Universidad Nacional Autónoma de México

Problemas del DESARROLLO | REVISTA LATINOAMERICANA DE ECONOMÍA

Volume 48, Number 191, October-December 2017

THE EXTERNAL SECTOR, RESTRICTIONS, AND ECONOMIC GROWTH IN ECUADOR

Rafael Alvarado and Stefany Iglesias[1]

Date received: January 10, 2017. Date accepted: May 23, 2017.

Abstract

This research examines the constraint imposed by the external sector on growth in Ecuador in the time period 1980-2015 using cointegration techniques. The results are consistent with the theoretical framework used and conclude that the external sector does indeed hinder Ecuadorian growth. In the timespan analyzed, we found that Ecuador exhibits an elevated marginal propensity to import: when national income rises 1%, imports go up by 1.57%. Moreover, we show that exports are closely related in the short and long term with external income. One policy implication derived from this research is that two mechanisms to shore up economic growth in developing countries could involve bolstering domestic demand and diversifying export destinations.

Keywords: External sector, economic growth, Ecuador.

1. INTRODUCTION

Several countries in Latin America are highly dependent on the primary sector with an eye to the international market, in particular, to exporting natural resources. Likewise, these countries are facing burgeoning domestic demand for imported products and are very reliant on demand from the United States, their top trade destination. This situation has prompted persistent external deficit problems for countries in the region, as their growth rates are tied to the prices of the commodities they export. It also affects growth stability, makes the product more volatile, and, as such, has a direct influence on long-term economic policy objectives.

The empirical evidence in this regard reveals that in countries where the primary sector enjoys a large share of total production in the productive structure, growth is tied to the rise and fall of commodities prices; when prices are high, the growth rate is high, and vice versa (Cavalcanti *et al.,* 2015; Arezki and Gylfason, 2011; Alvarado and Toledo, 2017). In this context, in countries very much grounded in exporting primary goods, it might be expected that the external sector would impose a severe constraint on expansion and variability of the product to a greater extent than in service- and manufacturing-based developed economies.

Multiple authors have written that the structuralist paradigm of development rests on the idea that development and underdevelopment together constitute a single process, and that asymmetries between countries are reproduced through foreign trade, and even more so in Latin America, because the region exports raw materials to the United States, its top trade partner, and imports manufactured products from the American market. Accordingly, Latin America's development pattern has come to be known as a *primary export-led* or *outward-oriented* development model, and an import substitution industrialization policy or some policy to reduce the inequality of opportunities when it comes to new technologies would help Latin American countries evolve towards an industrial sector of capital goods and find the path to inward-oriented development (Kay, 1991; Kaldor, 1957).

One approach that formalizes the restriction placed by the external sector on economic growth is the post-Keynesian aggregate demand model, which Thirlwall (1979) formalized. In this model a country's economic growth can be approximated by the ratio between the global product growth rate, multiplied by the income elasticity of export demand and the income elasticity of import demand. This means that growth is constrained by the current account of the balance of payments. In the theoretical and empirical literature, this model is known as Thirlwall's simple rule. This idea underscores the role of exports as the main component of autonomous demand, because it is the sole element that makes it possible to finance imports, prevents restrictions on demand, maintains equilibrium in the balance of payments, and allows other elements of demand to grow to their maximum potential.

The results of estimates using this law for other countries or sets of countries are contradictory. Some of the empirical evidence does show that the data fits the theory well, but other results indicate that the external sector does not curb economic growth whatsoever (Bairam, 1988; McCombie, 1997; León-Ledesma, 1999; Perraton, 2003; Azevedo and Tadeu, 2007; Acaravci and Ozturk, 2009; Jayme, 2003).

With all that said, the main goal of this research is to determine whether the external sector, in particular, exports and imports, restricts Ecuador's economic growth (a developing country in Latin America). To do so, time series econometrics were used with annual data from between 1980 and 2015 taken from the World Bank. It bears mentioning that limited data availability did condition the analysis period. Based on the economic structure of the country (high degree of trade openness, high dependency on commodities export prices, and a sustained increase in consumption-oriented imports), it was estimated that the external sector was restricting economic growth.

To check this hypothesis, first, the price and income elasticity of import and export demand, respectively, were estimated, using OLS regressions. Second, two vector autoregression models were performed using the Johansen (1991) cointegration approach for export and import functions, respectively. Two cointegration vectors were located for each function. The results were consistent with the theoretical framework used and showed that exports and the high marginal propensity to import do have a significant effect on the product. In this sense, robust empirical evidence was found showing that the external sector did indeed impose a severe restriction on growth in the country in the time period analyzed. The results of this research contribute to the debate on which trade policy instruments are best in developing countries that want the product to grow and are trying to strike a better trade balance.

This paper is divided into four sections, plus the introduction. The second section contains a brief literature review and the derivation of the theoretical model. The third section introduces the methodology used and describes the data. In the fourth section, we discuss the findings of the research. And, finally, in the fifth we offer the conclusions of this research and potential economic policy implications.

2. LITERATURE REVIEW

Beginning with an aggregate Keynesian model of export and import elasticities estimated by Houthakker and Magee (1969), Thirlwall (1979) demonstrated that the economic growth rate of various countries can be approximated through the relationship. Under this approach, the economic growth rate compatible with the equilibrium of the external sector can be calculated through the (long-term) export growth rate and the income elasticity of import demand (Bagnai, 2010). In the wake of the publication of this seminal research, various other authors have developed other estimates to verify the validity of the law, sparking ample theoretical and empirical debate with several implications for economic policymakers. Some of the studies along these lines include: McGregor and Swales (1985 and 1991); Bairam (1988); Thirlwall and Hussain (1982); McCombie (1997); and more.

Various authors have asserted that this economic relationship can be an empirical regularity. Nevertheless, some results show that this law is not always valid (Cavalcanti *et al.,* 2015; Arezki and Gylfason, 2011; Azevedo and Tadeu, 2007; Acaravci and Ozturk, 2009; Jayme, 2003). In this sense, the results are contradictory and the debate very much still open, in particular in countries or regions that are highly reliant on an export-led primary sector, like developing countries in Latin America. Estimates of models of this sort have gained strength as new statistical tools have been developed and information has become available. Bagnai (2010) asserted that the development of cointegration models (Engle and Granger, 1987; Johansen, 1991) has significantly contributed to the empirical debate on this law, because this methodology makes it possible to identify stable and long-term economic relationships between variables.

Research along these lines include papers by Pacheco-López and Thirlwall (2005) for Latin America; Moreno-Brid (1998, 1999a); López and Cruz (2000), Ferreira and Canuto (2003) for Brazil; Moreno-Brid and Pérez (1999b) for Central America; Perraton (2003) for 34 developing countries; Hussain (1999) for African countries and East Asia; Atesoglu (1997) for the United States, to name a few. One aspect that comes up in most of these research papers is the use of vector autoregression models, although the time periods analyzed and versions of the model used vary. In this sense, the results are not directly comparable, but they do furnish information about the average effect of the external sector, in particular, the balance of payments on economic growth.

In Latin America, the empirical literature is sparse. Among the existing evidence, Ferreira and Canuto (2003), using the simple rule, show that in Brazil, estimated growth is 5.23%, while with the financial rule, growth is 6.18%. Considering that the economy in the period of study grew at an average rate of 5.41%, the simple rule is a better fit for growth in the Brazilian economy. Guerrero de Lizardi (2003) showed in a study for Mexico that economic growth in the country depends on the rest of the world's demand for exports and that capital flows have a positive influence on macroeconomic aggregates and do not represent the definitive solution to the balance of payments problem. In this case, too, Thirlwall's simple rule is the best estimate for the country's economic growth, because the gross domestic product restricted with the simple rule is 5.21%, is 5.76% with the second model, and the observed product is 4.47%.

Jayme, Prates-Romero, and Silveira (2011) cite Calvalho and Lima's (2008) work analyzing Thirlwall's law in Brazil, and conclude that the real exchange rate is insignificant for the increase in production observed; the elasticity reason was responsible for most of the growth, showing that the income elasticity of demand fell from 7 to 1.3% between 1994 and 2004, which led to a decrease in production on the order of -0.7%. In their study, they proved the growing relationship between the degree of technology in exports and income elasticity, observing the same for imports. They found that higher growth is achieved by joining the global market as an exporter of high- and medium-technology goods (high income elasticity) and as an importer of low-technology goods (basic products, low income elasticity).

Matesanz, Álvarez-Ude, and Candaudap (2007) estimated Thirlwall's model for the Argentine economy and found that the model restricted by the balance of payments is valid in explaining Argentina's slow growth, because the restricted rate was very close to the real rate. The restricted product was 2.01% and the observed rate was 1.72%. Price elasticity has a negative sign in the coefficient, meaning that a drop in the terms of exchange is positively related with an increase in the product. Accordingly, a decline in import prices or a rise in export prices is related to economic momentum and the expansion of economic activity in Argentina. Nevertheless, by conventional logic, a reduction in the price of imports would lead to a higher volume of imports, in the same way that if exports become more expensive, a smaller volume would be sold in the international markets.

Finally, Márquez (2006), in a study for Colombia, introduced a version that incorporates all of the balance of payment accounts. These models are evaluated with and without the price effect. The results of that research reveal that in 24 of the 35 time periods in the study, the Colombian economy exhibited a current account deficit that necessarily had to be replenished through capital flows, even if that deficit was higher than the deficit in the same time period. Observed growth was 3.90% and the model incorporate all of the balance of payment accounts produced 4.03%.

In general, these results speak to two lessons. One, Thirlwall's simple rule is a better explanation of the product than the financial rule or other adaptations. Second, the external sector does impose a severe restriction on the product in various countries throughout the region.

3. DERIVING THE MODEL

Econometric Strategy

The econometric strategy aims to verify the effect of the external sector on economic growth in Ecuador, divided into two phases. First, we conduct an analysis using the OLS procedure to estimate the export and import functions, respectively, in order to obtain the income elasticities. This part makes it possible to verify the size of the effect and the elasticities in a model balanced with the external sector. Second, a vector autoregression model was estimated for each function, used to confirm the long-term relationship between the external sector and economic growth in the country.

In order to meet the objective set for this research, a theoretical model formalized by Thirlwall (1979), and discussed and reflected on years later in another of his works (1997) was derived. The current account of the balance of payments can restrict economic growth when there is a recurring trade deficit that becomes unsustainable in the long term, because the revenue generated off exports fails to cover the expenses incurred for exports. This situation can worsen when resources are underused and due to commodities exports, as well as importing added-value goods, an aspect characteristic of trade between countries where there are wide technological disparities, which can harm less competitive countries (Grossmand and Helpman, 1991). Thirlwall (1979) formalized this restriction using Harrod's (1939) and Prebisch's (1952) growth models to derive an equation for growth under the condition of equilibrium for the current account of the balance of payments:

$$P_t X_t = P_t^* M_t R_t \quad (1)$$

Where P_t, X_t, P^*_t, M_t, and R_t, are domestic prices, exports, external prices, imports, and the real exchange, respectively, in the time period. Using a conventional Cobb-Douglas export demand function for an open economy:

$$X_t = (P_t / P_t^* R_t)^{\alpha} Z_t^{\epsilon} \quad (2)$$

In addition to the previously defined variables, Z_t, represents global income, while α and ∈ represent the price and income elasticity of export demand, respectively. As equation (2) indicates, the export volume depends on the relative prices of the products exported, the real exchange rate, and global income. On another note, following along the same typology, the import demand equation can be expressed as a function of the relative prices of the imported products, the real exchange rate, and domestic income;

$$M_t = (P_t^* R_t / P_t)^{\delta} Y_t^{\pi} \quad (3)$$

Where δ and π represent the price and income elasticity of import demand, respectively. Under the equilibrium condition in the current account supposed by the author, and expressing the variables from equations (1-3) in growth rates, Thirlwall (1979) obtains the long-term product growth rate of an open economy consistent with the equilibrium in the current account of the balance of payments.

$$p_t + x_t = p_t^* + m_t + r_t \quad (4)$$

$$x_t = \alpha(p_t - p_t^* - r_t) + \epsilon z_t \quad (5)$$

$$m_t = \delta(p_t^* - p_t + r_t) + \pi y_t \quad (6)$$

$$y = [(1 + \alpha + \delta)(p + r - p^*) + \epsilon z] / \pi \quad (7)$$

The expectation is that δ and α < 0; and ∈ and π > 0. According to Thirlwall (1979) and other subsequent studies, the relative prices do not influence foreign trade, remain constant, or have an extremely small effect. To the contrary, there are strong arguments in favor of the effect of relative prices on economic growth. For example, McGregor and Swales (1985, 1991) sharply critique this assumption, arguing that relative places play a central role in explaining international trade. Surprisingly, the empirical evidence shows results in support of and against both arguments (Hussain, 1999; McGregor and Swales, 1991). In this work, the assumption is that relative prices do not have any influence or their effect is extremely low. In this context, the long-term product growth rate, restricted by the balance of payments for an open economy, is obtained.

$$y_b = \epsilon z / \pi \quad (8)$$

Based on the previous equation, the product growth rate, restricted by the balance of payments, is a function of the ratio between global income multiplied by the income elasticity of export demand over the income elasticity of import demand. Equivalently, income can be approximated by $y = x/\pi$, a variation of Harrod's (1939) foreign trade multiplier, in which income level is equal to the ratio between export level and the marginal propensity to import. Diverse authors have used an array of methods to estimate the export and import elasticities, respectively. In this paper, both elasticities (δ and α) are calculated beginning with a log regression of the conventional export and import functions after linearizing the equations (2) and (3) and placing them in an estimable linear version:

$$\log(X_t) = \alpha[\log(P_t) - \log(P_t^*) - \log(R_t)] + \epsilon \log(Z_t) + \varphi_t \quad (9)$$

$$\log(M_t) = \delta[\log(P_t^*) + \log(R_t) - \log(P_t)] + \pi \log(Y_t) + \vartheta_t \quad (10)$$

In the first phase of the econometric strategy, the terms $[\log(P_t) - \log(P_t^*) - \log(R_t)]$ and $[\log(P_t^*) + \log(R_t) - \log(P_t)]$ can be approximated by the real exchange rate thanks to the simplicity of the econometric estimate. In the case of Ecuador, it is necessary to include a dummy variable that captures the structural change the country underwent (in 1999) in the midst of economic and financial crisis. Likewise, Ecuador's exports are mainly destined for the American market; nearly half of total exports end up in that market, so an adequate proxy for foreign income could be the product of the United States. With that, the model to estimate the export and import functions, respectively, are provided below:

$$\log(X_t) = \gamma_0 + \gamma_1 \log(Y_{USAt}) + \gamma_2 \log(TCR_t) + \gamma_3 Dummy_{99} + \theta_t \quad (11)$$

$$\log(M_t) = \delta_0 + \delta_1 \log(Y_t) + \delta_2 \log(TCR_t) + \delta_3 Dummy_{99} + \varphi_t \quad (12)$$

In the second phase, aiming to examine the long-term relationship between the export and import function variables, respectively, we posit a vector autoregression (VAR) model and check for the existence of cointegration vectors. In this model, all of the variables are endogenous and each variable is a function of its own lags and the lags of the other variables in the function. The length of the lag is driven by the Akaike (1974) information criterion. Likewise, the order of integration of the variables is considered through the augmented Dickey and Fuller test, with which it was determined that all of the variables have an order of integration I(1). The VAR model to estimate for the export function is as follows:

$$\begin{aligned}
\Delta \log X_t &= \delta_0 + \sum_{i=1}^{a} \delta_1 \Delta \log Y_{USAt-i} + \sum_{i=1}^{a} \delta_2 \Delta \log TCR_{t-i} + \sum_{i=1}^{a} \delta_3 \Delta \log X_{t-i} + \vartheta_1 \\
\Delta \log Y_{USAt} &= \delta_4 + \sum_{i=1}^{a} \delta_5 \Delta \log X_{t-i} + \sum_{i=1}^{a} \delta_6 \Delta \log TCR_{t-i} + \sum_{i=1}^{a} \delta_7 \Delta \log Y_{USAt-i} + \vartheta_2 \\
\Delta \log TCR_t &= \delta_8 + \sum_{i=1}^{a} \delta_9 \Delta \log TCR_{t-i} + \sum_{i=1}^{a} \delta_{10} \Delta \log Y_{t-i} + \\
&\quad \sum_{i=1}^{a} \delta_{11} \Delta \log X_{t-i} + \vartheta_3
\end{aligned} \quad (13)$$

The VAR model for the import function follows the same structure as that of the export function. In this case, the import model variables have an order of integration I(1) for the three variables. Similar to the model in equation (13), the stationarity test and the length of the lag were verified using the Akaike information criterion (1974) and the augmented Dickey-Fuller (1979), respectively.

$$\begin{aligned}
\Delta \log M_t &= \delta_0 + \sum_{i=1}^{a} \delta_1 \Delta \log Y_{t-i} + \sum_{i=1}^{a} \delta_2 \Delta \log TCR_{t-i} + \sum_{i=1}^{a} \delta_3 \Delta \log M_{t-i} + \vartheta_1 \\
\Delta \log Y_t &= \delta_4 + \sum_{i=1}^{a} \delta_5 \Delta \log M_{t-i} + \sum_{i=1}^{a} \delta_6 \Delta \log TCR_{t-i} + \sum_{i=1}^{a} \delta_7 \Delta \log Y_{t-i} + \vartheta_2 \\
\Delta \log TCR_t &= \delta_8 + \sum_{i=1}^{a} \delta_9 \Delta \log TCR_{t-i} + \sum_{i=1}^{a} \delta_{10} \Delta \log Y_{t-i} + \\
&\quad \sum_{i=1}^{a} \delta_{11} \Delta \log M_{t-i} + \vartheta_3
\end{aligned} \quad (14)$$

For simplicity, the error correction model (VEC) for equations (13) and (14) requires the addition of the lagged error term in a period as an additional independent variable. If the coefficient accompanying this term is significant, it can be concluded that there is a short-term equilibrium.

Statistical Sources

The database used in this research is the World Bank's World Development Indicators (2016). The variables are annual time series in the time period 1980-2015. As a function of imports, the dependent variable (M_t) is measured by the sum of goods and services imports. The independent variables are national income (Y_t), measured by GDP, and the real exchange rate (TCR_t), which is represented by the average official exchange rate over the time period. In the export function, the dependent variable (X_t) is measured by the sum of goods and services exports. The independent variables are foreign income (Y_{USAt}), measured by the American product, and the real exchange rate (TCR_t), which is represented by the average official exchange rate over the time period due to data availability limitations. All of the variables are expressed in constant prices from 2010.

As a point of departure, and before diving into the econometric analysis, we first wrote up a descriptive analysis and an analysis of the correlations between the variables. Figure 1 shows the behavior of the five variables included in the econometric models over time. The variables behave pursuant to a trend consistent with time series, with the exception of the exchange rate. This makes it necessary to administer the augmented Dickey-Fuller test, which effectively confirms that the variables, including the exchange rate, are stationary.

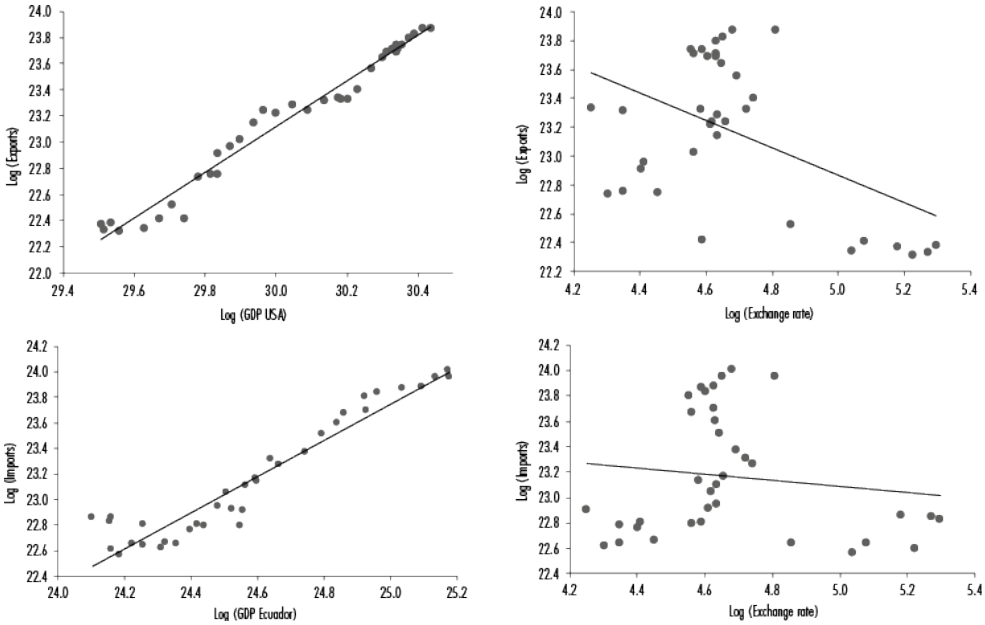
When we obtain the first difference of the five variables and the augmented Dickey-Fuller individually for the variables, all become non-stationary series. This means that they have an integration of order I(1). This procedure is necessary to estimate the econometrics of the time series and avoid spurious results. The outcome of the augmented Dickey-Fuller (1979) is verified using the Phillips and Perron (1988) test, with trend and intercept, respectively. In practice, the results are consistent with both of the most often-used unit root tests. Figure 2 illustrates the results clearly.

Figure 3 shows the correlation between the logs of the dependent and independent variables of the two functions. Namely, between imports with national income and the exchange rate, and between exports with foreign income and the exchange rate, respectively. The correlation between imports and national income is 0.95% and is significant (*p value* = 0.00); the correlation between imports and the exchange rate is 0.12 and is statistically not significant (*p value* = 0.40). The correlation between exports and the product of the United States is 0.98 and is significant (*p value* = 0.00), and the correlation between exports and the exchange rate is -0.487 and is significant (*p value* = 0.00).

(SEE FIGURE 1)

(SEE FIGURE 2)

Figure 3. Correlation between the logs of the variables



Source: Created by the authors using data from the World Bank, 2016.

4. DISCUSSION OF RESULTS

In this section, we present the results of the econometric models described in equations (11) and (12). This process is used to obtain the price and income elasticities of export and import demand, respectively. Table 1 summarizes the results. Columns (1) and (2) show the coefficients of the export regressions and columns (3) and (4) the results of the import function, respectively. Looking at the results of the export function, the first regression did not include the domestic and foreign price effect, while the second does include prices and the nominal exchange rate. As expected, they did not have a significant influence on exports, while foreign income did have a statistically significant effect.

The coefficients we are interested in, for the income elasticity of export demand, came to 1.74 and 1.66%. This shows that the products that Ecuador exports are associated with or respond to the income of the rest of the world, specifically to the United States' income, its top trading partner. This result can be explained by the fact that Ecuador basically exports commodities and raw materials, demand for which is tied to the fluctuations of income. One result contrary to what was expected was the exchange rate variable, as it was not significant for either of the regressions. This demonstrates that devaluations and/or depreciations meant to make Ecuadorian products more competitive did not have the expected effect.

Regarding the import function regressions, the results show that the data fit the model well, and that all coefficients are statistically significant. In this regression, we find that the exchange rate, domestic prices, and foreign prices all have a positive and statistically significant effect on imports. The income elasticity of import demand came to 1.57 and 1.98%, respectively, demonstrating that the marginal propensity to import is high when national income goes up. This may be because the country basically imports consumer-oriented goods, products which, according to the theory, have high income elasticity. Finally, it is clear that domestic prices do have an important effect on imports for this country.

Table 1. Price and Income Elasticities of Ecuador's Imports and Exports

	Export function		*Import function*	
	[1]	[2]	[3]	[4]
Log exchange rate	0.01	-0.102	0.45**	-0.410***
	(0.16)	(-1.00)	(6.61)	(-5.26)
Log GDP USA	1.74***	1.662*		
	(27.08)	(2.04)		
Log prices USA		0.0821		-1.075***
		(0.33)		(-10.06)
Log prices Ecuador		0.108		0.449***
		(0.75)		(5.39)
Log GDP Ecuador			1.57***	1.985***
			(26.65)	(11.04)
Constant	-29.52**	-27.04	-17.47***	-17.33***
	(-33.95)	(-1.14)	(-11.00)	(-4.08)
Observations	35	35	35	35
Adjusted R^2	0.95	0.946	0.96	0.980

Note: t statistic in parentheses and *p<0.05; **p<0.01; ***p<0.001

Source: Created by the authors.

In the second stage, before introducing the results of the VAR model of the two functions estimated in this research, we summarize the results of the Dickey-Fuller (1979) test. In general, the results show that the variables at levels are stationary, and that the trend effect goes away after obtaining the first difference for each one of the variables. Table 2 summarizes the results of this test.

Table 2. Results of the ADF Test

	Levels				*1st difference*				*I(q)*
	Calculated value	*Critical value*			*Calculated value*	*Critical value*			
		1%	*5%*	*10%*		*1%*	*5%*	*10%*	
Exports	-0.564	-3.689	-2.975	-2.619	-6.911	-3.689	-2.975	-2.619	I(1)
GDP USA	-1.83	-3.689	-2.975	-2.619	-3.885	-3.689	-2.975	-2.619	I(1)
XRT	-2.14	-3.689	-2.975	-2.619	-4.708	-3.689	-2.975	-2.619	I(1)
Imports	0.207	-3.689	-2.975	-2.619	-6.51	-3.689	-2.975	-2.619	I(1)
GDP ECU	1.588	-3.689	-2.975	-2.619	-5.312	-3.689	-2.975	-2.619	I(1)

Source: Created by the authors with data from the World Bank, 2016.

After confirming that the series are not stationary in first differences, equations (13) and (14) were estimated and a Johansen cointegration test was conducted to verify the long-term relationship between the variables of each function. Table 3 contains the results of the VAR model for exports. The length of the lag (second-order lag) was determined using Akaike's (1974) criterion. The cointegration test points to the existence of two cointegration vectors between exports, foreign income, and the official exchange rate, as well as the dummy variable formalized in equation (13), which reflects the structural change the economy underwent during the dollarization phase and its economic and financial crisis of 1999.

Table 3. Results of the Cointegration Test for the Export Function

Maximum range	*Parameters*	*LL*	*Own value*	*Tracking statistic*	*5% critical value*
0	20	152.475	.	56.92	47.21
1	27	165.204	0.548	31.46	29.68
2	32	175.108	0.461	11.65*	15.41
3	35	180.601	0.290	0.67	3.76

Source: Created by the authors using data from the World Bank, 2016.

Table 4 displays the results of the VAR import model. Just as in the previous model, the length of the lag (second-order lag) was determined using Akaike's (1974) criterion. The Johansen cointegration test points to the existence of two cointegration vectors between imports, national income, and the official exchange rate, as well as the dummy variable formalized in equation (14) on the economic and financial crisis of 1999 and subsequent dollarization.

Table 4. Results of the Cointegration Test for the Import Function

Maximum range	*Parameters*	*LL*	*Own value*	*Tracking statistic*	*5% critical value*
0	20	133.13579	.	67.5515	47.21
1	27	150.57793	0.66383	32.6672	29.68
2	32	161.32909	0.48929	11.1649*	15.41
3	35	166.72755	0.28638	0.3680	3.76

Source: Created by the authors using data from the World Bank, 2016.

The coefficient of the import demand income function indicates that the marginal propensity to import is high (1.98%), which makes it hard to save for domestic investment. Besides the deficit, the country produces 1.00 USD for every 1.98 USD it imports. This reality poses a serious challenge to the domestic economy, because the country primarily imports consumer goods, when a developing economy should be importing capital goods and technology to generate added value. This result is verified in the long run, because there are at least two cointegration vectors in the import function. Second, exports are strongly associated with foreign income (represented by the United States product). This means Ecuador is very reliant on the economic behavior of its top trading partner. Third, the exchange rate has a not significant effect on exports and a significant effect on imports. In the export function, there are also two cointegration vectors between exports, foreign income, and the official exchange rate.

If the product restricted by the balance of payments current account is the ratio between global income multiplied by the income elasticity of the export demand over the income elasticity of import demand, the balanced product for Ecuador in the time period analyzed, considering global income, is *y_b=2.86*1.74/1.57=3.17*, while the observed product is 3.16. This means that Thirlwall's (1979) restricted model explains with almost exact precision Ecuador's economic growth. These results are similar to those obtained in other recent research: Márquez (2006) for Colombia; Fraga and Moreno (2015) for Mexico and Brazil; and by Arenas-Díaz and Blando-Ambriz (2015). In practice, these results underscore the problem of over-spending on imports and its long-term implications for developing countries in Latin America.

5. CONCLUSIONS

This research demonstrates that the external sector does impose a severe restriction on economic growth via imports and exports. This result is even truer in a dollarized economy, where the primary source of foreign currency is exports. When exports are concentrated into just a few markets, when those markets recede and top trading partners face crises, it can jeopardize a country. Therein the importance of diversifying export destinations and reducing dependency on the American market. Second, Ecuador's current economic structure is not sustainable, with a marginal propensity to import consumer goods, which do not generate added value or jobs, or boost local economic dynamics. Future research might dive deeper into strategies for how the country could reduce its reliance on the market in the United States and posit mechanisms to lower the marginal propensity to import, as the current export and import structure is not doing any favors to development in Ecuador.

BIBLIOGRAPHY

Acaravci, A. and Ozturk, I. (2009), Balance of Payments Constrained Growth in Turkey: Evidence From ARDL Bound Testing Approach, *Transformations in Business & Economics*, vol. 8, no. 2.

Akaike, H. (1974), A New Look at the Statistical Model Identification, IEEE *Transactions On Automatic Control*, vol. 19, no. 6.

Alvarado, R. and Toledo, E. (2017), “Environmental Degradation and Economic Growth: Evidence For a Developing Country”, *Environment, Development and Sustainability*, vol. 19, no. 4.

Arenas-Díaz, G. and Blando-Ambriz, A. G. (2015), “Ley de Thirlwall y tipo de cambio: un análisis empírico para la economía mexicana de 2003 a 2012, mediante la metodología del modelo SVAR cointegrado”, *Nóesis. Revista de Ciencias Sociales y Humanidades*, vol. 24, no. 47.

Arezki, R. and Gylfason, T. (2011), “Chapter 2 Commodity Price Volatility, Democracy, and Economic Growth”, in *Economic Growth and Development*, Emerald Group Publishing Limited.

_____ and Gylfason, T. (2011), *Beyond the Curse: Policies To Harness The Power of Natural Resources*, International Monetary Fund.

Atesoglu, H. S. (1997), “Balance-of-Payments–Constrained Growth Model and Its Implications for The United States”, *Journal of Post Keynesian Economics*, vol. 19, no. 3.

Azevedo, R. and Tadeu, G. (2007), “A Structural Economic Dynamics Approach to Balance-of-Payments-Constrained Growth”, *Cambridge Journal of Economics*, vol. 31, no. 5.

Banco Mundial (2016), World Development Indicators (WDI), online.

Bagnai, A. (2010), “Structural Changes, Cointegration and The Empirics of Thirlwall’s Law”, *Applied Economics*, vol. 42, no. 10.

Bairam, E. (1988), “Balance of Payments, The Harrod Foreign Trade Multiplier and Economic Growth: The European and North American Experience”, *Applied Economics*, vol. 20, no. 12.

Carvalho, V. and Lima, G. (2008), A restrição externa e a perda de dinamismo da economia brasileira: investigando relações entre estrutura produtiva e crescimento económico, *Working Paper.*

Cavalcanti, D. V., Tiago, V., Mohaddes, K. and Raissi, M. (2015), “Commodity Price Volatility and The Sources of Growth”, *Journal of Applied Econometrics*, vol. 30, no. 6.

Dickey, D. A. and Fuller, W. A. (1979), “Distribution of The Estimators for Autoregressive Time Series With a Unit Root”, *Journal of the American Statistical Association*, vol. 74, no. 366a.

Engle, R. F. and Granger, C. W. (1987), “Co-integration and Error Correction: Representation, Estimation, and Testing”, *Econometrica: Journal of the Econometric Society*.

Ferreira, A. and Canuto, O. (2003), “Thirlwall’s Law and Foreign Capital in Brazil”, *Momento Económico*, no. 125.

Fraga-Castillo, C. A. and Moreno-Brid, J. C. (2015), “Exportaciones, términos de intercambio y ciclos de crecimiento económico de México y Brasil”, *EconoQuantum*, vol. 12, no. 1.

Grossman, G. M. and Helpman, E. (1991), “Quality Ladders in The Theory of Growth”, The *Review of Economic Studies*, vol. 58, no. 1.

_____ and Helpman, E. (1991), “Trade, Knowledge Spillovers, and Growth”, *European Economic Review*, vol. 35, no. 2-3.

Guerrero de Lizardi, C. G. (2003), “Modelo de crecimiento económico restringido por la balanza de pagos: evidencia para México, 1940-2000”, *El Trimestre Económico*.

Harrod, R. F. (1939), “An Essay in Dynamic Theory”, *The Economic Journal*, vol. 49, no. 193.

Houthakker, H. S. and Magee, S. P. (1969), “Income and Price Elasticities in World Trade”, *The Review of Economics and Statistics*.

Jaguaribe, H. (2010), “América Latina y los procesos de integración”, *Cuadernos sobre Relaciones Internacionales*.

Jayme Jr, F. G. (2003), “Balance-of-Payments-Constrained Economic Growth in Brazil”, *Brazilian Journal of Political Economy*, vol. 23, no. 1.

Jayme Jr, F. G., Prates-Romero, J. and Silveira, F. (2011), “Brasil: cambio estructural y crecimiento con restricción de balanza de pagos”, *Revista Cepal*.

Johansen, S. (1991), “Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian vector Autoregressive Models”, *Econometrica: Journal of the Econometric Society*.

Kaldor, N. (1975), “Economic Growth and The Verdoorn Law--A Comment on Mr Rowthorn’s Article”, *The Economic Journal*, vol. 85, n. 340.

_____ (1957), “A Model of Economic Growth”, *The Economic Journal*, vol. 67, no. 268.

_____ (1977), “Capitalismo y desarrollo industrial”, in Díaz Alejandro *et al.*, *Política Económica en Centro y Periferia,* Fondo de Cultura Económica, Mexico.

Kay, C. (1991), “Teorías latinoamericanas del desarrollo”, *Nueva Sociedad*, no. 113.

Leon-Ledesma, M. A. (1999), “An Application of Thirlwall’s Law to the Spanish Economy”, *Journal of Post Keynesian Economics*, vol. 21, no. 3.

López G., J. and Cruz B., A. (2000), “‘Thirlwall’s Law’ and Beyond: The Latin American Experience”, *Journal of Post Keynesian Economics*, vol. 22, no. 3.

Loria, E. (2007), *Econometría con aplicaciones*, Mexico, Pearson.

Márquez, Y. (2006), “Estimaciones econométricas del crecimiento en Colombia mediante la ley de Thirlwall”, *Cuadernos de Economía*, vol. 25, no. 44.

Matesanz, D., Álvarez-Ude, G., and Candaudap, E. (2007), “Balanza de pagos y crecimiento económico restringido. Una comparación entre la economía argentina y la mexicana”, *Revista de Economía Mundial*, no. 17.

McCombie, J. S. (1997), “On the Empirics of Balance-of-Payments–Constrained Growth”, *Journal of Post Keynesian Economics*, vol. 19, no. 3.

McGregor, P. G. and Swales, J. K. (1985), “Professor Thirlwall and Balance of Payments Constrained Growth”, *Applied Economics*, vol. 17, no. 1.

_____ and Swales, J. K. (1991), “Thirlwall’s Law and Balance of Payments Constrained Growth: Further Comment on The Debate”, *Applied Economics*, vol. 23, no. 1.

Moreno-Brid, J. C. (1998), “On Capital Flows and The Balance-of-Payments- Constrained Growth Model”, *Journal of Post Keynesian Economics*, vol. 21, no. 2.

_____ (1999a), “Mexico’s Economic Growth and e Balance of Payments Constraint: A Cointegration Analysis”, *International Review of Applied Economics*, vol. 13, no. 2.

Moreno-Brid, J. C. and Pérez, E. (1999b), “Balance-of-Payments-Constrained Growth in Central America: 1950-96”, *Journal of Post Keynesian Economics*, vol. 22, no. 1.

Pacheco-López, P. and Thirlwall, A. P. (2005), *Trade Liberalisation, The Balance of Payments and Growth in Latin America* (No. 05), Department of Economics Discussion Paper, University of Kent.

Perraton, J. (2003), “Balance of Payments Constrained Growth and Developing Countries: An Examination of Thirlwall’s Hypothesis”, *International Review of Applied Economics*, vol. 17, no. 1.

Perrotini, I. (2002), “La Ley de Thirlwall y el crecimiento en la economía global: Análisis crítico del debate”, *Revista Venezolana de Análisis de Coyuntura*, vol. 8, no. 2.

Phillips, P. C. and Perron, P. (1988), “Testing for a Unit Root in Time Series Regression”, *Biometrika*, vol. 75, no. 2.

Prebich, R. (1952), *Problemas teóricos y prácticos del crecimiento económico*, Cepal, Santiago de Chile.

Thirlwall, A. P. (1979), “The Balance Of Payments Constraint as an Explanation of The International Growth Rate Differences”, *Quarterly Review*, vol. 32, no. 128.

_____ (1997), “Reflections on the Concept of Balance-of-Payments–Cons- trained Growth”, *Journal of Post Keynesian Economics*, vol. 19, no. 3.

_____ and Hussain, M. N. (1982), “The Balance of Payments Constraint, Capital Flows and Growth Rate Differences Between Developing Countries”, *Oxford Economic Papers*, vol. 34, no. 3.

_____ and McCombie, J. (1994), “Economic Growth and the Balance of Payments Constraint”, *Grã-Bretanha (primeira publicação),* MacMillan Press LTD.

Hussain, M.N. (1999), “The Balance of Payments Constraint and Growth Rate Differences Among African and East Asian Countries”, *African Development Review*, no. 11.

[1] National University of Loja and the Private Technical University of Loja, Ecuador, respectively. E-mail addresses: rafaalvardaolopez@gmail.com and saiglesias@utpl.edu.ec, respectively.

Published in Mexico, 2012-2017 © D.R. Universidad Nacional Autónoma de México (UNAM).
PROBLEMAS DEL DESARROLLO. REVISTA LATINOAMERICANA DE ECONOMÍA, Volume 49, Number 192, January-March is a quarterly publication by the Universidad Nacional Autónoma de México, Ciudad Universitaria, Coyoacán, CP 04510, México, D.F. by Instituto de Investigaciones Económicas, Circuito Mario de la Cueva, Ciudad Universitaria, Coyoacán, CP 04510, México, D.F. Tel (52 55) 56 23 01 05 and (52 55) 56 24 23 39, fax (52 55) 56 23 00 97, www.probdes.iiec.unam.mx, revprode@unam.mx. Journal Editor: Alicia Girón González. Reservation of rights to exclusive use of the title: 04-2012-070613560300-203, ISSN: pending. Person responsible for the latest update of this issue: Minerva García, Circuito Maestro Mario de la Cueva s/n, Ciudad Universitaria, Coyoacán, CP 04510, México D.F., latest update: Feb 23th, 2018.