration, the time analyzed corresponds to years before the Pacific Alliance was created, i.e., before 2011, but also contains data after the signing of the agreement, which provides a more complete and less limited view.

Regarding the gaps, these would be linked to the non-consideration by the present research, due to its characteristics, of non-statistical and more qualitative aspects; which, although not fully objective, have an influence on integration processes. At this point it is pertinent to mention Abrusci (2017) and his implications when referring to integration, since it is necessary to assess and evaluate a geopolitical scenario, taking into account the political, economic and social factors of the region under analysis.

Finally, in accordance with the previous paragraph, it is necessary to point out Armas (2017) who focused on economic integration from a more social perspective and directed it through cooperation and awareness of the population of the benefits of this process. This is relevant, since as an example we have the exit of the United Kingdom from the European Union, caused by a purely social movement. Although this research does not contemplate it and its results are based on quantitative aspects, we cannot fail to mention it and encourage future research to address it, given its characteristics and limitations.

## 5. Conclusions

**First.** The first objective of this research consisted of constructing the model that explains the intra-regional exports of the Pacific Alliance in the period 1990-2019. As a result, the following equation was obtained: Intraregional Exports (X) = -406002,576 + 50,331 XT + 2,706 XNT - 28,769 IP - 13,667 PT - 15369,702 IPC. This model considers traditional exports, non-traditional exports, portfolio

investment, tax pressure and the consumer price index as indicators that affect intra-regional exports within the framework of the Pacific Alliance integration process.

- **Second.** The second objective of this research consisted of constructing the model that explains the intra-regional imports of the Pacific Alliance in the period 1990-2019. As a result, the following equation was obtained: Intraregional Imports (M) = -1030849.869 + 41530.637 CPI + 410.599 TC. This model considers the consumer price index and the exchange rate as indicators that affect intra-regional imports within the framework of the Pacific Alliance integration process.
- **Third.** The third objective of this research consisted of constructing the model that explains the coefficient of external openness of the Pacific Alliance countries in the period 1990-2019. As a result, the following equation was obtained: Coefficient of External Openness (CAE) = 10.700 0.002 MBC + 0.157 TIR + 0.283 IPC 0.004 TC. This model considers imports of consumer goods, the real interest rate, the consumer price index and the exchange rate as indicators that affect the coefficient of external openness within the framework of the Pacific Alliance integration process.

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