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The Impact of Agricultural Exports to China on the Pacific Alliance Economies: A Short- and Long-Run Analysis

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Abstract
This study aimed to analyze and quantify the short and long-run impact of agricultural exports to China on the economic growth of the Pacific Alliance's Economies in the period from 2001 to 2018. Agricultural exports to China (AXCH), the labor force (LF), and foreign direct investment (FDI) values were used as determinant factors of economic growth. The study employed Vector Autoregression (VAR) Model, Johansen Co-integration test, and Granger Causality test for data analysis. The results showed that, in the short run, the economic growth and AXCH have a positive effect on the economic growth of Pacific Alliance's Economies. At the same time, both FDI and LF have a positive impact on the GDP. Moreover, the Co-integration test result revealed a long-run relationship between the studied variables, and a causality relationship between the economic growth and the AXCH, the FDI and the LF. Finally, we observed that the impact on the Pacific Alliance's Economies is bigger than the impact in each member country. The study suggests some recommendations to improve the agriculture sector's performance as a driver of sustainable economic growth in the region.

Keywords – Agricultural exports, Pacific Alliance's Economies, China, Economic growth, Foreign Direct Investment, Labor force.

I. INTRODUCTION

There is an existence of interest to study the development of emerging markets, which have different economic and institutional characteristics compared with developed markets, and which make them interesting for research[1]. Likewise, this interest, there's a long-standing debate and interested in the relationship between export and economic growth in developed and emerging markets. In developing or emerging markets that have disadvantages in the production of capital goods, the generation of foreign exchange through the goods and services' exportation is essential to production capacity in the long run. As well as market openness, international trades between countries are required to promote economic growth and development[2,3,4,5,6,7,8,9,10,11,12].

The role of export expansion contribution to the economic growth and development hypothesis through international trade benefits in the long-run has been known for empirical studies[12,13,14,15,16]. Those studies supported the existent literature review, which had documented the evidence of the export-led growth scenario[18,19,20,21,22]. Like this, the role of the agriculture development in the modern environment had overcome more important after the financial crisis of 2008, caused by natural, economic and political factors[23]. The crisis showed the importance of agriculture in the system of national and international economic development, due to the increase of the population that will be over 10 billion at the end of the century[24]. However, research on the relationship between agricultural exports and economic growth was not given serious attention until the beginning of the 21st century. Some modern economists posit that rising agricultural exports play a pivotal role in economic growth, particularly in emerging markets[12,25,26,27,28,29,30,31,32]. However, other economists argue that, in general, agriculture's performance and its contribution to a nation's economic development has traditionally been undervalued[33,34,35,36,37]. It because its linkages (forward and backwards) with other sectors of the economy, including the value added by these linkages, do not appear in the basic statistics of many developing countries. Another issue is that of "adding up" caused by the low-price elasticity of demand for agriculture commodities, which can result in lower export revenue as volume exported increases and the average price of the commodities decreases. Due to this difference between studies' results, it may not be generalized for emerging markets, to which belong Chile, Colombia, Mexico, and Peru.

On behalf of their similarities in the export orientation, macroeconomic stability and the capacity to expand their international market, those economies decided to sign the Pacific Alliance Trade and to share their vision of strengthening their economic cooperation. It was signed in 2012, which make them more attractive to the international market. As a block, the GDP represents 35% of total America's GDP, with an annual average growth of 5%, and GDP per habitant of US$ 10 011. One of the main objectives of the treatment is to promote the economic growth, development, and competitiveness of their economies having as objective the reduction of socio-economic inequalities (Martinez-Castillo, 2016). The commercial relationship between China and the Pacific Alliance's economies had different effects on each economy. As you can observe in Figure 1, since 2001, the trade balance between China and Chile and between China and Peru was positive, but the trade balance between China and Colombia and between China and Mexico was negative.

Analyzing the economies, independently, we can observe that in the case of Chile, the exportation to China is higher than the importation. The main products that Chile exports to China are minerals (copper, ores, slag and ash), followed for the pulp of wood and edible fruits like melons of citrus fruits. And the main products that Chile imports from China are electrical machineries such as sound recorders, reproducers, television, mechanical appliances, boilers and parts, followed for articles of apparel and clothing accessories (knitted, not knitted or crocheted) and vehicles, including the accessories.

Peru has a similar structure like Chile, the main products that Peru exports to China are minerals (ore, slag, ash, copper and articles made from those minerals), residuals and waste from food industries and preparations of meat, fish, crustaceans and aquatic invertebrates, followed for wood and edible fruit (like citrus fruit, nuts or melons). Besides, the main Peruvian importations from China are electrical machinery (like reproducers, television, mechanical appliances, vehicles and parts of them), articles of iron or steel, plastics, toys and furniture and clothing accessories.

For the case of the countries that have a negative trade balance in the commercial relationship with China, we can start describing Colombia. This country exports principally mineral fuels, mineral oils, mineral in the raw state (such as iron, steel, and copper), leathers and coffee, tea, mate and spices. Additionally, the main imported products from China are electrical machinery (television, boilers, and mechanical appliances), vehicles and articles of iron or steel.

Finally, Mexico exports majorly minerals (including ores, slag, ash, and copper), vehicles and electrical machinery. And, the main imported products from China are electrical machinery (recorders, reproducers, and television), optical machinery (photographic, cinematographic, medical or surgical), vehicles and furniture.

Independently only two economies have benefited from the commercial relationship with China, but, and as you can appreciate in Figure 2, the Pacific Alliance's economies spend more money importing Chinese goods than exporting national goods. As it was described for each economy, all of them imports machineries, and exports principally mineral and fruits in the raw state. Nevertheless, as we could appreciate, agriculture products become important exportation from the Pacific Alliance's economies, especially after 2008, mainly from Chile, as you can observe in Figure 3.

In this study, therefore, our objective is to investigate the influence of agricultural exports to China on the economic growth of the Pacific Alliance's Economies. We prove that the impact as independent economies is lower than as a unique economy in the short-run analysis, while in the long-run analysis there's evidence of a correlation between the agriculture exportation to China and the economic growth as a block. As the second objective, we examine the causal relationship between the economic growth and the agriculture exportation to China in the short- run as single economies and as a block. Finally, we make a comparison between the results as single economies and as a block. In this study, we further include the labor force and foreign direct investment for each country. Although several studies have outlined the theoretical relationship between agriculture and economic growth, their causal dynamics is an empirical question worthy of further investigation. What more, there are no studies that analyzed the empirical relationship between agricultural exports to China, Foreign Direct Investment, Labor Force and economic growth in the

Pacific Alliance's Economies, as a block. According to the econometric results, it can be possible to give a conclusion about the impact of agricultural exports to China on their economies, with the inclusion of some recommendations for the improvement of the independent variables' impact on economic growth. The rest of the study is organized as follows: Section 2 reviews the methodological framework and the details of the data. Empirical results are reported in Section 3. In the end, Section 4, we will summarize the findings and make some concluding remarks.

II. MATERIAL AND METHODS

2.1 Research Design

This research was fundamentally analytical as it embraced the use of secondary data to determine the effect of the agricultural exports to China on the economic growth in the Pacific Alliance's Economies, as independent economies and as a block, in the short and long-run term. For the analytical test, we used econometrical tests related to modelling the annual time series data; and we used regression of the Solow model and its interpretation.

2.2. Kinds and sources of data

For the current research, we used annual time series data that covered the period between 2001-2018 including data on Gross Domestic Product (GDP), agricultural exports to China, labor force and the foreign direct investment value for Chile, Colombia, Mexico, and Peru. The data for this research was obtained from secondary resources, mainly from Trade Map and the World Bank Indicators.

2.3. Model specification

To examine the contribution of the agricultural exports to China on the perspective of the economic growth supply-side is necessary to consider the neo-classical growth model developed by Solow[38,39] that was also applied by Awokuse[40] for developing economies, which includes the capital (K) and the labor force (L) as main variables for the production function (Y). As the following equation specifies it:

$$Y_t = f\,(L_t, K_t) \qquad (1)$$

As the economies are opened, the model (1) can express the output by including the Agriculture Exportation to China (AXCH). The Gross Domestic Product (GDP) refers to the economies output as independent and as a unique block; the Foreign Direct Investment (FDI) stands for capital meanwhile the Labor Force (LF) used by the economies is for the production of goods and services in a fixed period. So, the model can be written as follows:

$$GDP_t = f\,(AXCH_t, FDI_t, LF_t) \qquad (2)$$

To discard the differences in the measurement variables, we applied the natural logarithm on both sides of the equation 2. Another reason to use natural logarithm is that the growth of every series becomes the same as the derivative of its log with respect to time.

$$d(\ln Y_t)/d_t = d(\ln Y_t)/dY_t * Y_t/d_t = Y_t/Y_t \qquad (3)$$

Thereby, the equation (2) becomes:

$$LGDP_t = \beta_0 + \beta_1\, LAXCH_t + \beta_2\, LFDI_t + \beta_3 LLF_t + e_t \qquad (4)$$

The equation (4) represents the production function model for the econometric estimation with the coefficients β_0, β_1, β_2 and β_3 that shows the return to scale associated with the variables link with the Pacific Alliance's Economies in the time t. And et represents the error term.

As it was mentioned in the previous section, this study includes the sample of four countries over the period of 18 years falling into the category of the Vector Autoregression Model, which also allows making the Granger Causality and the long-run analysis.

2.4. Estimation procedures

In this case, for the short-run analysis, we used the Vector Autoregression (VAR) Model, enforced for the Unit Root Test and the Causality Granger Test; and for the long-run analysis, there was used the Co-integration Test.

Unit root test

The Vector Autoregression (VAR) Model can be done when the variables are stationary at a level I (0), and or integrated of order one, I (1). A variable is considered as stationary if it has a constant mean, variance, and autocovariance at any measured point. If the data is a non-stationary time series, it may become stationary after differencing several times that can be also explained as a series integrated at the order I (n), it becomes stationary after differencing "n" times. We use the Augmented Dickey-Fuller (ADF) test, which was formulated by Dickey and Fuller[41,42]. It will be stationary if the ADF test statistic is greater than the critical value, and it is not stationary if it is less than the critical value. The following regression represents the general ADF Test form:

$\Delta Y_t = \alpha_0 + \alpha_1 * Y_{t-1} + \Sigma\alpha * \Delta Y_t + e_t$; it includes only the drift (5)

$\Delta Y_t = \alpha_0 + \alpha_1 * Y_{t-1} + \Sigma\alpha * \Delta Y_t + \delta_t + e_t$; it includes the drift and linear time trend (6)

Where:

Y = time series of a specified variable

t = time trend

Δ = first differencing operator $\Delta Y_{t-1} = Y_t - Y_{t-1}$

α_0 = constant term

N = optimum lags' number

e_t = random error term

Johansen co-integration test

As one of the objectives is to analyze the long-run term relationship between the variables, we perform the co-integration test. The test was developed by Johansen and Juselius[43]. Johansen[44] states that the long-run term relationship will occur when the co-integration among the variables happens with the same order of integration. The test is based on the two methods of likelihood ratio test statistic[45]; the Maximal Eigenvalue Test and the Trace Statistic Test, in which the null hypothesis is the no existence of co-integration between the variables, which will be rejected when the test statistic is higher than the critical value.

Pairwise Granger causality test

Another aim is to analyze the significant relationship between the studied variables (the total agricultural exports to China, the foreign direct investment, and the labor force) with the economic growth on Pacific Alliance's Economy, as a block. We performed the Granger Causality Test. The independent variable is considered as a Granger-cause variable of Y if the y_t (the variable Y in the current period) is conditional on the past values of the variable X (x_{t-1}, x_{t-2}, x_{t-1} … x_0).

Focusing on the total agricultural exports to China, the foreign direct investment and the labor force as the engines of the economic growth, we are interested in the bidirectional causal relation between them to provide evidence of those independent variables as causes of the economic growth between 2001 and 2018. Therefore, we considered the following principal hypotheses to respond:

For the case of LGDP (Logarithm of Gross Domestic Product) and the LAXCH (Logarithm of agricultural exports to China):

i. LAXCH does not Granger Cause LGDP

ii. LGDP does not Granger Cause LAXCH

For the case of LGDP (Logarithm of Gross Domestic Product) and the LFDI (Logarithm of Foreign Direct Investment):

i. LFDI does not Granger Cause LGDP

ii. LGDP does not Granger Cause LFDI

For the case of LGDP (Logarithm of Gross Domestic Product) and the LLF (Logarithm of Labor Force):

i. LLF does not Granger Cause LGDP

ii. LGDP does not Granger Cause LLF

Vector Autoregression (VAR) Model

The vector Autoregression is frequently used for analyzing the dynamic impact of independent variables on the dependent, in the short-run term. The VAR Model approach treats each endogenous variable in the system as a function of lagged values. This model is also a dynamic system of equations, which is represented by the following model:

$$Y_t = \alpha + \Sigma\alpha_i{*}\Delta Y_{t-1} + e_t \quad (7)$$

When this equation is extended, it will be:

$$Y_t = \alpha + \alpha_1{*}Y_{t-1} + \alpha_2{*}Y_{t-2} + \alpha_3{*}Y_{t-3} + \ldots + \alpha_k{*}Y_{t-k} + e_t \quad (8)$$

Where:

Y_t = vector of endogenous variables at time t

α_i (i=1, 2, …, k)= (n x n) coefficient matrices that describe the relationship between endogenous and exogenous variables

e_t = vector of residuals or random disturbances

The above equation will change with the inclusion of the lag operator (L), and it'll be represented by the following equation:

$$Y_t = \alpha{*}(L){*}\ Y_{t-1} + et \quad (9)$$

Where:

Yt = vector of endogenous variables at time t

$\alpha{*}(L)$ = matrix of coefficients

e_t = vector of residuals or random disturbances

III. RESULTS AND DISCUSSION

Before the econometric analysis, it was done a brief interpretation of the statistical analysis. The definitions and summary of the statistics for Chile, Colombia, Mexico, Peru, and for the Pacific Alliance's Economies as a unique block were provided in Table 1, Table 2, Table 3, Table 4 and Table 5, respectively. It reported that the average of the GDP growth was 199 000.00 million dollars (for Chile); 262 000.00 million dollars (for Colombia); 1 070 000.00 million dollars (for Mexico); 134 000.00 million dollars (for Peru); and 1 680 000.00 million dollars (for Pacific Alliance's Economies as a unique block).

For the agriculture exportation to China, it reported that the growth average was 118.00 million dollars (for Chile); 12.30 million dollars (for Colombia); 7.72 million dollars (for Mexico); 55.20 million dollars (for Peru) and 231.00 million dollars (for Pacific Alliance's Economies as a unique block).

For the case of the labor force, it showed that it had a growth average of 7.98 million (for Chile); 22.40 million (for Colombia); 48.90 million (for Mexico); 15.90 million (for Peru) and 95.20 million (for Pacific Alliance's Economies as a unique block).

Finally, it showed that the average growth of the foreign direct investment was 12 800.00 million dollars (for Chile); 10 400.00 million dollars (for Colombia); 28 000.00 million dollars (for Mexico); 6 460.00 million dollars (for Peru) and 59 700 million dollars (for Pacific Alliance's Economies as a unique block).

About the direction of the skew (which gives the measure of departure from symmetry), for Chile, Colombia, Mexico, and Peru, all variables (excepting the agriculture exportation to China, which is highly skewed to the right) have symmetric distribution. For Pacific Alliance's Economies as a block, all variables (excepting the agriculture exportation to China, which is moderately skewed), have symmetric distribution.

Unit root test

The Augmented Dickey-Fuller test was performed on all variables (gross domestic product, agriculture exportation to China, labor force and foreign direct investment) for Chile, Colombia, Mexico, Peru, and for the Pacific Alliance's Economies as a block. The results were represented in Table 6, Table 7, Table 8, Table 9 and Table 10, respectively.

The reported result confirmed the stationary test of the variables at the level form I (0) for the LGDP, LAXCH, LLF, and the LFDI in Chile, Mexico, Peru and in the Pacific Alliance's Economies as a block. In the case of Colombia, LAXCH achieved the stationary level at form I (1), while LLF had stationary level at form I (6). The null hypothesis of non-stationary was rejected since the P-value was significant at 5% and 10%. Therefore, we can conclude that the variables for each country achieve the stationarity after some differentiation, and those results supported the econometric model of the equation (4).

Co-integration test

Table 11, Table 12, Table 13, Table 14 and Table 15, presented the result of the Johansen Co-integration Test in the Trace Statistic and the Maximum Eigen Test statistics for Chile, Colombia, Mexico, Peru, and for the Pacific Alliance's Economies as a block, respectively. Both tests revealed that there were three co-integrating equations for Chile and Pacific Alliance's Economies, two for Colombia and Mexico and one for Peru.

This was because of the null hypothesis of the co-integration rank (r=0), which implies the no existence of correlation in the long – run term, the max-eigenvalue was greater than the 5%, and even at the 1% critical value. The same happened with the trace statistics, which also indicated the quantity of the co-integrating equation. The evidence of co-integration in the study indicated that the agricultural exports to China, the foreign direct investment, and the labor force are long-run determinants of the economic growth in the Pacific Alliance's Economies as a block, more than the evidence from each country independently.

The same long-run relationship and importance between agricultural exports and economic growth (primarily) were found in the study made in some countries such as in Serbia[23], Pakistan[31], Portugal[46] and in ASEAN Latecomer Economies[12]. Xabadiya and Hu[47] analyze the agriculture cooperation for the Belt and Road Initiative in South Africa, showing the importance of agriculture in the long run term for the success in the Chinese Initiative.

Granger causality test

In this case, we analyzed the causal relationship between the LAXCH (Logarithm of agricultural exports to China) and the LGDP (Logarithm Gross Domestic Product) for each economy and the Pacific Alliance's Economies as a block.

Nevertheless, we also included the analysis of the causal relationship between the LLF (Logarithm of Labor Force) and the LGDP (Logarithm Gross Domestic Product), and between LFDI (Logarithm of Foreign Direct Investment) and the LGDP (Logarithm Gross Domestic Product).

Table 16, Table 17, Table 18, Table 19 and Table 20 showed the value of the Test considering the probability value of 5% for Chile, Colombia, Mexico, Peru, and for the Pacific Alliance's Economies as a bock, respectively. The Null Hypothesis of no causality existence was rejected if the P statistic was higher than 5%.

For the case of the LAXCH (Logarithm of agricultural exports to China) and the LGDP (Logarithm of Gross Domestic Product), it was demonstrated that it has a bidirectional causal relationship for the cases of Colombia, Mexico, and Peru, and it is unidirectional for the cases of Chile and for the Pacific Alliance's Economies as a block. It implies that the GDP is Granger caused by agriculture exportation to China, and the income from the agro exportation to China has a significant effect on economic growth. Studies made in Pakistan[10,30,48], and in the Kingdom of Eswatini[49] supported our result.

About the causal relationship between the LLF (Logarithm of Labor Force) and the LGDP (Logarithm Gross Domestic Product), we found a unidirectional causal relationship between those variables for Chile, Mexico and Pacific Alliance's Economies as a unique block. For those cases, it showed that the LGDP Granger caused the LLF, the labor force of the country or economy depends on the economic growth of the region. For Colombia and Peru, there is a bidirectional causal relationship between the variables. The labor force improved the production and the exportation of goods and services, which resulted in an economic growth that allowed the major improvement of the salary or the augmentation of the employment. It might also imply the knowledge improvement of the labor force, changing from labor force into human capital force.

Finally, between LGDP (Logarithm of Gross Domestic Product) and the LFDI (Logarithm of Foreign Direct Investment), there was a unidirectional relationship for Chile, Colombia, Peru and for the Pacific Alliance's Economies as a unique block. It was shown that the LGDP Granger caused the LFDI for Peru, meanwhile for others was the LFDI that Granger caused the LGDP. Mexico was the only country that had a bidirectional relationship between the variables. The Foreign Direct Investment is key for the R&D, which plays an important role in the productivity, competitiveness, and value with the implementation of the innovation management systems[16,49,50,51,52].

Vector Autoregression Model

Table 21, Table 22, Table 23, Table 24 and Table 25 presented the result of the Vector Autoregression (VAR), which revealed the impact of dependent variables (LAXCH, LLF, and LFDI) on the independent variable (LGDP) in the short-run term.

The equation's result for Chile is shown in Table 21. It indicated that this function best fits the model with significant effects on the GDP, having 97.61% as the R^2. This result implied that independent variables explained 98% of the total variation in the GDP for the short run. The Probability of F-statistic was 0.00 that also indicated the significance of the model, which implied that the parameters were significant at 5% even at 1%. The Breusch-Godfrey Correlation LM Test was used to test the existence or not of autocorrelation, having as a null hypothesis the no autocorrelation against the alternative hypothesis of autocorrelation. In this particular case, the value was 0.49 that implied the no rejection of the null hypothesis. So, the estimated model is free from autocorrelation.

In the case of testing the existence of residuals normality, the Jarque-Bera test was used. It has as a null hypothesis that the residuals are normally distributed against the alternative hypothesis, which is that the residuals are not normally distributed. In this case, the result was 0.36, which implied the no rejection of the null hypothesis and it showed the normal distribution of the residuals.

For Colombia, the result is shown in Table 22. It has 96.45% as the R^2, implying that independent variables explained 96% of the total variation in the GDP, in the short-run. The Probability of F-statistic was 0.00 enforcing the significance of the model, which implied that the parameters were significant at 5% even at 1%. The Breusch-Godfrey Correlation LM Test had as result 0.37 that implied the no rejection of the null hypothesis. Moreover, in the case of the Jarque-Bera test, the result was 0.36, which also implied the no rejection of the null hypothesis. Both results showed that the model was free from autocorrelation and the residuals have a normal distribution.

Table 23 shows the result of Mexico. The independent variables explained 86% of the total variation in the GDP for the short-run since the R^2 is 86.13%. The Probability of F-statistic was 0.00 enforcing the significance of the model, which implied that the parameters were significant even at 1%. The Breusch-Godfrey Correlation LM Test had as result 0.09 that implied the no rejection of the null hypothesis showing that the model was free from autocorrelation.

In the case of Peru, the result is shown in Table 24. It has 99.23% as the R^2, implying that independent variables explained 99% of the total variation in the GDP, in the short-run. The Probability of F-statistic was 0.00 enforcing the significance of the model, which implied that the parameters were significant even at 1%. The Breusch-Godfrey Correlation LM Test had as result 0.47 that implied the no rejection of the null hypothesis. Also, in the case of the Jarque-Bera test, the result was 0.49, which also implied the no rejection of the null hypothesis. Both results showed that the model was free from autocorrelation and the residuals had a normal distribution.

Finally, Table 25 showed the result for the Pacific Alliance's Economies as a unique block. The R^2 was 95.01%, from which we concluded that independent variables explained 95% of the total variation in the GDP for the short-run. The Probability of F-statistic was 0.00 enforcing the significance of the model. About the other Tests, the Breusch-Godfrey Correlation LM Test had as result 0.41 that implied the no rejection of the null hypothesis. Also, the Jarque-Bera test result was 0.46, which also implied the no rejection of the null hypothesis. Both results showed that the model was free from autocorrelation and the residuals have a normal distribution.

According to the results, and focusing on the agro exportation impact on the economic growth, we could observe that even when Chile, and as you could appreciate in Figure 3, had the higher income in nominal terms, in the model, when the agriculture exportation to China grows in 1%, the GDP of Chile decreased in 0.13%. The same negative effect could be shown for Mexico when the agriculture exportation to China grew by 1%, the GDP of Mexico decreased by 0.10%. About Colombia and Peru, we could see that agriculture exportation had a positive impact on their GDP growth. For Colombia, when the agriculture exportation to China increased by 1%, the GDP of Colombia increased by 0.04%; and for Peru, when the agriculture exportation to China increased by 1%, the GDP of Peru had also the growth of 0.04%. For those countries, the result had a significance at 10%. For the case of the Alliance Pacific's Economies as a unique block, the impact of the agriculture exportation to China on the economic growth was higher (when there is an increase of 1% in the agriculture exportation to China, the economic growth of the block increased by 0.07%). However, as a block, the result had a low significance. Some studies in Kenya[53] or in Namibia[54] had the same similarity, which they explained that this low impact is for the production techniques that had, as a result, the commercialization in a raw state, with low prices.

About the control variables like the Labor Force (LF), it had a positive and significant impact on Chile, Mexico, and Peru. For Chile, an increase of 1% in the labor force allowed the increase in the GDP in Chile of 2.77%. For Mexico, the increase of 1% in the labor force made the GDP of Mexico increased by 2.36%. Moreover, for Peru, an increase of 1% in the labor force had a positive impact on the increase of 0.76% on the GDP of Peru. The same result was found in Ethiopia[55], which could be explained for the population quantity that has as principal economic activity the agriculture. From the analyzed countries, only Colombia had a negative and no significant impact of the labor force increase on the GDP of Mexico, when the labor force increased by 1%, the GDP decreased in 0.17%. About the result for the Pacific Alliance's Economies as a unique block, it showed a positive but no significant effect. When there is an increase of 1% in the labor force, economic growth as a block would increase by 0.71%. The no significance of the labor force could be explained for the labor quality, which could not be considered as human capital force, for the presence of low production techniques in the agriculture sector.

The other control variable was the Foreign Direct Investment (FDI), which was positive and significant for the analyzed countries. For Chile, when the FDI increased by 1%, the economic growth also increased by 0.08%. The increase of the FDI in 1% in Colombia had as consequence the increase of the GDP by 0.21%. For Mexico, the increase in 1% on the FDI allowed an increase in the GDP by 0.13%. Peru, the last country on the list had the biggest impact on the increase of 1% on the FDI, which had as impact the increase of 0.70% on its GDP. However, as a unique block, the impact of 1% on the FDI involved an increase of 0.34% on the Pacific Alliance's Economies, giving them more investment opportunities in different sectors[50,52].

Finally, the lagged GDP (LGDP-1) had a positive and significant impact on the economies. This variable suggested that the previous GDP increased the investment level, having as result the increase in the current GDP. For Chile, an increase of 1% in the previous year meant 0.61% of the increase in the current GDP, and the same result happens for Colombia. In Mexico, an increase of 1% in the previous GDP allowed an increase of 0.48% in the current period. And for the case of Peru, the increase in 1% of the previous GDP became an increase of 0.58% in the current GDP. As a unique block, an increase of 1% in the previous GDP had resulted in an increase of 0.23% in the economic growth of the Pacific Alliance's Economies.

IV.CONCLUSION

The primary objective of the study was to make an empirical analysis about the impact of agricultural exports to China on the economic growth of Pacific Alliance's Economies, independently and as a unique block, in the short- and long-run using a time series data from 2001 to 2018. For the economic analysis, the ADF test was used to determine the data stationary, which results showed all variables achieved stationary at the level I (1) supporting the Vector Autoregression Model used for the short-run analysis. The short-run analysis indicated a positive relationship between the agricultural exports to China and the economic growth for Colombia and Peru, while for Chile and Mexico it was negative; and in the analysis as a unique block, it presented a positive impact, which was higher than the obtained as independent economies. The Co-integration Test result indicated the existence of a long-run relationship between the variables for the Pacific Alliance's Economies. Moreover, the Granger Causality test revealed a unidirectional causality relationship between agricultural exports to China and the economic growth of the Pacific Alliance's Economies as a block, in which the agricultural exports to China Granger caused the economic growth of the Economies as a block. However, there is a problem with the significance of the short-run term result, which implied that the exportation of the products was still as a raw material rather than as value-added products, fetching a low price in the world market, and facing the problem of the agriculture products' price volatility. Nevertheless, it is necessary to recall that the exportation to China is an engine of economic growth for the Pacific Alliance's Economies, which is higher if they work together than independently.

The study included labor and foreign direct investment as explanatory variables. The results showed that the labor positively contributed to economic growth in the Pacific Alliance's Economies as a block, but it is not significant, which was explained by the low or null transformation of the human labor force in human capital through continued capacity development. Finally, the foreign direct investment also contributed positively to the economic growth, which was expected a priori.

Considering the findings, the policy implications are as follows:

1. As the study showed, the impact of agricultural exports to China was essential and higher in the Pacific Alliance's Economies as a block than individual economies. The Pacific Alliance's Economies should enforce the objective of being an integrated commercial platform, working together as a unique economy to impulse the sustainable development of the region.
2. Since the price of agricultural commodities is fluctuating on the time, depending close to international demand, and the product presentation. The Pacific Alliance's Economies should work to export agricultural products with added-value more than agricultural products in the raw material. Each economy should do internal policies such as providing some tax-free credits to producers for the improvement of the technology in the agriculture production, as part of an international development plan following the objective of the Pacific Alliance Agreement.
3. Finally, and as it was demonstrated in different studies around the world, it is needed to give training and the necessary skills to convert the labor force into a human capital force. It also should be done by each country but following the general objective of the agreement between these economies.

REFERENCES

[1] J. A. Batten and P. G. Szilagyi, "The Impact of the Global Financial Crisis on Emerging Financial Markets," in Jonathan A. Batten, and Peter G. Szilagyi (ed.). Contemporary Studies in Economic and Financial Analysis, Vol. 93, pp. 3 – 16, 2011.
[2] H. B. Chenery and A. Strout, "Foreign assistance and economic development," American Economic Review, Vol. 56, pp. 680 – 733, 1966.
[3] M. Michaely, "Exports and growth: an empirical investigation," Journal of Development Economics, Vol. 4, pp. 49 – 53, 1977.
[4] B. Balassa, "Exports and growth: further evidence," Journal of Development Economics, Vol. 5, pp. 181 – 189, 1978.
[5] W. Tyler, "Growth and export expansion in less developed countries: some empirical evidence," Journal of Development Economics, Vol. 9, pp. 121 – 130, 1981.
[6] R. M. Kavoussi, "Export expansion and economic growth: Further empirical evidence," Journal of Development Economics, Vol. 14, No.1, pp. 241 – 250, 1984.
[7] R. Ram, "Exports and economic growth in developing countries: evidence from time-series and cross-section data," Economic Development and Cultural Change, Vol. 36, pp. 51 – 72, 1987.
[8] 8. N. S. Shirazi and A. A. Manap, "Export-led growth hypothesis: Further econometric evidence from South Asia," The Developing Economies, Vol. 43, No. 4, pp. 472–488, 2005.
[9] H. Kang, "Agricultural exports and economic growth: Empirical evidence from the major rice exporting countries," Agricultural Economics – Czech, Vol. 61, No. 2, pp. 81 – 87, 2015.
[10] N. Verter and V. Bečvářová, "The impact of agricultural exports on economic growth in Nigeria," Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, Vol. 64, No. 2, pp. 691 – 700, 2016.
[11] A. K. Fosu, "Growth, inequality, and poverty reduction in developing countries: Recent global evidence," Research in Economics, Vol. 71, pp. 306 – 336, 2017.

[12] K. Vogiatzoglou, “Export composition and long-run economic growth impact: a cointegration analysis for ASEAN 'Latecomer' Economies,” Margin - The Journal of Applied Economic Research, Vol. 13, No.2, pp. 168–191, 2019.
[13] R. Baldwin and F. Robert-Nicoud, “Trade and growth with heterogeneous firms,” Journal of International Economics, Vol. 74, No 1, pp. 21 – 34, 2008.
[14] R. C. Feenstra and H. L. Kee, “Export variety and country productivity: Estimating the monopolistic competition model with endogenous productivity,” Journal of International Economics, Vol. 74, No.2, pp. 500 – 518, 2008.
[15] G. M. Grossman and E. Helpman, “Growth, trade, and inequality,” Econometrica, Vol. 86, No. 1, pp. 37 – 83, 2018.
[16] 16. M. R. Sultanuzzaman, F. Hongzhong, W. Banban, A. B. Miraj and K. M. M. Adnan, “Trade (exports) as an opportunity for Bangladesh: A VECM analysis,” The International Trade Journal, Vol. 33, No. 1, pp. 95 – 110, 2019.
[17] K. Vogiatzoglou, “Export composition and long-run economic growth impact: a cointegration analysis for ASEAN 'Latecomer' Economies,” Margin - The Journal of Applied Economic Research, Vol. 13, No.2, pp. 168–191, 2019.
[18] P. A. Reppas and D. K. Christopoulos, “The export-output growth nexus: Evidence from African and Asian countries,” Journal of Policy Modeling, Vol. 27, No. 8, pp. 929 – 940, 2005.
[19] R. C. Feenstra and H. L. Kee, “Export variety and country productivity: Estimating the monopolistic competition model with endogenous productivity,” Journal of International Economics, Vol. 74, No.2, pp. 500 – 518, 2008.
[20] C. Dreger and D. Herzer, “A further examination of the export-led growth hypothesis,” Empirical Economics, Vol. 45, No. 1, pp. 39 – 60, 2013.
[21] T. S. Eicher and D. Kuenzel, “The elusive effects of trade on growth: Export diversity and economic take-off,” Canadian Journal of Economics, Vol. 49, No. 1, pp. 264 – 295, 2016.
[22] F. Ahmad, M. Umar Draz and S. C. Yang, “Causality nexus of exports, FDI and economic growth of the ASEAN5 economies: Evidence from panel data analysis,” The Journal of International Trade and Economic Development, Vol. 27, No. 6, pp. 685 – 700, 2018.
[23] A. Dušan, N. Olgica, S. Nataša and M. Slavomir, “The perspectives of sustainable development of Serbia's agriculture in the globalized environment,” Economics of Agriculture, Vol. 66, No.1, pp. 221 – 235, 2019.
[24] U. N. Department of Economic and Social Affairs Population Division (2013). Available at http://www.un.org/en/development/desa/population/publications/ database/index.HTML (accessed January 10, 2019).
[25] N. Verter and V. Bečvářová, “Analysis of some drivers of cocoa export in Nigeria in the era of trade liberalization,” Agris On-Line Papers in Economics and Informatics, Vol. 6, No. 4, pp. 208 – 218, 2014.
[26] N. Verter, “The application of international trade theories to agriculture,” Mediterranean Journal of Social Sciences, Vol. 6, No. 6, pp. 209 – 219, 2015.
[27] C. Miao, D. Fang, L. Sun and Q. Luo, “Natural resources utilization efficiency under the influence of green technological innovation,” Resour. Conserv. Recycl., Vol. 126, pp. 153 – 161, 2017.
[28] S. T. Hassan, E. Xia, N. H. Khan and S. M. A. Shah, “Economic growth, natural resources, and ecological footprints: evidence from Pakistan,” Environ. Sci. Pollut. Res., pp. 2929 – 2938, 2018.
[29] S. Wu, L. Li and S. Li, “Natural resource abundance, natural resource-oriented industry dependence, and economic growth: evidence from the provincial level in China,” Resour. Conserv. Recycl., Vol. 139, pp. 163 – 171, 2018.
[30] I. F. Abubakar and U. B. Ibrahim, “A macroeconomic analysis of the agricultural sector in Nigeria,” Advanced Journal of Social Science, Vol. 5, No. 1, pp. 18 – 25, 2019.
[31] S. T. Hassan, E. Xial, J. Huang, N. H. Khan and K. Iqbal, “Natural resources, globalization, and economic growth: evidence from Pakistan,” Environ. Sci. Pollut. Res., Vol. 26, No. 15, pp. 15527 – 15534, 2019.
[32] V. C. Ndubuaku, O. E. U. Okoro, K. Bello and C. P. Alozie, “Agric Financing and its impact on agricultural GDP: an ARDL approach,” International Journal of Sustainable Agricultural Research, Vol. 6, No1, pp. 47 – 60, 2019.

[33] F. G. Mucavele, "True contribution of agriculture to economic growth and poverty reduction: Malawi, Mozambique and Zambia (Synthesis Report)," Pretoria, South Africa: Food Agriculture and Natural Resources Policy Analysis Network, 2013.
[34] D. Hallam, P. Liu, G. Lavers, P. Pilkauskas, G. Rapsoman, and C. Julie, "The market for non-traditional agricultural exports" Rome, Italy: Food and Agricultural Organization of the United Nations (FAO), 2004.
[35] M. B. Dastagiri and L. Bhavigna, "The theory of agricultural price bubble & price crash in the global economy," Applied Economics and Finance, Vol. 6, No.5, pp. 168 – 176, 2019.
[36] D. B. B. Nguyen and M. Prokopczuk, "Jumps in commodity markets," Journal of Commodity Markets, Vol. 13, pp. 55 – 70, 2019.
[37] A. Martínez-Castillo, "Alianza del Pacífico y Mercado Común del Sur: dos enfoques de la integración económica regional," Papel Político, Vol. 21, No. 2, pp. 469 – 494, 2016.
[38] R. M. Solow, "A contribution to the theory of economic growth," The Quarterly Journal of Economics, Vol. 70, No. 1, pp. 65 – 94, 1956.
[39] R. M. Solow, "Technical change and the aggregate production function," Review of Economics and Statistics, Vol. 39, pp. 312 – 320, 1957.
[40] T. O. Awokuse, "Causality between exports, imports, and economic growth: Evidence from transition economies," Economics Letters, Vol. 94, pp. 389 – 395, 2007.
[41] D. A. Dickey and W. A. Fuller "Distribution of the estimators for autoregressive time series with a unit root," Journal of the American Statistical Association, Vol. 74, No. 366a, pp. 427 – 431, 1979.
[42] D. A. Dickey and W. A. Fuller "Likelihood ratio statistics for autoregressive time series with a unit root," Econometrica: Journal of the Econometric Society, pp. 1057 – 1072, 1981.
[43] S. Johansen and K. Juselius, "Maximum likelihood estimation and inference on cointegration - with applications to the demand for money," Oxford Bulletin of Economics and Statistics, Vol. 52, No.2, pp. 169 – 210, 1990.
[44] S. Johansen, "Likelihood-Based Inference in Cointegrated Vector Autoregressive Models," Oxford University Press (1995). Available at http://www.oxfordscholarship.com/view/10.1093/0198774508.001.0001/acprof-9780198774501 (accessed on March 8, 2019).
[45] M. H. Pearsan, Y. Shin and R. P. Smith, "Pooled mean group estimation of dynamic heterogeneous panels," Journal of the American Statistical Association, Vol. 94, pp. 621 – 634, 1999.
[46] M. F. Oliveira, F. Gomes da Silva, S. Ferreira, M. Teixeira, H. Damásio, A. D. Ferreira and J. M. Gonçalves, "Innovations in sustainable agriculture: Case study of Lis Valley irrigation district, Portugal," Sustainability, Vol. 11, pp. 331, 2019.
[47] A. Xabadiya and Z. Hu, "An Analysis of China-Africa Agricultural Cooperation and Prospects of Belt and Road Initiative: A Case of South Africa," International Journal of Academic Research in Business and Social Sciences, Vol. 9, No.2, pp. 221 - 250. 2019.
[48] M. Z. Faridi, "Contribution of agricultural exports to economic growth in Pakistan,". Pak. J. Commer. Soc. Sci., Vol. 6, No.1, pp. 133 – 146, 2012.
[49] S. G. Dlamini and D. V. Dlamini, "Granger-causality Between Economic Growth and Sugar Exports in the Kingdom of Eswatini: A Toda-Yamamoto Approach," J. Agric. Econ. Rural Devel., Vol. 5, No. 1, pp. 543 – 547, 2019.
[50] A. L. Leite, M. C. Klotzle, A. C. F. Pinto and A. F. Da Silva, "Size, value, profitability, and investment: Evidence from emerging markets," Emerging Markets Review, Elsevier, Vol. 36, No. C, pp. 45 – 59, 2018.
[51] T. V. Hung and L. T. M. Hương, "Relationship between economic growth and foreign direct investment: The case of Dong Nai Province, Vietnam," The EUrASEANa: Journal on Global Socio-Economic Dynamics, Vol. 2, No. 15, pp. 50 -59, 2019.
[52] C. Laffineur and A. Gazaniol, "Foreign direct investment and wage dispersion: Evidence from French employer-employee data," International Economics, Vol. 157, pp. 203 – 226, 2019.
[53] D. Ouma, T. Kimani and E. Manyasa, "Agricultural Trade and Economic Growth in East African Community," African Journal of Economic Review, Vol. 4, No. 2, pp. 203 – 221, 2016.
[54] C. Simasiku and J. P. Sheefeni, "Agricultural exports and economic growth in Namibia," European Journal of Basic and Applied Sciences, Vol. 4, No. 1, pp. 41 – 50, 2017.

[55] T. Yifru, Impact of Agricultural Exports on Economic Growth in Ethiopia: The Case of Coffee, Oilseed and Pulses (Unpublished master's thesis). Egerton University, Njoro, Kenya (2015). Retrieved from http://ageconsearch.umn.edu/record/243473

V. TABLES

Table 1: Summary Statistics of variable in million, from 2001 - 2018 (Chile)

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis
AGDP	193000.00	199000.00	298000.00	69700.00	78800.00	-0.34	1.69
AXCH	407.00	118.00	1530.00	17.40	482.00	1.02	2.76
LF	7.90	7.98	9.38	6.35	1.00	-0.16	1.71
FDI	13300.00	12800.00	30300.00	2550.00	8290.00	0.46	2.04
Source: Researcher's compilation from Stata 13.0							

Table 2: Summary Statistics of variable in million, from 2001 - 2018 (Colombia)

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis
AGDP	243000.00	262000.00	382000.00	94600.00	103000.00	-0.18	1.64
AXCH	15.90	12.30	53.60	0.88	16.20	1.13	3.15
LF	22.50	22.40	26.70	18.70	2.70	0.15	1.51
FDI	9620.00	10400.00	16200.00	1720.00	4960.00	-0.29	1.80
Source: Researcher's compilation from Stata 13.0							

Table 3: Summary Statistics of variable in million, from 2001 - 2018 (Mexico)

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis
AGDP	1030000.00	1070000.00	1310000.00	729000.00	190000.00	-0.31	1.77
AXCH	20.80	7.72	92.40	1.53	26.30	1.48	4.09
LF	48.60	48.90	56.60	39.70	5.41	-0.18	1.79
FDI	28500.00	28000.00	47300.00	17700.00	7990.00	0.51	2.71
Source: Researcher's compilation from Stata 13.0							

Table 4: Summary Statistics of variable in million, from 2001 - 2018 (Peru)

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis
AGDP	137000.00	134000.00	222000.00	52000.00	61300.00	-0.09	1.43
AXCH	72.40	55.20	214.00	0.12	71.60	0.61	2.05
LF	15.50	15.90	18.30	12.50	1.65	-0.22	2.10
FDI	5720.00	6460.00	13600.00	1140.00	3350.00	0.43	2.83
Source: Researcher's compilation from Stata 13.0							

Table 5: Summary Statistics of variable in million, from 2001 - 2018 (Pacific Alliance Economies)

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis
AGDP	1610000.00	1680000.00	2160000.00	958000.00	425000.00	-0.30	1.66
AXCH	516.00	231.00	1870.00	24.80	579.00	0.97	2.70
LF	94.50	95.20	111.00	77.40	10.70	-0.09	1.74
FDI	57100.00	59700.00	94100.00	25300.00	18900.00	0.05	2.12

Source: Researcher's compilation from Stata 13.0

Table 6: Unit root test for order of integration of variables (ADF)

Chile

Variables			Critical values (1%)	Critical values (5%)	Critical values (10%)
LGDP	At level	-1.805	-2.602	-1.753	-1.341
	First difference	-2.625	-2.650	-1.771	-1.350
LAXCH	Fifth difference	-2.786	-3.365	-2.015	-1.476
	Sixth difference	-2.864	-4.541	-2.353	-1.638
LLF	At level	-1.700	-2.602	-1.753	-1.341
	First difference	-2.922	-2.650	-1.771	-1.350
LFDI	At level	-1.367	-2.602	-1.753	-1.341
	First difference	-2.621	-2.650	-1.771	-1.350

Source: Researcher's compilation from Stata 13.0

Table 7: Unit root test for order of integration of variables (ADF)

Colombia

Variables			**Critical values (1%)**	**Critical values (5%)**	**Critical values (10%)**
LGDP	At level	-1.521	-2.602	-1.753	-1.341
	First difference	-1.856	-2.650	-1.771	-1.350
LAXCH	First difference	-1.545	-2.650	-1.771	-1.350
	Second difference	-1.648	-2.718	-1.796	-1.363
LLF	Sixth difference	-1.851	-4.541	-2.353	-1.638
	Seventh difference	-7.243	-31.821	-6.314	-3.078
LFDI	At level	-1.715	-2.602	-1.753	-1.341
	First difference	-2.083	-2.650	-1.771	-1.350

Source: Researcher's compilation from Stata 13.0

Table 8: Unit root test for order of integration of variables (ADF)

Mexico

Variables			**Critical values (1%)**	**Critical values (5%)**	**Critical values (10%)**
LGDP	At level	-1.405	-2.602	-1.753	-1.341
	First difference	-1.473	-2.650	-1.771	-1.350
LAXCH	At level	-2.370	-4.380	-3.600	-3.240
	First difference	-3.635	-4.380	-3.600	-3.240
LLF	At level	-2.352	-2.602	-1.753	-1.341
	First difference	-2.394	-2.650	-1.771	-1.350
LFDI	At level	-3.070	-2.602	-1.753	-1.341
	First difference	-1.800	-2.650	-1.771	-1.350

Source: Researcher's compilation from Stata 13.0

Table 9: Unit root test for order of integration of variables (ADF)

Peru

Variables			Critical values (1%)	Critical values (5%)	Critical values (10%)
LGDP	At level	-1.749	-2.602	-1.753	-1.341
	First difference	-1.869	-2.650	-1.771	-1.350
LAXCH	At level	-4.396	-2.602	-1.753	-1.341
	First difference	-4.227	-2.650	-1.771	-1.350
LLF	At level	-1.332	-2.602	-1.753	-1.341
	First difference	-0.836	-2.650	-1.771	-1.350
LFDI	At level	-1.463	-2.602	-1.753	-1.341
	First difference	-2.112	-2.650	-1.771	-1.350
Source: Researcher's compilation from Stata 13.0					

Table 10: Unit root test for order of integration of variables (ADF)					
Pacific Alliance Economies					
Variables			**Critical values (1%)**	**Critical values (5%)**	**Critical values (10%)**
LGDP	At level	-1.295	-2.602	-1.753	-1.341
	First difference	-1.488	-2.650	-1.771	-1.350
LAXCH	At level	-1.889	-4.380	-3.600	-3.240
	First difference	-3.315	-4.380	-3.600	-3.240
LLF	At level	-2.358	-2.602	-1.753	-1.341
	First difference	-2.253	-2.650	-1.771	-1.350
LFDI	At level	-1.488	-2.602	-1.753	-1.341
	First difference	-1.757	-2.650	-1.771	-1.350
Source: Researcher's compilation from Stata 13.0					

Table 11: Johansen Cointegration Trace and Maximun Eigvenvalue Test

Chile						
Hypothesized No. of CE(S)	**Trace Test**			**Maximun Eigen Test**		
	Trace Statistic	**0.05 Critical Value**	**0.01 Critical Value**	**Max Statistic**	**0.05 Critical Value**	**0.01 Critical Value**
None	71.15	47.21	54.46	30.66	27.07	32.24
At most 1	40.5	29.68	35.65	24.58	20.97	25.52
At most 2	15.91*	15.41	20.04	15.29	14.07	18.63
At most 3	0.63**	3.76	6.65	0.63	3.76	6.65

* is at 1%, and ** is at 5%

Source: Researcher's compilation from Stata 13.0

Table 12: Johansen Cointegration Trace and Maximun Eigvenvalue Test

Colombia						
Hypothesized No. of CE(S)	**Trace Test**			**Maximun Eigen Test**		
	Trace Statistic	**0.05 Critical Value**	**0.01 Critical**	**Max Statistic**	**0.05 Critical Value**	**0.01 Critical Value**

			Value			
None	66.90	47.21	54.46	35.62	27.07	32.24
At most 1	31.28*	29.68	35.65	25.56	20.97	25.52
At most 2	5.71**	15.41	20.04	5.27	14.07	18.63
At most 3	0.45	3.76	6.65	0.45	3.76	6.65

* is at 1%, and ** is at 5%

Source: Researcher's compilation from Stata 13.0

Table 13: Johansen Cointegration Trace and Maximun Eigvenvalue Test						
Mexico						
	Trace Test			**Maximun Eigen Test**		
	Trace Statistic	**0.05 Critical Value**	**0.01 Critical Value**	**Max Statistic**	**0.05 Critical Value**	**0.01 Critical Value**
None	66.39	47.21	54.46	35.51	27.07	32.24
At most 1	30.87*	29.68	35.65	19.74	20.97	25.52
At most 2	11.14**	15.41	20.04	9.27	14.07	18.63
At most 3	1.87	3.76	6.65	1.87	3.76	6.65
* is at 1%, and ** is at 5%						
Source: Researcher's compilation from Stata 13.0						

Table 14: Johansen Cointegration Trace and Maximun Eigvenvalue Test						
Peru						
Hypothesized No. of CE(S)	**Trace Test**			**Maximun Eigen Test**		
	Trace Statistic	**0.05 Critical Value**	**0.01 Critical Value**	**Max Statistic**	**0.05 Critical Value**	**0.01 Critical Value**
None	60.55	47.21	54.46	34.37	27.07	32.24
At most 1	26.18*,**	29.68	35.65	16.25	20.97	25.52
At most 2	9.92	15.41	20.04	8.48	14.07	18.63
At most 3	1.49	3.76	6.65	1.49	3.76	6.65
* is at 1%, and ** is at 5%						
Source: Researcher's compilation from Stata 13.0						

Table 15: Johansen Cointegration Trace and Maximun Eigvenvalue Test						
Pacific Alliance Economies						
Hypothesized No. of CE(S)	**Trace Test**			**Maximun Eigen Test**		
	Trace Statistic	**0.05 Critical Value**	**0.01 Critical Value**	**Max Statistic**	**0.05 Critical Value**	**0.01 Critical Value**
None	88.57	47.21	54.46	53.50	27.07	32.24
At most 1	35.08*	29.68	35.65	18.21	20.97	25.52
At most 2	16.86	15.41	20.04	13.24	14.07	18.63
At most 3	3.62**	3.76	6.65	3.62	3.76	6.65
* is at 1%, and ** is at 5%						

Source: Researcher's compilation from Stata 13.0

Table 16: Pairwise Granger Causality Test		
Chile		
Null hypothesis	**F-statistic**	**Prob.**
LAXCH does not Granger Cause LGDP	12.54	0.00
LGDP does not Granger Cause LAXCH	1.02	0.31
LLF does not Granger Cause LGDP	8.54	0.03
LGDP does not Granger Cause LLF	2.33	0.13
LFDI does not Granger Cause LGDP	0.44	0.51
LGDP does not Granger Cause LFDI	6.44	0.01
Source: Researcher's compilation from Stata 13.0		

Table 17: Pairwise Granger Causality Test		
Colombia		
Null hypothesis	**F-statistic**	**Prob.**
LAXCH does not Granger Cause LGDP	0.95	0.76
LGDP does not Granger Cause LAXCH	0.45	0.50
LLF does not Granger Cause LGDP	0.11	0.74
LGDP does not Granger Cause LLF	0.48	0.49
LFDI does not Granger Cause LGDP	0.02	0.90
LGDP does not Granger Cause LFDI	4.83	0.03
Source: Researcher's compilation from Stata 13.0		

Table 18: Pairwise Granger Causality Test		
Mexico		
Null hypothesis	**F-statistic**	**Prob.**
LAXCH does not Granger Cause LGDP	4.59	0.10
LGDP does not Granger Cause LAXCH	5.58	0.06
LLF does not Granger Cause LGDP	12.16	0.00
LGDP does not Granger Cause LLF	3.66	0.16
LFDI does not Granger Cause LGDP	4.78	0.09
LGDP does not Granger Cause LFDI	0.47	0.79
Source: Researcher's compilation from Stata 13.0		

Table 19: Pairwise Granger Causality Test		
Peru		
Null hypothesis	**F-statistic**	**Prob.**
LAXCH does not Granger Cause LGDP	1.23	0.27
LGDP does not Granger Cause LAXCH	0.08	0.78
LLF does not Granger Cause LGDP	2.45	0.12
LGDP does not Granger Cause LLF	0.00	0.96
LFDI does not Granger Cause LGDP	3.12	0.00
LGDP does not Granger Cause LFDI	0.02	0.89
Source: Researcher's compilation from Stata 13.0		

Table 20: Pairwise Granger Causality Test

Alliance Pacific Economies		
Null hypothesis	**F-statistic**	**Prob.**
LAXCH does not Granger Cause LGDP	8.25	0.06
LGDP does not Granger Cause LAXCH	6.75	0.03
LLF does not Granger Cause LGDP	15.74	0.00
LGDP does not Granger Cause LLF	0.43	0.81
LFDI does not Granger Cause LGDP	2.68	0.26
LGDP does not Granger Cause LFDI	49.36	0.00
Source: Researcher's compilation from Stata 13.0		

Table 21: VAR Regression				
Chile				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**P-value**
D(LGDP-1)	0.61	0.22	2.77	0.01
D(LAXCH)	-0.13	0.05	-2.97	0.00
D(LLF)	2.77	0.85	3.25	0.00
D(LFDI)	0.08	0.05	0.54	0.59
Constant	-31.98	9.76	-3.28	0.00
R-squared	0.976100			
Prob (F-statistics)	0.000000			
Breusch-Godfrey LM Test	0.494870			
Jarque-Bera (Prob)	0.358420			
Source: Researcher's compilation from Stata 13.0				

Table 22: VAR Regression				
Colombia				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**P-value**
D(LGDP-1)	0.61	0.15	4.14	0.00
D(LAXCH)	0.04	0.27	1.49	0.14
D(LLF)	-0.17	0.45	-0.38	0.71
D(LFDI)	0.21	0.06	3.50	0.00
Constant	7.60	5.41	1.41	0.16
R-squared	0.964500			
Prob (F-statistics)	0.000000			
Breusch-Godfrey LM Test	0.379390			
Jarque-Bera (Prob)	0.362630			
Source: Researcher's compilation from Stata 13.0				

Table 23: VAR Regression				
Mexico				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**P-value**
D(LGDP-1)	0.48	0.20	2.37	0.02
D(LAXCH)	-0.10	0.46	-2.16	0.03
D(LLF)	2.36	0.69	3.41	0.00
D(LFDI)	0.13	0.07	1.81	0.07
Constant	-19.08	9.54	-2.00	0.04
R-squared	0.861300			
Prob (F-statistics)	0.000000			
Breusch-Godfrey LM Test	0.094570			

Jarque-Bera (Prob)	0.923120			
Source: Researcher's compilation from Stata 13.0				

Table 24: VAR Regression				
Peru				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**P-value**
D(LGDP-1)	0.58	0.09	6.54	0.00
D(LAXCH)	0.04	0.02	1.67	0.10
D(LLF)	0.76	0.44	1.76	0.08
D(LFDI)	0.70	0.03	2.47	0.01
Constant	-4.14	6.21	-0.67	0.50
R-squared	0.992300			
Prob (F-statistics)	0.000000			
Breusch-Godfrey LM Test	0.473580			
Jarque-Bera (Prob)	0.495830			
Source: Researcher's compilation from Stata 13.0				

Table 25: VAR Regression				
Alliance Pacific Economies				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**P-value**
D(LGDP-1)	0.23	0.26	0.87	0.39
D(LAXCH)	0.07	0.13	0.56	0.57
D(LLF)	0.71	1.40	0.51	0.61
D(LFDI)	0.34	0.09	3.69	0.00
Constant	8.47	28.72	0.29	0.77
R-squared	0.950100			
Prob (F-statistics)	0.000000			
Breusch-Godfrey LM Test	0.409260			
Jarque-Bera (Prob)	0.464780			
Source: Researcher's compilation from Stata 13.0				

V. FIGURES

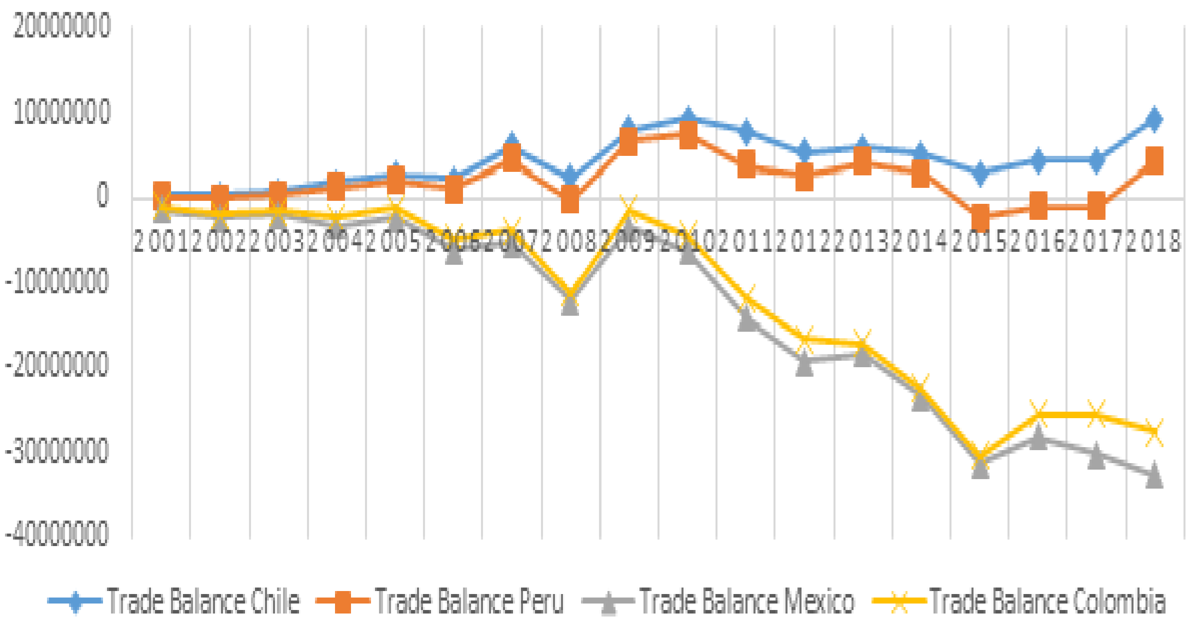


Figure 1: Trade Balance between Pacific Alliance's Economies and China.
Source: Trademap (2019)

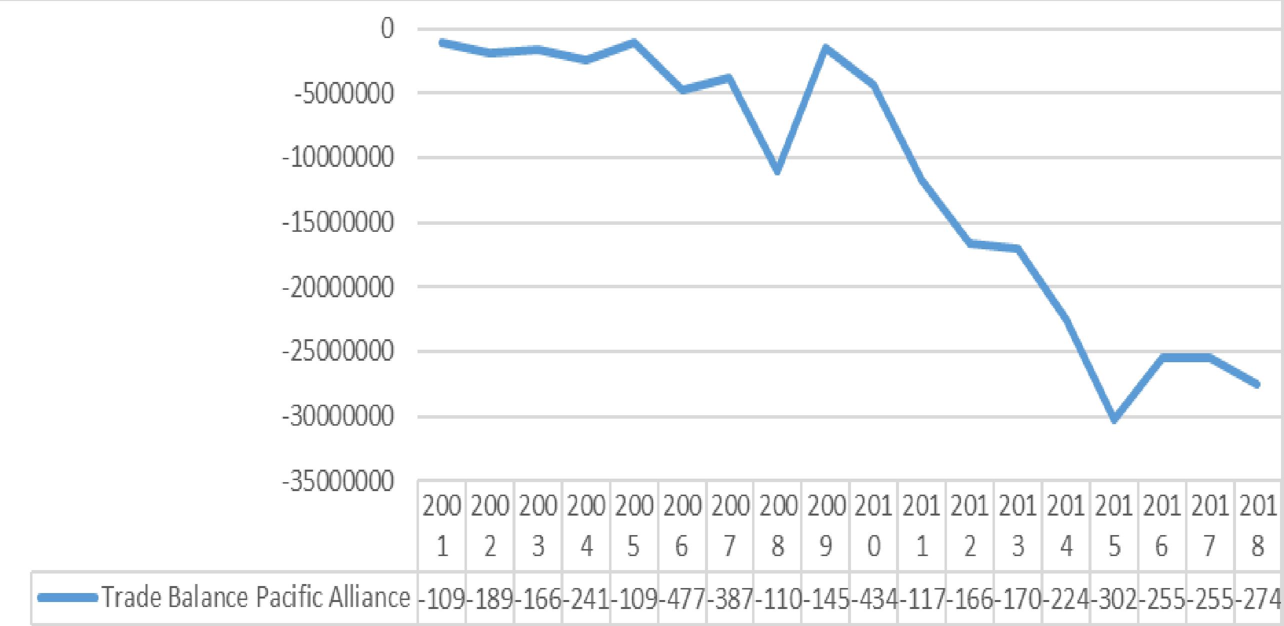
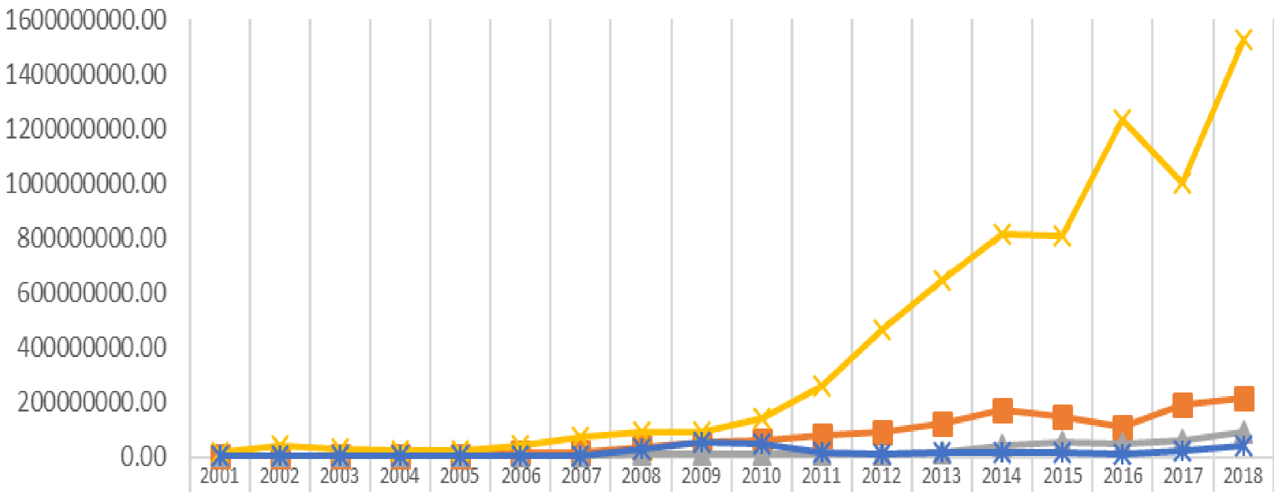


Figure 2: Trade Balance Pacific Alliance as an unique economy.
Source: Trademap (2019)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
PAXCH	12300	43200	18050	22570	41310	14670	13167	33614	50479	59902	75754	92727	12463	17089	14409	11230	18895	21357
MAXCH	32680	37040	15330	22200	37270	51530	59450	75690	78770	80730	73740	95410	14938	38697	54933	48076	58917	92427
CHIAXCH	17404	37769	25330	22338	22537	38014	69481	93158	93375	14210	26132	46281	64806	81573	80631	12347	10010	15255
COAXCH	40300	25420	87500	21980	21800	19100	16770	25658	53572	46047	12975	11218	13007	15916	16970	11717	22478	41260

Figure 3: Agriculture Exportation from Pacific Alliance's Economies to China.
Source: Trademap (2019)