Journal of Post Keynesian Economics

ISSN: 0160-3477 (Print) 1557-7821 (Online) Journal homepage: http://www.tandfonline.com/loi/mpke20

Balance-of-payment-constrained growth in unbalanced productive structures: disregarded terms of trade negative effects

Florencia Médici & Demian Tupac Panigo

To cite this article: Florencia Médici & Demian Tupac Panigo (2015) Balance-of-payment-constrained growth in unbalanced productive structures: disregarded terms of trade negative effects, Journal of Post Keynesian Economics, 38:2, 192-217

To link to this article: http://dx.doi.org/10.1080/01603477.2015.1065673

Published online: 20 Oct 2015.

Journal of Post Keynesian Economics, 38:192–217, 2015

ISSN 0160-3477 print / 1557-7821 online
DOI: 10.1080/01603477.2015.1065673

FLORENCIA MÉDICI AND DEMIAN TUPAC PANIGO

Balance-of-payment-constrained growth in unbalanced productive structures: disregarded terms of trade negative effects

Abstract: *The aim of this paper is to analyze the relation between foreign asset formation (FAF) and terms of trade (TOT) in countries characterized by unbalanced productive structures (UPS). This is done by modifying the structuralist thesis about the (overstated) positive effects of a rise in TOT on the balance-of-payment equilibrium gross domestic product growth rate. The theoretical analysis follows Thirlwall's law and its subsequent modifications. The paper's main contribution will be to explain and formalize the low—and even null—effects of TOT on balance-of-payment constraints due to the quasi-rent generated in the export sector of a UPS. To reinforce this idea, the empirical section econometrically shows the existence of a significant and positive relationship between TOT and FAF in developing countries.*

Keywords: *balance-of-payments-constrained growth, Thirlwall's law, structural heterogeneity, Argentina*

Motivation

Between 2003 and 2012, Latin America recorded its highest ten-year average gross domestic product (GDP) growth rate over

Florencia Médici is a researcher at the Center of Innovation for Workers (CITRA-UMET/CONICET), and professor at the National University of Moreno (UNM) and University of Buenos Aires (UBA), Argentina. Demian Tupac Panigo is Director of CITRA-UMET/CONICET and a professor at UNM and National University of La Plata (UNLP), Argentina.

the past forty years. The relative consensus among analysts is that the main reasons for this remarkable performance were the high (and increasing) prices of commodities, the international trade boom, and favorable financial conditions (Izquierdo et al., 2008; Ocampo, 2009).[1]

The improvement in external conditions allowed Latin American countries to reduce the effect of the recent financial crisis. However, a trade decline and drop in commodity prices became serious transmission channels of global financial collapse. The quantity effect was more important for manufactured goods suppliers (e.g., Mexico), but the price effect was greater in South American countries, which export mainly primary products (Ocampo, 2009).

The less favorable international context of the past five years significantly deteriorated regional balance-of-payment (BOP) performance. According to the Economic Commission for Latin America and the Caribbean (ECLAC) report (2014a), Latin American total export value went from a growing 23 percent in 2011 to stagnation in 2013, whereas the current account to GDP ratio was −2.7 percent in the past year. Our countries are facing another wave of external vulnerability and the main risk differs among economies depending on their indebtedness level and productive structure.

Even though the effects of trade (volume and price) reduction have already started to be felt, we should not overlook evolving capital flows, which constitute one of the main sources of volatility for Latin America (Easterly et al., 2000). In this sense, although foreign asset accumulation and external public debt reduction allowed the softening of any capital outflow effect, at least two issues should be taken into account.

First, it is well-known that foreign direct investment (FDI), without state regulation, can be a relief in the short term, but in the medium and long term it imposes a limit on economic expansion due to the foreign currency absorption required for profit remittances. According to the ECLAC report on FDI in Latin America and the Caribbean (2014b), in spite of the high and sustainable dynamics of these flows, outflows related to remitted

[1] Despite this relative consensus, a large group of post Keynesian researchers and policymakers supported an alternative hypothesis, where expansive fiscal policies and income inequality reductions are important explanations for Latin American sustained GDP growth.

earnings reached 92 percent of FDI, almost neutralizing the sizable foreign currency inflows under this heading.

Second, but not less important, in South America—except for Brazil—40 percent of FDI was oriented toward extractive activities between 2007 and 2011. This phenomenon reinforces the structural characteristics of the region and produces a higher outflow of foreign currency because these sectors have, as we will see, a lower tendency to reinvest profits.

Therefore, it is essential that foreign capital inflow be framed in a national development process that does not overlook the need to modify the productive structure. This means not only more state regulation of short-term capital flows but also prioritizing the stimulation of investment allocated to nontraditional tradable sectors.

Beyond the current account performance issues (e.g., repatriation of profits), there are signs of emerging capital account weakness. In this sense, another less examined feature in the analysis of regional capital accounts is foreign asset formation (FAF) on the part of residents.

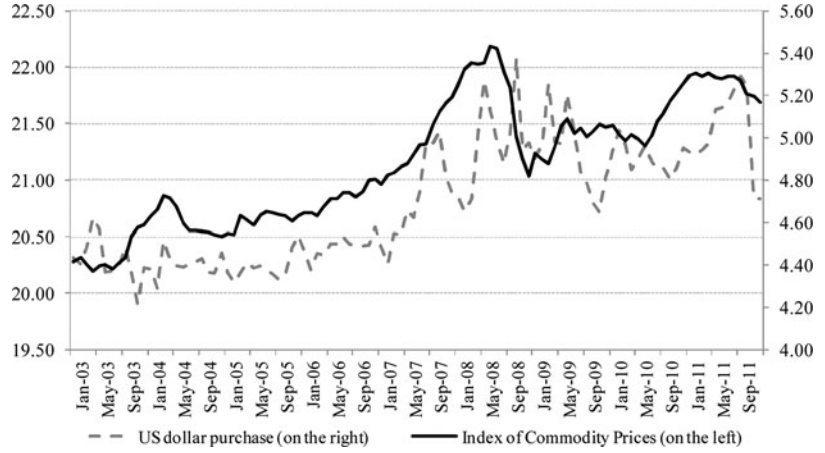
The high level of dollarization of assets and liabilities in some Latin American economies has been a persisting problem. In Argentina, this phenomenon has shown a challenging dynamics in recent years. The monthly average of dollar purchases was $661 million between 2003 and 2006, but it rose to $1,763 million between January 2007 and October 2011.

In this situation, the Argentine tax agency AFIP (Administración Federal de Ingresos Públicos) implemented, in late 2011, a new record and authorization method for foreign exchange purchases. This measure reduced capital outflows under FAF headings. As a result, from its adoption to December 2013, the monthly average of dollar purchases in the legal exchange market fell 70 percent to $284 million.

It is worth noting, in Figure 1, that there is a strong correlation between FAF and price evolution of Argentinean main exportable commodities. This dynamics led us to question whether there exists a significant relation between FAF and terms of trade (TOT). The results introduced below suggest the existence of that link.

To conclude, although Latin American countries had room for maneuver to face the global financial crisis—avoiding sharp interest rates rise, fiscal adjustments, and strong devaluations—the duration of the crisis is threatening their capacity to implement countercyclical policies without facing foreign currency constraints. This is because fiscal and external surpluses are beginning to run out. Moreover,

Figure 1 Dollar purchases by residents and index of commodity prices (in logarithms)—Argentina January 2003–November 2011



Source: Authors' estimates based on statistical data from the Central Bank of Argentina (BCRA)

evaluating the financial channel, there are phenomena that threaten to become sources of vulnerability in the coming years. Among them, we focus on the dynamics of external asset accumulation and its close connection to TOT evolution.

In the following section, we review Thirlwall's law and its modifications. Even though this law allowed the notion of structural heterogeneity and its links to the long-term growth rate, at least one characteristic has not yet been formally considered. Consequently, put forward a new Thirlwall's law modification intended to explain the low and even nonsignificant effects that TOT improvements could have on the BOP-constrained growth rate. Econometric evidence shows the existence of a positive and significant connection between TOT and FAF in Argentina.

It is important to conduct an in-depth investigation of the interaction between Latin American productive structures and BOP constraints. We hope to make a contribution in this direction.

Balance-of-payment-constrained growth model

According to neoclassical theory, for both developed and underdeveloped economies, an economy's maximum rate of growth is

determined by full capacity utilization, which, in turn, coincides with the actual growth rate. However, following heterodox insights, there are other relevant constraints before getting to full use of resources: effective demand and foreign currency shortages.

Both constraints are strongly related. Economies with unbalanced productive structures (UPS) are often limited by BOP performance. That is, when these economies begin to grow, greater economic activity leads to an increasing demand for foreign currency due to higher imports of both consumer goods and industrial inputs. Since foreign currency inflows come mainly from primary sector exports —whose supply is quite inelastic—a growing current account deficit starts to be generated, leading to a severe devaluation and followed by a deep recession, even far from full capacity utilization.

Thirlwall's law allows the formalization of the whole set of ideas outlined in structuralist theory about the limits imposed on the long-term growth rate by the presence of unbalanced productive structures. While some of these ideas have already been included as recent amendments (e.g., Chena, 2014), some relevant aspects still remain to be considered.

The original balance-of-payment-constrained growth model

Growth constraints based on foreign currency bottlenecks can be analyzed by means of Thirlwall's law. Starting from the Kaleckian/Keynesian effective demand principle, Thirlwall (1979) considers the cause of noticeable divergences in GDP growth rates among underdeveloped countries. For this author, the foreign currency constraint is an important issue as long as it is usually placed before full capacity utilization, leading to a high and persistent unemployment rate.

Thirlwall (1979) assumes that demands for imports and exports become multiplicative functions that depend on domestic prices of exports (P_{dt}), the foreign price of imports (P_{ft}), and the exchange rate (E, measured as the price of domestic currency by foreign currency unit), with constant elasticities.

$$X_t = \left(\frac{P_{dt}}{E_t}\right)^{\eta} P_{ft}^{\delta} Z_t^{\epsilon}, \tag{1}$$

$$M_t = \left(P_{ft} E_t\right)^{\psi} P_{dt}^{\phi} Y_t^{\pi}, \tag{2}$$

where $\eta < 0$ is price elasticity of demand for exports; $\psi < 0$ is price elasticity of demand for imports; is income elasticity of demand for exports; $\pi > 0$ is income elasticity of demand for imports; $\delta > 0$ is cross elasticity of demand for exports; $\phi > 0$ is cross elasticity of demand for imports; Y_t is domestic output; and Z_t is world real income.

On the other hand, BOP equilibrium in terms of domestic currency is achieved when the export value is equated with the import value:

$$P_{dt}X_t = P_{ft}E_tM_t. \tag{3}$$

Setting Equations (1) to (3) in dynamic terms,[2] we get the following equation system:

$$x_t = \eta(p_{dt}) - \eta(e_t) + \delta(p_{ft}) + (z_t), \tag{4}$$

$$m_t = \psi(p_{ft}) + \psi(e_t) + \phi(p_{dt}) + \pi(y_t), \tag{5}$$

$$p_{dt} + x_t = p_{ft} + e_t + m_t. \tag{6}$$

Then, substituting Equations (4) and (5) into (6) and assuming that cross elasticities of demand for imports and exports are equated with price elasticities ($-\phi = \psi\, y\, \eta = -\delta$), the growth rate compatible with the balance-of-payment equilibrium is obtained (y_{BPt}):

$$y_{BPt} = \frac{(1 + \eta + \psi)(p_{dt} - p_{ft} - e_t) + \epsilon(z_t)}{\pi}. \tag{7}$$

Thus, on the basis of Equation (7) it can be stated that:

- Domestic currency devaluation will produce an increase in the growth rate compatible with the balance-of-payment equilibrium only if the Marshall–Lerner condition holds, that is, if $|\eta + \psi| > 1$. Likewise, said increase will take place only at once unless it is possible to bring about constant depreciations of the exchange rate.
- A greater growth of world real income (or an increase in export sensitivity in the face of it) will produce an increase in y_{BPt}.
- Less income elasticity of demand for imports will lead to a higher growth rate compatible with balance-of-payment equilibrium.

[2] Uppercase letters are used for variables expressed in levels, and lowercase letters refer to those expressed in growth rates.

Assuming that terms of trade remain constant throughout time, the original Thirlwall's law is obtained:

$$y_{BPt} = \frac{\epsilon(z_t)}{\pi}. \tag{8}$$

This simple expression shows that the maximum growth rate that BOP-restricted economies can reach is determined by the relation between income elasticities of demand for exports (ε) and imports (π), and the exogenous rate of world GDP growth (z).

Moreover, Equation (8) allows country differences in GDP growth to be easily explained: "In this respect, it should not be forgotten that, in many instances, countries' income elasticities are largely determined by natural resource endowments and the characteristics of goods produced (e.g., whether they are 'necessities' or 'luxuries')" (Thirlwall, 1991, p. 26). Thirlwall's statement is similar to the Latin American structuralist center–periphery theory. Both viewpoints coincide in stating that ultimately, international trade division (and then GDP growth potential) depends on how successful public policy is in going beyond primary goods production.

We define unbalanced productive structure similarly to the definition of most Latin American structuralist authors (e.g., Diamand, 1978; Diaz-Alejandro, 1965; Prebisch, 1973;). UPS is characterized by the presence of two sectors with large differences in productivity levels:

- On the one hand, a highly productive primary sector (the exporter) generates foreign currency but little employment (and makes intensive use of quasi-fixed production factors).
- On the other hand, a less productive industrial (labor-intensive) sector's production requires a large amount of foreign currency and is sold mostly in the domestic market.

Similarly, countries that have a more homogeneous productive structure (HPS) where the productivity spread among the sectors is smoothly and imperceptibly reduced while they specialize mainly in international trade of industrial goods.

Consequently, an HPS has a higher growth rate compatible with balance-of-payment equilibrium because of having an income elasticity of demand for exports that is higher and an income elasticity of demand for imports that is lower than those of peripheral countries. Therefore, Thirlwall's law also allows us to explain the

uneven economic growth between developed and underdeveloped countries (Dutt, 2002).[3]

The impact of FDI and unilateral transfers on the BOP-constrained rate of GDP growth

Later, Thirlwall's original law was subject to several modifications. The first ones were oriented toward incorporating the effects of the inflow of foreign direct investment and unilateral fund transfers.

To study the effect of foreign capital inflow on the growth rate, Thirlwall and Hussain (1982) extended the balance-of-payment equilibrium condition, setting as a constraint that the trade deficit (surplus) should be equated with capital inflow (outflow):

$$P_{dt}X_t + P_{dt}C_t = P_{ft}M_tE_t, \tag{9}$$

where $P_{dt}C_t$ is the value (in domestic currency) of capital flows. In dynamic terms, Equation (9) yields:

$$\theta(p_{dt} + x_t) + (1-\theta)(p_{dt} + c_t) = p_{ft} + m_t + e_t, \tag{10}$$

where, $\theta = \frac{P_{dt}X_t}{P_{ft}M_tE_t}$ represents the export-financed proportion of imports, and $(1-\theta) = \frac{P_{dt}C_t}{P_{ft}M_tE_t}$, the proportion financed with capital inflow.

Therefore, substituting Equations (4) and (5) into (10),[4] the new BOP-constrained rate of GDP growth is obtained, assuming that countries are capable of financing their deficits with foreign capital inflow:

$$y^1_{BPt} = \frac{\theta\epsilon(z_t) + (1-\theta)c_t + (1+\theta\eta+\psi)\left(p_{dt} - p_{ft} - e_t\right)}{\pi}. \tag{11}$$

With this modification, the new GDP growth rate compatible with the balance-of-payment equilibrium becomes a weighted sum of different foreign currency available sources (exports and foreign capital) divided by the income elasticity of demand for imports.

Starting from a current account deficit, $(\theta < 1)$, y^1_{BPt} will be higher than y_{BPt} if the capital inflow growth rate turns out to be

[3] Many empirical works shows that the supply of exports is hardly sensitive to variation in TOT or changes in the real exchange rate in developing countries. Among others, see Berrettoni and Castresana (2009), Catão and Falcetti (2002), and López Gallardo and Cruz (2000).

[4] And keeping the assumption that $\eta = -\delta\, y\, \psi = -\phi$.

higher than that of the export rate weighted by its income elasticity (ε) (always under the assumption that $z_t > 0$ and $c_t > 0$).

Nevertheless, as several authors correctly note (Barbosa-Filho, 2001; McCombie and Thirlwall, 1997; and Moreno-Brid, 1998, among many others), this extended version of Thirlwall's law does not guarantees a sustainable path of debt denominated in foreign currency.

A new condition is imposed on the balance-of-payment constraint in order to ensure a sustainable path of debt: keeping a constant ratio of current account deficit over GDP. In other words, this means that countries constrained by the performance of the balance of payments could grow at a higher rate than the one determined by its current account equilibrium by having access to the international capital market as long as capital inflow as a share of GDP is sustained.

Indeed, this condition implies that:

$$p_{dt} + c_t = p_{dt} + y_t. \tag{12}$$

It should be emphasized that this additional constraint is nothing but the typical no-Ponzi condition of international finance models (Barbosa-Filho, 2001).

Therefore, substituting (12) into (10), the new balance-of-payment equilibrium condition (with a sustainable path of foreign debt) is now obtained:

$$\theta(p_{dt} + x_t) + (1 - \theta)(y_t + p_{dt}) = p_{ft} + m_t + e_t. \tag{13}$$

Then, substituting (4) and (5) into (13) and keeping the assumption regarding the relation between price elasticities, the new BOP-constrained growth yields:

$$y^2_{BPt} = \frac{\theta\epsilon(z_t) + (1 + \theta\eta + \psi)(p_{dt} - p_{ft} - e_t)}{\pi - (1 - \theta)}. \tag{14}$$

This new expression of Thirlwall's law shows the maximum rate at which BOP-constrained economies can grow without promoting explosive paths of external debt.[5] Assuming constant TOT, y^2_{BPt} will be higher than y_{Bt} if $\theta\pi > \pi - (1 - \theta)$.

[5] In order to study some special cases and the stability of the model in depth, see Moreno-Brid (1998). Moreover, an analysis of the limitations of the model can be found in Barbosa-Filho (2002).

The impact of foreign debt interest payments on the BOP-constrained rate of GDP growth

Financing current account deficits through foreign indebtedness produces future capital outflows as interest payments. This was a very relevant phenomenon for Latin American economies in the 1990s. These facts triggered the introduction of new modifications in Thirlwall's law, allowing additional constraints imposed by foreign debt interest payments to be shown (Barbosa-Filho, 2002; McCombie and Thirlwall, 1997; and Moreno-Brid, 2003; among others).

Analytically, interest payments are additional sources of foreign currency demand. Consequently, the balance-of-payment equilibrium condition yields:

$$P_{dt}X_t + P_{dt}C_t - P_{dt}R_t = P_{ft}M_tE_t. \tag{15}$$

Calculating the differential, the condition in dynamic terms is obtained:

$$\theta_1(p_{dt} + x_t) - \theta_2(p_{dt} + r_t) + (1 - \theta_1 + \theta_2)(p_{dt} + c_t) = p_{ft} + e_t + m_t, \tag{16}$$

where $\theta_1 = \frac{P_{dt}X_t}{P_{ft}E_tM_t}$; $\theta_2 = \frac{P_{dt}R_t}{P_{ft}E_tM_t}$ and $(1 - \theta_1 + \theta_2) = \frac{P_{dt}C_t}{P_{ft}E_tM_t}$.

Keeping the intertemporal sustainability condition of capital inflow and the assumption that price elasticities equate the absolute value of cross elasticities, then, from (4), (5), (12), and (16), the BOP-constrained rate of GDP growth yields:

$$y^3_{BPt} = \frac{\theta_1\epsilon z_t - \theta_2\, r_t + (1 + \theta_1\eta + \psi)\left(p_{dt} - p_{ft} - e_t\right)}{\pi - (1 - \theta_1 + \theta_2)}. \tag{17}$$

It is worth noting that if it is accepted as an assumption that $\theta_1 < \theta$ and that $(1 - \theta_1 + \theta_2) < (1 - \theta)$, then y^3_{BPt} will be lower than y^2_{BPt}. Because of the need for an additional sum of foreign currency for interest payments, financing current account deficits with foreign debt reduces the growth rate compatible with the balance-of-payment equilibrium (with a sustainable path of foreign debt).

BOP constrained rate of GDP growth in food exporters

Chena (2014) puts forward a new change in the original Thirlwall's law, to show certain characteristics of Latin American economies. In particular, the author examines the consequence of being a food exporter on BOP-constrained GDP growth.

This is a well-known and very interesting structuralist idea, also discussed in Harrod's writings (1973). However, it had not yet been considered by the post Keynesian tradition focused on the study of BOP-constrained-growth models.

Considering this special characteristic of wage goods exporter economies, Chena (2014) assumes that the export function for a country consuming the same good that it exports is determined by:

$$X_t = \left(\frac{P_{dt}}{E_t}\right)^{\eta} P_{ft}^{\delta} \frac{Z_t^{\epsilon}}{Y^{\sigma}}. \tag{18}$$

The innovation is related to $\sigma > 0$, which represents the income elasticity of domestic demand for food. In dynamic terms:

$$x_t = \eta(p_{dt}) - \eta(e_t) + \delta(p_{ft}) + (z_t) - \sigma(y_t). \tag{19}$$

Substituting Equations (19), (5), and (12) into Equation (16), a new BOP-constrained rate of growth is obtained:[6]

$$y_{BPt}^{4} = \frac{\theta_1 \epsilon . z_t - \theta_2 r - (1 + \eta\theta_1 + \psi)(p_{dt} - p_{ft} - e_t)}{\pi - (1 - \theta_1 + \theta_2) + \theta_1 \sigma}. \tag{20}$$

Equation (20) shows that food exporters will have a lower BOP-constrained rate of GDP growth than those lacking this feature ($y_{BPt}^{4} < y_{BPt}^{3}$). This is because domestic GDP growth reduces the volume of exports and, thus, the amount of foreign currency available to finance imports.

Foreign asset formation and terms of trade: rethinking tailwind effects on Thirlwall's law for commodity exporters

In previous sections, we saw how Thirlwall's law and its modifications allow us to formalize some key post Keynesian and structuralist ideas regarding Latin American constraints to achieve long-term sustainable GDP growth. Nevertheless, the role of UPS on capital account features of Thirlwall's law has not yet been formally considered.

By definition, unbalanced productive structures have an export (usually primary) sector that intensively uses a quasi-fixed

[6] We keep the assumption that cross elasticities of demand for imports and exports are equated with price elasticities.

production factor. Without any government intervention, it turns out to be much more lucrative than the industrial sector (which also generates a lower risk-adjusted profit rate than the same sector in other countries), leading to a lower aggregate investment rate. This phenomenon takes place because in sectors with quasi-fixed production factors, scale expansion will involve not only usual investment costs but also those related to additional time and money expenditures to expand those rigid factors. Consequently, because unbalanced productive structures: (1) bear higher adjustment costs than homogeneous productive structures (i.e., advanced economies that intensively use more flexible production factors); and (2) do not promote international competitive (in terms of risk-adjusted profit rates) industrial sectors (those with more flexible production factors), this generates large quasi-rent (associated with those quasi-fixed production factors used in primary goods) that will not be reinvested either in primary (because of the adjustment costs) or in industrial sectors (because of its relative low risk-adjusted profit rate).

This fact is supported by abundant empirical evidence suggesting that economies with a high participation of rent-generating sectors in their productive structures, either because of the existence of fixed production factors or legal monopolies, have a significantly lower investment rate (Médici and Panigo, 2014).

Apart from the typical characteristics of the UPS seen so far (high income elasticity of demand for imports, low price elasticity of export supply, and countercyclical exports), economies with structural heterogeneity have another distinctive feature: high propensity to foreign-asset formation (FAF).

One of the most widespread explanations for the high portfolio dollarization of Latin American economies, even in times of stability, is lack of trust in the national currency due to recurrent episodes of devaluation, inflation, and financial crisis. In these contexts of long-term macroeconomic instability, the U.S. dollar is often used as a substitute for the national currency as store of value (see, e.g., Burdisso and Corso, 2011; Castillo and Winkelried, 2006; Ize and Levy Yeyati, 2003).

Using the standard portfolio selection theory for Argentina between 1965 and 2009, Burdisso and Corso (2011) estimate the optimal investment opportunity set. As an interesting result for the subperiod 2003–9, they conclude that after seven years of economic stability, the nonfinancial private sector of Argentina has an

incentive to dollarize 40 percent of its portfolio. However, actual dollarization levels are much higher than those estimated by the authors (around 70 percent for the same subperiod). This outcome might indicate that there are other theories/elements to explain foreign currency demand of the nonfinancial private sector that have been overlooked by the portfolio approach.

The standard portfolio analysis of dollarization is based on two assets: a foreign asset and a domestic one.[7] James Tobin (1982), in his Nobel Prize lecture, emphasized the need to consider a multiplicity of assets in economic analysis. "Asset disaggregation is essential for analyzing, among other phenomena, financing of capital accumulation and government deficits, details of monetary and debt management policies, international capital movements and foreign exchange markets, and financial intermediation" (Tobin, 1982, p. 13). In underdeveloped economies, where structural characteristics deeply determine economic behavior, incorporating Tobin's advice becomes essential. On the one hand, domestic assets to be considered must include those whose profitability depends on production factor scarcity. On the other hand, the foreign asset group must include those sector specific assets that mimic domestic alternatives.

None of the extensions of Thirlwall's law took into account that the main factor leading exports in Latin American economies is a rent sector related to a quasi-fixed production factor (operating in a UPS where industrial firms are not internationally competitive).

In this context, and recalling Tobin's recommendations about using multiple assets for portfolio comparison purposes, our main hypothesis is that a large fraction of quasi-rents generated by primary sectors in UPS economies:

1. Will not be reinvested in the same sector (because of quasi-fixed production factor constraints);
2. Will not be invested in any other domestic real sector (because of their low profit rate in both domestic and international terms);
3. Could not be invested in any other domestic-currency-denominated assets (including financial ones), even with positive spreads in uncovered interest rate parity equations (because of the higher

[7] From an empirical and theoretical point of view, portfolio selection theory and uncover interest parity are ineffective tools to understand investment decisions at the micro level and capital flows at the macroeconomic level (see Flood and Rose, 2002; Harvey, 2004).

internal rate of return of alternative foreign currency assets, other than those used in the uncovered interest rate parity equation); and
4. Will largely be invested in FAF.

In conclusion, in the current development status, there are plots of land with different productivity, and the increase in its intensive use implies increasing costs and greater risk (which we call adjustment costs). Therefore, part of the extra surplus is reinvested but with increasing costs, and another part is transferred to the rentier due to the price increase of the quasi-fixed asset (or of its rent). Therefore, for greater profitability derived from increased TOT to be completely translated into domestic investment—if there were enough demand—(a) a quasi-fixed production factor should not exist, and (b) rate of profit at an international level of industrial sectors of unbalanced productive economies should be equal to those of the rest of the world, which would contradict the definition of unbalanced productive economies.[8]

Paradoxically, in UPS economies, the foreign currency constraint could worsen (or, at least, not be relaxed significantly) when TOT improves. While a positive effect on the BOP-constrained rate of GDP growth through the current account is produced,[9] the rise in TOT also propels a foreign currency outflow (because of the above mentioned quasi-rent investment dynamics). Eventually, this last effect may outweigh the benefits of trading.

Proposal for extending Thirlwall's law

With the aim of incorporating TOT effects on the capital account in BOP-constrained-growth models, it is necessary to include a function considering the erosive effect that speculative foreign currency purchases could have on the economy.

To deal with this objective, we add a capital flow equation to Thirlwall's model. We believe that an autonomous part (c_t) and

[8] We do not support the profit rate equalization hypothesis, among other reasons, because of their dependence on the hypotheses of free capital mobility and perfect competition. Furthermore, numerous empirical works account for the absence of any type of tendency toward profit rate equalization at an international level and in different regions of the world (e.g., Bou and Satorra, 2007; Cubbin and Geroski, 1987; McGahan and Porter, 2002; Mueller, 1990; Panigo, 2008.

[9] It is worth noting that, regarding balance of trade, we can expect greater imports due to imitation of the consumer pattern of rich countries (Duesenberry, 1949; Nurkse, 1953).

another capital flow segment depend on productive structures:

$$k_t = c_t - \omega\left(p_{dt} - p_{ft} - e_t\right) \tag{21}$$

where k stands for net capital flows. If $c_t > 0$, an inflow of autonomous foreign capitals takes place, and if $\omega > 0$ there is nonzero foreign asset formation by residents.

The magnitude of the negative relation between TOT and capital flows depends on the importance of the (exporter) primary sector in the economy (F):

$$\omega = \upsilon F \quad con \quad \upsilon > 0. \tag{22}$$

The balance-of-payment equilibrium condition that includes interest payments and foreign asset formation yields, in dynamic terms:

$$\theta_1(p_{dt} + x_t) - \theta_2(p_{dt} + r_t) + (1 - \theta_1 + \theta_2)(p_{dt} + k_t) = p_{ft} + e_t + m_t. \tag{23}$$

By substituting Equations (19), (5), (21), and (22) into (23), the following expression is obtained:

$$y^5_{BPt} = \frac{\theta_1 \epsilon . z_t + c_T . (1 + \theta_2 - \theta_1) - \theta_2 . r_t + (1 + \theta_1 \eta + \psi) . TOT}{\pi + \theta_1 \sigma} - \frac{(1 - \theta_1 + \theta_2) . \nu . F . TOT}{\pi + \theta_1 \sigma}, \tag{24}$$

where $TOT = (p_{dt} - p_{ft} - e_t)$.

Equation (24) is the new BOP-constrained rate of GDP growth. Considering foreign asset formation dynamics in primary goods exporters (intensively using quasi-fixed production factors), the last rate of growth turns out to be lower than that obtained without considering the negative effect of TOT improvements on capital account evolution.

Differentiating the previous equation with respect to TOT yields:

$$\frac{\delta y^5_{bp}}{\delta TOT} = \frac{(1 + \psi + \theta_1 \eta)}{\theta_1 \sigma + \pi} - \frac{(1 - \theta_1 + \theta_2) . \upsilon F}{\theta_1 \sigma + \pi}. \tag{25}$$

Equation (25) shows a paradox because there is a possibility that an improvement in TOT may result in a reduction of the BOP-constrained rate of GDP growth. This possibility will be greater if:

a) The economy has a high price elasticity of import demand (ψ).
b) There is a high level of foreign indebtedness that causes significant interest payments (θ_2), negatively affecting the current account result.
c) The economy has a UPS with a high relevance of primary goods exporters that intensively uses quasi-fixed production factors (F). In this situation, there will be a higher propensity to foreign currency purchases as a consequence of an improvement in TOT.

For example, suppose that there is a UPS country with agricultural by-products as its main exports. Now, suppose that the price of its main tradable good (e.g., soy beans) is steadily increasing. On the one hand, we can expect an improvement in the trade balance, but it would be limited given the low increase in the volume of exports. On the other hand, a TOT improvement will increase U.S. dollar purchases due to higher quasi-rents in the primary sector, which could significantly compensate for the extra foreign currency obtained through the trade balance.

The characteristics of this hypothetical country agree with those of most South American economies. Therefore, we could test our hypothesis by using the information of one of them.

Empirical evidence

To test our hypothesis of a positive relation between TOT and FAF, we use monthly Argentinean data between January 2003 and October 2011.[10]

As we have already stated, we will concentrate on dollar purchase determinants. For financial reasons, agents can decide to buy dollars according to devaluation expectations, relative profitability (of other financial assets), and country risk perception. For that group, we take the difference between three-month future and spot values of the U.S. dollar; the international reserves–imports ratio; the Buenos Aires Stock Market composite price index—Merval—(the higher the index, the lower the dollar purchases might be); the country risk index calculated by JPMorgan Chase; the federal funds (interest) rate, as a measure of foreign asset return; and the domestic wholesale market interest rate, as an alternative return in domestic currency.

Regarding structural determinants, we use the index of commodity prices of the Central Bank of Argentina. This variable

[10] Although there is updated monthly data on dollar purchases, our time period is interrupted in October 2011 due to the implementation of new authorization requirements for foreign currency purchases.

takes into account the prices of the most important commodities within Argentinean exports (e.g., soybeans, soybean oil, corn, crude petroleum, among others). As stated in the previous section, the presence of rent sectors is a key determinant to explain the dynamics of foreign currency purchases.

Additional factors might be relevant in explaining foreign currency purchases, but they are hard to measure. These determinants include qualitative aspects such as intensified political disputes, imminent elections, or economic policies perceived negatively by capitalists, who can generate dollar flight as an extortion instrument.

Methodology

After defining the variables of interest in accordance with economic theory, we use an alternative procedure based on Gluzmann and Panigo (2014). This technique is called "Global Search Regression" (GSREG). GSREG is a Software Stata code that allows automatic model selection for time series, cross-section, and panel data regressions.

This new technique has three main advantages: it guarantees optimality with both in- and out-of-sample selection criteria; it allows residual testing for each alternative; and it provides, depending on user specifications, a full data set with outcome statistics for every alternative model. These features make GSERG a valuable tool for high-accuracy forecasting and parameter robustness comparisons.

GSREG assumes that what really matters is not only the best econometric specification but also the whole set of alternative models. This new automatic selection method is superior to other techniques such as "Relevant Transformation of the Inputs Network Approach (RETINA) algorithm" y PcGETS/AUTOMETRICS. They still fail to guarantee "global optima" because of unexplored reduction paths, the size–power trade-off, and cumulative type-I errors of sequential testing, especially in small sample problems.

In simple terms, the GSREG command, in the first stage, creates a set of models including all possible covariate combinations (taken from 1 to the maximum number of selected variables). In the second stage, it performs a regression for each alternative specification, saving estimated coefficients and a series of statistics and options selected by the user (e.g., *t*-statistics, regression number, number of covariates, number of observations, adjusted *r*-squared, etc.).

Table 1
Basic descriptive statistics of the variables used

Variable	Deseription	Source	Statisties		
			N	Mean	Standard deviation
lcpra	US dollar purchase in the Single Free Exchange Markett (MULC) by the nonfinancial private sector, monthly averages	BCRA - http://bcra.gov.ar/	106	20.801	0,551
limp	Index of Commodity Prices	BCRA	106	4.873	0.294
lres_m	International reserves-imports ratio	Secretaria de Politica Economica y Planifcacion del Desarrollo (SPE-MECON) http://mecon.gov.ar/peconomica/basehome/infoeco.html	106	2.332	0.192
libol	Buenos Aires Stock Market composite price index (Merval), monthly averages	http://invertia.com/	106	7.401	0.445
li	Interest rate of the domestic wholesale market (call), in percentages	SPE-MECON	106	1.818	0.664
liff	Federal Fund Interest rate, in percentages	Centro de Economia Internacional (CEI) -http://cei.gob.ar/es/sector-linanciero	106	0.149	1.203
lembi	Country risk index calculated by JP Morgan Chase, monthly averages	CEI	106	6.959	1.117
spread3	Difference between 3-month future and spot values of the US dollar, in percentages	ROFEX http://rofex.com.ar/ y BCRA	106	9.604	15.064

The letter *l* means that the variables are expressed in logarithms.

This statistical information allows us to assess the relative importance of each covariate to test our working hypothesis.

As we stated above, the set of independent variables (X) to be considered will be (see Table 1):

$$X = [limp,\ \ lres\_m,\ libol,\ li,\ lif,\ lembi,\ spread3]\ . \qquad (26)$$

Monthly data are used and four lags are added for each independent variable as potential covariates.

To avoid atheoretical macroeconometrics critiques, we examine only those models with no more than one variable for each original covariate (e.g., a model with $lembi_t$ and $lembi_{t-1}$ will not be considered). Therefore, GSREG standard procedure estimates 233,280 models to work with.

In addition, for analytical purposes, in the outcome database we created two new columns (*coef_j* and *t_j*) for each regression containing the estimated *t*-test and regression coefficients of each included covariate but regardless of the order of lags.

Empirical Results

First, the best econometric specification in terms of adjusted R^2 is shown in Table 2.

- In the GSREG best model, all the original covariates except *spread3* are significant at 10 percent (some are contemporaneous and other with lagged relations).
- Regarding our variable of interest (*L1.limp*), the estimated coefficient has the expected sign, with a 99 percent statistical confidence level. Indeed, a 10 percent increase in the price index of the main Argentinean tradable commodities in t would generate an 11.7 percent increase in dollar purchases in $t+1$.
- Unexpectedly, the domestic interest rate (*li*) is positively correlated with FAF. Analyzing cross-correlation among variables (using up to two lags and forward operators), we can conclude that this unusual positive correlation is just the by-product of a reverse causality. U.S. dollar purchases precede domestic rate (because the last variable appears to be a policy response to reduce dollarization incentives.[11]

[11] Analyzing the correlation between both the lagged (*lj_li*) and forward (*fj_li*) values of the local interest rate (*li*) and U.S. dollar purchases (*lcpra*) since 2007, we can see that *lcpra* temporarily precedes *li* (see Appendix).

Table 2
Best selected model according to GSREG

Source	SS	df	MS	Number of obs	103
				F(6, 96)	100.82
Model	26.875	6	4.479	Prob > F	0
Residual	4.265	96	0.044	R^2	0.863
Total	31.140	102	0.305	Adj R^2	0.8545
				Root MSE	0.21077

lcpra	*Coef.*	*Std. Err.*	*t*	*P > t*	[95% Conf.	Interval]
L1.limp	1.170	0.142	8.220	0.000	0.888	1.452
lres_m	−0.219	0.125	−1.760	0.082	−0.466	0.028
libol	−0.266	0.126	−2.120	0.037	−0.516	−0.017
li	0.477	0.066	7.260	0.000	0.347	0.608
lembi	0.111	0.051	2.200	0.030	0.011	0.212
L3.liff	−0.089	0.027	−3.330	0.001	−0.142	−0.036
_cons	15.977	1.204	13.270	0.000	13.587	18.366

- In turn, an increase in the foreign assets rate of return (*L3.liff*) would reduce dollar purchases. A 10 percent rise in the federal funds rate—a reference rate in the U.S. financial market—has a negative effect on U.S. dollar purchases of 1 percent after three months.
- The estimated MERVAL coefficient (*libol*) and the international reserves–imports ratio coefficient are positive (*lres_m*), significant, and have the expected negative sign.
- As expected, the country risk will increase FAF. A 10 percent rise in the Emerging Market Bond Index (EMBI) (*lembi*) causes a 1.1 percent increase in foreign currency purchases.

It is worth noting that relevant outcomes for our main hypothesis do not change when the best ten models are considered (see Table 3). Although the *spread3* variable appears in most of them with a positive sign, this is not statistically relevant.

Focusing on our main variable *limp*, the following illustrations show kernel density functions of *t*-statistics (see Figure 2) and adjusted R^2 (see Figure 3).[12]

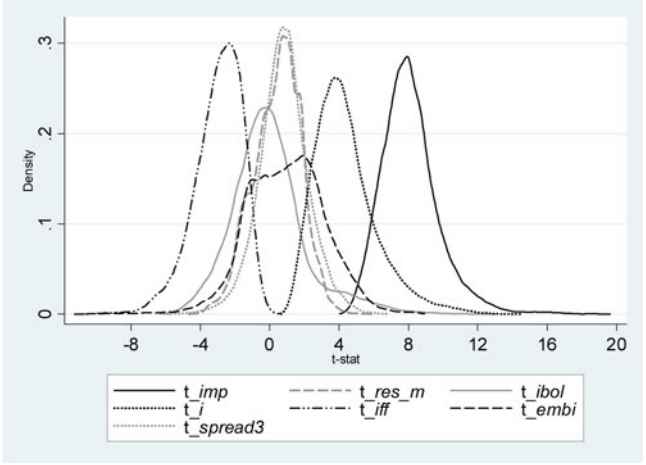
[12] The kernel-specific smooth function is the Epanechnikov, with a bandwidth of 0.0211.

Table 3
The best ten models according to GSREG

Model	*limp*	*lres_m*	*libol*	*li*	*liff*	*lembi*	*spread*	*constant*	*R-sq_a*
1	**1.170****	**−0.219***	**−0.266****	**0.477****	**−0.089****	**0.111****	–	**15.977****	**0.8545**
	[1; 8.2230]	[0; −1.757]	[0; −2.1192]	[0; 7.264]	[3; −3.3333]	[0; 2.1969]		[13.2697]	
2	**1.153****	**−0.241***	**0.250***	**0.469****	**−0.091****	**0.108****	**0.343**	**16.022****	**0.8541**
	[1; 7.9674]	[0; −1.8623]	[0; −1.8797]	[0; 6.907]	[2; −3.1535]	[0; 2.1148]	[3; 0.1899]	[11.9987]	
3	**1.142****	**−0.253***	**0.261***	**0.478****	**−0.092****	**0.109****	**0.181**	**16.165****	**0.8541**
	[1; 7.8357]	[0; −1.9432]	[0; −1.9777]	[0; 6.9401]	[2; −3.1937]	[0; 2.1223]	[4; 0.1059]	[12.1621]	
4	**1.218****	**−0.304***	**0.543***	**0.310****	**−0.163****	**−0.079****	–	**19.635****	**0.8537**
	[1; 8.8380]	[0; −2.3916]	[0; −5.6301]	[0; 4.5835]	[2; −6.2993]	[4; −1.8078]		[17.7587]	
5	**1.123****	**−0.254***	**0.212***	**0.452****	**−0.091****	**0.106****	**0.575**	**15.953****	**0.8537**
	[1; 7.686]	[0; −1.9340]	[0; −1.6688]	[0; 6.5154]	[0; −3.1048]	[0; 2.0551]	[3; 0.3218]	[11.9818]	
6	**1.112****	**−0.265****	**0.223***	**0.461****	**−0.093****	**0.108****	**0.282**	**16.095****	**0.8535**
	[1; 7.5562]	[0; −2.0072]	[0; −1.7634]	[0; 6.5172]	[0; −3.1224]	[0; 2.0595]	[3; 0.1655]	[12.09445]	
7	**1.179****	**−0.206***	**−0.234***	**0.464****	**−0.083****	**0.112****	**1.775**	**15.669****	**0.8534**
	[1; 8.1931]	[0; −1.6144]	[0; −1.6684]	[0; 6.596911]	[3; −2.7836]	[0; 2.1963]	[1; 0.5168]	[11.6342]	
8	**1.141****	**−0.250***	**0.228***	**0.463****	**−0.089****	**0.109****	**0.467**	**15.938****	**0.8532**
	[1; 7.8359]	[0; −1.9014]	[0; −1.7473]	[0; 6.7415]	[1; −3.0511]	[0; 2.1301]	[3; 0.2590]	[11.8757]	
9	**1.179****	**−0.209***	**−0.245***	**0.469****	**−0.085****	**0.112****	**0.907**	**15.756****	**0.8532**
	[1; 8.1542]	[0; −1.6446]	[0; −1.7971]	[0; 6.8266]	[3; −2.9458]	[0; 2.1981]	[2; 0.4056]	[11.8828]	
10	**1.131****	**−0.261***	**0.238***	**0.472****	**−0.090****	**0.111****	**0.317**	**16.064****	**0.8531**
	[1; 7.7132]	[0; −1.9777]	[0; −1.8363]	[0; 6.7549]	[1; −3.0845]	[0; 2.1385]	[4; 0.1864]	[12.0505]	

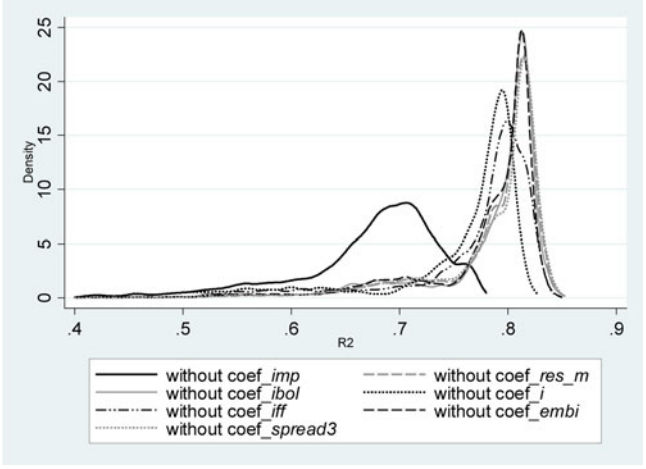
**statistically significant at the 0.05 level;
*statistically significant at the 0.10 level.
The estimated coefficient is shown in the first bold line of each model. The number of lags and the *t*-statistic are in the second line [lags; t]. The estimated coefficient for spread are multiplied for 1000.

Figure 2 Kernels of *t*-statistics, per variable



Regarding *t*-statistics, it is remarkable that 100 percent of the estimated commodity price index coefficients (*t_imp*) are highly significant. This is a unique outcome distribution with that characteristic (see Figure 2).

Figure 3 Kernels of adjusted R^2 for alternative models



To compare relative relevance among included covariates, we examine kernel functions of the adjusted R^2 for all the estimated models except for those containing the variable *j*. Thus, we get seven groups of adjusted R^2, one per each absent variable, and we made a graph of its density functions.

It can be clearly seen that the goodness of fit of alternative estimated models is considerably reduced in those without the index of commodity prices (*coef_imp*) among their explanatory variables (see Figure 3).

To conclude, on the basis of the 233,280 final regressions, we found convincing evidence of the positive relation between the price of the main tradable commodities (soybean, corn, steel, petroleum, etc.) and FAF. It is remarkable that index of commodity prices coefficients were positive and significant in 100 percent of the cases. Moreover, including *coef_imp* as covariate noticeably improves the explanatory power of the model.

Country risk, expected devaluation rate, international reserves–imports ratio, and stock market index do not have a significant explanatory power. On the contrary, foreign and national interest rates usually emerge as significant covariates. However, when evaluating the correlation of these variables with U.S. dollar purchases, we find that significant domestic interest rate coefficients are mainly explained by a reverse causality relation where FAF leads interest rate dynamics.

Conclusion

The aim of this paper was to challenge the generalized belief that TOT improvement is highly beneficial to growth because it relaxes foreign currency constraints through the trade balance. In contrast to this naive approach, we found that TOT improvements in UPS do not have unambiguous effects on the BOP-constrained rate of GDP growth because their positive trade balance effects are mitigated (and even overwhelmed) by their negative impact through the capital account.

Our study tried to show that the UPS main export sectors produce with a quasi-fixed production factor and coexist with a low (absolute and relative) profit rate industry. We explained why a TOT improvement increases the quasi-rent of these sectors, which cannot be reinvested and will not be invested in any other real domestic sector but accumulated as foreign liquid assets.

To formalize our main hypothesis, we proposed a new change in Thirlwall's law showing the negative effects of a TOT improvement through the capital account in countries with the mentioned structural characteristics. In addition, using a new automatic model selection technique, we found convincing empirical evidence to support the hypothesis of a positive relation between TOT and U.S. dollar purchases in Argentina between 2003 and 2011.

In conclusion, it is worth noting that in the past decade there has been some widespread agreement on the "tailwind" effect that TOT and foreign capital inflows generate in Latin American countries. Many of these analyses have left out, on the one hand, the importance of improving income distribution to economic performance and, on the other hand, the mid-run TOT effects on inflation, reprimarization, dollarization, and repatriation of profits.

Although TOT improvement, as in the case of Latin America in the early twenty-first century, allowed external constraints to be relaxed, this relaxation would have been greater if TOTs did not foster FAE, too. Consequently, we are convinced that it is necessary to encourage the development of policies for the reduction of productive heterogeneity and for the regulation of capital flows. Terms of trade cannot replace industrial policies. Furthermore, Latin American countries will not improve well-being of their populations through commodity price increases. The tailwind story has been overstated.

REFERENCES

Barbosa-Filho, N.H. "The Balance-of-Payments Constraint: From Balanced Trade to Sustainable Debt." *Quarterly Review, Banca Nazionale del Lavoro*, 2001, *54* (*219*), 381–400.

Berretoni, D., and Castresana, S. (2009) "Elasticidades de comercio de Argentina para el período 1993–2008." [Trade elasticities of Argentina for the period 1993–2008]. Revista del Centro de Economía Internacional, 2009, *16* (*3*), 85–97.

Bou, J.C. and Satorra, A. "The Persistence of Abnormal Returns at Industry and Firm Levels: Evidence from Spain." *Strategic Management Journal*, 2007, *28* (*7*), 707–722.

Burdisso, T. and Corso, E.A. "Incertidumbre y dolarización de cartera: el caso argentino en el último medio siglo." [Uncertainty and portfolio dollarization: the Argentinian case in the last half century]. *Ensayos Económicos*, 2011 (*63*), 41–95.

Castillo, P., and Winkelried, D. "¿Por qué la dolarización es tan persistente?" Premio de Banca Central Rodrigo Gómez. Centro de Estudios Monetarios Latinoamericanos, 2006.
Catão, L., and Falcetti, E. "Determinants of Argentina's External Trade." *Journal of Applied Econometrics*, 2002, *5* (*1*), 19–57.
Chena, P.I. "Balance-of-payments-constrained growth in Argentina (1976–2006)." *Journal of Post Keynesian Economics*, 2014, *36* (*4*), 699–718.
Cubbin, J., and Geroski, P. "The Convergence of Profits in the Long Run: Inter-Firm and Inter-Industry Comparisons." *Journal of Industrial Economics*, 1987, *35* (*4*), 427–442.
Diamand, M. "Towards a Change in the Economic Paradigm Through the Experience of Developing Countries." *Journal of Development Economics*, 1978, *5* (*1*), 19–53.
Diaz-Alejandro, C.F. "Industrialization and Labor Productivity Differentials." *Review of Economics and Statistics*, 1965, *47* (*2*), 207–214.
Duesenberry, J.S. *Income, Saving and Theory of Consumer Behaviour*. Cambridge: Harvard University Press, 1949.
Dutt, A.K. "Thirlwall's Law and Uneven Development." *Journal of Post Keynesian Economics*, 2002, *24* (*3*), 367–390.
Easterly, W., Islam, R., and Stiglitz, J.E. "Shaken and Stirred: Explaining Growth Volatility." World Bank, 2000.
ECLAC. (2014a). Economic Survey of Latin America and the Caribbean, 2014 (LC/G.2619-P). Santiago de Chile, 2014.
ECLAC. (2014b). Foreign Direct Investment in Latin America and the Caribbean, 2013 (LC/G.2613-P). Santiago de Chile, 2014.
Flood, R. P., and Rose, A. K. "Uncovered interest parity in crisis". *IMF staff papers*, 2002, *49* (*2*), 252–266.
Gluzmann, P., and Panigo, D. "Global search regression: A new automatic model-selection technique for cross-section, time-series, and panel-data regressions". *Stata Journal*, 2015, *15* (*3*), 325–349.
Harrod, R. F. *Dinámica Económica [Economic Dynamics]*. Madrid: Editorial Alianza, 1973.
Harvey, J. T. "Deviations from uncovered interest rate parity: a Post Keynesian explanation". *Journal of Post Keynesian Economics*, 2004, *27* (*1*), 19–35.
Ize, A., and Levy Yeyati E. "Financial Dollarization." *Journal of International Economics Journal of International Economics*, 2003, *59* (*2*), 323–347.
Izquierdo, A., Romero, R., and Talvi, E. *Booms and Busts in Latin America: The Role of External Factors*. Inter-American Development Bank, Research Department, 2008.
López Gallardo, J., and Cruz, A.B. "Thirlwall's Law' and Beyond: The Latin American Experience." *Journal of Post Keynesian Economics*, 2000, *22* (*3*), 477–495.
McCombie, J., and Thirlwall, T. "Economic Growth and the Balance-of-Payments Constraint Revisited." In P. Arestis G. Palma, and M. Sawyer (eds.), *Markets, Unemployment and Economic Policy* (pp. 498–511). London: Routledge, 1997.
McGahan, A. M., and Porter, M. E. "What do we know about variance in accounting profitability?" *Management Science*, 2002, *48* (*7*), 834–851.
Médici, F., and Panigo, D.T. "Factores fijos de producción y crecimiento económico: el rol de la inversión." [Fixed factors of production and economic growth: the role of investment]. Paper presented at the *VII Jornadas de Economía Crítica*, LaPlata, October 16–18 2014.

Moreno-Brid, J.C. "On Capital Flows and the Balance-of-Payments-Constrained Growth Model." *Journal of Post Keynesian Economics*, 1998, *21* (*2*), 283–298.
Mueller, D.C. *The Dynamics of Company Profits: An International Comparison*. Cambridge: Cambridge University Press, 1990.
Nurkse, R. *Problems of Capital Formation in Underdeveloped Countries*. New York: Oxford University Press, 1953.
Ocampo, J.A. "Latin America and the Global Financial Crisis." *Cambridge Journal of Economics*, 2009, *33* (*4*), 703–724.
Panigo, D.T. "Volatilité macroéconomique et inégalité en Amérique latine." École doctorale de l'École des hautes études en sciences sociales/UBA, (PhD dissertation) 2008.
Prebisch, R. *Problemas teóricos y prácticos del crecimiento económico* [Theoretical and practical problems of economic growth], Santiago de Chile: CEPAL, 1973.
Thirlwall, A.P. *The Balance of Payments Constraint as an Explanation of International Growth Rate Differences*. Rome: Banca Nazionale del Lavoro, 1979.
———. "Professor Krugman 45-Degree Rule Rule." *Journal of Post Keynesian Economics*, 1991, *14* (*1*), 23–28.
Thirlwall, A.P., and Hussain, M.N. "The Balance of Payments Constraint, Capital Flows and Growth Rate Differences Between Developing Countries." *Oxford Economic Papers*, 1982, *34* (*3*), 498–510.
Tobin, J. *Reimpression de les Prix Nobel en 1981: Money and Finance in the Macro-Economic Process*. Stockholm: Nobel Foundation, 1982.

Appendix. Correlation between both the lagged and forward values of the local interest rate and U.S. dollar purchases (January 2007–October 2011)

pwcorr	*lcpra*	*li*	*f1 li*	*f2 li*	*l1 li*	*l2 li*
lcpra	**1**					
li	0.5981	1				
f1 li	0.6367	0.8083	**1**			
f2_li	0.5199	0.5767	0.7993	1		
	0.4557	0.8238	0.5998	0.3927	1	
l2 li	0.3549	0.6079	0.4092	0.3182	0.8297	1