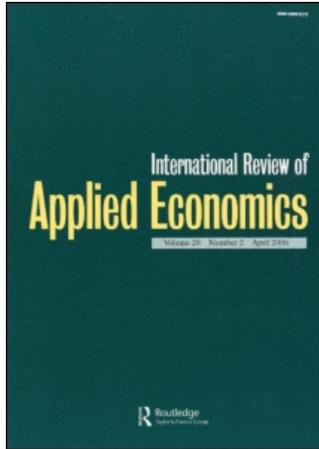


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Five years of competitive and stable real exchange rate in Argentina, 2002–2007

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We argue that the macroeconomic regime focused on the preservation of a stable and competitive real exchange rate (SCRER) has been a key factor explaining the rapid growth experienced in Argentina during 2002–2007. This policy promoted economic growth not only by preserving external and fiscal accounts sustainability, but also by providing incentives to the tradable sector and thus encouraging the expansion of its production, employment and investment. Monetary and exchange rate policies aimed at preserving a SCRER collide with conventional wisdom, particularly with the open economy trilemma. We argue that the critiques based on the trilemma may fail to hold in situations of excess supply of foreign currency and analyze the conditions under which the SCRER policy is sustainable.

Keywords: real exchange rate; growth; monetary policy; trilemma; Argentina

JEL classifications: F41, F31, E52

1. Introduction

Between the last days of 2001 and the beginning of 2002, Argentina declared the default of its international debt, abandoned the convertibility regime based on a currency board and devaluated the peso (AR\$). The resulting economic collapse implied a gross domestic product (GDP) contraction of 21% with respect to the peak of mid 1998 and a rise in the unemployment rate up to 21.5%, leaving half of the population below the poverty line. However, only 3 months after the devaluation and the default, economic activity gradually started to recover. By the end of 2002, once the government managed to stabilize domestic financial markets, the recovery gained momentum and since then the economy has shown an impressive performance. In 5 years – from the first quarter of 2002 to the same period in 2007 – GDP growth was at 8.1% annual rate, reaching a peak 18.1% higher than that of mid 1998. The investment rate rose up to 22% of GDP (on a seasonally adjusted basis), which is the maximum range of the official time series beginning in 1993 and has continued growing at a higher rate than GDP. During these 5 years exports have expanded at a slightly higher rate than GDP, but its pace of growth has substantially increased from mid 2004 onwards.

Current economic evolution contrasts with the performance of the last 60 years. Since post Second World War, Argentina's growth has been low and very volatile, especially in the second financial globalization period beginning in the mid 1970s. For the first time in 30 years Argentina has seen growth for 5 years in a row. More importantly, current expansion is based on solid macroeconomic fundamentals. Growth volatility has been typically associated to current account and fiscal deficits. Between the mid 1940s and the mid 1970s, macroeconomic evolution was characterized by stop-and-go cycles related to external imbalances. During the second financial

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globalization period, the availability of external funds momentarily relaxed the external constraint to growth, but it led to two episodes of explosive fiscal and external debt accumulation; one between the late 1970s and early 1980s and the other during the convertibility regime period (Damill et al., 2005).

In contrast, current macroeconomic configuration stands out because of the external and fiscal surpluses. Certainly, the debt restructuring in 2005 – implying a US\$67 billion reduction in the nominal stock – softened both external and fiscal requirements. Similarly, favorable external conditions – especially the high prices of some commodities – have also contributed. However, in our view, the main factor behind the current success lays in the official policy aimed at preserving a stable and competitive real exchange rate (SCRER). The SCRER has been a key factor explaining the current account adjustment, which changed from a US\$14.5 billion deficit in 1998 into a US\$7.6 billion surplus in 2006. From this US\$22 billion adjustment, US\$20 billions came from the improvement in the trade balance, which is mainly attributable to the effects of the real exchange rate depreciation.

The influence of the SCRER on performance of the fiscal accounts has also been important. After devaluation, the government introduced taxes on traditional exports, mainly agricultural products and oil. In practice, this measure implied the introduction of multiple exchange rates that contributed to reducing the pass-through of devaluation to wage–goods prices, but also to capture part of the rent that these traditionally competitive sectors obtained from the competitive real exchange rate. In 2006, the federal administration recorded a primary surplus of 3.5% of GDP and a total surplus of 1.8% of GDP, from which taxes on exports accounted for 63% of the former and 122% of the latter.

In our view, the positive effects of the SCRER policy are crucial in explaining the rapid growth experienced so far. This policy promotes economic growth not only by preserving external and fiscal accounts sustainability, but also by providing incentives to the tradable sector and thus encouraging the expansion of its production, employment and investment. Although the success of the SCRER strategy over these 5 years has undoubtedly had a persuasive impact among analysts, skepticism remains. The SCRER policy collides with conventional wisdom, particularly with the well-known open economy trilemma.

In this paper, we argue that a macroeconomic regime based on a SCRER is both desirable and manageable for a developing open economy. The next section describes the evolution of monetary and exchange-rate policies in Argentina in the post-convertibility period. Section 3 discusses the usual criticisms against the SCRER policy and shows the conditions in which this policy is sustainable. Section 4 presents some concluding remarks.

2. Monetary and exchange rate policies in the post-convertibility period

At the beginning of 2002, after the abandonment of the convertibility regime, the government aimed to restrain the capital outflow and stabilize the foreign exchange (FX) market by introducing a dual exchange rate regime. The idea was to use this scheme only temporarily, in order to stabilize the nominal exchange rate while the domestic prices absorbed the impact of the devaluation, and then to adopt a floating regime. The authorities also decided to convert most of domestic debts contracted in dollars (bank credits, rents, etc.) to pesos at a AR\$/US\$1.00 rate (plus indexation to CPI inflation), thus neutralizing most of the effects of the relative price change on the debtors' balance sheets. In contrast, banks' deposits originally denominated in dollars were 'pesoificated' at a AR\$/US\$1.40 rate (plus indexation to the evolution of CPI inflation). Together with the 'pesoification', the authorities unilaterally decided to extend the maturity of all deposits, including those originally contracted in pesos. In exchange, private depositors received certificates for the reprogrammed deposits.

In February 2002, the FX market was unified and the peso started to float. Given the political and economic uncertainty, the exchange rate skyrocketed fed by self-fulfilling expectations. Interestingly, this process developed in an illiquid environment because of the restrictions on the withdrawal of cash from banks. Additionally the erratic monetary policy followed in the first quarter of 2002 did not contribute to stabilize the exchange rate. The authorities delayed the issuing of a domestic asset that could perform as a potential substitute for foreign currency. Given the distrust in banks and in the Treasury, the economic depression and the accelerating inflation, the US dollar appeared as the only secure asset to allocate savings. Only after 2.5 months following the devaluation did the central bank start to issue notes (i.e. the Lebac), aiming to introduce a financial instrument that could compete with the dollar. Figure 1 illustrates the run against domestic assets during this period.¹

The resulting portfolio switch from domestic to foreign assets affected the FX market. The nominal (NER) and real exchange rate (RER)² rose continuously along the first semester of 2002 (around 260% and 180%, respectively). Their behaviors are shown in Figure 2. Real exchange rate overshooting was so pronounced that in June 2002 its value was almost 193% higher than the 1980/2001 period average value, and 309% higher than the convertibility decade average.

These disruptive trends began to revert in July 2002. The turning point was the exchange rate stabilization. Several factors contributed to this outcome. Controls on FX transactions were introduced in November 2001 and they were further tightened in March 2002. Since June 2002, controls and interventions in the FX market have been strengthened in order to conduct a systematic policy to stabilize the exchange rate. The decision that export revenues surpassing US\$1 million had to be sold directly to the central bank was especially important in this regard. This became the main source of accumulation of international reserves for the monetary authority, which in turn allowed it to increase the volume of its interventions in the FX market.

Financial market behavior itself also contributed to stop the bubble in the exchange rate. On the one hand, local interest rates skyrocketed (Figure 3). In July 2002, the annual interest rate of

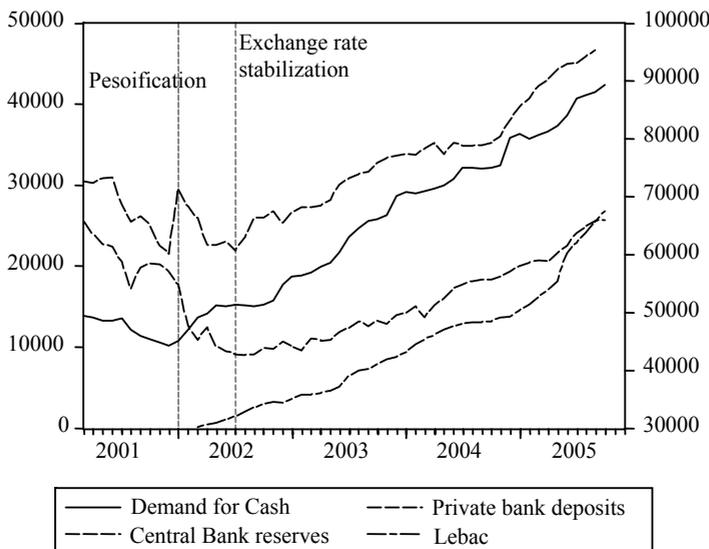


Figure 1. Demand for cash, central bank international reserves (in millions of US dollars), Lebac, and private bank deposits (right axis) (in millions of pesos and US dollars). Source: Central Bank of Argentina (BCRA).

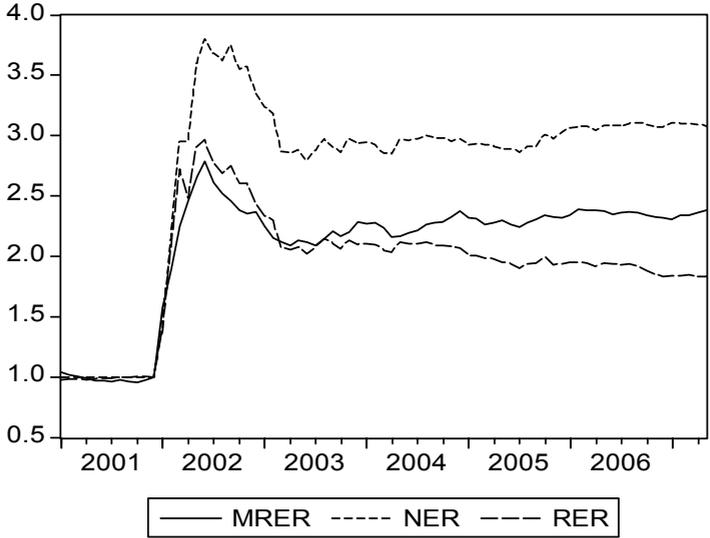


Figure 2. Bilateral nominal (NER) and real exchange rate (RER), calculated using US and Argentina consumer price indexes, with the USA and multilateral real exchange rate (MRER), elaborated using monthly data of the exchange rates of the 18 principal trading partners of Argentina, adjusted by the respective consumer price indexes (in pesos and indexes 1 = December 2001). Source: BCRA.

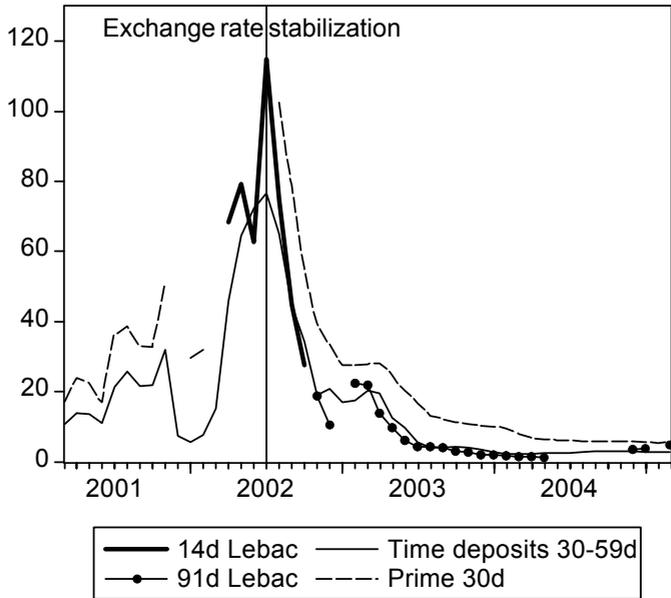


Figure 3. Interest rates in pesos: Lebac (14 and 91 days), time deposits (30–59 days) and prime (30 days) (monthly average, in %) Source: BCRA.

time deposits reached a 76% peak, and the annual interest rate of the 14-day Lebac reached almost 115%. Thus local financial assets began to appear more attractive as substitutes for the dollar. On the other hand, as mentioned above, the real price of the dollar reached very high and 'abnormal' levels in historical terms (i.e. the prices in dollars of domestic assets, non-tradable goods and salaries were perceived as abnormally low). In this context, once the authorities managed to stop the exchange rate bubble in July, the public changed expectations and the demand for domestic assets gradually recovered. Bank deposits began to grow, as well as the demand for the Lebac, local shares and the demand for cash. With the normalization of monetary and financial variables, the exchange rate began to experience a trend of smooth nominal appreciation.

The nominal and real appreciation process stopped around mid 2003, when the government decided to manage the flotation of the exchange rate in order to preserve competitiveness. The effects of the SCRER on economic activity, employment and external and fiscal accounts had been demonstrated to be highly favorable. Thus, the government gradually started to recognize and make explicit reference to the importance of preserving the SCRER in the official economic strategy. On the contrary, Central bank authorities never made any explicit statement regarding the existence of any exchange rate target. According to their official statements and documents, the permanent intervention in the FX market has been oriented to accumulate international reserves as a precautionary purpose; namely, to protect the economy from international capital market volatility. Statements aside, the joint intervention of the central bank and the Treasury in the FX market actually controlled the price of the dollar in a narrow range between AR\$2.8 and AR\$3.1. The resulting fluctuation of the exchange rate in this interval made the multilateral (or effective) real exchange rate remain stable around a level 129% higher than the one at the end of the convertibility regime. The bilateral real exchange with the US dollar also remained relatively stable, although it began a continued soft appreciation trend in early 2005.

In 2002, when the Congress passed a law revoking the currency board, the government decided to keep central bank's independency with the mandate of pursuing low inflation rates as its primary mission. Given that the economy was still absorbing the effects of the crisis and domestic financial markets had shrunk significantly, the central bank decided not to follow an inflation targeting regime. The monetary transmission mechanisms of the interest rate were thought to be uncertain and weak.³ Instead, the authorities opted to follow a more pragmatic policy based on broad quantitative monetary targets. From 2003 on, targets have been announced at the beginning of every year throughout the central bank monetary programs, in which the authorities commit themselves to maintain monetary aggregates within a certain range. Given the uncertainty surrounding the effects of monetary policy, the central bank has tended to set these ranges sufficiently broad. However, their upper levels resulted in values systematically lower than the monetary expansion arising from the interventions in the FX market required to preserve the SCRER. Thus, since 2003 the central bank has dealt with two 'conflicting' objectives: the preservation of a competitive exchange rate by intervening in the FX market and at the same time the attainment of the monetary expansion targets announced in the monetary program.

The tension between these two policy objectives can be observed in Table 1, which shows the sources of variation of the monetary base. In the first semester of 2002 the central bank intervened in the FX market supplying dollars to contain the depreciation pressures. Thus, the FX intervention operated as a source of monetary base contraction. Once the exchange rate was stabilized, an accumulation of international reserves resulted, on the contrary, in a source of monetary expansion. During the second semester of 2002, this source of monetary expansion was easily absorbed by the rapid growth of the demand for cash caused by the re-monetization of the economy. However, since 2003 the gradual deceleration of money creation established in the monetary programs in order to maintain controlled inflation expectation started to conflict with the increasing expansion of the monetary base generated by central bank's intervention in the FX

market, which aimed to preserve the SCRER. Since the amount of monetary base created to intervene in the FX market (i.e. first column in Table 1) exceeded the actual expansion of the monetary base to accomplish the monetary targets (i.e. second column), an 'excess' of monetary expansion (i.e. third column) had to be absorbed.

During this period, the 'excess' of monetary expansion has been absorbed through several mechanisms. Along 2003, the sterilization operations implemented by the issuing of central bank notes were especially relevant. The need for sterilization increased during 2004 and 2005. However, the central bank could limit the issuing of Lebac because other compensatory mechanisms began to operate. In the first place, as liquidity grew the banks started to service the debt incurred with the central bank during the financial crisis. Hence, capital payments by the banks and especially the payment of interest operated as a source of monetary base contraction. In 2005, the central bank launched a program allowing the acceleration of debt amortizations of the banks, reinforcing this contractionary mechanism. By early 2006 most banks had cancelled their debts with the monetary authority.

The Treasury also helped to absorb the 'excess' of monetary expansion. While in 2002, a net flow of financing from the central bank to the Treasury was observed, in 2003 and especially since 2004, the transactions between the Treasury and the central bank have operated as a source of monetary base contraction. The Treasury's purchases of international reserves with the proceeds of the primary surplus gave place to a monthly average contraction of the monetary base of AR\$543 millions in 2004. The main purpose of these operations was to serve the debt with the multilateral financial institutions. The Treasury and other official agencies also accumulated part of the fiscal surplus in foreign currency and thus intervened directly in the FX market to alleviate the central bank's management of the 'conflicting' objectives. These operations started in late 2002 and gradually expanded afterwards, thus becoming an important policy instrument (i.e. last column of Table 1).

In June of 2005, the government introduced controls on the capital account. It was established that all capital inflows – excluding the issuing of new private and public debt, international trade financing and foreign direct investment – would be subject to a 30% unremunerated reserve requirement for at least 365 days. In theory, controls are meant to reduce short-term capital inflows; however its implementation left open ways to avoid the reserve requirements. For instance, capital inflows can easily circumvent the reserve requirement by operating through the stock exchange market (by buying domestic assets abroad and selling them in the local market). There has been no evidence of a reduction in the supply of dollars in the FX market after the measures were implemented. Local analysts believe that controls are ineffective and even the authorities do not reject the idea that they were introduced more as a signal of the official willingness of maintaining the SCRER strategy rather than as an effective control mechanism.

As from 2006 monetary policy stopped targeting the monetary base and started to focus on M2. The authorities argued that the change in the target was due to the increasing monetization of the economy and the gradual recovery of bank credit. In these conditions, it was argued, the use of a larger monetary aggregate represented a step forward toward the fine-tuning of monetary policy. In practice, the switch of the monetary aggregate target helped to relax the conflicting management of exchange rate and monetary policies. The central bank was facing increasing difficulties in accomplishing the monetary base targets. As Table 1 shows, the 'excess' of monetary expansion had risen substantially between 2003 and 2005. The use of M2 as a target gave the authorities greater flexibility to conduct the two-target policy, allowing for greater intervention in the FX market and expansion of the monetary base.

In sum, during the post-convertibility period the central bank has been able to conduct the two-target policy successfully, even generating quasi-fiscal surpluses in every year. Some analysts have argued that the management of monetary policy focusing on two targets has had an

Table 1. Sources of variation of the monetary base (monthly average variation, in millions pesos or US dollars).

	Central bank FX intervention	Monetary base variation	'Excess' of monetary expansion	Central bank sterilization	Assistance to the banks	Assistance to the Treasury	Others	Treasury FX intervention ¹
2002:01	-1450	406	-1856	-216	1426	124	522	n/a
2002:02	1281	1574	-363	-270	86	250	327	n/a
2003	1374	809	565	-420	-125	-52	32	28
2004	1931	483	1447	-323	-601	-543	19	112
2005	2352	186	2166	-836	-939	-353	-39	343
2006	3584	2113	1471	-812	-204	-446	-8	40

Notes: ¹In millions of US dollars. ²Calculated for the period February–June 2002. ³A cancellation of a Banco Nación's rediscount by the Treasury with assistance of the central bank in September 2002 for about AR\$3500 million is omitted.
n/a = not applicable.

inflationary bias. Certainly, inflation accelerated since 2004 and became a source of concern in 2007. In our view, the acceleration of inflation is due not to inconsistencies in the management of monetary and exchange rate policies, but to the lack of coordination between these and the fiscal policy. The expansion of public spending well above the increase of tax revenues since 2006 has implied an expansionary fiscal impulse to an already fast-growing aggregate demand. Given the fact that monetary and exchange rate policies focus on preserving a SCRER – which is intended to put the economy on a high growth path – fiscal policy is the only macroeconomic instrument available to moderate aggregate demand when inflationary pressures arise.

3. The economics of SCRER

The notion that a SCRER favors economic development has a long tradition in economic theory. Advocates of the outward orientation approach to development during the 1960s and 1970s pointed to the SCRER as a key element in that strategy. According to this view, a competitive real exchange rate boosts economic growth because it softens the balance of payment constraint and favors the development of tradable activities, which tend to be more dynamic. The stability of the exchange rate is also important because low volatility reduces the risk and uncertainty of investment in tradable sectors. These arguments have been recently revitalized by modern scholars emphasizing other related positive aspects of the SCRER strategy⁴ and a growing literature has documented a statistically positive relationship between economic growth and competitive real exchange rates.⁵

The preservation of a SCRER has also been invoked for other reasons. Maintaining a competitive real exchange rate typically involves intervention in the FX market and the accumulation of international reserves. It is a well documented fact that international financial integration may lead to macroeconomic instability and increases the likelihood of external crises. Accumulation of international reserves serves as a shield against volatile capital flows, especially for developing countries. Empirical studies show a positive relationship between reserve accumulation and economic growth (Polterovich and Popov 2002).

Another less studied motive is that competitive real exchanges rates promote job creation. Besides the above-mentioned effects on growth, a SCRER may impact on employment through a more intense use of labor. A competitive parity favors labor-intensive activities and sectors and also the substitution of expensive inputs (such as imports) in favor of labor across sectors (Frenkel and Ros 2006).

Probably because of all these reasons, the preservation of a SCRER does not attract much criticism by itself. Skepticism towards the SCRER strategy points instead to the actual ability of governments to conduct it. The main objection is that the real exchange rate is not under the government's control, at least in the long run. However, given the weak empirical support of equilibrium real exchange rate models,⁶ the objections relevant for economic policy formulations are based on the trilemma argument. The trilemma says that it is impossible for a country to simultaneously maintain free capital mobility, active monetary policy and the ability to manage the exchange rate. One of these features must necessarily be given up. In other words, in an economy open to capital flows it is impossible for local authorities to simultaneously control the exchange rate and the interest rate (or the monetary base).

There are at least two ways to express the objection to the SCRER policy based on the trilemma. The first one argues that targeting the exchange rate implies central bank intervention in the foreign exchange market. In doing so, the central bank loses its ability to control money supply, unless capital flow controls are imposed. However, the effectiveness of capital regulation in a financially integrated world is low, because the private sector innovative capacity is greater than the regulatory ability of the public sector. The conclusion is that central banks have to choose

between two poles: active monetary and floating exchange rate or hard peg cum passive monetary policy (Fischer 2001). This vision has lost strength, however, with the increasing evidence of countries following intermediate options.

The second way to express the objection focuses on the argument of controlling inflation. If the interventions in the exchange market target the real exchange rate (instead of the nominal exchange rate), no nominal anchor remains for the public to configure inflationary expectations. Because the central bank cannot control the money supply, the inflation rate is completely out of control.

The trilemma is essentially a policy argument, logically derived from interest rate parity theorems for open economies. When forward exchange markets are not fully developed, the relevant theorem is the uncovered interest parity (UIP) condition. The UIP states that the returns of two perfect substitute assets nominated in different currencies should be equal. This implies that the domestic interest rate i should equalize the sum of the foreign interest rate i^* and the expected variation of the nominal exchange rate ($E(\dot{S}) = (S_{t+1}^E - S_t)/S_t$). With the additional assumptions of small country ($i_t^* = i^*$) and perfect foresight ($S_{t+1}^E = \bar{S}$), the UIP condition formally implies:

$$i_t = i^* + \frac{\bar{S}}{S_t} - 1 \quad (1)$$

Equation (1) is a simple model with two unknowns: the domestic interest rate and the exchange rate S_t . Under a credibly fixed exchange rate regime ($S_t = \bar{S}$), the model is solved by determining the interest rate endogenously equal to the international rate. In other words, the government is able to set the exchange rate but loses the control on the monetary policy. When the exchange rates float freely, equation (1) is solved by setting the domestic interest rate exogenously. This is the case in which governments have an active monetary policy at the cost of letting the exchange rate float. If both the interest rate and the exchange rate are exogenous, equation (1) is overdetermined. The only way to avoid this situation is to consider the imposition of capital controls, which prevent arbitrage forces to make the parity hold.

In any model, conclusions depend on its assumptions. In the case of the trilemma one crucial assumption is that assets are perfect substitutes. If this assumption is relaxed the validity of the trilemma as a general theorem characterizing the performance of economies open to capital flows no longer holds. Moreover, it has been recognized for long time in open economy macroeconomics that in the context of free capital mobility central banks have room to conduct active monetary policy and control nominal exchange rate when assets are imperfect substitutes.⁷ The degrees of freedom of monetary policy vary inversely with the degree of substitutability of assets.

The degree of freedom of monetary policy also depends on the institutional characteristics of the central bank, and the situation of the FX market. In a case of excess supply of foreign exchange at the targeted exchange rate, if the central bank is allowed to issue bonds to sterilize, it can control both the prevailing exchange and interest rates. This can be done by purchasing all the excess supply of international currency in the FX market and sterilizing the monetary effect of that intervention through the issuing of bonds in the monetary 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 intervention in the money market to control the interest rate. Tinbergen's maxim is fulfilled. The excess supply of international currency, at the exchange rate targeted by the central bank, implies an excess demand for domestic assets at the prevailing domestic interest rate. The fully sterilized intervention operation can be imagined as a policy implemented in two steps. In the first one, the central bank intervention generates a monetary base 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 complete 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.

Therefore, if assets are imperfect substitutes and sterilization is allowed, the ability of the central bank to simultaneously manage the exchange rate and the interest rate critically depends on the existence of an excess supply of international currency at the targeted exchange rate. In this setting the trilemma is invalid. 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 international currency. It is mostly focused on situations with a balance of payments deficit.

Certainly, in excess demand contexts the predictions of the trilemma are generally valid. Even when assets are imperfect substitutes, in these situations the capacity of central banks to intervene in the FX market is limited by their stock of international reserves. Consequently, it may be argued that even powerful central banks cannot simultaneously control the exchange rate and the interest rate in contexts of excess demand for international currency. There is no symmetry between excess demand and excess supply situations. In the first case the trilemma is valid while not necessarily in the second one. The asymmetry lies in the fact that in the first case sterilization is constrained by a fixed stock (i.e. the international reserves), while in the second, sterilization may continue indefinitely because of a variable stock (i.e. central bank's bonds). A central bank's ability to issue bonds but not international reserves is the key difference.

This ability raises the question of whether it is possible to carry permanently the fully sterilized intervention policy under situations of excess supply of foreign currency. In order to do so, the central bank must fulfill a sustainability condition: its net worth should not follow an explosive trend. Sustainability therefore depends on the magnitudes of the international and the domestic interest rates and on the rate of variation of the nominal exchange rate. Taken as given the international interest rate and the trend of the nominal exchange rate, the sustainability condition depends on the domestic interest rate. The central bank enjoys autonomy to determine the domestic interest rate, but in order to be sustainable the policy must determine domestic interest rates lower than a certain upper limit. This limit can be formally determined as follows.⁸ Assume a central bank that holds international reserves R as its unique asset and issues monetary base H and remunerated liabilities L yielding the domestic interest rate set by the monetary authority, i_t . Therefore, the net worth of the central bank N at any point in time would be:

$$N_t = S_t R_t - (H_t + L_t) \quad (2)$$

In each period, the central bank earns the yield on international reserves – which for simplicity we assume is invested at the international interest rate – and makes the interest payments on its remunerated liabilities. There is also a valuation effect on the international reserves as a result of the variation of the exchange rate \dot{S} . Since the changes in the stocks cancel out, the central bank's quasi-fiscal profit is equal to the variation of its net worth.

$$dN = SR(i^* + \dot{S}) - iL \quad (3)$$

A simple (although restrictive) condition for the central bank's net worth not to follow an explosive trend is to assume that the quasi-fiscal profit has to be non-negative ($dN \geq 0$). Under this sustainability condition, we obtain the maximum domestic interest rate that makes the fully sterilized intervention policy sustainable:

$$i_t^{\max} = \frac{i^* + \dot{S}}{L_t / S_t R_t} \quad (4)$$

It follows that there is a range of interest rates from zero to i^{\max} that makes the fully sterilized intervention policy sustainable. Given that central banks typically enjoy senioriage and inflation tax revenues, the case in which $L_t < S_t R_t$ does not seem unlikely. In these cases, the upper limit of this range would be greater than the sum of the international interest rate and the rate of variation of the nominal exchange rate.

It is important to notice that since i^{\max} depends on the behavior of R_t and L_t , the range of sustainable interest rates also evolves over time. Given a set of variables and parameters of the economy (such as the inflation rate, the elasticity of money demand and the rate of variation of the exchange rate), i^{\max} would tend to decrease as the interest rate set by the central bank increases. Thus, in order to keep the policy on a sustainable trend, the cumulative sterilization cost should be bounded and manageable. A key point for sustainability is therefore that the domestic interest rates set by the central bank should be ‘moderate’ in the mentioned sense.

4. Concluding remarks

In this paper we argue that monetary and exchange rate policies targeting a SCRER are viable for developing open economies. We illustrated our argument with Argentina’s recent experience, which is one of many other economies like China or India following this strategy. The growing evidence documenting the positive effects of a SCRER on employment creation and economic growth may explain why these countries focus their monetary and exchange rate policies to preserve a SCRER. It is important to notice however that when a country is trying to sustain a SCRER, potential conflicts between domestic goals – such as the exchange rate, inflation rate and employment – might arise. Recent inflationary pressures in Argentina could be an example of these conflicts. For these reasons, it is important to stress here that the management of a SCRER regime should aim to coordinate monetary, exchange rate and fiscal policies. In such a macroeconomic regime, the current dominant policy advice favouring the segmentation between objectives – of which independent central banks with a narrow mandate on inflation is an eloquent example – should be avoided. The preservation of a SCRER, the level of employment and the control of inflation should be the priorities and the restrictions that the economic policy must fulfil. Monetary, exchange rate and fiscal policies should therefore be coordinated to guarantee the consistency between these multiple objectives.

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Notes

1. The ‘jump’ in the private bank deposit series in January 2002 reflects the accounting effect of the ‘pesoification’ at 1.40 pesos per dollar of deposits issued in foreign currencies, previously valued at a AR\$/US\$ 1 rate.
2. Exchange rates are defined so that a rise in these variables implies nominal/real depreciation.
3. The effects of the interest rate through the credit channel are very weak in an economy where bank credit to private sector remains below 13% of GDP as in Argentina.
4. See Williamson (2003), Dooley, Folkerts-Landau and Garber (2004), Frenkel and Taylor (2007), and Rodrik (2007).

5. See Hausman, Pritchett and Rodrik (2005) and Prasad, Rajan and Subramanian (2007).
6. Evidence regarding short-run indeterminacy of the real exchange rate seems to be conclusive. Its behavior is almost completely determined by nominal exchange rate. Although most scholars agree about the existence of an equilibrium real exchange rate in the long run, there is no consensus regarding its determining factors. The purchasing power parity (PPP) is the most accepted hypothesis (Taylor and Francis 2004). However, evidence regarding the PPP shows time series reverting to their means in very long periods (i.e. average half life of 3–5 years) and results are highly sensitive to data sets and estimation techniques.
7. See, for instance, chapter 10 of Dornbusch (1980).
8. The complete model is in Frenkel (2007).

References

- Damill, M., R. Frenkel, and M. Rapetti. 2005. The Argentinean debt: History, default and restructuring. Initiative for Policy Dialogue, Working Paper Series, Columbia University, New York.
- Dooley, M., D. Folkerts-Landau, and P. Garber. 2004. The US current account deficit and economic development: Collateral for a total return swap, NBER Working Paper No. 10727, Cambridge, MA.
- Dornbusch, D. 1980. *Open Economy Macroeconomics*. New York: Basic Books.
- Frenkel, R., and J. Ros. 2006. Unemployment and the real exchange rate in Latin America. *World Development* 34, no. 4: 631–646.
- Frenkel, R., and L. Taylor. 2007. Real exchange rate, monetary policy, and employment. In *Policy Matters. Economic and Social Policies to Sustain Equitable Development*, ed. J.A. Ocampo, K.S. Jomo, and S. Khan. London: Zed Books, 2007.
- Frenkel, R. 2007. The sustainability of sterilization policy. *CEPAL Review*, 93, forthcoming.
- Fischer, S. 2001. Exchange rates regimes: Is the bipolar view correct? *Journal of Economic Perspectives* 15, no. 2: 3–24.
- Hausman, R., L. Pritchett, and D. Rodrik. 2005. Growth accelerations. *Journal of Economic Growth* 10, no. 4: 303–329.
- Prasad, E., R. Rajan, and A. Subramanian. 2007. Foreign capital and economic growth. *Brooking Papers on Economic Activity* 1: 153–209.
- Polterovich, V., and V. Popov. 2002. Accumulation of foreign exchange reserves and long term growth. Working Paper, New Economic School, Moscow.
- Rodrik, D. 2007. The real exchange rate and economic growth: Theory and evidence. Harvard University, mimeo.
- Taylor, A., and M. Taylor. 2004. The purchasing power parity debate. *Journal of Economics Perspectives* 18, no. 4: 135–158.
- Williamson, J. 2003. Exchange rate policy and development. Paper prepared for the project ‘Capital market liberalization task force’, Initiative for Policy Dialogue, Barcelona.