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IMPACT OF EXPORTS AND IMPORTS ON ECONOMIC GROWTH: NEW EVIDENCE FROM PANAMA

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ABSTRACT
This paper investigates the relationship between exports, imports, and economic growth in Panama. In order to achieve this purpose, annual data for the periods between 1980 and 2015 were tested using the Johansen co-integration analysis of Vector Auto Regression Model and the Granger-Causality tests. According to the result of the analysis, it was determined that there is no relationship between exports, imports and economic growth in Panama. On the other hand, we found that there is a strong evidence of bidirectional causality from imports to economic growth and from exports to economic growth. These results provide evidence that exports and imports, thus, are seen as the source of economic growth in Panama.

JEL classification: F10, F13, F14.
Key words: export, import, economic growth, cointegration, causality, Panama

I. INTRODUCTION:

It has been theoretically argued that both export and import may play a crucial role in economic development. The theoretical and empirical studies mainly concentrate on either the relationship between export and growth or between import and growth or the association between export, import and economic growth. Exports of goods and services are seen as an engine of economic and social development for a number of reasons, including exports that require companies to innovate and improve to maintain market share. On the other hand, exports ensure increased sales and profits. Alternatively, they reduce dependency on local

markets since, in the event of expansion in foreign markets, the market base increases, leading to a reduction in local customers only. Otherwise, exports have the ability to minimize the impact of market volatility, by working in global markets, companies become more captive to economic changes, changing customer demands and seasonal fluctuations in the local economy. Finally, and with regard to the advantages of exports, it can be summarized that an increase in exports leads to an increase in the access to the currencies, which increases the national income, the turnover and the surpluses of the state. This leads to an improvement in the standard of living. In spite of these benefits for exports, they sometimes do not lead to these results lucrative and which do not contribute to higher economic growth of the country, and this is due to several reasons, among them: the existence of competition is greater than expected, the products is unpopular or popular in the markets other, instability in the target country as a result of wars or civil conflicts, weak media publicity and definition exported product or other similar reasons. As for import, it is generally reflected the weakness of the state in achieving its needs itself and makes them dependent and at the mercy of foreign countries. Imports unlike exports lead to the exit of the local currency and weaken the trade balance, thus weakening economic growth. However, and in some cases it is considered the import source of economic growth, especially if it includes hardware and electronic equipment to help and contribute to the increase and improvement of the investment, or include products that require a production value of more than imported. Due to these reasons, the export and import remain a controversial topic for their ability to influence the social and economic growth of the countries. Panama is the most important economic nations at the moment, given the distinguished geographical location, so they are considered the fastest growing economy in South America at the moment, with a GDP of 46.21 billion dollars for this year, compared B32.56 billion dollars just last year thus, the per capita GDP is US $ 19,637.09 per year, and after that it was 18,793 dollars last year, an increase over the previous reporting B5.8%. When calculated by purchasing power per capita, the gross domestic product per capita is 111% of the global average. In addition, Panama is considered the largest economy in the Central American region, before Guatemala, Costa Rica and El Salvador. However, Panama's economy is one of the fastest economy in terms of growth, the largest in terms of per capita income and the least in terms of population density in Central America countries. In spite of this economy integrated in Panama. The impacts of exports and imports

on economic growth have not been studied well in Panama and were not of interest to researchers in this field. In 2014, Panama exported $4.62B and imported $28.5B, resulting in a negative trade balance of $23.9B. In 2014 the GDP of Panama was $46.2B and its GDP per capita was $20.9k. In 2014 Panama exported $4.62B, making it the 114th largest exporter in the world. During the last five years the exports of Panama have decreased at an annualized rate of -14%, from $9.8B in 2009 to $4.62B in 2014. The most recent exports are led by Passenger and Cargo Ships which represent 12.1% of the total exports of Panama, followed by Refined Petroleum, which account for 12%. In 2014 Panama imported $28.5B, making it the 68th largest importer in the world. During the last five years the imports of Panama have increased at an annualized rate of 1.9%, from $26B in 2009 to $28.5B in 2014. The most recent imports are led by Crude Petroleum which represent 15.1% of the total imports of Panama, followed by Refined Petroleum, which account for 14%.

The aim of this paper, therefore, is to econometrically investigate the direct linkages between trade and economic growth of Panama, using yearly data for the period 1980-2015. Particularly, this work aims to empirically discover an answer for the query of whether exports lead economic growth or imports lead economic growth or economic growth leads exports and imports. To achieve this objective the paper is structured as follows. In section 2, we present the literature review concerning the nexus between trade and economic growth. Secondly, we discuss the Methodology Model Specification and data used in this study in Section 3. Thirdly, Section 4 presents the empirical results as well as the analysis of the findings. Finally, Section 5 is dedicated to our conclusion.

II. LITERATURE REVIEW

Different studies and researches were done by academics and policy makers for exports, imports and economic growth. A variety of studies shows different results about the relationship of these three variables. Recently, most of studies have attended to focus on VAR and VEC models and cointegration approach. Our review of literature is limited to studies that focus on the joint impact of both export and import on economic growth.

Table 1: Studies related to the relationship between exports, imports and economic growth

Authors	Countries	Periods	Econometric techniques	Keys Findings
Khaled R.M. Elbeydi and al (2010)	Libya	1980 – 2007	Cointegration analysis VECM Granger Causality tests	EX => GDP
Dilawar Khan and al (2012)	Pakistan	1972 – 2009	Cointegration analysis VECM Granger causality tests	GDP <=> EX GDP <=> IM
Qazi Muhammad Adnan Hye (2012)	China	1978 - 2009	Cointegration analysis Granger causality tests	GDP <=> EX GDP <=> IM
Velnampy.T and Achchuthan. S (2013)	Sri Lanka	1970 – 2010	Correlation analysis regression analysis	EX <=> IM IM => GDP EX => GDP
Kojo Menyah and all (2014)	21 African Countries	1965 - 2008	Granger causality tests	Trade => GDP
Mounir Belloumi (2014)	Tunisia	1970 - 2008	Cointegration analysis Granger causality tests	Trade ≠ GDP
Güngör Turan and all (2014)	Albania	1984 – 2012	OLS	EX => GDP IM ≠ GDP
Auro Kumar Sahoo and all (2014)	India	1981 – 2010	Cointegration analysis VECM Granger causality tests	GDP => EX
Hussain M and Saaed A (2014)	Tunisia	1977 – 2012	Cointegration analysis VECM Granger causality tests	IM => GDP
Musibau Adetunji Babatunde (2014)	Nigeria	1960 – 2014	Cointegration analysis Granger causality tests	EX <=> IM
Ajmi and all (2015)	South Africa	1911 – 2011	Granger causality tests	GDP ≠ EX GDP ≠ IM
Sachin N. Mehta (2015)	India	1976 – 2014	Cointegration analysis VECM Granger causality tests	GDP => EX GDP ≠ IM EX => IM

Gaber H. Abugamea (2015)	Palestine	1968 - 2012	Cointegration analysis VECM Granger causality tests	GDP ≠ EX GDP ≠ IM
Masoud Albiman Md and all (2016)	Malaysia	1967 – 2010	Cointegration analysis VAR Granger causality tests	EX => GDP EX => IM
Hatem H. A. A and al (2016)	Saudi Arabia	1980 -2014	Cointegration Analysis VECM	EX => GDP IM ≠ GDP

III. Data, methodology model specification

1. The Data:

The analysis utilized in this survey coat annual time series of 1980 to 2015 in Panama. The data set entails of observation for GDP (current US$), exports of goods and services (current US$), and imports of goods and services (current US$). All data set have brought from World Development Indicators 2016.

2. Methodology

We will operate the further apt method which is aimed to firstly set up the degree of integration of each variable. If the variables are all integrated in level, we will clench an estimate founded on a linear regression. In contrast, if the variables are all integrated into the first difference, our estimation will be based on an estimate of the VAR model. Concerning the estimation of VAR models types and when the variables are impartial in the first difference we will look and plot the cointegration between the variables, if the cointegration test denotes the non-attendance of cointegration relation then we will involve the Unrestricted Vector Auto-Regression (Unrestricted VAR) and the Granger Causality Tests. If the cointegration test elects the presence of a cointegration relation between the different variables studied, Vector error correction model (VECM) will be employed.

3. Model specification:

Early empirical formulations well-tested to track down and to assume the causal bond between imports, exports and GDP growth by mixing exports and imports into the aggregate

production function, and which is used by Francisco F. Ribeiro Ramos (2001), Titus O. Awokuse (2007), Dilawar Khan (2012), Güngör Turan (2014), Rummana Zaheer (2014) and Afaf Abdull J. Saaed (2015). The augmented production function, including both exports and imports is expressed as:

$$\boldsymbol{GDP_t = f(exports, imports)} \quad \textbf{(1)}$$

The function can also be represented in a log-linear econometric format thus:

$$\boldsymbol{\log (GDP)_t = \beta_0 + \beta_1 \log (exports)_t + \beta_2 \log (imports)_t + \varepsilon_t} \quad \textbf{(2)}$$

Where:

- β_0 : The constant term.
- β_1: coefficient of variable (exports)
- β_2: coefficient of variables (imports)
- t: The time trend.
- ε: The random error term assumed to be normally, identically and independently distributed.

IV. Empirical Analysis

1) Tests for unit roots: ADF and PP

At this step it is necessary to evaluate the stationary of main variables and to determine the order of their integration for each of them. To complete this task, we use stationary tests such as the ADF test and the PP test.

Table 2: Tests for Unit Root: ADF

Variable	ADF		PP		Order of Integration
	Test Statistic	Probability	Test Statistic	Probability	
Log(GDP)	3.252107	0.0254	3.289346	0.0233	I(1)
Log(Exports)	4.258073	0.0026	3.861216	0.0057	I(1)
Log(Imports)	4.663625	0.0007	4.686261	0.0006	I(1)

The results of the stationary tests ADF and PP show that all variables are integrated in order (1), namely in first difference and in all levels (1%, 5% and 10%).

2) VAR Lag Order Selection Criteria

As soon as the order of integration of the studied variables is in first differentials, we will determine the cointegration between them. But before this step, one must determine the number of delay existing in this estimate. To accomplish this, we will apply the VAR Lag order selection criteria method.

Table 3: Lag order Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	34.33122	NA	2.66e-05	-2.021369	-1.882596	-1.976133
1	143.7778	190.6488	4.09e-08	-8.501792	-7.946700*	-8.320846
2	156.6140	19.87536*	3.26e-08*	-8.749287	-7.777877	-8.432632*
3	161.1148	6.097979	4.57e-08	-8.459022	-7.071293	-8.006657
4	173.1464	13.97214	4.13e-08	-8.654607	-6.850559	-8.066532
5	184.8434	11.31966	4.09e-08	-8.828606*	-6.608239	-8.104822

The results of the VAR lag order selection criteria show that the number of delay chosen is equal to 1. Therefore, and at this moment, we are ready to process the existing cointegration number.

3) Cointegration Analysis: Johanson Test

To determine the number of cointegration existing in our situation, we use the most effective and suitable test, which is the Johanson test.

Table 4: Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	**Eigen value**	**Trace Statistic**	**0.05 Critical Value**	**Probability**
None	0.347832	20.01591	29.79707	0.4218
At most 1	0.110957	5.482529	15.49471	0.7556
At most 2	0.042702	1.483788	3.841466	0.2232
Trace test indicates no cointegration at the 0.05 level				

The Johanson test indicates the absence of a cointegration relation between the variables studied. Therefore, we will use an estimate based on the VAR model and the Granger causality test.

4) VAR estimation

The purpose of the model estimation is to identify and see if there are effects between the independent variables that are negative or positive on the dependent variable.

Table 5: Vector Auto-regression Estimates

	LOG(GDP)	LOG(EXPORTS)	LOG(IMPORTS)
LOG(GDP(-1))	0.822552	0.027491	-0.050130
	(0.06461)	(0.13707)	(0.16959)
	[12.7314]	[0.20057]	[-0.29558]
LOG(EXPORTS(-1))	0.246135	0.918077	0.616301
	(0.19860)	(0.42133)	(0.52132)
	[1.23934]	[2.17898]	[1.18218]
LOG(IMPORTS(-1))	-0.025648	0.068368	0.468541
	(0.16110)	(0.34178)	(0.42289)
	[-0.15920]	[0.20004]	[1.10795]
C	-0.833924	-0.274966	-0.654151
	(0.30382)	(0.64455)	(0.79751)
	[-2.74484]	[-0.42660]	[-0.82024]

Standard errors in ( ) & t-statistics in [ ]

$$\boldsymbol{LOG(GDP) = C(1) * LOG\,(GDP\,(-1)) + C(2) * LOG\,(EXPORTS\,(-1)) + C(3) * LOG\,(IMPORTS\,(-1)) + C(4)}$$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.822552	0.064608	12.73143	0.0000
C(2)	0.246135	0.198601	1.239344	0.2245
C(3)	-0.025648	0.161103	-0.159200	0.8745
C(4)	-0.833924	0.303816	-2.744837	0.0100

The results of the VAR model estimate show that the variable that designates exports has a positive effect on GDP, but it does not have a significant probability. On the other hand, the variable that designates imports has a negative effect on GDP, but it also has a probability that it is not significant.

5) Granger Causality Test

The objective of applying the Granger Causality Test is to verify whether there is a causal relationship between the different variables existing in our empirical investigation.

Table 6: Granger Causality Tests

Null Hypothesis:	**Probability**
LOG(EXPORTS) does not Granger Cause LOG(GDP)	0.0016
LOG(GDP) does not Granger Cause LOG(EXPORTS)	0.8848
LOG(IMPORTS) does not Granger Cause LOG(GDP)	0.0036
LOG(GDP) does not Granger Cause LOG(IMPORTS)	0.6075
LOG(IMPORTS) does not Granger Cause LOG(EXPORTS)	0.8854
LOG(EXPORTS) does not Granger Cause LOG(IMPORTS)	0.2110

The causality test indicates that exports and imports influence the GDP. On the other hand, the GDP does not influence exports or imports. Otherwise, there is no causal relationship between exports and imports.

6) Residual Diagnostics Tests

To verify that our empirical work is acceptable and that our estimate is well treated. We use a set of tests called residual diagnostic tests.

Table 7: Residual Diagnostics Tests

Residual Diagnostics Tests	
R-squared	0.995916
Adjusted R-squared	0.995521
F-statistic	2519.753
Probability (F-statistic)	0.000000
Breusch-Godfrey Serial Correlation LM Test:	0.1308
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.8398

All residual diagnostic tests are satisfactory and assert that our model is acceptable and well treated (R^2 is greater than 60%, Fisher statistical probability is less than 5%, Breusch-Godfrey Serial Correlation LM Test and Heteroskedasticity Test are superior to 5%.).

V. Discussion and Conclusions

The aim of this study was to determine the relationship between exports, imports and economic growth of Panama in the period 1990-2015. The cointegration test, VAR model and Granger causality tests are used here to look into the relationship between these three variables. The unit root properties of the data were examined using the Augmented Dickey Fuller test (ADF) and Phillips Perron test (PP) after that the cointegration and causality tests were conducted. The cointegration test results show the absence of cointegration relation, which suggests using the VAR model. The estimation of the VAR model shows that exports and imports have no effect on Panamanian economic growth. Finally, and from the causality test, we find that exports and imports do not cause economic growth. These results indicate that exports and imports are presented and seen as a source of economic growth in Panama. Therefore, our findings have led to the discovery that exports and imports cause economic growth; these results are expressed using the several advantages that characterize the social and economic situation of Panama and its economic policy strategy. Among these results, we can mention in the first place, Panama has an important geostrategic dimension. The presence of the canal and its position at the Eastern extremity of the Isthmus linking North America and South America are of particular advantage to Panama. It simplifies the exchange of goods, allowing people to move from one place to another, and to create openness in the world market, since Panama is a politically and economically stable country. A second advantage is that the exports of Panama are more diversified. It exports yellow metals, bananas, shrimps, pineapples, watermelons, melons, coffee, fish, fish meal, sugar, rum and beef. This diversification of exports helps it to combat the shocks of price volatility on the world market. For imports, they are represented in the form of electrical and electronic equipment, crude oil, food products, chemicals, vehicles and pharmaceuticals. These imports are more beneficial to Panamanian economic growth since they help it to produce the exportable products such as electrical and electronic goods on the one hand and on the other hand, they help it to make deliveries of products Exported as vehicle imports and crude

petroleum. Finally, the extension of the exemption from the export subsidy ban was the most advantageous opportunity that made Panama's trade very strong, refined, developed and exploited. Since under Article 27.4 of the SCM Agreement a 13-year period (1 January 2003 to 31 December 2015) is foreseen under which most developing countries are required to abolish their subsidies Including preferential tax, customs duties on imported inputs, and any subsidies granted to public services and the transport sector. Through this article, Panama benefits from an extension of prohibitions on subsidies. All these advantages show us the importance of trade on economic growth in Panama and assert the robustness of the economic and political strategies applied in this country.

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