Real exchange rates, domestic and foreign savings: the missing link

Paulo Gala[1]
Marcos Rocha[2]

Abstract

This paper provides theoretical and empirical elements to the analysis of the relationship between real exchange rates and domestic savings. We show from a theoretical perspective how a competitive exchange rate may stimulate domestic savings by avoiding consumption booms based on currency overvaluation and by increasing profits in the tradable sector. Our baseline model shows from a short run perspective how a competitive exchange rate may stimulate investment, exports, profits and thus domestic savings. Our theoretical model is supported by empirical evidence using panel data econometric analysis, which shows a robust connection between real exchange rates and domestic savings as a share of GDP.

Key words: Real exchange rate, savings, investment and economic development

JEL Classification: F3 (International finance); F4 (Macroeconomic aspects of international trade and finance); O2 (Development Planning and policy).

Resumo

Este trabalho tem como principal objetivo investigar as relações entre nível da taxa de câmbio real, poupança externa e poupança doméstica em países emergentes. Dentro do modelo aqui explorado, casos de sobrevalorização excessiva do câmbio real levam a redução de margens de lucro nos setores de produção de bens comercializáveis resultando numa queda importante no nível de poupança agregada doméstica. A análise econométrica do trabalho indica que a desvalorização relativa da taxa de câmbio parece ter impactos importantes nos níveis de poupança doméstica de países em desenvolvimento. Os resultados das estimações, em todas as especificações, apontam para uma robusta e significativa relação positiva entre o índice de desvalorização relativa da taxa de câmbio real calculada e a poupança doméstica/PIB.

Palavras-chave: Nível do câmbio real, poupança doméstica, poupança externa e desenvolvimento econômico

Área Anpec 5: Crescimento, desenvolvimento econômico e instituições

[1] São Paulo School of Economics, Getulio Vargas Foundation. We are grateful to Luiz Carlos Bresser-Pereira for all the comments and suggestions during the work.
[2] São Paulo School of Economics, Getulio Vargas Foundation.

1. Introduction

The main purpose of this paper is to investigate the relationship between real exchange rate levels and foreign and domestic savings in emerging countries. There has been an increasing number of academic studies analyzing the effects of real exchange rates on long-term growth dynamics over recent years (see Frenkel and Taylor 2006, Bresser-Pereira 2006, Eichengreen 2007, Levy-Yeyati, and Sturzenegger 2007, Rodrik 2008, Williamson 2008). Some of these authors point out that a policy of competitive exchange rates and trade surpluses may be favorable for economic growth. These results are supported by the empirical evidence of several Asian countries, which have simultaneously shown competitive exchange rates and high growth rates. China is the leading example, followed by South Korea, Malaysia, Thailand, and others. However, while the link between a competitive real exchange rate and growth through the promotion of exports finds strong empirical support, the theoretical channels through which the exchange rate affects growth has been far less explored.

At the level of policy analysis, emerging countries' excessive reliance on foreign savings has been a continuing target of criticism. Generally speaking, this view emphasizes the potentially negative effects of foreign savings flows on the indebtedness and domestic savings of emerging countries, standing as significant obstacles against long-term growth strategies (see Bresser-Pereira 2006 and Bresser-Pereira & Nakano 2003). Many empirical studies show the negative effects of the use of foreign savings on domestic savings, in what has become known in the literature as "*savings displacement*" (Reinhart & Talvi 1998). The channels through which foreign savings exert a negative impact on domestic savings, however, remain subject of a few studies, with the exception of Bresser-Pereira (2006) and Bresser-Pereira & Nakano (2003). In a recent study, Montiel and Sérven (2008) point to the growing number of economists embracing the notion that real exchange rate levels may exercise an important influence on growth through its effects on savings and accumulation of capital.

Encouraged by this debate and building on Bresser-Pereira (2006) we assess in this paper a potential link between real exchange rate levels and domestic savings. To do so, we provide theoretical and empirical views that explore the macroeconomic channels through which exchange rates and foreign savings affect domestic savings. Applying an alternative set of theoretical and empirical approaches than Montiel and Sérven's (2008), we arrive at interesting results which show that real exchange rates seem to have a strong impact on the level of domestic and foreign savings. The theoretical considerations find support in our empirical analysis, according to which exchange rate levels seem to affect domestic savings in a significant way. Besides this brief introduction, the paper is divided into three sections. Section 2 introduces theoretical views on the effects of exchange rate competitiveness on income levels, consumption, aggregate demand, and domestic and foreign savings. It also provides a theoretical assessment of the influence of foreign on domestic savings. Section 3 offers an empirical analysis, while Section 4 presents a few conclusions.

2. Theoretical analysis

Montiel and Sérven (2008) investigate the potential link between real exchange rates and domestic savings levels. Their empirical results based on cross-country analysis show a

positive correlation between exchange rate *appreciation* and savings, which the authors argue could be caused by a correlation between unobserved variables. One such variable, they argue, would be per capita income, which affects both the exchange rate level (through the Balassa-Samuelson effect) and domestic savings rates. And indeed, controlling for the effect of per capita income, the authors' empirical results do confirm a positive relationship between domestic savings rates and relative devaluation of the real exchange rates, albeit of a small magnitude and statistically insignificant. Their general results show, despite some favorable preliminary evidence, that the mechanism through which the exchange rate affects growth is very unlikely to be found in its effect on savings.

The authors also develop a theoretical framework to understand how a competitive currency could affect growth in the context of a conventional open economy model. More specifically, they analyze the effects of a competitive exchange rate on savings in a model of an individual agent with intertemporal optimization. They introduce the exchange rate as a "policy target" variable. Their main conclusion based on this theoretical strategy is that domestic savings only increases in response to a devaluation of the real exchange rate if the depreciation generates a temporary increase in real income.

Our paper's approach is different. In order to provide a theoretical examination of the effects of real exchange rate levels on growth through capital accumulation, we present a short-run income determination model whose dynamics are essentially determined by the real exchange rate level. The analysis is divided into three stages: i) the impact of the real exchange rate on wages and profits, ii) the impact of wages and profits on income levels, and iii) the impact of the real exchange rate on domestic and foreign savings.

2.1 - Real exchange rates, wages and profits

We first analyze the effect of exchange appreciation on aggregate rates of profit and real wages. To do so, we assume a hypothetical division of the economy in three sectors: i) pure tradables, ii) pure non-tradables, and iii) non-tradables with tradable inputs. In addition we assume imperfect competition for price formation:

$$p_i = (1 + m_i)w / b \tag{1}$$

where p_i is the price level in industry i, m is the mark-up in industry i, b is labor productivity, and w is the nominal wage. For the pure non-tradables sector, the price level will depend on mark-ups, nominal wages and productivity, all of which are constant in the short-run in traditional models. Rearranging, we can see that mark-ups in the non-tradable sector will depend on nominal wages, productivity, and the level of non-tradables prices:

$$p_{nt} = (1 + m_{nt})w / b \tag{2}$$

$$m_{nt} = (bp_{nt} / w) - 1 \tag{3}$$

The same *rationale* can be applied to the pure tradables sector, however with one difference: for an open and relatively small economy (price taker), tradable prices are endogenous and determined by the nominal exchange rate (e) and prices in US Dollars p^*:

$$p_t = (1 + m_t)w/b \quad (4)$$

$$p_t = ep^* \quad (5)$$

$$m_t = (bep^*/w) - 1 \quad (6)$$

In this case, an appreciation of the exchange rate will reduce the price of tradable goods and, all other things being constant (that is, nominal wages, foreign prices and productivity), reduce the tradable sector's profit margin. However, exchange rate appreciation may increase the profits of the non-tradables sector, which operates with imported inputs. For tradables sectors operating with tradable inputs, an exchange rate appreciation will inevitably reduce mark-ups, since the fall in final prices will be greater than the price drop of a cost component. The argument that an appreciated exchange rate favors aggregate investment by reducing the price of machinery and equipment may be understood as a case in which lower input prices increase profit margins for the non-tradable sector.

Given this scenario, what would thus be the effect of exchange rate appreciation/depreciation on mark-ups in aggregate terms? To show this, we define aggregate mark-ups as the average mark-up weighted by each sector's size (*j*,*k*,*l*). Therefore:

$$jm_t + km_{nt} + lm_{it} = m \quad (7)$$

An exchange rate appreciation reduces the mark-up for the tradables sector, maintains it for the non-tradables sector, and increases the mark-up for the non-tradables sector with tradable inputs. The end result for the system's general mark-up will depend on the relative size of each sector. If the tradables sector is larger than non-tradables with tradable inputs $(j > l)$, an appreciated exchange rate will inevitably reduce the system's mark-up in the short run. The larger the non-tradable cost component in tradables production, the greater the effect on mark-ups.

To analyze the behavior of the whole system, we show in a second step how a nominal exchange rate appreciation (depreciation) affects the other variables, thus prices, real wages and the real exchange rate. Given that the overall price level is a composite of tradable and non-tradable prices, it falls (rises) as the nominal exchange rate appreciates (depreciates).

$$p = \alpha ep^* + (1 - \alpha)p_{nt} \quad (8)$$

Real wages should increase (decrease) as the nominal exchange rate appreciates (depreciates), since they are a ratio of nominal wage to prices:

$$w/p = w/(\alpha ep^* + (1 - \alpha)p_{nt}) \quad (9)$$

The real exchange rate (10) in turn should appreciate (depreciate), insofar as the nominal exchange rate falls (rises) more than the general price level, which is partly dependent on non-tradables prices.

$$\theta = ep^*/p \quad (10)$$

Finally, assuming that the tradables sector is bigger than non-tradables with imported inputs, the system's aggregate mark-up should fall. That is, for certain levels of productivity and nominal wages, an appreciation of the exchange rate results in reduced system profit margins and increased real wages.

2.2. Real exchange rates and income levels

Let us now see how income, investment and savings are affected by the above outlined short-run changes in mark-ups and profits. Following a keynesian-kaleckian framework formally developed by Bhaduri and Marglin (1990), we start from a definition of aggregate savings S, which only depends on a fixed share s of capitalists' profits. As workers are assumed to consume all of their income, workers' savings are equal to zero. Therefore:

$$S = sR = s(R/Y)(Y/Y^*)Y^* \tag{11}$$

Where R is capitalists' income and Y^* is potential output. Defining $h = R/Y$ as capitalists' income as a percentage of total income, $z = Y/Y^*$ as the level of installed capacity utilization, and potential output as $Y^* = 1$, we have:

$$S = shz \tag{12}$$
$$1 > h > 0 \tag{12.1}$$
$$1 > z > 0 \tag{12.2}$$

Defining W/Y as workers' share of income, N as employed workers, and $1/b = N/Y$:

$$W/Y = wN/pY = 1/b * w/p = 1/1+m \tag{13}$$

The capitalists' share of income, $h = R/Y$ will be:

$$h = R/Y = (pY - wN)/pY = 1 - W/Y = m/1+m \tag{14}$$

Assuming that workers consume their income in full, an increase in real wages will imply reduced domestic savings and increased consumption. As a consequence, aggregate demand may fall or rise, depending on the effects of the reduced profit margins on investments.

The model's investment function depends positively on the profit margin *h* and on the level of installed capacity utilization z:

$$I = I(h,z), I_h > 0, I_z > 0 \tag{15}$$

Savings equal investment on the equilibrium of the goods market in a closed economy (which defines an IS relation):

$$shz = I(h,z) \tag{16}$$

The level of installed capacity utilization relative to profit margins will depend on the following derivative:

$$\partial z / \partial h = (I_h - sz)/(sh - I_z) \quad (17)$$

$$I_h = \partial I / \partial h > 0 \quad (18)$$

Assuming that equilibrium in the goods market occurs as a result of changes in savings levels ($sh - I_z > 0$) and since sh is always positive, installed capacity utilization will increase or decrease depending on $(I_h - sz)$.

If investments are inelastic to changes in profit margins, a fall in real wages will have recessive effects, as the fall in consumption will not be offset by increased investments $(I_h < sz)$. This is the classic thesis of under-consumption and in this case the economy's accumulation regime could be described as wage-led. On the other hand, if investments are highly sensitive to profit margins, the opposite effect will occur. Reductions in real wages will increase profits, which, in turn, will increase aggregate demand and installed capacity utilization. The economy can then be described as operating under a profit-led accumulation regime.

2.3 - Real exchange rates, foreign and domestic savings

We now extend the model to an open economy, incorporating functions for exports X_e and imports X_m as in Bhaduri and Marglin (1990), which depend with the following elasticities on the real exchange rate θ and the installed capacity utilization level z.

$$(dX_e / d\theta)(\theta / X_e) = \eta_e \quad (19)$$

$$(dX_m / d\theta)(\theta / X_m) = -\eta_m \quad (20)$$

$$(\partial X_m / \partial z)(z / X_m) = u \quad (21)$$

In the new goods market equilibrium total savings plus import M must equal total investments plus exports E,

$$shz + M = I(h, z) + E \quad (22)$$

The partial derivative for installed capacity utilization relative to profit margins will be very similar to the closed economy (equation 19):

$$\partial z / \partial h = (I_h - sz)(gu + sh - I_z) \quad (23)$$

Where g stands for the initial share of imports and exports in the product and u is the elasticity of imports relative to installed capacity utilization. Again assuming that $(gu + sh - I_z) > 0$, we arrive at similar conclusions to those outlined above.

In the open-economy case, given certain productivity levels, real exchange rate devaluations will reduce real wages and increase profit margins if the tradable sector outweighs the non-tradable sector with imported inputs (as in [7]). Investment, exports and income levels will rise as long as the respective functions are sufficiently elastic. As for exports and imports, the total effect on trade balance and current accounts will be positive if the Marshall Lerner condition $(\eta_e + \eta_m > 1)$ holds.

The model shows that macroeconomic equilibrium may be written as:

$$y = C + I + E - M = C(\theta) + I(h(\theta), z) + E(\theta) + M(\theta, z) \tag{24}$$

In terms of savings equilibrium:

$$S + M - E = I \tag{25}$$

Or, as in (22),

$$sh(\theta)z + M(\theta, z) - E(\theta) = I(h(\theta), z) \tag{28}$$

Thus, the path of domestic and foreign savings' depends on the real exchange rate, which affects all of above variables. Given sufficiently elastic functions, a depreciated real exchange rate may increase income levels through higher exports and investments and reduce consumption relative to GDP, thus increasing domestic and reducing foreign savings. An overvalued real exchange rate in turn may result in consumer-led growth paths with current-account deficits and lower saving levels. This would be the case of a substitution of foreign for domestic savings as discussed in Bresser-Pereira (2006)[3]. Figure 2 in the Appendix shows this correlation for our data: higher current account levels (and therefore lower foreign savings levels) are positively correlated with domestic savings-to-GDP ratio. These relationships will be discussed in greater detail in Section 3, next.

3. Empirical analysis

In this section we test whether the real exchange rate level affects domestic and foreign savings using a panel of 83 medium income countries (low-middle income and high-middle income according to the World Bank income classification). Data were collected from the World Penn Tables of Heston, Summers and Atina (2006) and from World Bank's *World Development Indicators* series and span from 1980 to 2000.

3.1 - Real exchange rate misalignments

[3] According to this rationale, foreign savings finance consumption rather than investment. Increased consumption is due to the fact that the exchange rate impacts real wages. If the exchange rate is overvalued, real wages will be artificially high and, as a consequence, domestic consumption and imports will increase – given a high marginal propensity to consume – causing domestic savings to drop. Therefore, a strategy of growth with foreign savings enabled by policies that attract international capital flows will appreciate the exchange rate and reduce domestic savings.

We first measure real exchange rate misalignment using Rodrik's (2008) misalignment index with *World Penn Tables 6.2* data for nominal exchange rates (*XRAT*), purchasing power parities (*PPP*) and the log of the per capita GDP (ln*RGDPCH*). Rodrik's misalignment index, which has the advantage of being comparable across countries over time, is based on a long-term PPP exchange rate equation corrected for the Balassa-Samuelson effect and calculated in three steps. First, the nominal exchange rate and purchasing power conversion factors are used to calculate the real exchange rate of country *i* in period *t* (Equation (29)).

$$\ln RER_{it} = \ln(XRAT_{it} / PPP_{it}) \quad (29)$$

A real exchange rate in excess of 1 indicates that the value of the currency is lower than purchasing power parity would indicate. In a second step, the value of the real exchange rate is adjusted in order to reflect lower non-tradable prices in low and middle income countries (the Balassa-Samuelson effect). To do so, we regress the log of the real exchange rate on the log of GDP per capita (*lnRGDPCH*) (30), where f_t is a fixed effect for the period t and u_{it} as the error term.

$$\ln RER_{it} = \alpha + \beta \ln RGDPCH_{it} + f_t + u_{it} \quad (30)$$

Finally, in a third step the misalignment index is calculated as a deviation from the predicated long-run value (Equation 31), where $\ln RER_{it}$ is the realized real exchange rate and $\overline{\ln RER_{it}}$ is the forecast produced by the panel regression of the exchange rate adjusted by the Balassa-Samuelson effect.

$$\ln(\text{Real Depreciation}) = \ln RER_{it} - \overline{\ln RER_{it}} \quad (31)$$

Thus, following this methodology "Real Depreciation" is comparable across countries and over time. A "Real Depreciation" above one indicates that the exchange rate is such that domestically-produced goods are cheaper in US-Dollar terms – the currency is depreciated relative to its long-run path.

Charts 1, 2, 3 and 4 in the Appendix show these misalignment indexes (series 2) and domestic savings (series 1) for Brazil, Argentina, Chile and China for illustrative purposes. Figures under 1 on the scale at the right indicate exchange rate overvaluation, while those above 1 indicate undervaluation. While the charts show a tendency for currency appreciation over time and a drop in the domestic savings rates for Brasil and Argentina, the opposite seems to occur for Chile and China

Estimating equation (30) we obtain a significant coefficient of $\beta = -0.133$, thus suggesting a strong Balassa-Samuelson effect: as income rises by 10%, the exchange rate appreciates by around 1.3 percent.

Table 1
Estimation of long-run real PPP exchange rate, corrected for Balassa Samuelson effect

Fixed-effects (within) regression			Number of observations = 1,477		
Group variable (i): countries			Number of groups = 83		
corr(u_i, Xb) = -0.1953			Prob > F = 0,0081		
	Coefficient	Std Error	t	P > t	
ln *RGDPCH*	-0.1333	0.0503	-2.6500	0.0080	
Constant	1.9592	0.4195	4.6700	0.0000	
F test that all u_i = 0			F (82.1393) = 22.63		Prob > F = 0.0000

Source: Research results.

To obtain a first notion of the relationship between the real exchange rate and domestic savings we present in Figure 1 of the Appendix the cross-country association between the domestic savings rate and the real exchange devaluation index. Our graph is similar to that presented in Montiel and Serven (2008) (where they relate domestic savings to the exchange rate *level*), but contrary to these authors' results, a linear and positive trend between the relative real exchange depreciation and domestic savings can be observed. Therefore, the more depreciated the exchange rate (the higher the index), the greater the savings rate.

3.*2 - Domestic savings*

Following Arellano and Bond (1991) and Blundell and Bover (1998) we estimate domestic savings using Generalized Method of Moments for a dynamic panel. These estimators try to deal with unobservable temporal effects by means of the inclusion of time-specific intercepts. Dealing with these effects is not a trivial task. As a result, the model is dynamic and may include endogenous regressors that are controlled by means of the instrumentalization of variable differences.

The instruments that correspond to moment conditions are lagged both in terms of level and difference of the independent and dependent variables. Because moment conditions typically over-identify the model's regression, the dynamic panel method allows for testing different specifications with the Sargan's or Hansen's test. Using Arellano and Bover's (1995) estimators, Blundell and Bond (1998) developed a system estimator (*System*-GMM) that uses additional moment conditions. The Arellano-Bond (1991) and Blundell-Bond (1998) estimators were considered suitable to the analysis conducted here because they enable dynamic specification (allowing a lagged dependent variable) and because they appropriately instrumentalize potentially endogenous variables. For a more detailed description of these econometric techniques, see Baltagi (2005).

Thus, we estimate the following domestic savings equation:

$$\ln(S/Y)_{it} = \alpha_i + \ln(S/Y)_{it-1} + (CA/Y)_{it} + (\ln \text{Real Depreciation})_{it} + DGDP_{it} + OPENK_{it} + FDI_{it} + I_{it} + GDP_{it} + \psi_t + \varepsilon_{it} \quad (32)$$

Where:
$\ln(S/Y)_{it}$ is the ratio of the log of domestic savings to GDP for country *i* in period *t*

$(CA/Y)_{it}$ is the ratio of current account to GDP in US Dollars for country *i* in period *t*,

$(\ln \text{Real Depreciation})_{it}$ is the relative real exchange rate devaluation index as explained earlier;

$DGDP_{it}$ is the per capita GDP growth rate for country *i* in period *t*

$OPENK_{it}$ stands for a country's trade openness level, calculated as exports + imports)/GDP;

FDI_{it} is the level of direct foreign investments in country *i* in period *t*,

I_{it} is the real interest rate in country *i* in period *t*

GDP_{it} is the per capita GDP of country *i* in period *t*

ψ_t are annual dummies for periods of five years each, with ε_{it} as stochastic residual.

All data are either from World Penn Tables 6.2 or World Development Indicators (see Appendix for more details).

Table 2 shows the results of our dynamic panel estimation of the domestic savings-to-GDP ratio for six alternative specifications (I)-(VII). The Arellano-Bond tests appropriately reject auto-correlation among second order residuals. The Hansen's J and Hansen-Difference tests reject the hypothesis of invalid level and difference over-identification for the instruments: the instruments for endogenous variables are valid in principle. To control for the endgoneity of real exchange rate devaluation and domestic savings, we include real GDP in levels in the equation (see Montiel and Sérven (2008) for a detailed theoretical justification).

Unlike the results obtained by Montiel and Sérven (2008), our estimation results show a robust and significant positive relationship between the previously calculated relative exchange rate devaluation index and domestic savings-to-GDP for every specification estimated. Coefficients range from 0.16 up to 0.5 depending upon the econometric specification. These different results could be due either to sample size, which in our case only incorporates medium-income countries, or in the alternative estimation of the real exchange rate. While Montiel and Sérven (2008) include the level of the exchange rate, our model explicitly accounts for the deviation of the exchange rate from its long-run path.

The results indicate that the relative devaluation of the exchange rate that affects growth may do so by means of its beneficial effects on the domestic savings rate. The per capita GDP level variable is included in specification (VII) for three reasons: in addition to being part of the domestic savings specification, it serves as a control variable for high middle income countries relative to low middle income countries. The third reason is the assessment of the hypothesis raised in Montiel and Sérven (2008) that the effects of real exchange rates on domestic savings rates disappear once we control the estimations for the level of income (among other savings determinants). The results show that including the level GDP variable has no effect on the general specification results in the direction of a robust positive relation between the depreciation or undervaluation of real exchange rate and the domestic savings rate. Furthermore, the results of specifications (III-VI) show the importance of GDP growth for the ratio between per capita GDP and savings, not of GDP per capita in levels (which do not appear statistically significant, in specification [VI]). Perhaps the fact that this paper uses an exchange rate devaluation index, rather than the level of the real exchange rate, may be crucial to the empirical results of the effects of exchange rates on savings and capital accumulation.

The variable which describes the foreign direct investment appears with negative and significant signal. Trade openness, measured as the ratio of the sum of exports and imports to GDP, appears in specifications (IV)-(VI). The sign is positive and significant at 1%. Real interest rates appear with positive and significant signs in specification (VI).

Table 2- *System* GMM for domestic savings-to-GDP

System GMM	(I)	(II)	(III)	(IV)	(V)	(VI)
Domestic Savings_1	0.4045	0.464	0.3704	0.3723	0.3962	0.3591
	(0.0350)*	(0.0226)*	(0.0054)*	(0.0036)*	(0.0102)*	(0.0115)*
Current Account/GDP	0.0124	0.0065	0.0172	0.0197	0.0149	0.0190
	(0.0051)*	(0.0016)*	(0.0004)*	(0.0005)*	(0.0007)*	(0.0007)*
Real Exchange Depreciation		0.4892	0.2945	0.3895	0.4992	0.1627
	...	(0.0578)*	(0.0079)*	(0.0212)*	(0.0247)*	(0.0259)*
Per Capita GDP Growth	...	...	0.0058	0.0067	-0.0011	0.0091
	...	...	(0.0004)*	(0.0006)*	(0.0010)	(0.0018)*
Trade Openness	...	...	...	0.0028	0.0064	0.0070
	...	...	...	(0.0002)*	(0.0006)*	(0.0003)*
Foreign Direct Investment	...	...	...	...	-0.0354	-0.0219
	...	...	...	...	(0.0017)*	(0.0020)*
Interest Rate	...	...	...	...	...	0.0023
	...	...	...	...	...	(0.0005)*
ln(Per Capita GDP)	...	...	...	...	...	-0.0783
	...	...	...	...	...	(0.0624)
Year dummies	...	...	...	...	...	Yes
Constant	1.7819	1.5225	1.8205	1.6153	1.3734	1.9701
	(0.1100)*	(0.0666)*	(0.0149)*	(0.0304)*	(0.0597)*	(0.5456)*
AB test AR(1)	0.000	0.001	0.001	0.001	0.002	0.007
AB test AR(2)	0.565	0.421	0.385	0.366	0.870	0.986
Hansen's J test p-value	0.504	0.419	0.442	0.253	0.423	0.400
Hansen Difference Chi(2)	0.133	0.421	0.759	0.380	0.415	0.500
Number of observations	1102	1029	1021	1021	1021	1021
Number of countries	70	70	70	70	70	70

* significant at 1% significance.

Note: in all specifications, Current Account and Real Depreciation are endogenous variables instrumentalized by their lagged values, in level and in differentials.

4. A few conclusions

The paper offers theoretical and empirical perspectives that explore macroeconomic channels for the effects of exchange rate levels on domestic savings. The paper's econometric analysis indicates that the beneficial effects of competitive exchange rates on growth may operate through its effects on domestic savings and investment. The results of the estimations indicate a robust and significant positive relation between the currency competitiveness index calculated and domestic savings-to-GDP ratios. This stands in contrast to the findings of Montiel and Sérven (2008), who do not find a significant relationship between the real exchange rate and domestic savings. The theoretical arguments provided in the paper attempted to discuss the impacts of real exchange rate levels on real wages, profits, aggregate investment and foreign and domestic savings. According to the model, in the event of excessive currency overvaluations, reduced profit margins in the tradable sector would lead to a fall in aggregate domestic savings. The opposite would happen in cases of undervaluations.

In the debate of relative effects of exchange rates on growth and development, some authors have argued that the Asian model could not be implemented in Latin America or elsewhere because of low private savings levels. Treating the current account as a residual, they argue that the low propensity to consume of Asian individuals is responsible for the high levels of domestic savings and current account surpluses. Leaving aside "culturalist" explanations, the model discussed above endogenizes aggregate consumption as a function of real wages, which, in turn, depend on real exchange rate levels. According to the model, the high level of savings in East Asian economies could then be explained by the police of maintaining competitive exchange rates for long periods of time. The recent case of massive increases of domestic savings in Argentina after the currency regime changed as well as the case of higher savings in Chile during the eighties could also be explained by the model presented here.

It is worth noting that the entire discussion in this paper is based on given productivity levels. Higher real wages in the absence of offsetting productivity gains create problems by putting the economy on unsustainable growth paths that eventually end up in a balance-of-payments crisis. On the other hand, competitive exchange rates increase the profitability of investments and exports, especially in the industrial sector, which tends to increase the economy's overall productivity level in the long run, allowing for real wages increases in a sustainable manner.

5. References

ARELLANO, M; BOND, B. (1991). "Some Test Specification for Panel Data: Monte Carlo Evidence and an application to employment equations". *Review of Economic Studies*.

ARELLANO, M. BOVER, O. (1995), "Another look at the instrumental-variable estimation of error-components models", *Journal of Econometrics*, 68.

BALTAGI, B. (2005) *Econometric Analysis of Panel Data*, John Wiley & Sons.

BLUNDEL, R; BOND A. (2000) "Estimation in Dynamic Panel Data Models: Improving on the Performance of The Standard GMM Estimators", *The Institute for Fiscal Studies.*

BHADURI, A., and MARGLIN, S., A. (1990), "Unemployment and the real wages: the economic basis for contesting political ideologies", *Cambridge Journal of Economics*, 14, December.

BRESSER-PEREIRA, L.,C. (2006) "Exchange rate, fix, float or manage it?" Preface to Mathias Vernengo, (ed.) *Financial Integration or Dollarization: No Panacea*. Cheltenham: Edward Elgar.

BRESSER-PEREIRA, L.,C. and NAKANO (2003) "Crescimento com poupança externa?" *in Revista de Economia Política*, vol. 23, n.2, April-June, São Paulo.

EICHENGREEN, B. (2008) "The Real Exchange Rate and Economic Growth", UC Berkeley, *mimeo*.

EDWARDS, S., (1995), "Why are Saving Rates so Different Across Countries? An International Comparative Analysis", *NBER Working Paper***,** No. W5097**.**

FRENKEL, R., and TAYLOR, L., (2006), "Real exchange rate, monetary policy and employment", *Desa Working paper n.19*, United Nations, New York.

HESTON A, SUMMERS R and ATEN B. (2006) *Penn World Table Version 6.2*, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

LEVY-YEYATI, E., and STURZENEGGER, F., (2007), "Fear of floating in reverse: exchange rate policies in the 2000s", *Kennedy School of Government*, Harvard, mimeo.

MONTIEL, P.; SÉRVEN, L., (2008), "Real exchange rate, savings and growth: is there a link?", Policy research working paper, *The World Bank*, Washington.

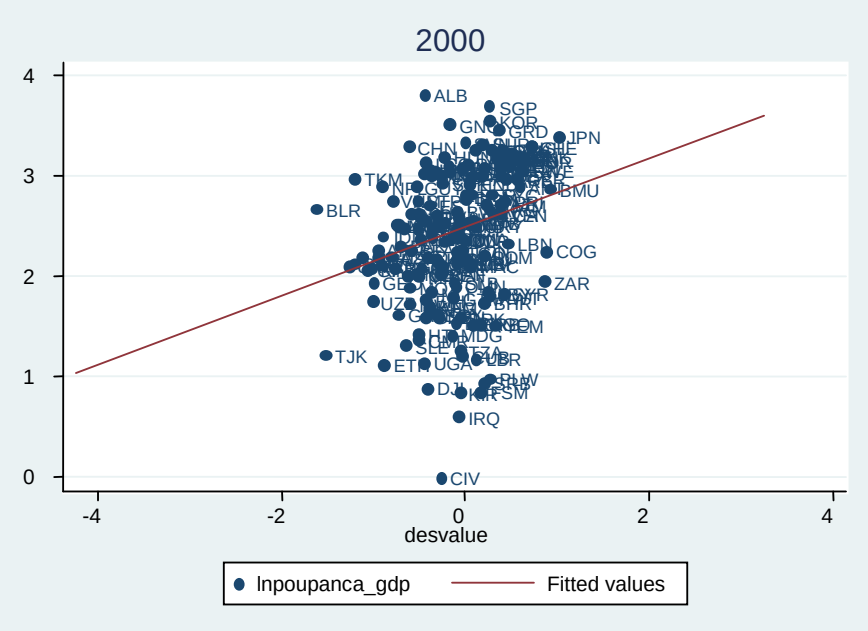
REINHART, C; TALVI, E. (1998). "Capital Flows and Savings in Latin America and Asia: A Reinterpretation", *Journal of Development Economics*, 57.

RODRIK, D., (2008) "Real Exchange Rate and Economic Growth: Theory and Evidence", John F. Kennedy School of Government, Harvard University, Draft, July.

WILLIAMSON, J, (2008) "Exchange rate economics", *Working Paper Series*, Peterson Institute for international economics, Washington.

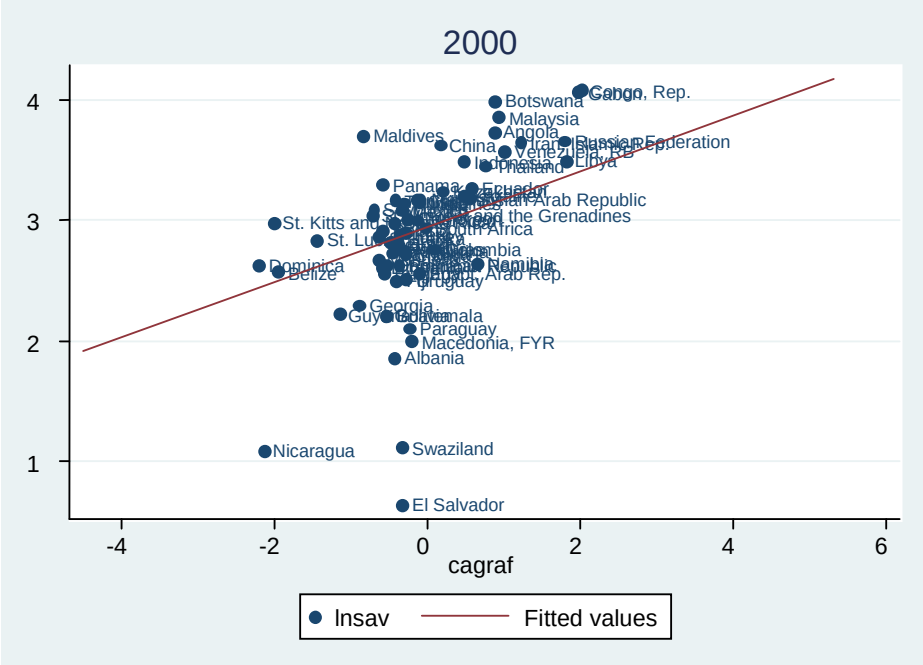
6. Appendix

Figure 1 – Cross-Country relation between the Real Devaluation Index and Aggregate Savings



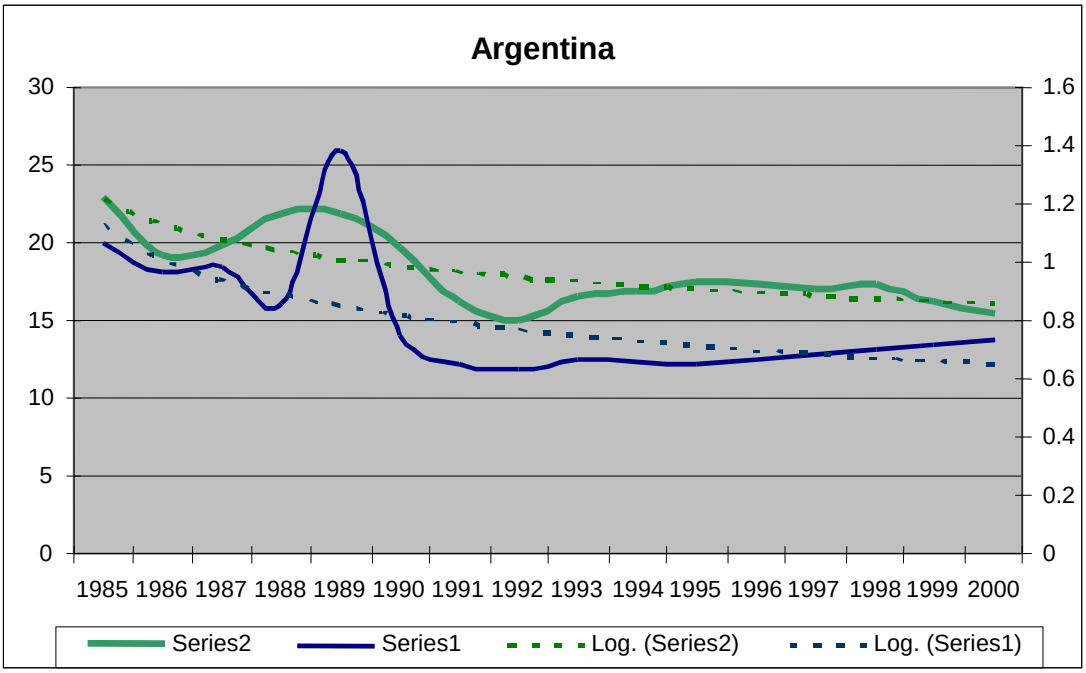
Source: Prepared by the authors based on the *World Penn Tables 6.2* data panel.

Figure 2 –Cross-Country relation between Current Account-to-GDP and Domestic Savings-to-GDP



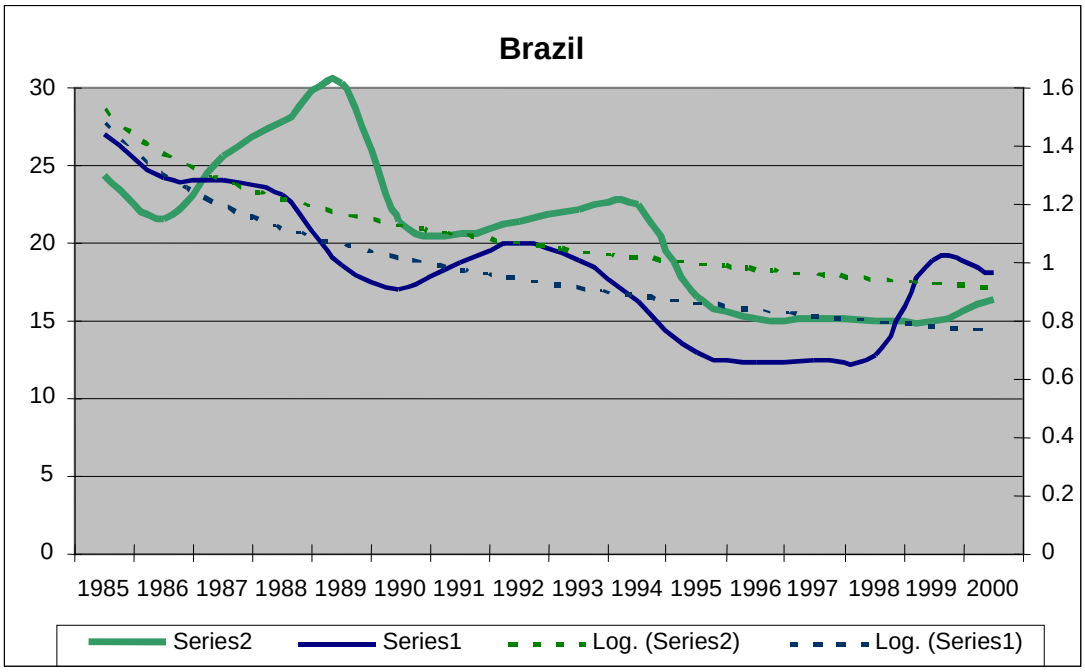
Source: Prepared by the authors based on *Word Development Indicators*.

Graph 1 – Relative exchange rate devaluation and domestic savings



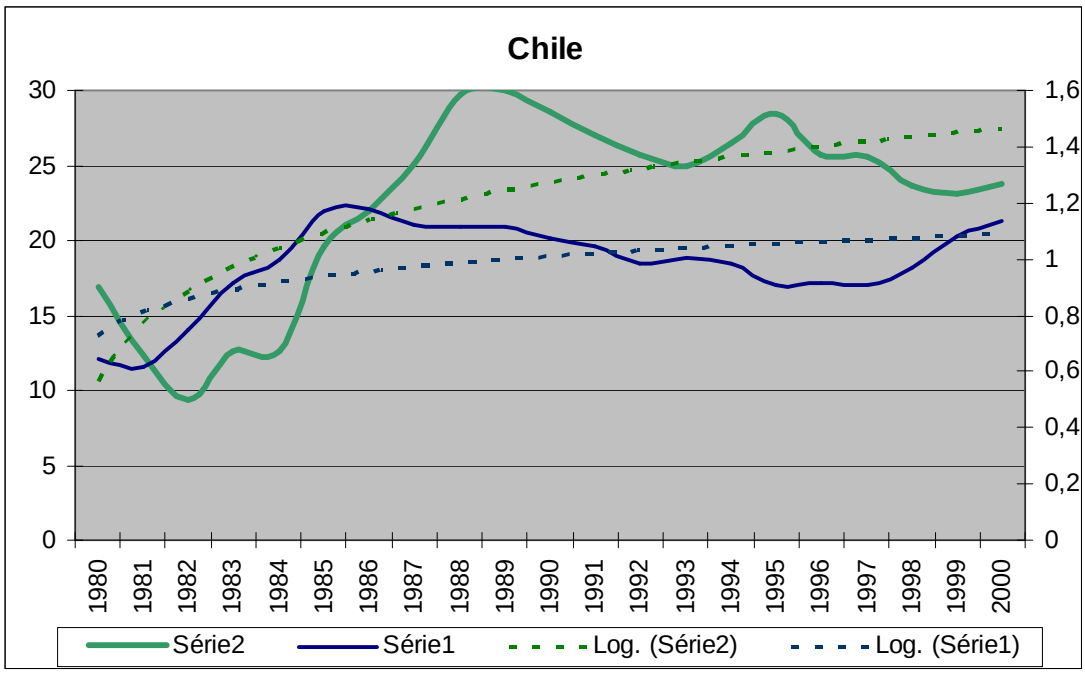
Source: Prepared by the authors based on *Word Development Indicators* and the *World Penn Tables 6.2* data panel.

Graph 2 – Relative exchange rate devaluation and domestic savings



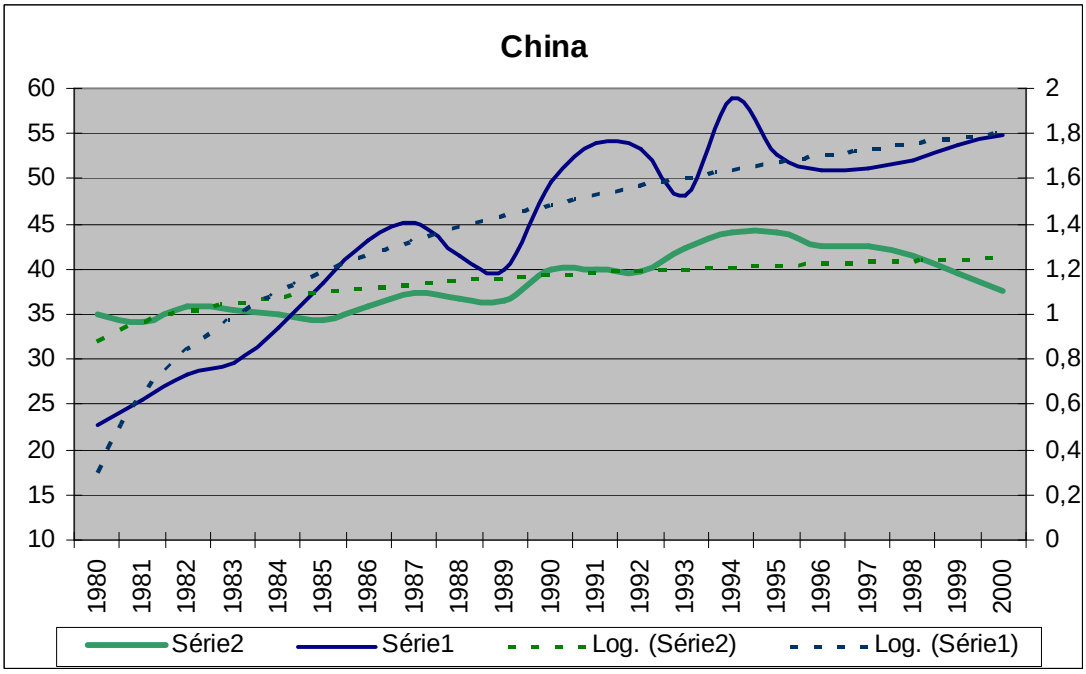
Source: Prepared by the authors based on *Word Development Indicators* and the *World Penn Tables 6.2* data panel.

Graph 3 – Relative exchange rate devaluation and domestic savings



Source: Prepared by the authors based on *Word Development Indicators* and the *World Penn Tables 6.2* data panel.

Graph 4 – Relative exchange rate devaluation and domestic savings



Source: Prepared by the authors based on *Word Development Indicators* and the *World Penn Tables 6.2* data panel.