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ABSTRACT

This article discusses the secular volatility of output, inflation, the exchange rate, and poverty in Argentina. Inflation, currency devaluation and a wide gross domestic product (GDP) cycle have been recurrent problems in Argentina for several decades. The literature has extensively discussed those issues from different viewpoints. This study focuses on a relatively unexplored theme that may contribute to a partial explanation. It deals with the continuous tendency to equalize different profitabilities resulting, in turn, from remarkably different sectoral purchasing power parities. Thus, for any given exchange rate, an incessant tendency toward the equalization of profitabilities generates opposing inflationary and devaluatory pressures. The resulting inflation-devaluation cycle feeds income redistribution, GDP fluctuation, real exchange rate instability, and high levels of uncertainty.

KEYWORDS

Economy-wide country studies; macroeconomic analysis of economic development; open economy macroeconomics

JEL CLASSIFICATIONS

F41; O11; O54

To discuss the structural inflation-devaluation cycle in Argentina, we propose the following theoretical contributions: First, we adapt Olivera's (1970, 1990) closed economy model of inflation to depict opposing inflationary and devaluatory pressures in Argentina's open economy. Second, to recessive devaluation (Braun and Joy, 1968; Diamand, 1978; Diaz Alejandro, 1963) we add an endogenous inflationary recovery phase relating to the exchange rate. Such a recovery phase was missing in the structuralist literature cited above. Third, to Diamand's (1972) argument that the low sectoral purchasing power parity (SPPP) corresponding to Argentina's fertile agriculture depresses the real exchange rate ρ, we add that ρ is also attracted to the high industrial SPPP, as in Nicolini-Llosa (2007). Fourth, to Harvey's (1991, 2006) argument that the real exchange rate does not stabilize in a single aggregate purchasing power parity (PPP), we add that in Argentina the remarkable disparity of SPPPs further destabilizes ρ. Finally, the policy proposal to close the SPPP gap is relatively new.

This study's theoretical architecture is constructed only to explain Argentina's structural inflation-devaluation gross domestic product (GDP) cycle for the period 1970–2011. Therefore, we claim no generality.

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Notation and a few methodological remarks

To focus on the structural phenomenon, let us abstract from fiscal and monetary issues and expectations at first, to consider them later on.

The discussion about the consequences of sectoral differences between agriculture and industry in Argentina started with industrialization in the early twentieth century when the economy only exported food (e.g., Bunge, 1928; Olivera, 1924). In 1970, manufacturing exports for the first time surpassed 10 percent of total exports and reached 29 percent of total exports in 1991–2011. Thus, the industrial SPPP became increasingly important after 1970 and our discussion starts in that year.

The argument is mostly theoretical although it is illustrated with the data available. Unless otherwise stated, only official government data are used.[1]

The following notation will be used throughout:

$$\rho = er/cpi, \tag{1}$$

where:

cpi: Argentina consumer price index (CPI) to U.S. CPI ratio

er: Nominal exchange rate AR$/US$

ρ: Real exchange rate

Devaluation is a rise in *er*. The instability of a variable is measured by its standard deviation. "Agriculture" consists of agriculture and farming (including processed food, as in the World Trade Organization methodology).

Argentine rent originates in land rent and oligopoly profits. Rentiers are defined as agents whose income (rent) is protected by property rights. Therefore, rentiers lack the incentive to invest in production where profits are exposed to the competition of cost reducing innovation. Interestingly, Ricardo, Walras, and Milton Friedman shared this view.

Argentina's economic structure

Kydland (2006) and Kydland and Zarazaga (1997) argue that there would be nothing different about Argentina if perfect competition and long-run full employment were assumed. We depart from Kydland's view. In Argentina very different economic policies under all kinds of political regimes since 1952 have always led to balance-of-payments crises (Chudnovsky and Lopez, 2007; Della Paolera and Taylor, 2003; Diaz-Alejandro, 1970). This repetition

[1]Data available at www.economia.gob.ar and www.indec.gov.ar. From 2008 onward, official data on the economy began to diverge from private data collection. Inconsistencies within the official data would suggest that there are some grounds for concern. For example, Figure 1 shows the real exchange rate calculated with official CPI data, and the real exchange rate calculated with official GDP deflator data. These two series increasingly diverge from 2005 onward, whereas they were always pegged to each other before 2005. After 2011, the differences became too wide and a heated political debate broke out. To avoid unnecessary controversy we focus on the 1970–2011 period. Quarterly data for 1970–2011 are sufficient to illustrate our argument. Quoted econometric works are for 1970–2008. There is no indication, however, that events after 2011 respond to a different pattern from the one we are discussing for 1970–2011.

Table 1. Per annum % growth rates.

	1953–1969		1970–2011	
	Volume	US$	Volume	US$
World gross domestic product	4.8		3.0	
World agricultural exports	4.9	3.8	3.2	8.3
Argentina's agricultural exports (includes processed food)	2.7	1.8	3.9	8.7
World minerals and fuel exports	7.0	7.4	2.2	11.2
World manufactured exports	9.7	10.0	6.2	10.5
Argentina's manufactured exports of industrial origin	9.1	8.7	9.3	13.3

Source: World Trade Organization, International Trade Statistics, Appendix Tables, Table A1a "World merchandise exports, production and gross domestic product"; Economic Commission for Latin America and Instituto Nacional de Estadística y Censos de Argentina "Indices de valor, precio y cantidad de las exportaciones, importaciones, y términos del intercambio [Indices of value, price and quantity of exports, imports and terms of trade]".

would suggest a long-run or structural pattern. To discuss this pattern, we summarize Argentina's economic structure as follows:

1. Argentina exports the wage good par excellence: food. Food is produced on highly fertile private land. Land yields differential rent in dollars. Food accounts for two-thirds of total exports. Argentina also exports conventional technology manufactures (one-third of total exports).[2] The country has no significant influence on international quantities or prices. The real rate of growth of Argentina's industrial exports, which was 2.38 times larger than that of agricultural exports in 1970–2011, illustrates their relative importance (see Table 1). Figure 1 shows that the rates of growth of industrial or food exports show no correlation with the wide fluctuations in the real exchange rate. Berrettoni and Castresana (2009) estimate real exchange rate elasticities of Argentine exports of 0.08 and 0.30 for the short- and long run, respectively. Catao and Falcetti (2002, p. 28) estimate a long-run international price elasticity of supply of Argentine exports to non-Mercosur of about 1 for 1980–97. Their real exchange rate elasticity of supply of exports is not significant. Thus, during an abrupt devaluation Argentine exports are somewhat unresponsive to the exchange rate. Medici and Panigo (2015) show that terms of trade correlate with capital flight.
2. Intermediate and capital goods with some sophistication are almost entirely imported. They represented 87.1 percent of total imports in 1980–2012 (including 4 percent of public transportation vehicles). Thus, as in most peripheral economies, GDP growth is constrained by the availability of foreign exchange to pay for critical intermediate and capital goods. This dependency becomes apparent in Argentina's resilient import demand function: income elasticity was 2.95 and real exchange rate elasticity was

[2]In 1991–2011, the composition of exports in nominal U.S. dollars was as follows: agricultural products—56 percent; manufactures—29 percent; and fuels and minerals—15 percent. Abstracting from the rise in commodity prices in 2007–11 (i.e., in constant 1993 prices) the share of manufactures rose from 26 percent in 1991–95 to 39 percent in 2005–11. In all our calculations, we removed gold and copper (1.4 percent of total exports in 2007–11) from manufactures and added them to minerals. Argentina started exporting gold and copper in 2007.

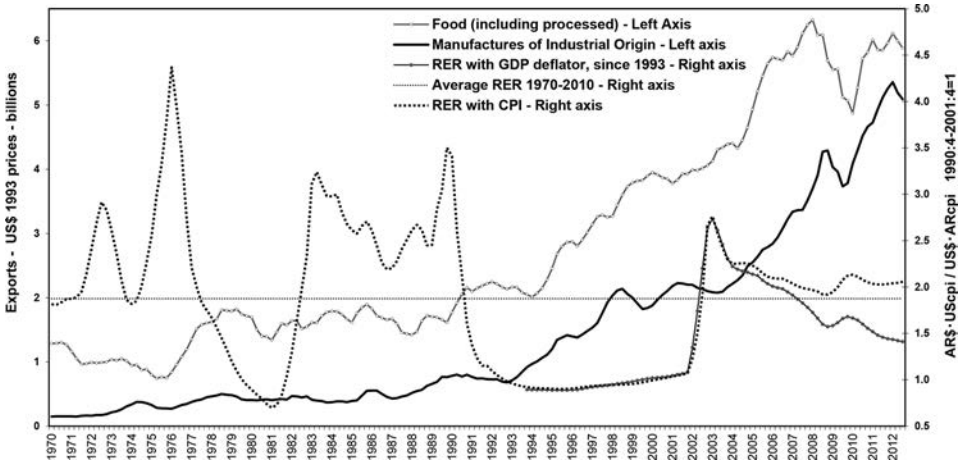

Figure 1. Argentine exports at constant prices and the real exchange rate, 4 quarters, moving exchange rate. *Source*: Free market exchange rate 1953–97 FIEL, www.fiel.org.ar; from 1998 onwards Banco Central de Republica Argentina. Exports and prices INDEC of Argentina and Economic Commission for Latin America; US.CPI www.bis.gov. GDP deflator since 1993 INDEC. Gold and copper (1.4% of total exports).

0.4 in 1992–2008 (Nicolini-Llosa, 2011).[3] Therefore, given the exchange rate, exports must grow 2.95 times faster than GDP for the current account to be in balance (CEPAL, 1955, p. 18; Chena, 2014; Thirlwall, 1997).

3. The service sector is largely nontradable and represents about two-thirds of GDP. Industry has traditionally been protected by para-tariff barriers, by Argentina's geographic location, by two world wars, and by the interwar crisis. Since early industrialization at the start of the twentieth century, domestically demanded industrial consumption goods have been largely nontradable but marginally tradable depending on the long-term exchange rate. Such nontradability shows in the following facts since data on private consumption first became available in 1993: imported industrial consumer goods constituted 3.4 percent of total private consumption in 1993–2012; the remaining 96.6 percent of these goods were produced domestically.[4] Domestically produced industrial consumer goods (including cars)

[3]In his import demand function, Nicolini-Llosa (2011) detected a structural change in the first quarter of 1992 corresponding to the aggressive trade liberalization policy. Thus, income elasticity *rose* from 1.72 in 1970–91 to 2.95 in 1992–2008. Nicolini-Llosa (2011) regressed quarterly nonstationary unit-root time series into Engle and Granger's ordinary least squares (OLS) long-run equation. The corresponding augmented Dickey–Fuller test of residuals of the OLS equation rejected the null hypothesis of no cointegration. The short-term values converged to long-term values in the error correction model. Specification errors, serial correlation, and heteroskedasticity were not detected. Income elasticity was 2.42 in 1980–97 (Catao and Falcetti, 2002) and 2.76 in 1993–2008 (Berretoni and Castresana, 2009).

[4]This results from multiplying (a) the 0.142 ratio of imported manufactured consumer goods to total imports by (b) the 0.239 ratio of total imports to total private consumption, that is, $0.142 \times 0.239 = 0.034$. The trade liberalization period 1993–2001 yields $0.173 \times 0.161 = 0.028$. This is a higher than average ratio of manufactured consumer goods imports to total imports of 0.173, but a lower than average total imports to total private consumption ratio of 0.161. The latter is because GPD grew 2 percent p.a. in 1991–2001, but 5.5 percent p.a. in 2002–2012, given the above-mentioned high income elasticity of demand for imports.

represented only 9.9 percent of total exports in 1993–2012. Almost half of these exports went to Mercosur (a regional tariff-protected trade zone).

4. To the extent that industrial (mostly consumer) goods are nontradable, their prices in pesos are set as a markup over variable costs (Aspiazu and Manzanelli, 2011; Eichner, 1973; Kalecki, 1938; Lee, 2004; Manzanelli and Schorr, 2013; Scitovsky, 1978; Sylos Labini, 1979). No significant CPI reductions have occurred since 1950.
5. Demand for labor is mostly from industry. Agricultural production in 1970–2014 was 7.7 percent of total production and represented 5.1 percent of total labor demand. Immigration barriers in industrialized economies, along with relatively open immigration into Argentina from the rest of the world, generate an ample supply of labor. Since 1970, the urban population has accounted for 90 percent of the total population. An aerial view of the Pampa Húmeda shows 600,000 square kilometers of beautiful and prosperous crops with practically no human presence while population crowds into cities with growing poverty agglomerations.

Sectoral purchasing power parities

The parity price of any product is defined as its cost price measured in international units of account independently from the real exchange rate. The PPP of each product is the ratio of its domestic parity price to its international parity price. In this study, the SPPPs are per product, as in Parsley and Wei (2007), International Bank for Research and Development (IBRD, 2008), and Crucini et al. (2010). We do not follow the traditional approach (e.g., Rogoff, 1996) that considers a single aggregate PPP. The SPPP of each Argentine export sector is defined here as the export-weighted average of product PPPs corresponding to individual export products. Throughout this averaging, each weight-coefficient is the share of each product's exports in the relevant sector's total exports. This allows us to define agricultural and industrial SPPPs and label them as α_1 and α_2, respectively.

Worldwide agriculture parity prices are set in a Ricardian fashion at the marginal land cost, where differential rent is negligible. In Argentina, most producers have costs below marginal land costs, indicating differential rent for landowners. Bus and Nicolini-Llosa (2015) estimated land rent corresponding to the five largest crops as 4.42 percent of GDP in 2002–8.

To complete Argentina's economic structure, we assume that in the world market a unit of a given tradable manufactured bundle produced in Argentina trades both for a unit of the same bundle produced elsewhere and for an international unit of account. Thus, their parity prices are the same, which implies $\alpha_2 = 1$. Moreover, a unit of a tradable food bundle produced in the rest of the world has that same parity price. The same food bundle produced in Argentina, however, trades for the other three bundles but has a remarkably lower parity

price. This is because Argentina's marginal land employs much less capital and labor per unit of output than the less fertile marginal land in the rest of the world. Thus, Argentina's agricultural SPPP α_1 is lower than its industrial SPPP α_2:

$$\alpha_1 < \alpha_2 = \alpha_w = 1 \tag{2}$$

The following notation will be used:
1: Food (includes processed agricultural products and farming)
2: Industrial goods (excludes processed food)
n: Nontradables
w: Rest of the world
α: Sector purchasing power parity (SPPP) in international units of account independent from the real exchange rate ρ

According to the Dutch disease argument (Cordon and Neary, 1982), to be in line with world tradables' PPP the relatively high nontradables' SPPP would have to be multiplied by the relatively low SPPP of the strongly advantageous natural resources. This is because costly nontradables have tradable inputs that become less costly at the low natural resource SPPP. In our Argentine case, this yields $\alpha_n\alpha_1 = \alpha_2 = \alpha_w$.

Measured in international units of account, the Argentine agriculture profit rate r_1 permanently exceeds the world benchmark rate r_w, that is, productive capital mobility toward the sector endowed with high fertility is sluggish enough to sustain $r_1 > r_w$, as in Ricardo (1821, p. 136). Subject to international competition and with no natural endowment, the price-taker export industry has a profit rate r_2 similar to r_w. With costs above international costs, nontradables' profitability r_n would be below r_w, if measured internationally. Equivalent bundles of goods tend to trade at a single price. Therefore, to construct the profit rates arbitrage condition (3) below, the profit rates of the tradable sectors, r_1 and r_2, are multiplied by their own SPPP, α_1 and α_2, respectively. For Dutch disease consistency, the relatively low nontradables' profit rate r_n is divided by the low agricultural SPPP $\alpha_1 < 1$. Thus, all three sectoral rates are set equal to the benchmark r_w, as in the following profitability equalization condition:

$$\alpha_1\ r_1 = r_n/\alpha_1 = \alpha_2\ r_2 = r_w, \tag{3}$$

with *r*: Profit rate in international units of account, independent from the real exchange rate ρ

Equation (3) says that the equalization of sectoral profitabilities—measured in international units—implies using different SPPPs.

Inflation-devaluation pressures

Anticipating the Dutch disease by a decade, Diamand (1972) argued that the sectoral productivity differentials captured in Equation (2) depress ρ. In order to discuss the full dynamics of ρ, it seems convenient to extend Diamand's

Table 2. Annual devaluation and inflation rates and real exchange rate in Argentina 1970–2010, with monthly data.

	$\widehat{er} = \Delta_{t-12}$ LN(AR$/US$)	$\widehat{cpi} = \Delta_{t-12}$ LN(ARcpi)	$\rho = er^{*}UScpi/ARcpi(1999{:}4Q = 1)$
Average	62.1%	66.1%	1.95
Std. dev.	88.3%	87.8%	94%

Source: *Arcpi*: www.indec.gov.ar; *Uscpi*: ww.bls.gov; Free market nominal exchange rate prior 1998 from www.fiel.org.ar; after 1998 from www.bcra.gov.ar.

argument and consider sectoral profitabilities, too. Since ρ is a monetary variable, we must account for monetary profitabilities.

The traditional approach (e.g., Rogoff, 1996) considers the long-term real exchange rate as a proxy for a single aggregate PPP. Two necessary conditions are implicit: (a) that profitabilities tend toward an average rate of profit; and (b) that capital is mobile enough for such a tendency to drive product PPPs toward clustering around a single aggregate PPP.[5] In Argentina, the latter is not fulfilled because product PPPs cluster around not one, but two remarkably different SPPPs, α_1 and α_2.[6]

Figure 1 shows the volatility in ρ. Table 2 shows the high rates of inflation and devaluation, and their correspondingly large volatilities in 1970–2010.

In Argentina, as in most countries, the CPI is calculated largely with nontradables. Now consider costs, land rent, and profitability measured in domestic currency at constant prices, that is, real pesos. Argentina's nontradable sector demands nonsubstitutable, tradable inputs (typically, imported capital and intermediate goods). Tradable prices equal the international price multiplied by the nominal exchange rate *er*. Exportables partially use nonsubstitutable, nontradable inputs. Thus, land rent and sectoral real monetary profitabilities are a function of $\rho = er/cpi$. According to condition (3), profitability in sector i meets the international rate r_w when $\rho = \alpha_i$. Clearly, ρ cannot simultaneously equal α_1 and α_2. Therefore, the equalization condition (3) is never fulfilled and it becomes the following profitabilities inequality:

$$\begin{cases} \rho r_2 = r_w & if\ \rho = \alpha_2 \\ \rho r_1 = r_n/\rho = r_w & if\ \rho = \alpha_1 \\ \rho r_2 < r_w & if\ \rho < \alpha_2 \\ \left.\begin{array}{l} \rho r_1 < r_w \\ r_n/p < r_w \end{array}\right\} & if\ \rho < \alpha_1 \end{cases} \tag{3'}$$

Inequality (3′) is illustrated in Figure 2, which shows that industrial profitability ρr_2 is below the international benchmark r_w if $\rho < \alpha_2$. On the other hand, if

[5]An additional necessary condition for a single PPP to hold is that the quantity theory of money would apply. Evidence, however, is that causality does not go from money to prices and then to the exchange rate, but the other way around (Harvey, 2006). The PPP presents additional problems besides the necessity of the quantity theory (Flassbeck and La Marca, 2009; La Marca, 2004). However, this goes beyond the scope of this study.

[6]Obstfeld and Rogoff (1996, ch. 4) show that in a tradable/nontradable economy with capital mobility and equal profit rates, the real exchange rate need not converge to the PPP. In Argentina, PPP does not hold for tradables, even if nontradables are dismissed—Equation (2).

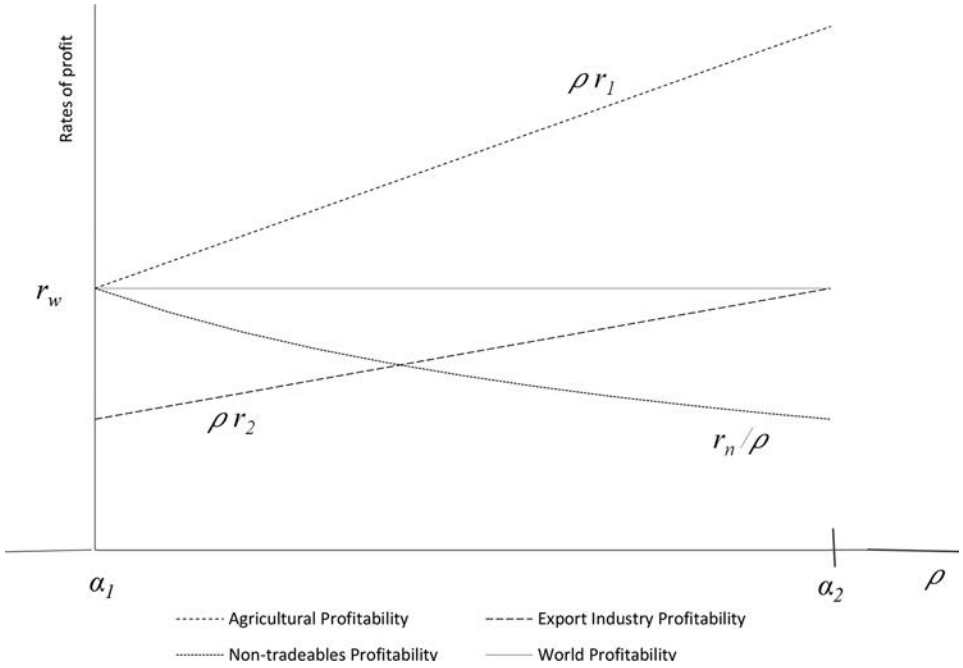

Figure 2. Sectoral profitabilities and the real exchange rate.

$\rho > \alpha_1$, nontradables' profitability r_n/ρ is below r_w, and agricultural profitability ρr_1 is above r_w.

To discuss the consequences for ρ of profitabilities' inequality (3′) the dynamics of ρ's two components are depicted as follows:

$$\widehat{cpi} = \gamma_1 \left(\frac{\rho}{\alpha_1} - 1 \right) \tag{4}$$

$$\widehat{er} = \gamma_2 \left(\frac{\alpha_2}{\rho} - 1 \right) \tag{5}$$

with $\alpha_1 \leq \rho \leq \alpha_2$ and $(\gamma_1; \gamma_2) > 0$,
where:

γ: Sectoral profitability speed of adjustment toward international profitability;

$\wedge$: A hat on a variable indicates pressure, not actual change. Pressure is the change that would be required in the variable for the relevant sector's profitability to equal the world profitability benchmark.

Equations (4) and (5) capture the pressure on *cpi* or *er* for the relevant sectoral profitability to meet the benchmark r_w. Assuming a *tendency* for profitabilities to arbitrage, pressures $\widehat{cpi}$ and $\widehat{er}$ are proportional to the distance between r_w and the corresponding sectoral profitability. When *cpi* or *er* gives in to pressure, it moves at a speed γ that, for simplicity's sake, we assume constant.

Pressures $\widehat{cpi}$ and $\widehat{er}$ are in opposition only within the range $\alpha_1 \leq \rho \leq \alpha_2$, which depicts Argentina's case. At $\rho < \alpha_1$, neither agriculture nor industry is internationally competitive—both sectoral profitabilities are below r_w in (3′)—which would generate trade deficit and unidirectional upward pressure on ρ. At $\alpha_2 < \rho$, both sectoral profitabilities are above r_w in (3′) and the long-term trade surplus would unidirectionally depress ρ.

For clarity, we will consider the relationship between GDP and ρ later.

The dynamics of the system of Equations (3) and (4) are discussed below with the aid of Figure 3.

At $\rho = \alpha_1$ in Figure 2, the profitabilities in agriculture and the nontradable sector are in line with the international benchmark r_w, but profitability in export industries falls short. With its profitability in line, the nontradable sector inflationary pressure is nil, that is, $\widehat{cpi} = 0$ in Equation (4) and Figure 4 (presented later in the study). If devaluation (the rise in *er*) raises ρ away from α_1 toward α_2, inflationary pressure $\widehat{cpi}$ increases because suppliers of nontradables would try to mark up prices to protect their profitability. The latter is depressed by the rise in prices of tradable inputs that increase along with er.

As ρ reaches α_2, industrial exports' profitability meets r_w, but agricultural profitability is above and nontradables' profitability below r_w, respectively, in Figure 2. The current account is in balance and the devaluatory pressure $\widehat{er}$ is nil in Equation (5) and Figure 3. Differential land rent is at its maximum and it accumulates in inexpensive domestic assets, adding demand-inflationary pressure.

At $\rho = \alpha_2$, as inflationary pressure becomes effective and ρ falls toward α_1, devaluatory pressure $\widehat{er}$ increases because: (a) the foreign trade deficit increases as the industrial sector loses competitiveness; and (b) rentiers

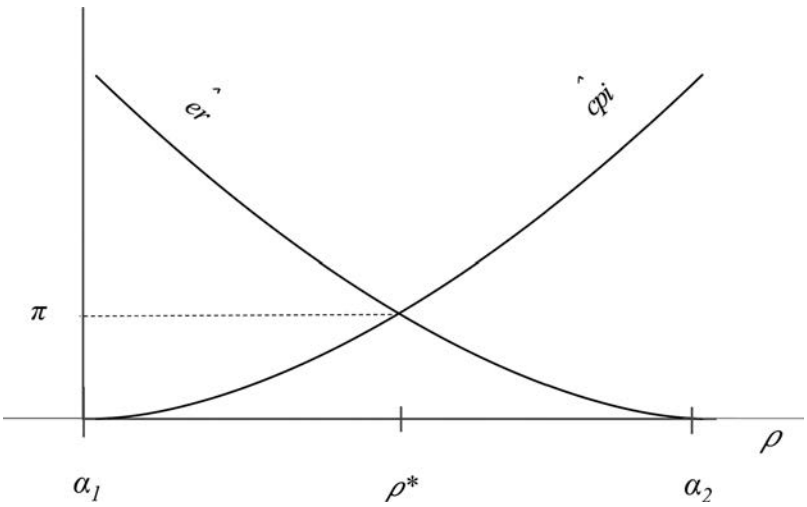

Figure 3. Inflation and devaluation pressures and the real exchange rate.

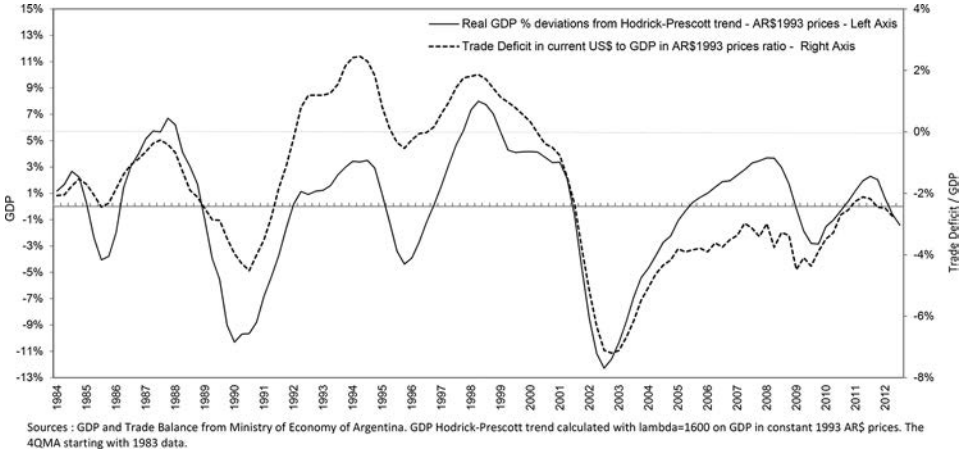

Figure 4. Argentina's gross domestic product (GDP) cycle and trade account deficit to GDP, four quarter moving average. *Sources*: GDP and Trade Balance from ministry of Economy of Argentina. GDP Hodrick-Prescott trend calculated with lambda = 1600 on GDP in constant 1993 AR$ prices. The 4QMA starting with 1983 data.

demand reserves from the central bank to convert their domestic assets into foreign currency.

The speeds γ_1 and γ_2 are the slopes of curves $\widehat{cpi}$ and $\widehat{er}$, respectively—depicted in Figure 3. We could regard speed γ_1 as a function of the domestic degree of monopoly and the low productivity of the nontradable sector. We could regard speed γ_2 as a function of the sectoral structure of the foreign trade sector with its low exchange rate elasticity of exports and large income elasticity of demand for imports—again the particulars of this will become clear in the GDP cycle discussion. For simplicity, assume that $\gamma_1 = \gamma_2 = 1$, and (4) and (5) yield the following rate of inflation-devaluation pressure π. See the Appendix for the mathematics:

$$\pi = (\alpha_2/\alpha_1)^{1/2} - 1 \tag{6}$$

Equation (6) says that for a given GDP, the SPPP duality, $\alpha_1 < \alpha_2$, generates a permanent rate of structural inflation-devaluation pressure π, even when expectations and money are not considered.

Approximate values for the sectoral purchasing power parities

The values of α_1 and α_2 can be approximated as follows. In the 1991–2001 period, during which agricultural export prices were not particularly favorable and ρ was kept at a remarkably low value, the agricultural exports' growth rate rose significantly (see Figure 1).[7] Thus, $\rho = 1$ (in 1990–2001 average prices)

[7]The ratio of agricultural average export prices in 1991–2001 to their average price in 1986–2012 was 0.90. This same ratio for manufacturing exports was 0.98, indicating that in 1991–2001 agricultural export prices were below their long-term average and below the manufacturing export prices in 1991–2001.

may be regarded as the approximate value of α_1. It is reasonable to assume that when $\rho = \alpha_1$ there is a long-term current account deficit because a part of the industry cannot export.

The long-term exchange rate average $\bar{\rho}$ is that of a long-term current account balance, by definition. The 1970–2010 average $\bar{\rho} = 1.95$ at 1990–2001 prices nearly doubled the size of $\alpha_1 = 1$ (see Figure 1 and Table 2). Thus, it is reasonable to assume that when $\rho = \bar{\rho}$ the agricultural sector has a foreign surplus. Given the overall current account balance, the rest of the economy must have a foreign deficit. Consequently, if only industry exported, its long-term exchange rate would have to be higher than $\bar{\rho}$ for the current account to be in balance. Therefore, $\bar{\rho} < \alpha_2$ should hold. A conservative assumption is:

$$\alpha_2/\alpha_1 \approx 2 \tag{7}$$

To illustrate the theoretical point, feed the simplified Equation (6) with this remarkable gap between α_1 and α_2 into Equation (7). To simplify further, assume that the unit of time was three years, meaning that it would take three years for $\widehat{cpi}$ to move ρ from α_2 to α_1 given er_0 (see Figure 3). From the opposite end, given cpi_0, it would take three years for $\widehat{er}$ to move ρ from α_1 to α_2. In this simple theoretical example, the annual rate of inflation-devaluation pressure π in Equation (6) would be:[8]

$$\pi = 12.2\% \text{ p.a.} \tag{6'}$$

The question naturally emerges as to why ρ does not tend to a stable value between α_1 and α_2, such as ρ^* in Figure 3. Instability in ρ was significant throughout the period 1970–2012 (see Table 2).

Imbs et al. (2005) mathematically prove that real exchange rate instability increases with differences in sectoral PPP dynamics in general. In the Argentine case, differences in sectoral dynamics result from sectoral income redistribution and GDP fluctuations in relation to the exchange rate.

GDP and the real exchange rate

In 1984–2012 Argentina's real GDP growth rate was 3.3 percent p.a. with a standard deviation of 6.5 percent, which indicates wide fluctuations.[9] Maximum and minimum were 14.7 percent in 1992:Q1 and negative 16.3 percent in 2002:Q2, respectively (see Figure 4).

To discuss the GDP cycle we refer to Figures 1–4 above and add Figure 5, depicting the correlation between poverty and changes in the inverse of the real exchange rate (i.e., 1 / ρ) for the period 1988–2008. Poverty captures both employment (GDP level) and real wages.

[8] $\pi = (\alpha_2/\alpha_1)^{1/(2*3)} - 1 = 2^{1/6} - 1 = 0.122$ p.a.
[9] $GDP_t/GDP_{t-4} - 1$ at constant 1993 AR$ prices.

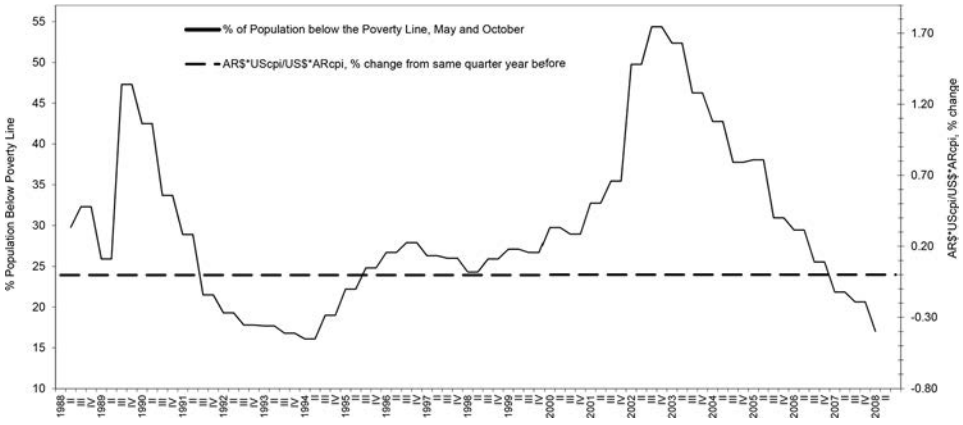

Figure 5. Real exchange rate and poverty in Argentina. *Source*: People liveing below the poverty line in Buenos Aires and Great Buenos Aires, "Encuesta permanente de Hogares" www.indec.gov.ar; no data prior 1988. Exchange rate from www.BCRA.gov.ar

The structuralist literature—the so-called stop–go literature—lacks an endogenous *go* phase (e.g., Braun and Joy, 1968; Chena 2014; Diamand, 1972, 1978; Diaz Alejandro, 1963).

Let us initially assume that the structuralist *stop* phase or recessive devaluation ($\rho \to \alpha_2$) is complete, that is, the economy is at any of the troughs in Figure 4 and it is at any of the two peaks in Figure 5. At $\rho = \alpha_2$, the current account is in balance and devaluatory pressure is negligible ($\widehat{er} \approx 0$ in Figure 3). As discussed above, ρ begins to fall when $\rho = \alpha_2$ because $\rho r_1 > \rho r_2 = r_w > r_n/\rho$ in inequality (3′) and Figure 2. The fall in ρ implies rising devaluatory pressure $\widehat{er}$ and declining inflationary pressure $\widehat{cpi}$ in Figure 3. The fall in ρ is a fall in the domestic relative price of tradables (mostly food, imported inputs, and capital goods) vis-à-vis nontradables (services and part of the manufactured consumer goods). Food demand has low price elasticity. Thus, given GDP, such a fall in the domestic relative price of food allows for a rise in wage earners' demand for manufactures. In addition, the decline in ρ redistributes income away from exporters and rentiers, toward wage earners with a higher propensity to spend. Thus, GDP expands and poverty declines in Figure 5. Note that the wage rise is the result of the fall in food prices (tradables in general), not the result of a rise in real monetary wages paid by the labor-intensive, nontradable domestic industry. The typically high income elasticity of demand for manufactures expands GDP even further. With falling tradable input prices, expanding demand and higher capacity utilization, profitability in the nontradable sector r_n/ρ improves as ρ declines in Figure 2. The trade account deteriorates in proportion to the large income elasticity of demand for imports. Figure 4 shows the GDP correlation with the foreign trade deficit. As long as foreign lending or a temporary rise in Argentina's terms of trade counters the rising pressure of nominal devaluation $\widehat{er}$, ρ continues to fall toward α_1, GDP

and domestic absorption continue expanding and rentiers continue demanding reserves from the central bank in their portfolio shift toward relatively inexpensive foreign-denominated assets.

At $\rho = \alpha_1$, the profitabilities in both agriculture and nontradables are in line with the international benchmark, $\rho r_1 = r_w = r_n/\rho$ in inequality (3′) and Figure 2. Poverty is relatively low (Figure 5) and GDP is at its peak (Figure 4). Position $\rho = \alpha_1$ is a source of instability since the export industry's profitability ρr_2 is below r_w by $(\alpha_2 - -\rho)$, the current account is negative (Figure 4), and rentiers' demand for relatively inexpensive foreign exchange is high.

At $\rho = \alpha_1$ devaluatory pressure exceeds inflationary pressure ($\widehat{cpi} < \widehat{er}$ in Figure 3).

To discuss the recessive phase we draw on the structuralist literature mentioned above. To this literature we add an explicit reference to sectoral profitabilities. Whenever the central bank's reserves fall to a critical level, devaluatory pressure $\widehat{er}$ becomes effective, raising ρ and hence the domestic relative price of food as well. The low price elasticity of demand for food depresses demand for manufactures for a given GDP. The rise in ρ transfers real income toward nonwage earners with a low propensity to consume domestic manufactures (including rentiers with a low propensity to invest in the production of goods or services in general). Thus, domestic manufacturing and GDP fall. The high income elasticity of domestic demand for manufactures relative to food reinforces the fall in manufacturing and in domestic absorption. Nontradables' profitability r_n/ρ falls in Figure 2 because: (a) demand falls and idle capacity increases; (b) prices of critical tradable inputs rise; (c) the decline in real wages is due to the rise in tradables prices (e.g., food), not necessarily due to lower real monetary wages; and (d) the recession reduces the speed with which producers of nontradables are able to mark up higher costs.

The recessive effect during devaluation is not compensated by the rise in exports because exchange rate elasticities of exports are low, particularly in the short term, as discussed above. In addition, the economy is relatively closed—exports were 17.5 percent of GDP in 1993–2012. Note the remarkable leaps in poverty during devaluation in Figure 5.

Nominal recessive devaluation exceeds inflation during $\rho \to \alpha_2$, because of the shortage of foreign exchange and the temporary fall in the markup. The recession eventually generates a large trade surplus through the large income elasticity of demand for imports (see Figure 4). This resets the central bank reserves. Thus, nominal devaluation stops and devaluatory pressure $\widehat{er}$ becomes nil when $\rho = \alpha_2$. The cycle continues with *cpi* eventually giving in to inflationary pressure $\widehat{cpi}$, which depresses ρ toward α_1. GDP expands due to a rise in domestic absorption, as discussed above.[10]

[10]De Gregorio et al. (1998) test a sharp rise in the consumption of manufactures at the end of large devaluations in Argentina and other developing countries with high exchange rate instability.

In line with Keynes (1936) and Harvey (2007), throughout our explanation the level of activity and employment is not an inverse function of real wages. In the case of Argentina, employment relates inversely to the real exchange rate. The position ρ^* in Figure 3 where the two opposing pressures are equal is not a full employment position. Employment is higher in α_1. This incentivizes governments to allow ρ to fall toward α_1 through foreign indebtedness. On the other hand, once lack of foreign finance and insufficient central bank reserves trigger devaluation, the recessive rise in ρ cannot stop before reaching current account balance in α_2. Therefore, ρ^* is not a stable position if GDP and foreign finance are considered. Clearly, the capital account is relevant.

Expectations and the capital account

After decades of inflation-devaluation, the domestic currency was debased. The ratio of bank domestic deposits to residents' foreign financial assets is low for world standards. The local capital market is small; domestic stock market capitalization is also well below international standards. Banks' private assets and liabilities are mostly of short maturity. Three times already, during the devaluation phase of the cycle ($\rho \rightarrow \alpha_2$), in 1962, 1989, and 2001, deposits were confiscated in an attempt to stop the run on the peso and on banks' deposits. In 1983 and 2002, contracts were defaulted throughout the economy during devaluation. Therefore, savings are mostly in foreign currency.

If applied to transforming the economic structure, access to international finance can permanently alter the foreign-exchange-constrained cycle (Moreno-Brid, 1998; Thirlwall and Hussain, 1982). This has not been the case with Argentina's indebtedness. Argentina's economic structure is currently similar to that of the 1970s. Indebtedness is used mostly to finance the current account deficits when ρ is near α_1 where structural unemployment is lower.

With Argentina having no access to capital markets since defaulting in 2002, the condition for current account equilibrium became binding again. In 2012, the current account approached the negative and a run on the peso began. To prevent devaluation the government has used reserves and exchange rate controls. A volatile gap of about 50 percent on average existed between the exchange rates on the official and the black markets from 2012 until devaluation in December 2015.

So far, we have abstracted from expectations and money. We can now remove this assumption. After decades of experience, Argentine investors and rentiers have the incentive to anticipate the reward cycle. Therefore, as the current account deteriorates during the expansionary phase, devaluatory expectations gradually build up and capital eventually flees the peso. This can contribute to precipitating and deepening the recessive devaluation. In fact, recession can anticipate devaluation if the central bank postpones the latter by selling reserves and raising domestic interest rates above the expected devaluation rate. Unless the interest rate rises sufficiently to generate

recession, the trade account continues to deteriorate due to the high income elasticity of demand for imports. Just as governments have the incentive to avoid recessive devaluation, as discussed above, they have the incentive to avoid a monetary-induced recession. Without recession central bank reserves are depleted and devaluation inevitably occurs. The resulting recession resets central bank reserves, and expectations of devaluation end. Foreign exchange flows back to take advantage of relatively low wages and low prices of nontradable goods and domestic assets. This capital inflow reinforces GDP expansion along with $\rho \to \alpha_1$, as discussed above.

Those who manage to anticipate the cycle accumulate foreign exchange when ρ is near α_1, to spend it domestically when ρ is near α_2, and repurchase it when ρ declines. This implies a proportional redistribution of income away from the vast majority of the population with small or null saving capacity. Rentiers' share in total wealth rises and their capacity to challenge the central bank increases. Thus, expectations about the future exchange become increasingly important to economic policy. Moreover, such rentiers' foreign exchange accumulation represents idle resources for the domestic economy. This depresses long-term investment and growth.

The cyclical current account deficit during the expansionary phase $\rho \to \alpha_1$ implies foreign debt growth. Interest payments force a long-term trade surplus. A foreign debt default, like that in 2002, resets the trade account but hinders access to international capital markets. This occurred in 2003–15.

Dual exchange rate policy

Dual real exchange rate policy (Diamand, 1978; Kaldor, 1964) recognizes the duality $\alpha_1 < \alpha_2$. This policy consists in levying an export duty $\tau = \rho - \alpha_1$ on food exports while fixing $\rho \approx \alpha_2$ for the rest of foreign trade. It aims at encouraging export-led growth (Freund and Peirola, 2012; Setterfield, 2002) while moderating the rise in domestic food prices, thus buffering the inflationary-recessive impact of a high ρ.

Dual exchange rate policy has been applied frequently over the past seventy years or more: in 1945–55, 1967–70, 1973–75, and 2002–15. Each one of these periods ended with recessive devaluation, and the dual exchange rate policy was abandoned. The following factors undermine the dual real exchange rate policy:

The export duty, $\tau \approx \rho - \alpha_1$, sets Argentina's agricultural profitability at the international level $(\rho - \tau)r_1 = \alpha_1 r_1 = r^w$. This withdraws the incentive for capital to expand Argentina's agricultural frontier at a faster pace than the international agricultural frontier, thus the ratio α_2/α_1 does not fall. The inflation-devaluation pressure π, which is a function of α_2/α_1 in (6), does not fall either.

In other words, the export duty τ does not reduce the high cost pressure of nonfood tradables (both imported and exportables) when priced at $\rho \approx \alpha_2$. The inflationary response of nontradables to protect profit margins persists.

Thus, ρ eventually tends toward α_1, albeit at a slower speed than without τ. The decline in ρ would gradually deteriorate the trade account, generating devaluatory pressure $\widehat{er}$, as discussed above. To the extent that policy exceptions are allowed—for example, exchange rate below α_2 for capital goods imports—the net export duty τ falls. The trade balance deteriorates faster and the policy loses effectivity.

Closing the gap between sectoral purchasing power parities

The great variety of economic policies adopted throughout the history of Argentina (Chudnovsky and Lopez, 2007; Diaz-Alejandro, 1970) never aimed at reducing the α_2/α_1 ratio. Closing this gap would reduce the inflation-devaluation pressure π in Equation (6) and with it, the structural ingredient in real exchange rate instability, that is, a high standard deviation $\sigma(\rho)$. Lowering $\sigma(\rho)$ would contribute to reducing uncertainty, thus enabling higher investment. Lowering $\sigma(\rho)$ would defuse the rise in inequality resulting from cyclical currency devaluations. This would both disincentivize private foreign currency holdings, and reduce the central bank's minimum foreign exchange reserves requirement. Additional capital would become available to finance growth.

Reducing α_2/α_1 implies removing our assumption of sluggish capital mobility toward agriculture. It implies that Argentina's agricultural frontier would expand at a faster pace than the international agricultural frontier. Because of diminishing returns in agriculture, this would raise α_1. Equations (2) and (7) yield $\alpha_w = 2\ \alpha_1$. If our estimation is correct, there is an opportunity for large rural investment to raise Argentina's share in world food exports until $\alpha_w = \alpha_1$.

The following two types of policy for reducing α_2/α_1 are envisaged.

Deindustrialization policy with unemployment

Reducing α_2/α_1 through deindustrialization implies eliminating α_2 and allowing market forces to drive capital toward the agricultural frontier to raise α_1. This policy matches the traditional International Monetary Fund (IMF) stabilization policies (Krueger, 1997). Easterly (2005) argues that IMF policies were ineffective for growth.

This deindustrialization policy would work as follows: freezing nominal wages when $\rho = \alpha_2$ would restrain the cyclical GDP recovery. Thus, stagflation would both reduce real wages and depress ρ down toward α_1, where inflationary pressure $\widehat{cpi}$ ceases. Only a few industrial exports with competitiveness based on lower wages would remain. Matching the real wage reduction, deindustrialization would take place in industries formally providing wage goods. To sustain long-term current account balance, the economy would grow at the volatile agricultural exports growth rate divided by the income elasticity

of demand for imports (CEPAL, 1955; Thirlwall, 1979). With immigration barriers in higher wage economies, unemployment would remain high until α_1 reached $\alpha_w = 1$ through a process of uncertain duration.

High growth and high employment policy

High employment policy of reducing α_2 / α_1 would require raising α_1 through massive rural industrialization, and reducing α_2 through technological enhancement.

A policy of inducing capital and labor mobility through public rural infrastructure investment (education, health, communications, energy, and transport) could raise α_1 and the growth of agricultural exports. This rural investment would demand massive domestic labor migration away from historically large urban poverty agglomerations. New rural infrastructure would contribute to raising agricultural productivity, thus extending the rise in Argentine agricultural production relative to world production until $\alpha_1 \rightarrow \alpha_2$. Easterly (2007) tested that abundant agricultural endowments correlate with inequality. A high employment policy of raising α_1 would contribute to overcome inequality. Lipton (2009) shows the positive effect on growth of egalitarian rural regimes in a large sample of countries.

The acceleration in agricultural exports' growth along with $\alpha_1 \rightarrow \alpha_2$ would provide the foreign exchange for imports of capital goods and technology in all sectors, thus allowing industry to gain competitiveness. Consequently, α_2 would fall and the share of Argentina's industrial exports in world exports would rise. Both the rise in α_1 and the reduction in α_2 would raise the export to GDP ratio, relaxing the constraint placed on growth by the balance of payments. The consequent reduction in the ratio of nontradables to GDP and the productivity gains in nontradables would tend to reduce the degree of monopoly and reinforce the fall in the inflation-devaluation pressures. Although the domestic price of food would rise with α_1, the provision of health, education, communications, energy, and transport could compensate for the impact of higher food prices on real wages.

Initially, the funds required for rural investment could result from a tax on land rent (i.e., a land tax). This would temporarily reduce the price of land and facilitate migration toward agriculture. Gradually, as $\alpha_1 \rightarrow \alpha_2$, the whole process becomes self-sustainable as the export growth rate increases. Higher productivity resulting from investment in rural infrastructure would gradually produce a recovery of land prices. All parties would benefit from the rise in productivity.

Conclusions

To discuss Argentina's secular cycle of recessive devaluation and subsequent inflation during the expansion, we present a new and fully endogenous GDP

cycle in relation to the exchange rate. For this purpose, we depicted Argentina's sectoral economic structure. The highly fertile and relatively small agricultural sector provides most of the foreign exchange required by the rest of the economy to pay for imports of critical capital and intermediate goods. The exporting industrial sector demands substantially more labor per unit of output and has an SPPP (α_2) higher than agriculture's SPPP (α_1). This gap is approximately $2\alpha_1 = \alpha_2$. Inflationary expansion cyclically depresses the real exchange rate ρ toward α_1 whereas recessive devaluation raises ρ toward α_2. Land rent and sectoral profitabilities are a function of ρ. Such high volatility in ρ raises uncertainty about demand and profitability, which depresses trend productivity, exports, and growth.

The opposing pressures or tendencies for profitabilities to arbitrage do not respond to classical dynamics (Nicolini-Llosa, 2015). What tends to raise profitability of manufacturing exports is not competitive cost-reducing innovation, but devaluation pressure resulting from a current account deficit caused, in turn, by nontradables oligopoly pricing. What reduces agricultural profitability is not competitive price reduction by food producers but, again, nontradables oligopoly pricing. Interestingly, the less-competitive firms indirectly drive profitabilities in the two competitive sectors. Rentiers learn and feed the cycle with their own profitable portfolio choices diverting resources away from wages and productive investment.

The wide $2\alpha_1 = \alpha_2$ gap sets a structural floor to what conventional economic policies can achieve for a given GDP. If our analysis were correct, taming structural inflation by tightening money supply or controlling a run on the currency by raising interest rates would shrink GDP well beyond target.

Addressing this structural problem would require reducing the $2\alpha_1 = \alpha_2$ gap, through policies of: (a) rural industrialization that would incorporate land whose fertility is subutilized by international standards into production, thus raising both α_1 and agricultural exports growth; and (b) technological innovation that would reduce α_2 and increase industrial exports growth. Higher overall exports growth would allow for higher imports of capital goods and productivity growth, relaxing the balance of payments constraint on GDP growth. Such policies would both induce domestic migration away from the historically large and growing urban poverty agglomerations, as well as reduce structural labor unemployment. With a larger foreign trade to GDP ratio, the nontradable sector would reduce its relative size. Therefore, the inflation-devaluation pressure would tend to decline even further. Finally, lower real exchange rate instability would defuse recurring income redistribution toward rentiers holding foreign exchange. This would supply capital for additional growth.

Adaptation of this article's analysis to the increasingly similar case of Brazil is open to future research along the lines, for example, of Araujo and Lima (2007), Bértola et al. (2002), and Rocha-Gouvea and Tadeu-Lima (2010).

References

Araujo, R.A., and Tadeu-Lima, G. "A Structural Economic Dynamics Approach to Balance-of-Payments-Constrained Growth." *Cambridge Journal of Economics*, 2007, *31* (5), 755–774.

Aspiazu, D., and Manzanelli, P. *La Concentración Industrial en la Argentina a Principios del Siglo XXI (Industrial Concentration in Argentina at the beginning of the 21st Century)*. Buenos Aires: Centro Cultural de la Cooperación, 2011.

Berrettoni, D., and Castresana, S. "Elasticidades de comercio de la Argentina para el período 1993–2008." *Revista del CEI: Comercio Exterior e Integración*, 2009 (16), 87–97.

Bértola, L.; Higachi H.; and Porcile G. "Balance of Payments Constrained Growth in Brazil: A test of Thirlwall's Law, 1890–1973." *Journal of Post Keynesian Economics*, 2002, *25* (1), 673–698.

Braun, O., and Joy, L. "A Model of Economic Stagnation: A Case Study of the Argentine Economy." *Economic Journal*, 1968, *78* (312), 868–887.

Bunge, A.E. *La Economía Argentina*, vol. 4. Buenos Aires: Agencia General de Librerías y Publicaciones, 1928.

Bus, A.G., and Nicolini-Llosa, J.L. "La renta diferencial agrícola en Argentina en 1986–2008, con datos de panel y co-integración (Differenctal rent in agriculture in Argentina in 1986-2008)." *Economica*, La Plata, 2015, *61* (January–December), 48–77.

Catao, L., and Falcetti, E. "Determinants of Argentina's External Trade." *Journal of Applied Economics*, CEMA, Buenos Aires, 2002, *5* (1), 19–57.

CEPAL, *Estudio Económico de América Latina 1954 (Economic Study of Latina America)*. Secretaría de la Comisión Económica de America Latina a cargo de Raul Prebisch, Naciones Unidas, Mexico, 1955.

Chena, P.I. "Balance-of-Payments-Constrained Growth in Argentina (1976–2006)." *Journal of Post Keynesian Economics*, *36* (4) 2014, 699–718.

Chudnovsky, D., and Lopez, A. *The Elusive Quest for Growth in Argentina*. New York: Palgrave Macmillan, 2007.

Corden, W.M., and Neary, J.P. "Booming Sector and De-industrialisation in a Small Open Economy." *Economic Journal*, 1982, *92* (368), 825–848.

Crucini, M., Shintani, M., and Tsuruga, T. "Accounting for persistence and volatility of good-level real exchange rates: the role of sticky information." *Journal of International Economics*, 2010, 81 (1), pp. 48–60.

De Gregorio, J.; Guidotti, P.; and Vegh, C. "Inflation Stabilisation and the Consumption of Durable Goods." *Economic Journal*, 1998, *108* (446), 105–131.

Della Paolera, G., and Taylor, A.M. eds. *A New Economic History of Argentina*. Cambridge, UK: Cambridge University Press, 2003.

Diamand, M. "La estructura productiva desequilibrada argentina y el tipo de cambio." *Desarrollo Económico*, 1972, *12* (45), 1–34.

———. "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. "A Note on the Impact of Devaluation and the Redistribution Effect." *Journal of Political Economy*, 1963, *71* (6), 577–580.

———. *Essays in Economic History of the Argentine Republic*. New Haven, CT: Yale University Press, 1970.

Easterly, W. "What Did Structural Adjustment Adjust? The Association of Policies and Growth with Repeated IMF and World Bank Adjustment Loans." *Journal of Development Economics*, 2005, *76* (1), 1–22.

———. "Inequality Does Cause Underdevelopment: Insights from a New Instrument." *Journal of Development Economics*, 2007, *84* (2), 755–776.

Eichner, A.S. "Theory of the Determination of Mark-up Under Oligopoly." *Economic Journal*, 1973, *83* (332), 1184–1200.

Flassbeck, H., and La Marca, M. "Globalization: Getting the Process Right for Convergence and Rising World Income." *Perspective of World Review*, 2009, *1* (1), 7–27.

Freund, C., and Peirola, M. "Export Surges." *Journal of Development Economics*, 2012, *97* (2), 387–395.

Harvey, J.T. "A Post Keynesian View of Exchange Rate Determination." *Journal of Post Keynesian Economics*, 1991, *14* (1), 61–71.

———. "Post Keynesian Versus Neoclassical Explanations of Exchange Rate Movements: A Short Look at the Long Run." *Journal of Post Keynesian Economics*, 2006, *28* (2), 161–179.

———. "Teaching Post Keynesian Exchange Rate Theory." *Journal of Post Keynesian Economics*, 2007, *30* (2), 147–168.

Imbs, J.; Mumtaz, H.; Ravn, M.; and Rey, H. "PPP Strikes Back: Aggregation and the Real Exchange Rate." *Quarterly Journal of Economics*, 2005, *120* (1), 1–43.

International Bank for Research and Development (IBRD). *Global Purchasing Power Parities and Real Expenditures: 2005*. International Comparison Program, 2008.

Kaldor, N. "Dual Exchange Rates and Economic Development." *Economic Bulletin for Latin America*, United Nations, 1964, 214–223.

Kalecki, M. "The Determinants of Distribution of the National Income." *Econometrica*, 1938, *6* (2), 97–112.

Keynes, J.M. *The General Theory of Employment, Interest and Money*. London: Macmillan, 1936.

Krueger, A. "Trade Policy and Economic Development: How We Learn." *American Economic Review*, 1997, *87* (1), 1–22.

Kydland, F.E. "Quantitative Aggregate Economics." *American Economic Review*, 2006, *96* (5), 1373–1383.

Kydland, F.E., and Zarazaga, C.E. "Is the Business Cycle of Argentina 'Different'?." *Economic and Financial Policy Review*, Federal Reserve Bank of Dallas, 1997, *9* (4th Quarter), 21–36.

La Marca, M. "Real Exchange Rate, Competitiveness and Policy Implications: A Formal Analysis of Alternative Macro Models." 2004, 1–56 (available at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.198.6158&rep=rep1&type=pdf).

Lee, F.S. *Post Keynesian Price Theory*. Cambridge: Cambridge University Press, 2004 [1979].

Lipton, M. *Land Reform in Developing Countries*. New York: Routledge, 2009.

Manzanelli, R., and Schorr, M. "Oligopolio e inflación; aproximación al proceso de formación de precios en la industria argentina." *Realidad Económica*, Buenos Aires, 2013, no. 273., 25–52

Medici, F., and Panigo, D. "Balance-of-Payment-Constrained Growth in Unbalanced Productive Structures: Disregarded Terms of Trade Negative Effects." *Journal of Post Keynesian Economics*, 2015, *38* (2), 192–217.

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.

Nicolini-Llosa, J.L. *Essays on Argentina's Growth Cycle and the World Economy*. Ph.D. diss., Amsterdam University. Amsterdam: Theta Thesis, 2007.

———. "Dual Equilibrium and Growth Cycle in Argentina." *International Review of Applied Economics*, 2011, *25* (2), 185–207.

———. "Dinámica de desequilibrio clásica en la tasa de ganancia." *Revista Ciclos*, no. 44, 2015, 1–13.

Obstfeld, M., and Rogoff, K. *Foundations of International Macroeconomics*. Cambridge, MA: MIT Press, 1996.

Olivera, J. *Desventajas que podría ocasionar a la República Argentina el retraso de su fomento industrial*. Buenos Aires: Editorial Figaro, 1924.

Olivera, J.H.G. "On Passive Money." *Journal of Political Economy*, 1970, *78* (4), pp. 805–814.
———. "Structural Inflation in a Semi-centralised Economy." In *Scritti in onore di Alberto Mortara*. Milan: Franco Angeli, 1990, 645–652.
Parsley, D.C., and Wei, S.J. "A Prism into the PPP Puzzles: The Micro-Foundations of the Big Mac Real Exchange Rate." *Economic Journal*, 2007, *117* (523), 1336–1356.
Ricardo, D. *On the Principles of Political Economy and Taxation*. Edited by Piero Sraffa. Cambridge: Cambridge University Press, 1821.
Rocha-Gouvea, R., and Tadeu-Lima, G. "Structural Change, Balance-of-Payments-Constraint and Economic Growth: Evidence from the Multisectoral Thirwall's Law." *Journal of Post Keynesian Economics*, 2010, *33* (1), 169–204.
Rogoff, K. "The Purchasing Power Parity Puzzle." *Journal of Economic Literature*, 1996, *34* (2), 647–668.
Scitovsky, T. "Market Power and Inflation." *Economica*, 1978, *45* (179), 221–233.
Setterfield, M., ed. *The Economics of Demand-Led Growth*. London: Edward Elgar, 2002.
Sylos Labini, P. "Prices and Income Distribution in Manufacturing Industry." *Journal of Post Keynesian Economics*, 1979, *2* (1), 3–25.
Thirlwall, A.P. "The Balance of Payments Constraint as an Explanation of International Growth Rate Differences." *BNL Quarterly Review*, 1979, *32* (128), 45–73.
———. "Reflections on the Concept of Balance-of-Payments-Constrained Growth Rates." *Journal of Post Keynesian Economics*, 1997, *19* (3), 377–385.
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.

Appendix

The two characteristic roots of the differential system of Equations (4) and (5) are:

$$R_{1,2} = \{-(\gamma_1 + \gamma_2) \pm [(\gamma_1 + \gamma_2)^2 - 4\gamma_1\gamma_2(1 - \alpha_2/\alpha_1)]^{1/2}\}/2 \qquad (A)$$

R_1 and R_2 are real and distinct since $(\gamma_1 + \gamma_2)^2 < 4\gamma_1\gamma_2(1 - \alpha_2/\alpha_1)$
Moreover, $R_1 > 0$ and $|R_1| > |R_2|$ since $\alpha_2 > \alpha_1 > 0$
All solutions to the system have the form:

$$\Phi = ae^{tR1} + be^{tR2}$$

where R_1 is the dominant root since $\Phi_{t \to \infty} = ae^{tR1}$.
Thus, we can write:

$$cpi_t \to cpi_0 e^{tR1},$$

$$er_t \to er_0 e^{tR1}.$$

With $\gamma_1 = \gamma_2 = 1$, (A) yields:

$$R_1 = \pi = (\alpha_2/\alpha_1)^{1/2} - 1. \qquad (6)$$