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# THE REAL EXCHANGE RATE AS A TARGET OF MACROECONOMIC POLICY

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## **Abstract**

*In recent years several authors have argued that developing countries should aim to target a stable and competitive real exchange rate (SCRER) to foster economic growth. A growing body of empirical research gives support to this claim. Although more theoretical work is needed, some ideas from development theory can help to explain the empirical findings. For instance, if modern tradable activities display some form of increasing returns to scale, market forces alone would deliver a set of relative prices that would make capital accumulation in these activities suboptimal. This paper supports the view that developing countries could target SCRER as a part of a development strategy that promotes the expansion of modern tradable activities. We review the empirical findings, discuss the channels through which a SCRER can stimulate economic growth, and describe the policies needed to pursue a strategy based on a SCRER.*

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## 1. Introduction

In recent years the idea that a stable and competitive real exchange rate (SCRER) can foster economic growth in developing countries has gained lots of attention. A growing body of research has shown persuasive evidence indicating that real exchange rate (RER) levels are positively associated with economic growth. Research has also documented that RER volatility affects growth negatively. Based on this and other more episodic evidence, some economists and analysts have started to advocate that developing countries should target a SCRER as a part of their development strategy.

The aim of this chapter is to take stock of the work—including ours—that has addressed different aspects of the SCRER strategy for development. We focus on what we see as the three main issues. First, we review in section I the empirical literature that finds evidence that SCRER is positively associated with economic growth. Second, we discuss the mechanisms that could explain such an association and their supporting evidence or lack of it. In section II, we go through the theoretical and practical aspects of macroeconomic management in a framework that targets a SCRER while attaining full employment, low inflation and balance of payments sustainability. We close the chapter in section III with some final remarks.

Before moving on, some definitions are in order. We define the exchange rate as the domestic price of a foreign currency. Consequently, a rise (fall) in the nominal/real exchange rate implies a nominal/real depreciation (appreciation). The RER is the relative price between tradables and non-tradables. A competitive or undervalued RER level is one that is above its equilibrium level.<sup>2</sup> We generally refer to competitive or undervalued RER level to the one at which the modern tradable sector of a developing economy reaches a risk-adjusted profit rate equal to that of the same sector in a developed economy.<sup>3</sup> We use all along competitive or undervalued RER indistinctively.

## 2. SCRER and economic performance<sup>4</sup>

The relationship between the RER, real wages and output usually generates some confusion. It is commonly accepted that a RER devaluation has a negative impact on output level in the short run. A standard Keynesian/Structuralist interpretation is that devaluation redistributes income against wage earners, who have a large propensity to spend and it therefore contracts aggregate demand and output levels. Another common

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<sup>2</sup> Equilibrium RER is a concept that generates no few confusions and debates. For simplicity, we define it here as the one at which the economy is at macroeconomic equilibrium (i.e., full employment with low inflation and external balance). It depends on deep economic fundamentals (e.g., productivity), exogenous variables (e.g., international interest rate) and policy variables (e.g., public spending).

<sup>3</sup> See Bresser-Pereira (2010) for a similar definition.

<sup>4</sup> This part draws on Rapetti (2014).

mechanism is the negative balance-sheet effect of devaluation when debts are issued in foreign currency. The proposition we develop in this paper claims that a stable and competitive level of the RER —through mechanisms discussed below— has a positive effect on the rate of growth of output and real wages in the medium run.<sup>5</sup>

The two propositions are not contradictory: the former refers to the *short-run* effects of a *change* in the RER on output *level*, and the latter to the *medium-run* effects of the *level* (and stability) of the RER on the *rate of change* of output (i.e., economic growth). While there is a good deal of evidence supporting the first proposition,<sup>6</sup> the second one is more controversial. Below we review a recent body of research that supports the second proposition and the mechanisms involved.

### **2.1. Empirical evidence**

Most empirical work analyzing the association between RER levels and economic growth has been carried out through growth regressions. This literature has found substantial evidence that competitive and stable RER levels tend to be associated with higher GDP per capita growth rates. The association appears robust to changes in the estimation technique —cross-section OLS, panel data (fixed and random effects), dynamic panel data (GMM), non-linear panels and panel cointegration techniques—, the number of control variables and the data sources for both the dependent and independent variables.

An interesting result is that the RER-growth association seems to be especially strong in developing countries. Rodrik (2008) tests whether there is any significant difference between developed and developing countries. He uses a fixed-effects model for a panel of up to 184 countries between 1950 and 2004 and defines developing countries as those with a GDP per capita less than \$6,000 in constant dollars of 2005. He finds that the positive relationship between RER competitiveness and economic growth is stronger and more significant for developing than developed countries. Rapetti et al. (2012) replicate Rodrik's work and show that if the threshold is instead selected from anywhere in the \$9,000-\$15,000 range, the estimated effect of RER competitiveness on growth developed countries is similar to the one estimated for developing countries. Given the fragility of Rodrik's result, they investigate the issue in more detail by developing a series of alternative developed/developing countries splits and conducting different empirical strategies. They find that the effect of currency undervaluation on growth is indeed larger and more robust for developing economies. Extending the analysis for a substantially longer period, Di Nino et al. (2011) also find supporting evidence that the relationship is strong for developing countries and weak for advanced countries in both the pre-and post-World War II period (1861-1939 vs. 1950-2009). Other studies, like Cottani et al.

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<sup>5</sup> We do not discuss here the association between RER levels and employment, but there is evidence suggesting that SCRERs tend to make growth more labor-intensive. See Frenkel and Ros (2006) and Damill and Frenkel (2012).

<sup>6</sup> See, for instance, Razmi (2007) for a theoretical and empirical discussion and the references therein.

(1990), Dollar (1992) and Gala (2008), focus exclusively on developing countries and find similar evidence of the positive effect of RER competitiveness on growth.

Since most of studies have used RER misalignment indexes as measures of RER levels, a valid concern is whether the results are driven by cases of RER overvaluation decelerating economic growth. Put it differently, the positive relationship between RER levels and growth rates may result from low RER levels decelerating growth, which also implies a positive association between RER levels and growth rates. Several studies have addressed this concern explicitly.

Razin and Collins (1999) use a pooled sample of 93 developed and developing countries over 16 to 18 year periods since 1975 and find that RER overvaluation hurts and undervaluation favors growth. The effect of overvaluation appears stronger though. Aguirre and Calderón (2005) find that the estimated coefficients of their RER misalignment indexes are larger for cases of overvaluation than those of undervaluation; but here again the positive effect of undervaluation on growth is significant both statistically and economically. Rodrik (2008) finds that overvaluation hurts growth and undervaluation favors growth and no significant difference in terms of the size of each effect. Rapetti et al. (2012) find similar results to Rodrik's, although the effect of overvaluation is slightly higher in absolute terms than that of undervaluation. Bereau et al. (2012) use panel non-linear techniques —i.e., a Panel Smooth Transition Regression model— to capture whether there are asymmetries between RER undervaluation and overvaluation. They find robust evidence that undervaluation accelerates and overvaluation decelerates growth.

Other studies have tested whether the RER-growth association is robust to measurement errors in the dependent and independent variable. MacDonald and Vieira (2010) construct seven different indexes of RER misalignment and use them alternatively on right-hand side of the growth regressions. They find a significant and positive correlation between RER competitiveness and economic growth, which is stronger for developing and emerging countries. Razmi et al. (2012) use the rate of investment growth as the dependent variable and find a strong positive association with RER levels.

Many empirical studies have used Penn World Tables (PWT) data for the dependent variable (i.e., GDP per capita growth). Johnson et al. (2009) show that GDP estimates vary substantially across different versions of the PWT and that the results of many published studies that employ PWT growth rates —especially those using higher frequency— are fragile when changing from older versions of the PWT to newer ones. Libman (2014) address this issue using growth rates from data sources other than the PWT, such as International Financial Statistics, World Development Indicators and Maddison Historical Statistics. He finds that the positive RER-growth association holds.

Other studies have used different empirical strategies, like case and episode studies or historical analyses and also found supporting evidence that SCRERs favor economic growth. Hausmann et al. (2005) identify and analyze determinants of 'growth episodes' in the latter half of the twentieth century and found that adjustments of RER toward more competitive levels tend to precede sustained growth spurts. Frenkel and Rapetti (2012) carry out a historical analysis of exchange rate regimes and economic performance in

Latin America and find that countries have tended to grow faster when macroeconomic policies aimed to maintain stable real exchange rates. Regarding the role of RER stability, Cottani et al (1990), Eichengreen (2008) and Rapetti et al. (2012) have found supportive evidence that RER volatility is negatively associated to GDP growth.

## **2.2. Mechanisms**

Research has established a robust positive association between RER levels and economic growth. Although there might be some room for debate, it seems to be widely accepted that the causality runs from RER levels to economic growth. Every-day experience shows that governments use a variety of instruments—including exchange rate, monetary, fiscal, income and capital management policies—to manage the level and stability of the RER with real objectives. Thus, the relevant question is not about causality but about the mechanism explaining why undervalued (overvalued) RER levels would favor (hurt) economic growth. Below we discuss the mechanisms that we assess as more plausible.

One of them focuses on the effects of capital movements on the RER and the probability of crisis. An extreme form of this mechanism arises as a result of RER overvaluation caused by massive capital inflows, which eventually leads to currency, financial and debt crises with a long-lasting negative impact on growth. A number of developing countries—mostly in Latin America—have experienced this type of boom-and-bust episodes.<sup>7</sup> Many of these episodes began with the implementation of macroeconomic programs that combined fixed or semi-fixed exchange rates, liberalized current and capital accounts, and the deregulation of domestic financial markets. In a first phase, the combination of these elements stimulated capital inflows that appreciated the RER, expanded economic activity and induced current account deficits. In many cases, a consumption boom ensued without a rise in the investment rate. Even when investment did increase, the overvaluation of the RER favored investment in non-tradable activities with little increase in the export capacity that was required to repay foreign debt.

In a second phase, the excessive external borrowing raised concerns about the sustainability of the fixed exchange rate regimes and triggered speculative attacks against the domestic currencies. The effect of capital outflows was typically contractionary. The domestic banking systems—which had currency mismatch between dollarized liabilities and assets in domestic currency—faced liquidity problems and in many cases went bankrupt, exacerbating the negative impact on economic activity. In cases in which the collapse of the financial system was severe and the foreign (private and public) debt burden very high, the crises had long-lasting effects on economic growth. Clear examples of these dynamics are the stabilization programs based on active crawling pegs (the so-called *tablitas*) in Argentina, Chile and Uruguay during the late 1970s, which ended up in severe debt crises that crippled growth during the 'lost decade' of the 1980s. Other

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<sup>7</sup> Frenkel (1983) analyzes and formalizes this kind of dynamics. English readers can check Frenkel (2003) and Frenkel and Rapetti (2009).

stabilization programs leading to crises occurred during the 1990s in Mexico (1994-95), Brazil (1998-99), Argentina (2001-02) and Uruguay (2002). Taylor (1998) suggests that this kind of cyclical dynamics was also observed in the South East Asian crises of 1997-98, and Bagnai (2012), Cesaratto (2012) and Frenkel (2013) argue similarly for the current crisis in the southern European countries.

Historical record is supportive of this mechanism for the case of RER overvaluation and low or negative growth via the effects of crises; more recent experience in emerging market accounts for the observed positive association between undervalued/competitive RERs and faster growth. Several authors have indicated that undervalued RERs help stabilize long-term growth by limiting external debt accumulation and avoiding contractionary effects of sudden stops (Prasad et al., 2007). Undervalued RERs typically generate current account surpluses and facilitate foreign exchange (FX) reserve accumulation. Current account surpluses and large stocks of FX reserves in turn operate as an insurance against international financial instability and sudden stops. Recent research supports this view. Aizenman and Lee (2007) find evidence suggesting that international reserve accumulation in emerging markets has been carried out as a self-insurance strategy to protect the economy from sudden stops. Polterovich and Popov (2003) and Levi Yeyati et al. (2013) find a positive correlation between FX reserve accumulation and RER levels, and also between reserve accumulation and economic growth. Similarly, Prasad et al. (2007) find that current account balances are highly and positively associated with both undervalued RERs and economic growth.

The mechanism discussed above highlights the fact that international capital markets operate with many imperfections that can jeopardize long-term economic performance, particularly in developing countries. Consequently, these countries need to establish safe linkages with international markets in order to minimize their reliance on foreign savings and the probability of crises. It is important to notice that this refers to the composition of savings. A higher RER helps reduce domestic absorption of tradables while promotes domestic production of tradables, thus lowering *foreign* saving. At the same time, a higher RER level implies a transfer of income from workers to firms via the decline in real wages generated by the rise in tradable prices. If workers have greater propensity to spend than firms, the redistribution would result in higher *domestic* savings. The effect of a higher RER level on *aggregate* savings would be determined by the effect of these two. Evidence is not completely clear about the complete effect, but seems to suggest that RER levels and aggregate saving rates are positively associated.

The strongest mechanism, in our view, is one that rests on the key role that “modern” tradable activities play in the process of economic development. Essentially, this mechanism sees economic development as a process characterized by a rapid and intense structural transformation from low-productivity to high-productivity activities that are largely tradable. “Modern” tradables have traditionally been associated with manufactures but there is now recognition that some services (e.g., software) and knowledge-intensive agricultural activities (e.g., seed production) are also part of this group. The tradable-led growth channel can be seen as consisting on three broad elements:

- 1) Modern tradable activities are intrinsically more productive or operate under some sort of increasing returns to scale.<sup>8</sup>
- 2) Given this trait, the reallocation of (current and future) resources to these activities —i.e. structural change— accelerates GDP per capita growth.
- 3) Accumulation in these activities depends on their profitability, which in turn depends on the level of the RER. Rapid capital accumulation requires a sufficiently competitive (undervalued) RER to compensate for the market failures caused by the increasing returns.

A large number of specific mechanisms have been advanced with this general logic. In an influential article, Rodrik (2008) indicates that modern tradable activities are affected disproportionately by market and institutional failures. Using an endogenous growth model, he shows that the resulting misallocation of resources towards non-tradables leads to slower economic growth; an undervalued RER can be a second-best policy that compensates for the market and institutional failures, improves tradable profitability, and accelerates economic growth.

Rodrik is, of course, not the first to emphasize the important interplay between RER levels and market failures in economic development. Learning externalities, for instance, imply that infant industries in the tradable sector can benefit from temporary protection against foreign competition via a transitory trade policy or RER undervaluation (Ros, 2013). Similarly, temporary RER overvaluation can lead to de-industrialization and lower growth —as in the Dutch disease case— when tradable firms' production is subject to some form of increasing returns to scale (e.g., Krugman, 1987, and Ros and Skott, 1998). The opposite case —transitory RER undervaluation— can spur a virtuous dynamics of structural change and economic development (Rapetti, 2013). Models of export-led growth and modern trade theory have emphasized positive externalities that are not equally prevalent in non-export activities; policies reallocating resources to export industries —like a SCRRER policy— therefore promote higher growth (e.g. de Melo, 1992).

Another mechanism emphasizes that the lack of FX may constrain economic growth in developing countries. This idea has a long tradition in CEPAL's Structuralist economics (Ocampo, 2014) and in the balance-of-payments-constrained growth literature initiated by Thirwall (1979). It is a matter of debate, however, whether the RER can help alleviate the FX constrain and favor growth. Under the "elasticity pessimism" view of the old structuralists, the level of the RER was unimportant. A similar view emerges from the Thirwall-type of models. In such settings, long-run growth is demand constrained; i.e., constrained by foreign *demand* of domestic tradables (i.e., exports). The level of the RER is neutral on growth dynamics because only a continuous real depreciation can foster growth via substitution effects on a given rate of foreign demand growth.

These pessimistic views overlook the possibility that the FX constraint on growth may depend on supply-side factors. As emphasized above, the RER is a key determinant of

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<sup>8</sup> This is a main characteristic emphasized by the pioneers of development economics such as Rosenstein-Rodan (1943) and Hirschman (1958).



tradable profitability and therefore on capital accumulation. In other words, the level of RER is a key determinant of the long-run *supply* of domestic tradables. If foreign demand for (at least) some tradables is large at a given international price (i.e., highly or perfectly elastic), then a higher RER level would increase exports, relax the FX constraint and accelerate growth. Thus, the point under dispute is to what extent export growth depends on foreign demand growth *vis-à-vis* domestic tradable firms' ability to profitably expand their supply at the given international prices. This has recently become an area of intense debate in certain circles.<sup>9</sup> Evidence seems to side on the view that the level of the RER does play an important role on the behavior of tradable supply and therefore at relaxing the FX constraint on growth.

For instance, Freund and Pierola (2012) detect 92 episodes of sustained manufacturing export growth and show that they tend to be preceded by RER undervaluations. Their findings suggest that undervalued RERs help entry into new exports products and new markets (i.e., extensive margin) in developing countries. Colacelli (2010) also finds strong evidence that the extensive margin of trade is very responsive to RER changes. Cimoli et al. (2013) work with a panel of 111 countries over 1962-2008 and find that higher RERs favor export diversification. Exports diversification in turn is associated with an upgrading in the technological intensity of exports and higher economic growth. McMillan and Rodrik (2011) use a panel data of nine sectors in 38 countries over the period 1990-2005 and find that level of the RER favors structural change in favor of modern tradables and the flow of labor from low-productivity to high-productivity tradable activities. Similarly, Eichengreen (2008) works with a panel of 28 industries for 40 emerging market countries covering the period 1985–2003 and finds that higher and more stable RER levels favors tradable employment growth.

Summarizing, there are both sensible explanations and a significant amount of evidence to believe that stable and competitive RER levels favor economic growth in developing countries. A SCRER appears to be growth-enhancing because it a) minimizes the risks of currency and financial crises and sudden-stops; b) relaxes the FX constraint on sustained economic growth; and more importantly, c) stimulates modern tradable activities that are key for economic development.

### **3. SCRER management**

From the strict point of view of conventional economic theory, managing a relative price —like the RER— sounds like a heresy. Because speeds of price adjustment vary from market to market and therefore some prices are stickier than others, conventional economic theory could concede that managing a relative price would only be possible in the short run. But, if deviations from equilibrium are only transitory what would the purpose of such an objective be?

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<sup>9</sup> See, for instance, Razmi (2013), Cimoli et al. (2013) and Marques Ribeiro et al. (2014).

Economists know that the real world is substantially more complex than any abstract representation of it and that policy making requires some degree of eclecticism. This pervades the conduct of macroeconomic policy. For instance, it is widely recognized that nominal exchange rates —like the price of any other financial asset— are highly volatile and frequently follow long swings. Thus, conventional wisdom on macroeconomic policy suggests that central banks should curb RER movements that are not associated with changes in economic fundamentals. Most central banks in developing countries — where exchange rate volatility is high— follow this recipe. They conduct *sui generis* inflation targeting regimes, in which exchange rates are managed through interventions in the FX market that seek to avoid this kind of non-fundamental volatility.<sup>10</sup>

A SCRER strategy challenges this view because its goal is not to manage the RER to avoid short-run misalignments but to keep it undervalued in the medium run. As discussed in the previous section, a central assumption is that modern tradables operate under some form of increasing returns making their expansion favorable for economic growth. Economic theory establishes that multiple equilibria arise in presence of increasing returns to scale. Targeting a SCRER can thus be conceived as a strategy seeking to move the economy from one equilibrium to another. Because in normal conditions some of the gains from investing are hard to internalize by the firms, a RER higher than equilibrium gives proper incentives to invest. Sustained capital accumulation in the modern tradable sector puts the economy in trajectory towards a better equilibrium in which the size of this sector is significantly larger. However, if incentives are weak and volatile, capital accumulation may not follow. RER competitiveness thus has to be stable and durable enough to induce investment. Such a goal may likely require managing the RER beyond the short run.

Targeting a SCRER beyond the short-run is a strategy that has a long-run goal —i.e., accelerate growth— but needs to be compatible with the conventional short-run goals of macroeconomic policy. In other words, macroeconomic policy under this regime needs to keep the RER stable and competitive while achieving full employment, low inflation (i.e., internal equilibrium) and current account sustainability (i.e., external balance). Addressing all these issues simultaneously is not an easy task. It requires the coordination of several policies.

### **3.1. SCRER and external equilibrium**

Attaining external equilibrium under a SCRER regime is probably the least controversial aspect. As discussed in section I, because it stimulates the supply of and limits the demand for tradables, a SCRER strategy tends to be associated with current account surpluses or low deficits, and the accumulation of international reserves by the central bank. Countries are in stronger positions to deal with negative external shocks and reduce the chances of sudden stops of capital inflows. Moreover, a SCRER strategy makes very unlikely that the economy follows unsustainable trajectories regarding its

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<sup>10</sup> See, for instance, the analysis of Chang (2008) for the case of Latin American inflation targeters.

international assets position. The most likely case is that the country would reduce its net foreign debt or to increase its net asset position.

If anything, the concerns are whether accumulating foreign assets is *optimal*. Textbook treatments consider sustained current account deficits and surpluses as cases of external imbalances. This characterization misses an important distinction. A sustained current account deficit implies that domestic agents are continuously issuing foreign debt. In turn, a sustained current account surplus implies that domestic agents are postponing spending indefinitely. In the first case, the behavior is probably desirable but unsustainable. One would like to consume beyond her means; the problem is to find someone willing to finance such a behavior. In the second case, the behavior is sustainable but arguably suboptimal. One can sustainably finance someone else's spending; the issue is whether there is a reason to do so.

In the case of a country following a SCRER strategy, it may be desirable to accumulate foreign assets—and therefore to finance other's countries spending—if by doing so, the country manages to reach a higher level of development. The discussions about the "global imbalance" have never pointed to China's inability to maintain its current account surplus, but to whether the US could keep running current account deficits or to the potential bubbles that such financing could cause on the US and European financial markets. These considerations relate to the important issue of the global consequences of conducting a SCRER strategy, but are unrelated to specifics of how such a strategy is conducted at the national level.

### **3.2. SCRER and internal equilibrium<sup>11</sup>**

Internal equilibrium—full employment with low inflation—is usually tackled through monetary policy. In the case of a SCRER strategy, the central bank needs, on the one hand, to manage nominal exchange rate to achieve the targeted SCRER and, on the other, to manage the interest rate to regulate the liquidity and influence the pace of aggregate demand. This immediately brings in the well-known policy trilemma, which establishes that it is impossible for a central bank to simultaneously control the exchange rate and the interest rate in an economy open to capital flows.

One way out of these difficulties is to use controls on capital inflows. Several countries have successfully experienced with capital controls. Evidence appears to suggest that they reduce the share of short-term inflows and lower exchange rate volatility. Many scholars highlight the benefits of capital management techniques for macroeconomic management, especially in developing countries (Gallagher et al., 2012). Even the IMF, who had fiercely opposed them in the past, now sees a role for them in the macroeconomic policy toolkit (IMF, 2010). Despite their increasing acceptance within the profession, it seems uncontroversial that they constitute an imperfect instrument to isolate domestic financial markets from the international capital market. If a central bank

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<sup>11</sup> This section draws on Frenkel (2007), Frenkel (2008), Frenkel and Rapetti (2008) and Rapetti (2013).

wants to use monetary and exchange rate policies simultaneously, it would surely need additional instruments.

Sterilized FX interventions can be useful in this regard. In a situation of excess supply of FX at the targeted exchange rate—a likely scenario in a country following a SCRER strategy that runs a current account surplus or a small deficit—the central bank can control both the prevailing exchange and the interest rate. It can purchase all the excess supply of international currency in the FX market and sterilize the monetary effect of such an intervention through the issuing of bonds in the money market. The central bank has two available instruments to perform its two targets: the intervention in the FX market to control the exchange rate and the sterilization in the money market to control the interest rate. Tinbergen's maxim is fulfilled.

A fully sterilized intervention in a situation of excess supply of international currency at the targeted exchange rate can be thought as a policy implemented in two steps. In the first one, central bank's intervention in the FX market generates a monetary expansion. The resulting situation would show a higher amount of monetary base, the same amount of domestic bonds and an interest rate lower than the initial one. In the second step, the sterilization fully compensates for the change in the private portfolio that took place in the first step. The central bank absorbs the increment of the monetary base and issues an amount of domestic assets equal to the initial excess demand for domestic assets (the excess supply of international currency) turning the domestic interest rate to its previous level.

Notice that the excess supply of international currency at the targeted exchange rate is tantamount to an excess demand of domestic assets. If the central bank can supply such an asset, the trilemma would be invalid.<sup>12</sup> Certainly, in a situation of excess demand of FX at the targeted exchange rate, the predictions of the trilemma continue to be valid. Central bank's capacity to intervene in such a situation is limited by its stock of international reserves. But there is no symmetry between situations of excess demand and excess supply of FX. In the first case the trilemma is valid while not in the second one. The asymmetry lies in the fact that in the first case, sterilization is constrained by a fixed stock (i.e. FX reserves), while in the second, sterilization may be carried out indefinitely because of an accommodating stock (i.e. central bank's bonds). Central bank's ability to issue bonds but not FX reserves is the key difference. It seems that this conclusion is not generally acknowledged because the literature discussing monetary autonomy and exchange regimes rarely considers situations of excess supply of FX.

Even if circumventing the trilemma is feasible in cases of excess supply of foreign currency, one may wonder about the sustainability of such a strategy. This depends on the potential cost that the central bank faces when performing these operations. At a given

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<sup>12</sup> Except for special circumstances, public debt instruments—including those issued by the central bank—are the least risky assets in a developing economy. The interest rate of such instruments set the floor of the other interest rates in the economy. In fact, this is the very basis for conducting monetary policy via an interest rate set by the central bank. Thus, unless there is an institutional constraint, central banks should be able to offer such an asset and perform sterilization operations.

targeted exchange rate, a sustained policy of fully sterilized interventions implies no change in central bank's net worth. The asset side of its balance sheet increases by the increment of FX reserves, and the liability side by the bonds issued to sterilize. Both magnitudes are initially of equal value. The cost depends on the yield of the FX reserves compared to the interest rate that the sterilizing bonds pay. Since FX reserves are typically allocated in low risk assets —e.g., US bonds—, the yield of FX reserves are likely to be lower than bonds interest rate (Rodrik, 2006). Notice, however, that the full cost of the operation also depends on the capital gains or losses associated with the variation of the exchange rate in time. If it depreciates (appreciates) the yield of FX reserves increases (diminishes) by the rate of depreciation. Notice that if the central bank follows some sort of U uncovered interest parity rule<sup>13</sup> to manage the exchange rate —devaluing by a rate equal to the difference between the interest rate that central bank's bonds pay and the one that is paid for the international reserves—the marginal cost of sterilization would be nil (Bofinger and Wollmershäuser, 2003). But even if the marginal cost is positive the policy may be financially sustainable. This would depend on the whole asset and liability structure of the central bank's balance sheet and the corresponding yields. Frenkel (2008) analyzes sustainability conditions for sterilized FX interventions considering reasonable balance sheet structures and reaches the conclusion that they are sustainable as long as the interest rate of monetary policy is “moderate”, which critically depends on sovereign and currency risk premia.

Sterilized FX intervention may be sustainable even if it generates a net positive cost to the central bank. This would imply that the Treasury has to finance central bank's deficit. The decision to keep financing the policy would depend on a cost-benefit analysis of the strategy. If the costs of the sterilized interventions on which the SCRER strategy is based are low compared with the benefits in terms of structural change and development, then it may worth financing them. As John Williamson (1996: 30) pointed out, regarding the cost of sterilization in Chile's SCRER policy during the 1990s: “[if paying 1-1.5 per cent of GDP] is the price of preserving a model that works, it would be cheap”.

Despite the arguments developed so far, it is possible that in certain conditions the interest rate required to attain internal equilibrium would be too high to make sterilization financially sustainable. Capital regulations could help in this scenario, but it is also imaginable that inflows would find ways to at least partially circumvent them. These considerations highlight the fact that financial integration with international markets makes monetary policy not completely independent. For this reason, fiscal policy also needs to play a role in the management of aggregate demand under a SCRER framework. Given that most public spending items and taxes are rigid and their modification typically require legislative treatment, authorities need to develop some fiscal instrument flexible enough to help monetary policy conduct counter-cyclical policy. Some countries have successfully developed counter-cyclical fiscal funds that play such a role.

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<sup>13</sup> UIP stands for uncovered interest parity, which states that portfolio decisions should lead to domestic interest rate being equal to the sum of foreign interest rate and the expected rate of exchange rate variation.

Managing aggregate demand under a SCRER strategy thus requires coordination of policies, including exchange rate, monetary, capital account and fiscal policies. If correctly coordinated, macroeconomic policy can properly respond to shocks and manage aggregate demand to attain internal equilibrium. It is important to bear in mind, however, that a SCRER strategy can have an inflationary bias even if macroeconomic policy is adequately coordinated. A competitive or undervalued RER implies that real wages —or, more specifically, wages in terms of tradable prices— are lower than they could be if the RER were at equilibrium. Thus, even if aggregate demand is not generating inflationary pressures in the goods markets, inflation may still accelerate due to wage inflation pressures that arise from workers perception that wages are too low. Wage aspirations are not only influenced by the degree of unemployment but also by history, social norms and institutions. Thus, keeping a RER competitive beyond the short run may ultimately depend on developing some mechanism making workers' wage aspirations compatible with modern tradable sector's profitability. Authorities would need to convince workers and their leaders that their cooperation in terms of prudent wage aspirations are beneficial not only for modern tradable activities but also workers themselves, because under cooperation real wages would be higher in the medium run. Social agreements between governments, firms and workers linking real wages to productivity in key tradable activities may thus be an important element in a successful competitive RER strategy for development.<sup>14</sup>

#### **4. Conclusions**

Today's mainstream approach to macroeconomic policy is to conduct inflation targeting regimes with a dominant goal on low and stable inflation rate. Additionally, exchange rates are managed through FX interventions seeking to avoid short-run volatility that is unassociated with economic fundamentals. A common result of this kind of approach has been RERs that are volatile and overvalued. This may represent an obstacle for long-run growth.

In this paper, we made the case for an alternative approach. Attaining standard macro-policy objectives while targeting a SCRER is viable. The proposed scheme is certainly more complex than a standard inflation-targeting framework because it adds an additional target to macroeconomic policy: the RER. However, evidence persuasively suggests that SCRERs tend to foster economic growth and development. Developing countries should evaluate the possibility of adopting this development-friendly approach to macroeconomic policy.

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<sup>14</sup> In commodities exports countries, such an agreement could be complemented with special taxes on rents and use the proceeds to finance social transfers that function as indirect wages.

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