



# A Concise History of Exchange Rate Regimes in Latin America

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Roberto Frenkel and Martín Rapetti

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**Center for Economic and Policy Research**  
1611 Connecticut Avenue, NW, Suite 400  
Washington, D.C. 20009  
202-293-5380  
[www.cepr.net](http://www.cepr.net)

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## About the Authors

Roberto Frenkel is a Senior Research Associate of the Center for Economic and Policy Research. He is also Principal Research Associate at Centro de Estudios de Estado y Sociedad (CEDES), Professor at the Universidad de Buenos Aires. Martín Rapetti is a PhD. candidate in the Department of Economics at the University of Massachusetts, Amherst and an adjunct researcher at CEDES.

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## Executive Summary

This paper analyzes exchange rate regimes implemented by the major Latin American countries since the Second World War, with special attention to the period of the second globalization process beginning in the 1970s. A central argument is that exchange rate policy has played a significant role in shaping many of the macroeconomic outcomes observed during these decades.

The choice of exchange rate regimes has decisive implications for the behavior of the nominal exchange rate (NER). This is a key macroeconomic variable that affects the behavior of relevant nominal and real variables, including the inflation rate, the balance of payments, output and employment levels and the rate of economic growth. In this regard, the exchange rate regime can have a decisive influence on four key economic policy objectives:

- a) Price stability
- b) Domestic financial stability and robustness
- c) External and internal balances
- d) Economic growth/development

The choice of exchange rate regimes in Latin America has been influenced to a great extent by the historically specific degrees of freedom (or urgency) with which countries had addressed these policy objectives.

During the 1950s and 1960s, the international monetary system followed the Bretton Woods rules, which established that countries had to maintain fixed exchange rates against the US dollar. Between the late 1960s and the early 1970s, Latin American countries began to face a significantly different international context: the gradual emergence of the second wave of financial globalization. Two key events in this process occurred during the first half of the 1970s. First, there was a shift in developed countries from fixed to floating exchange rates, which strongly stimulated the development of foreign exchange markets and their derivatives. Second, OPEC countries generated the first coordinated rise in the price of oil. This shock rapidly caused large current account imbalances in oil-importing countries and at the same time supplied the incipient Eurodollar market with abundant liquidity. Since that period there has been secular growth in international capital flows concurrent with a progressive de-regulation of capital accounts and a progressive liberalization and opening of domestic financial systems. Both trends shaped the second wave of financial globalization.

There were different responses to these changes in the international environment. Brazil kept its crawling peg regime after the oil shock of 1973 and also its previous monetary policy. Its current account deficit and foreign debt followed rising trends. During the first half of the 1970s, Argentina, Chile and Uruguay had suffered severe economic and political crises and persistently high inflation rates. The military coups that took power immediately afterwards tried to take advantage of the international financial conditions to introduce radical changes in the economic structures and fight inflation at the same time. They liberalized the domestic financial systems, reduced taxes on trade, tackled with different intensity fiscal imbalances and opened the capital account of the balance of payments. In the second half of the 1970s, all three countries oriented their exchange rate policies towards stabilizing prices, adopting active crawling peg regimes.

In Mexico, there was a severe balance of payments crisis in 1976, forcing the authorities to devalue for the first time in more than twenty years. After a year of sequential adjustments, the NER was fixed again in early 1977.

The next big external shock came in 1979, when the U.S. Federal Reserve drove up international interest rates; there was also another increase in oil prices. In Latin America, all of the economies that had participated in the process of financial globalization during this period ended up with large current account deficits and accumulated foreign debts.

The rise in international interest rates and virtually nil access to foreign finance in the early 1980s triggered massive balance of payments (and in some cases financial) crises in Argentina, Brazil, Chile, Mexico, Peru, Uruguay and Venezuela. This led to significant devaluations and monetary and fiscal policies oriented towards the management of the fiscal and external disequilibria and their repercussions. Between 1982 and 1990, the interaction of Latin American countries with international financial markets was limited to a series of negotiations of the external debt inherited from the crisis. Chile and Colombia were the only two major economies during this period that were able to use exchange rate regimes oriented towards preserving a stable real exchange rate (RER). They were able to avoid the sharp devaluations and extremely high inflation that other countries – including Argentina, Brazil, and Mexico – experienced. Some of these inflationary experiences involved devaluation/inflation spirals, where a currency devaluation increases inflation, which further overvalues the real exchange rate, leading to another devaluation, etc.

The 1990s brought a new period of high international liquidity and credit availability, in contrast to the 1982-1990 period. Argentina, Brazil, and Mexico were able to use fixed or near-fixed exchange rates during this period (with Mexico beginning in 1988) in order to bring inflation – which had reached triple digit levels – under control. In these cases, the fixed exchange rate was used as a nominal anchor to lower inflation. These efforts were successful in bringing down inflation but led to further severe problems up the road. In the case of Argentina's convertibility system, where the currency was fixed by law in 1991 at one peso to the dollar with a currency board, it began at an overvalued real exchange rate, which worsened over the ensuing years. This overvalued currency, combined with increasing levels of dollarization of the economy and external shocks, led to a severe recession between 1998-2002, a balance of payments crisis, and the collapse of convertibility regime in early 2002. Brazil's fixed exchange rate also collapsed, in 1999. The collapse of these fixed exchange rate regimes was similar in some respects to the failure of the crawling peg regimes of Argentina, Uruguay, and Chile during the 1970s.

Argentina, after defaulting on nearly \$100 billion in foreign public debt in 2002, was able to institute a new exchange rate regime, in which the central bank targeted a stable and competitive real exchange rate (SCRER). This exchange rate regime proved very successful; from mid-2002 to mid-2008, the economy grew at an 8.5% average annual rate. However, it also faced challenges, and inflation began to accelerate in 2005. The increase in inflation also makes it more difficult to manage the real exchange rate. This experience indicates that governments need to pursue a coordinated policy, including fiscal policy, when pursuing an economic strategy based on maintaining a stable and competitive real exchange rate.

At the end of the 1990s, a number of countries adopted inflation targeting with floating exchange rates. However, even in these cases, governments did not necessarily allow the exchange rate to float, but continued to intervene. In Peru, for example, the managed floating regime has certainly maintained RER stability, but not at an especially competitive level. Peru shared the motivations of

the other countries with inflation targeting/floating exchange rate regimes, but its managed floating with intense foreign exchange interventions has also been directed towards avoiding RER volatility in order to preserve the stability of the highly dollarized domestic financial system.

Probably the most important conclusion that can be drawn from our analysis is that the *level* of the RER has had a significant influence on the macroeconomic performance of Latin American countries. In particular, the experiences reviewed suggest that an excessively appreciated RER can lead to disastrous outcomes affecting short and medium term growth. Our historical narrative illustrates how fixed and semi-fixed exchange rate regimes focused on price stabilization can lead to excessive RER appreciation and balance of payment and financial crises. The Southern Cone experiences of the late 1970s and that of Argentina during the 1990s, attest that crises can reach the dimension of great depressions. After these negative experiences, there seems to be agreement among Latin American macroeconomists and policy-makers that avoiding pronounced real appreciation should be a central objective of any macroeconomic policy.

A second important lesson that emerges from our analyses is that in the process of integration with international financial markets, Latin American countries have gradually converged –through different national paths- towards the adoption of more flexible exchange rate regimes. Certainly, pegs have shown to be essential in providing a nominal anchor in contexts of high inflation or hyperinflation. But even in the cases that have been successful in conquering inflation, the phasing-out has proven to be traumatic, as the experiences of Argentina under the convertibility regime and Chile in the 1970s best illustrate. Under conditions of moderately high inflation (say 30% per year), experience has shown that it is possible to reduce inflation gradually without using the exchange rate as an anchor. The case of Chile between the mid 1980s and the mid 1990s -where the deceleration of inflation occurred in a context of rapid growth and robust external accounts- is a clear example of this. However, although a crawling band regime is much more flexible than a currency board, both Chile and Colombia found that it lacked enough flexibility to deal with capital flows and by the late 1990s both countries shifted to more flexible regimes.

Under conditions of low inflation, as has been the case of all major economies since the late 1990s, flexibility has shown to be highly valuable. The lack of commitment to the level of the NER provides the economy flexibility to adjust to external shocks without resulting in reputational costs for the monetary authorities. The lack of commitment also eliminates the incentives of one-way bets in the foreign exchange market by speculators. In their portfolio choices between domestic and foreign assets (and liabilities), private agents have to assume the exchange rate risk.

Lack of commitment should not be understood as synonymous with pure floating. In both pure and managed floating, the monetary authority has no commitment regarding the level of the NER. However, in the former the central bank commits itself not to intervene in the market and to allow the NER to be determined by market forces. A managed floating regime is more flexible because it allows the monetary authority to intervene whenever it considers necessary. This extra degree of freedom seems to be highly valued among Latin American central banks, since in their search for greater flexibility none of them adopted a pure floating regime. By the early 2000s, all central banks of the major countries in the region switched to managed floating regimes. These include not only the self-declared Argentinean managed float, but also countries with inflation targeting and officially floating exchange rate regimes.

The benefits of a managed floating regime are that it provides the same flexibility to absorb unexpected shocks as a pure floating regime, while also entitling the monetary authority to intervene in the foreign exchange market and influence the determination of the NER. In developing countries, this option is most dear given the potentially large effect of capital flows on the behavior of the NER and the importance of this relative price in the determination of other nominal and real variables. Central banks in developing countries may want to preserve the ability to influence the determination of the NER for two main reasons: 1) to reduce its volatility and avoid misalignments and 2) to influence its trend.

Managed floating regimes in Latin America have been accompanied by a systematic and massive accumulation of foreign exchange reserves. This has not been a peculiarity of the region, but a common feature among developing countries since the Asian crises. These reserve accumulations have been important for both precautionary reasons – to avoid excessive volatility and the risk of runs on the currency; and to manage the level of the real exchange rate.

Interventions in the foreign exchange market were useful for avoiding excessive depreciation between 1999 and 2002 and excessive appreciation during the boom period of 2003 to 2008. Despite the interventions, the RER in these countries has tended to be more volatile and prone to appreciation than what is expected in a country following a SCRER strategy. Also, there is little doubt that the large stocks of foreign exchange reserves –together with the greater NER flexibility– were essential to help central banks handle the impact of the international financial crisis of 2007-2008.

The analysis in this paper has also presented evidence about the importance of using exchange rate policy to manage the behavior of the RER. Our historical narrative suggests that Latin American economies tended to perform better when the exchange rate policy managed –with different degrees of intensity- the RER. In particular, some successful experiences of growth acceleration in the region have coincided with periods in which the exchange rate policy was purposely oriented towards preserving a SCRER. For instance, the arguably two most successful growth experiences in Latin America during the post World War II period have occurred in parallel with the implementation of exchange rate regimes targeting a SCRER. These experiences are the Brazilian *miracle* starting in the late 1960s simultaneous with the implementation of the crawling peg, and Chile's experience with the crawling bands between the mid-1980s and mid-1990s. There are also other important cases in which this correlation between the exchange rate policy and economic performance is observed. These are the crawling pegs in Argentina and Colombia between the mid-1960s and mid-1970s and the managed floating in Argentina since 2002. Certainly, this observation should not be interpreted as indicating that exchange rate regimes targeting a SCRER are *the* explanation behind the success of these experiences. Economic growth and development are complex processes that involve the combination of many social, political and economic factors, most of which economists are still trying to understand. In any case, our historical narrative of exchange rate policies in Latin American supports the conclusion reached by a body of empirical studies which indicate that an undervalued RER tends to foster economic growth in developing countries. In this regard, this paper suggests that the exchange rate policy can make an important contribution to economic development by preserving a stable and competitive exchange rate.

## Introduction

Latin American economic history is rich in cases of interest for macroeconomists. The region provides substantial material for the study of inflation, unemployment, financial and balance of payment crises, as well as episodes of rapid growth. A central goal of this paper is to present a persuasive argument showing that exchange rate policies and regimes have played a significant role in shaping many of these macroeconomic outcomes. We develop a historical narrative of the economic performance of Latin American countries since the Second World War. The analysis primarily focuses on Argentina, Brazil, Chile, Colombia, Mexico and Peru, and pays special attention to the domestic and external conditions that these countries faced when making their exchange rate regime choices.

Historical analysis is not the most practiced empirical strategy among economists. There are three main reasons why we chose it. First, we believe that a historical narrative is a concise and effective way to provide an overview of the main trends in exchange rate regime choice in Latin America. Second, historical analyses inform the reader about the circumstances in which choices were actually made. The literature on exchange rate regimes has made enormous contributions in identifying which regime performs better in any particular context. The results of those efforts have been primarily normative (e.g. the Mundell-Fleming result that fixed exchange rates are optimal when the economy is more exposed to nominal shocks). However, analyzing real world decisions through that approach is not always helpful, as choices can sometimes be constrained by specific circumstances that are ignored in these more abstract analyses. By describing the domestic and external contexts that Latin American countries faced in each period, we attempt to help understand some of the determinants of policy makers' decisions.<sup>1</sup> Finally, historical analyses provide valuable information and insights that are not captured in standard regression analysis (Durlauf, et al., 2005). Empirical studies on exchange rate arrangements have typically relied on regression analysis to evaluate the correlation between regimes and macroeconomic performance (e.g. economic growth, inflation, etc). In order to do so, exchange rate regimes need to be classified and then converted into a right hand variable (typically as a regime-specific dummy). Recent empirical work on exchange rate regimes has invested lots of effort in classifying exchange rate regimes in order to identify actual or *de facto* regimes -as opposed to the IMF's *de jure* classification- and thus evaluate the correlation between exchange rate arrangements and macroeconomic performance.<sup>2</sup> This methodological strategy can certainly provide relevant insights and information.<sup>3</sup> One obvious problem, however, is that no two regimes are identical. Collapsing the various characteristics of an exchange rate regime into a single variable may entail the loss of important information. On the contrary, by describing the actual rules and behavior of the regimes, historical analyses provide rich information and yield results that can at least complement those obtained in econometric studies.

The paper is organized as follows. After this introduction, section 2 provides a simple conceptual framework to analyze the potential channels through which the exchange rate can influence

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<sup>1</sup> Domestic political economy is one of these important elements. Our analysis does not go into the details of the political conditions in which decisions were made. For an analysis of the politics of exchange rates arrangements in Latin America see Frieden and Stein (2001).

<sup>2</sup> See Tavlas et al. (2008) for a critical survey.

<sup>3</sup> See, for example, the chapter on exchange rate and monetary policies in the Handbook of Development Economics (Levy Yeyati and Sturzenegger, 2009).

macroeconomic performance. Section 3 gives an overview of the main trends of exchange rate arrangements in the major Latin American countries. This narrative goes from the post world war period up until the unfolding of the subprime crisis in the US and its effects on Latin America. The following two sections describe in greater detail what we see as paradigmatic examples of exchange rate regimes under capital mobility in the region. Section 4 discusses two cases in which the exchange rate was used exclusively as a nominal anchor. These are the Southern Cone *tablitas* during the late 1970s and the currency board in Argentina during the 1990s. Section 5 focuses on two cases of exchange rate regimes that aimed to target the real exchange rate. These experiences are the crawling bands in Chile between mid-1980s and mid-1990s and managed floating in Argentina after the 2002 crisis. Section 6 closes with the main conclusions derived from our analysis. The appendix at the end of the paper provides graphs plotting the real exchange rate in Argentina, Brazil, Chile, Colombia, Mexico, and Peru between 1980 and 2008.



## Conceptual Framework

In a small open economy the nominal exchange rate (NER) is a key macroeconomic variable.<sup>4</sup> The importance of the NER is greater in a small open economy with an inflationary past, like many Latin American countries. Its relevance derives from its effects on both nominal and real variables.

Regarding its influence on nominal variables, the NER is a key determinant of the price level. In small open economies, traded goods prices are to a great extent determined by international prices scaled by the NER ( $P = EP^*$ ). In countries with an inflationary past, the behavior of the NER typically affects inflation expectations and the price-setting mechanisms of non-tradable firms and wage-setters. Because of these features, the NER plays a key role in determining the inflation rate and can operate as a *nominal anchor* (Dornbusch and Fischer, 1986). It is also a key determinant of other important nominal magnitudes. The NER is an asset price, and as such it influences expectations and behavior in financial markets. In countries with a history of high inflation, it has been common to set nominal contracts in a foreign currency. Many Latin American countries have tended to denominate financial assets and real estate prices in US dollars (Savastano 1992). When contractual dollarization is widespread, the robustness of financial and payments systems become very sensitive to NER variations.

The NER is also a key determinant of the real exchange rate (RER) in the short and medium run. In a world with full employment and fully flexible prices, the RER would be an endogenous variable determined in general equilibrium. The classical nominal-neutrality axiom, however, can hardly be sustained in the exchange rate policy discussion, as it has systematically been documented that the RER tracks the NER quite closely over the short and medium-run (Taylor and Taylor, 2004). Therefore, the choice of the exchange rate regime considerably influences the behavior of the RER via its effect on the NER.<sup>5</sup>

The real exchange rate is a fundamental relative price in the economy. It can be defined either as the relative price between domestic traded and non-traded goods or as the relative price between similar bundles of goods traded abroad and domestically.<sup>6</sup> As any relative price, the RER affects resource allocation and, given unemployment or underemployment, the level of activity. Economists have traditionally emphasized the role of the RER in influencing the trade balance through its effect on exports and imports. In the early Keynesian tradition, the effect of the RER on net exports was important not only in determining the balance of payments, but also in determining output and employment levels. Since then, the RER has been seen as a key variable for the determination of external and internal equilibrium (Meade, 1951 and Salter 1959). Structuralists, later on, pointed also to the effect of the RER on the balance of payments and output and employment levels through its effect on income distribution (Ferrer, 1963, Diaz Alejandro, 1963 and Krugman and Taylor, 1978). More recent contributions, developed after the various financial crises in emerging markets during the 1990s and 2000s, highlighted the effects of wealth redistribution from variations in the RER on output, employment and the structure of property rights. (Krugman 1999, Cespedes et al. 2004,

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<sup>4</sup> We follow the Latin American convention defining the exchange rate as the domestic price of foreign currency (i.e. units of domestic currency per unit of US dollar). A rise in the NER implies a nominal depreciation and a fall an appreciation. The same logic applies for the real exchange rate. In this regard, we refer to more competitive or undervalued RER as higher values of the RER.

<sup>5</sup> Governments can also influence the RER by affecting real variables such as public saving through fiscal policy.

<sup>6</sup> The former is usually referred to as the internal RER and the latter as the external RER.

Frankel 2005). Finally, research during the early 2000s on Latin American countries has shown that the RER can affect employment directly through its effects on the degree of labor intensity embedded in production techniques (Frenkel and Ros, 2006 and Galindo et al., 2007).

Early development economists tended to dismiss the role of the RER in the process of economic development as a consequence of elasticity-pessimism (Williamson 2008). Given that both the demand for developing countries' exports (i.e. raw materials) and developing countries' demand for imports (i.e. capital goods) were seen as essentially inelastic, the RER was considered irrelevant for trade performance, external balance and economic growth. In the 1960s and 1970s, this view gradually lost adherents as countries following outward-oriented development strategies outperformed those engaged in inward-oriented strategies, leading to an incipient recognition of the importance of maintaining a competitive RER in a development strategy (Diaz Alejandro, 1973). During the 1980s, this notion gained status in the development policy debate. The fact that "achieving a competitive exchange rate" was one of the items included in the Washington Consensus Decalogue illustrates this sentiment eloquently (Williamson, 1990). However, it was not until recent years that this notion achieved a more relevant status in development economics. The rapid economic growth experienced by some countries maintaining competitive currencies, especially China, has contributed in this regard. Although the exact channel through which it occurs is still under dispute, a large body of work documenting that competitive RERs correlate with higher growth has provided a solid empirical support for this view.<sup>7</sup> This has led to the idea that the choice of exchange rate regimes in developing countries is not neutral for growth, especially if it is focused on preserving a stable and competitive real exchange rate (SCRER) or at least on avoiding overvaluations (Commission on Growth and Development, 2008).

In sum, the choice of exchange rate regimes has decisive implications for the behavior of the NER. This is a key macroeconomic variable that affects the behavior of relevant nominal and real variables, including the inflation rate, the balance of payments, output and employment levels and the rate of economic growth. In this regard, the exchange rate regime can have a decisive influence on four key economic policy objectives:

- e) Price stability
- f) Domestic financial stability and robustness
- g) External and internal balances
- h) Economic growth/development

In our view, the choice of exchange rate regimes in Latin America has been influenced to a great extent by the historically specific degrees of freedom (or urgency) with which countries had addressed these policy objectives. In section 4, for instance, we will show that in the circumstances in which stabilizing inflation was virtually an emergency, the choice of the exchange rate regime was almost exclusively driven by the objective of stabilizing prices. This choice could undermine the other policy objectives and potentially lead –as happened in many cases- to disruptive results. In this paper, we will emphasize the correspondence between policy objectives and the exchange rate regime choice.

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<sup>7</sup> See, among others, Razin and Collins (1999), Polterovich and Popov (2002), Hausmann et al. (2005), Aguirre and Calderon (2005), Prasad et al. (2007), Gala (2008), Levy-Yeyati and Sturzenegger (2008), Rodrik (2008) and Razmi et al. (2009).

An exchange rate *regime* is defined by the rules followed by the central bank regarding the degree of intervention in the foreign exchange (FX) market and therefore by the degree of official commitment in the determination of the NER.<sup>8</sup> A *fixed* exchange rate regime is defined by monetary authority's commitment to intervene in the FX market in order to maintain certain constant parity. The most extreme case of fixed regimes is when a country gives up the sovereign right of issuing its own currency and adopts a common currency with other nations or one issued by some other country. In Latin America, this regime choice has taken the form of the latter, in particular by countries adopting the US dollar. The most popular case of *dollarization* is that of Panama. More recently, Ecuador and El Salvador also joined the club of dollarized countries.<sup>9</sup>

A *currency board* is another extreme case of a fixed exchange rate regime, in which countries adopt an explicit legislative commitment to fix the NER at certain parity, combined with restrictions on the central bank to issue domestic currency almost exclusively in exchange for foreign currency. The currency board was an invention of the British Empire to provide their colonies a stable and convertible currency (Williamson, 1995). In Latin America, the only experience during the period under analysis was Argentina's convertibility between 1991 and 2001. This regime was implemented as an attempt to provide a credible nominal anchor to stabilize the price level in the context of hyperinflation.

On the other extreme of regime choices, we find the *pure floating*, which is defined by the commitment of the monetary authority not to intervene in the market, leaving the NER to be almost exclusively determined by private market forces. Between the poles of pure floating and extremely fixed or *hard peg* choices there is a spectrum of alternative exchange regimes -the so called intermediate options- that have been widely employed in the post World War II period in Latin America and elsewhere. (Williamson, 1981 and Calvo and Reinhart, 2002). During this period, Latin American countries experimented with an ample set of intermediate exchange regimes, depending on the particular domestic and international contexts they faced. The most widely used regimes - ordered in increasing degree of flexibility- have been: adjustable peg, active and passive crawling peg, bands and crawling bands and managed floating.

*Adjustable peg* (or *fixed but adjustable*) was the exchange rate regime promoted during the Bretton Woods period. Under this regime, the authorities were committed to defend a particular parity, but reserved the right to change it under certain circumstances. Under a *crawling peg*, the authorities pegged the local currency to a foreign currency –or to a basket of currencies– but adjusted the rate gradually over time in a series of small corrections, instead of sudden and unanticipated discrete changes as with the adjustable peg. When implementing an *active crawling peg* (or *tablita*) the authorities pre-committed the future path of the rate. Because they share essential characteristics with the

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<sup>8</sup> As with any other classification, those regarding exchange rate arrangements are not exempt from some doses of arbitrariness. Different definitions of exchange rate regimes can be easily found in the literature. A widely used classification is that reported by the IMF in its *Annual Report on Exchange Rate Arrangements and Exchange Rate Restrictions*. The IMF's classification has varied over time (see Reinhart and Rogoff, 2004). Since 1999, the institution has been using a classification composed by seven types of arrangements. Our definitions essentially coincide with this more recent classification scheme.

<sup>9</sup> Since its independence in 1903, Panama's official currency has been the Balboa, but in practice the US dollar has been used widely for most transactions. Ecuador initiated its transition to substitute its national currency (Sucre) for US dollars in January 2000. El Salvador abandoned its own currency to adopt the US dollar in January 2001 and thus became the third dollarized economy in Latin America. For analyzes of the dollarization experiences of Panama, Ecuador and El Salvador see Goldfajn and Olivares (2001), Beckerman and Solimano (2002) and Quispe-Agnoli and Whisler (2006), respectively.

conventional peg, these regimes were used with stabilization purposes (e.g. Argentina, Chile and Uruguay in the late 1970s). In a *passive crawling peg*, the gradual adjustment of the peg can be related to the evolution of reserves or to the differential between domestic and international inflation. The motivation in this case is to maintain purchasing power against a single or basket of foreign currencies that are relatively stable around certain level. Central banks in Latin America adopted different degrees of commitments to the rules of adjustment of passive crawling pegs. In some cases, the authorities followed a systematic rule, for instance, indexing the NER to last period (i.e. month) inflation minus an estimate of international inflation (e.g. Chile in 1984). In some other cases, the commitment was loose or the adjustment path did not follow a systematic rule, but was determined discretionarily by the authorities (e.g. Argentina in 1964, Chile in 1965 and Brazil in 1968). In Williamson's (1981) classification, this latter case is denominated a 'decision-variant' crawling peg, whereas the former 'formula-variant'. The 'decision-variant' type resembles and shares characteristics with a managed floating regime.

Exchange rate *bands* have also been used in the post war period. In the standard case, the authorities typically pledge to intervene when the exchange rate hits pre-announced margins on either side of a central parity. However, given the typical inflationary context, countries adapted this regime to the form of *crawling bands*, in which the margins of the bands were adjusted gradually over time following some rule to avoid real appreciation due to inflation (e.g. Chile and Colombia in the 1990s). Some Latin American countries have used an innovative scheme sometimes called *asymmetric bands*, in which the upper bound is adjustable, while the lower one remains constant (e.g. the Real Plan in Brazil during the mid-1990s).

*Managed floating* is typically defined as a regime under which the authorities are not committed to defend any particular rate, but nevertheless intervene in the FX market at their discretion. Recent experience in developing countries has shown that most countries saying that they float actually intervene in the FX market to manage the way they float.<sup>10</sup> The motivations behind the interventions vary between countries; they can aim to reduce NER volatility, to avoid large swings, or to induce the path of the NER and RER. As discussed in section 3, Latin American countries have used this regime during the 2000s with different motivations.

Finally, it has not been uncommon for Latin American countries to face extreme difficulty in meeting international payments (i.e. balance of payment crises), where preserving the disposable stock FX reserves becomes a priority. In such critical situations, central banks have been forced to free the exchange rate, not as an optimal policy choice but as a sheer need. Given that the resulting depreciation of the local currency would likely have severe economic and social effects –in many cases, leading to hyperinflationary episodes– the authorities typically opted to impose restrictions on FX transactions. The imposition of FX controls meant, in practice, the implementation of a *multiple exchange rates* regime. In some cases, the monetary authority determined the agents and operations that could be carried through the official FX market -which was governed by a particular exchange rate regime- and let the rest of the FX transactions be carried in private free markets. The official market was typically limited to some “essential” trade and financial transactions. In other cases, FX transactions were restricted to authorized institutions and agents that were able to undertake only a limited type of transactions. In such contexts, parallel or black markets for the non-authorized transactions spontaneously emerged. In these markets, the NER floated and was typically higher than in the official market. When the volume of transactions in the black market was larger than in

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<sup>10</sup> As mentioned in the introduction, there is a large body of studies distinguishing between *de facto* and *de jure* exchange rate regimes. See Tavlas et al (2008) for a survey.

the official market, the parallel NER was the relevant price affecting private agents' behavior and expectations.

## A Panoramic View

In each particular period, the exchange rate regime choice in Latin American has been designed to orient macroeconomic policy towards the objectives considered most urgent or demanding. Changes in the international context were crucial in these choices. Macroeconomic policies have typically responded to those changes to either take advantage of the opportunities opened by the new conditions or to protect themselves from their potential negative impacts. Most of the changes in the external conditions have affected the countries in the region simultaneously. However, the policy reaction has not been uniform. Countries adopted different strategies to cope with new international scenarios. These strategies were determined to a great extent by countries' economic policy agendas; namely, the problems perceived as needing immediate attention and the elements of the economic performance that were deemed necessary to preserve. Therefore, national policy agendas have been determined by the economies' previous trajectory.

### The 1950s and 1960s

The main characteristics of the international conditions that Latin America faced during the post war period remained virtually unchanged up until the late 1960s. The international monetary system followed the Bretton Woods rules, which established that countries had to maintain fixed exchange rates against the US dollar. These parities could be adjusted in the presence of fundamental disequilibrium. Given the virtual absence of private sources of international finance, the only substantial source of external finance for the region came from the IMF. In order to get financial assistance, countries had to negotiate their exchange rate policy with the institution.

By the end of the period of high commodity prices associated with the Korean War, many Latin American countries started to experience balance of payments problems and had to rely on exchange rate adjustments agreed on with the IMF.<sup>11</sup> This was the beginning of a period characterized by stop-and-go dynamics resulting from the inconsistency between the adjustable peg regimes and the high inflation rates experienced by many countries. Shortages in FX reserves required adjustment of the fixed exchange rate. Devaluations, in turn, temporarily alleviated the balance of payment problems due to the fall in the demand for imports caused by the contractionary effect on aggregate demand (Ferrer, 1963 and Diaz Alejandro, 1963). However, they also led to the acceleration of the inflation rate due to wage indexation and real wage resistance (Bacha and Lopes, 1981). The RER appreciation resulting from inflation led again to balance of payment difficulties. This cyclical stop-and-go dynamic was a stylized fact among many countries in the region since mid 1950s and during the 1960s.<sup>12</sup>

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<sup>11</sup> Peru was the first Latin American country to sign an agreement with the IMF in 1954. Then Mexico, Chile, Paraguay, Nicaragua, Cuba, Bolivia, Colombia, Honduras, Nicaragua, El Salvador, Argentina, Brazil and Haiti signed agreements with the IMF during the 1950s; some of them more than once.

<sup>12</sup> The foreign exchange constraint to economic growth in Latin America and other developing countries found a rationalization in the two-gap model literature pioneered by Hollis Chenery. See, for instance, Chenery and Strout (1966). An early stylized description of the stop-and-go dynamics applied to Argentina can be found in Braun and Joy (1968).

In order to deal with the structural feature of high inflation and avoid stop-and-go dynamics, by the mid 1960s an innovative solution was found: the passive crawling peg. Under this regime, Argentina, Brazil, Chile and Colombia managed to relax the balance of payment constraint and experienced an acceleration of economic growth. Interestingly, the crawling peg had been proposed by academic economists as a solution to the problem faced by the Bretton Woods system given the different rates of (low) inflation experienced by developed countries in the mid 1960s. However, the IMF rejected the proposal, even when the system was on the edge of its collapse (Williamson, 1981). In a more pragmatic fashion, the crawling peg was simultaneously invented and adopted in Latin American around the same period. The adoption of this regime was certainly not universal. Other countries, most notably Mexico, Peru and Venezuela, did not experience high levels of inflation and maintained fixed regimes up to the 1970s or beyond.

It has been commonly indicated that Chile in 1965 was the first country to adopt a crawling peg.<sup>13</sup> In fact, Argentina had implemented such a regime in early 1964 under the government of Arturo Illia (García Vázquez, 1994 and De Pablo, 1999). The crawling peg was then adopted by Chile in April 1965, Colombia in early 1967 and Brazil in August 1968, reaching a respectable status among developing countries during and after the 1970s. These four countries implemented ‘decision-variant’ crawling pegs, in which the economic authorities adjusted the NER periodically without following precise and transparent rules. The frequency of adjustments varied from country to country. In the three years that the crawling peg lasted in Argentina, the NER was devalued on average once every other month. During the first years of its implementation in Colombia, on the other hand, authorities adjusted the NER almost every week. In Chile and Brazil, devaluations were essentially carried out on a monthly basis.

In all four countries, the purpose of implementing crawling pegs was to achieve RER stability and thus stimulate export growth and diversification. There was a clear recognition among economists and policy makers that more dynamic exports were required to overcome the FX constraint to growth. RER stability was not, however, the only goal of the exchange rate policy in Chile and (especially) Colombia. In these countries, the authorities believed that export dynamism not only required RER stability but also competitiveness; thus to achieve SCRERs they pursued rates of devaluation that tended to outpace past inflation rates. In the four countries, economic performance exhibited a significant improvement after the adoption of the crawling pegs. Between 1965 and 1970, Chile’s economy grew at 4% per year and non-copper exports expanded substantially. The exchange rate policy shifted to a fixed regime in 1970, when the government of Salvador Allende initiated its (failed) attempt to move towards socialism.<sup>14</sup> During the first seven-year period since the implementation of the crawling peg focused on a SCRER (1967-1974), Colombia experienced the period of highest economic growth in its post World War II history: GDP grew at 6.6% annually and the value of non-traditional exports multiplied by a factor of seven.<sup>15</sup> The implementation of the crawling peg in Brazil also coincided with the initiation of a period of high growth, popularly known as *o milagre econômico* (economic miracle). Between 1968 and 1973, the economy grew at an average rate of about 11% per year and exports more than tripled, stimulated by the expansion of non-

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<sup>13</sup> This is, for instance, the recollection in the pioneer historical analysis by John Williamson (1981), where it is noted that “the crawling peg was first adopted by Chile, following the urging of French-Davis (1964)”.

<sup>14</sup> For further details about the crawling peg in Chile during this period, see French-Davis (1981) and (2002), chapter 1.

<sup>15</sup> For a detailed analysis of the role of crawling peg in the Colombian strategy pursuing a SCRER and its effects on export diversification and economic growth, see Díaz Alejandro (1976), Ocampo (1994) and Urrutia (1981).

traditional items.<sup>16</sup> Argentina experienced a period of growth acceleration and export diversification with the implementation of the crawling peg. Although the regime was abandoned in mid 1967, the authorities managed to keep a SCRER in the subsequent period through a sharp devaluation in 1968 followed by a NER fixation. A second round of devaluations began in mid-1970, but in this case inflation accelerated and the RER gradually appreciated, prompting a massive balance of payments crisis in 1975. Overall, between 1964 and 1974, GDP grew at a yearly rate of 5%, non-traditional exports passed from representing less than 5% of total exports to about 25% and the trade balance remained always positive.<sup>17</sup>

A negative aspect associated with these experiences with crawling pegs was the behavior of inflation. In Argentina, the NER adjustments maintained RER stability during the three years that the crawling peg lasted, but they also contributed to high inflation, around 30% per year. In Colombia, the inflation rate gradually moved from figures around 5-10% before the implementation of the crawling peg to around 25% by the late 1970s and early 1980s. In Brazil the implementation of the crawling peg did not change inflationary dynamics substantially; the inflation rate remained around 20% and only accelerated after the first oil shock in 1973. Chile was the only case in which inflation was actually reduced. Although the path of NER depreciation tended to outpace past inflation, inflationary expectations did not accelerate. The inflation rate averaged 26% between 1965 and 1970, which -despite being still high- was significantly lower than the one prevailing when the crawling peg was implemented (about 50%).

## The 1970s

Between the late 1960s and the early 1970s, Latin American countries began to face a significantly different international context: the gradual emergence of the second wave of financial globalization. Two key events in this process occurred during the first half of the 1970s. First, there was a shift in developed countries from fixed to floating exchange rates, which strongly stimulated the development of FX markets and their derivatives (Eatwell and Taylor 2000). Second, OPEC countries generated the first coordinated rise in the price of oil. The shock rapidly caused large current account imbalances in oil-importing countries and at the same time supplied the incipient Eurodollar market with abundant liquidity. Since that period there has been secular growth in international capital flows concurrent with a progressive de-regulation of capital accounts and a progressive liberalization and opening of domestic financial systems. Both trends shaped the second wave of financial globalization. Latin America was part of that process from its very beginning. Brazil started to tap the Eurodollar market in the late sixties. Argentina, Chile, Mexico, Peru and Venezuela jumped in as recipients of capital flows in different moments of the 1970s. Since then, the financial integration with global markets became a very important factor in the performance of Latin American economies and their macroeconomic policies.

The new global scenario was one of high liquidity and high inflation. International banks were striving to place their credits. The international interest rate was low and in some periods the real

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<sup>16</sup> Some authors have questioned the extent to which the *milagre* can be considered a process of sustained growth. It has been argued that the economic expansion was partly due to the use of spare capacity and that the high growth rates would have eventually led to an unsustainable current account deficit -even without the negative effects of oil shocks- because of the high import-elasticity associated with the structure of the manufacturing sector (Bacha, 1977). Regardless of whether the experience actually constitutes a sustained growth episode, there seem to be agreement that the stability of the RER achieved through the crawling peg had a decisive influence in the observed acceleration of growth (Cardoso, 2009). For a detailed analysis of the system of 'mini-devaluations' in Brazil during the *milagre*, see (Bacha, 1979).

<sup>17</sup> For analysis of the period, see Gerchunoff and Llach (2003) chapter 7 and the references therein.

interest rate was even negative. In this context, two polar cases of international financial integration and macroeconomic policy formulation can be identified in Latin America. One is represented by Brazil, the other by Argentina, Chile and Uruguay.

As mentioned above, Brazil had been growing at very high rates since 1968, with a level of inflation that was high according to current standards, but was moderate and controlled according to the prevalent view at that time. The oil shock of 1973 generated a large trade deficit. In such a context, the Brazilian authorities decided to continue stimulating growth and take advantage of the international financial conditions to finance not only the increased value of imports but also an additional program of public and private investment, aimed at deepening the process of import substitution of inputs, raw materials and energy. The government was the main recipient and intermediary of the international credits, which were used for financing both public and private investment. There was no significant modification of the exchange rate regime –a passive crawling peg intended to preserve a competitive RER– or the monetary policy that had been in practice since the late 1960s. Both the current account deficit and the foreign debt followed rising trends.

During the first half of the 1970s, Argentina, Chile and Uruguay had suffered severe economic and political crises and persistently high inflation rates. The military coups that took power immediately afterwards tried to take advantage of the international financial conditions to introduce radical changes in the economic structures and fight inflation at the same time. They liberalized the domestic financial systems, reduced taxes on trade, tackled with different intensity fiscal imbalances and opened the capital account of the balance of payments. In the second half of the 1970s, all three countries oriented their exchange rate policies towards stabilizing prices, adopting active crawling peg regimes. The so-called *tablitas* were schedules of pre-announced rates of devaluation, which were meant to function as nominal anchors for inflation. The theoretical support of these policies –the then recently formulated monetary approach to the balance of payments (Frenkel and Johnson, 1976) - posited that the size of the current account deficit was irrelevant, since capital inflows would automatically and passively compensate for it. The only variable that needed to be controlled was the expansion of domestic credit by the central bank. If the source of money creation (i.e. fiscal deficits) was under control, the exchange rate policy could be oriented to an exclusive inflation target, disregarding its effects on the balance of payments and other aspects of economic performance. In all three cases, the private sector was the main recipient of external credits. The experiences led to substantial RER appreciation and a rapid increase in current account deficits and foreign debts.

Other countries also opened their capital accounts and borrowed from the international capital markets, but did not abandon their traditional pegged exchange rates regimes. This was, for instance, the case of Mexico. Due to an excessively expansive fiscal policy during the early 1970s, Mexico suffered a severe balance of payment crisis in 1976, forcing the authorities to devalue for the first time in more than twenty years. After a year of sequential adjustments, the NER was fixed again in early 1977. About that time, the discovery of voluminous oil reserves changed economic perspectives about the country. The perception that the change in oil prices represented a *permanent* change encouraged the government to initiate an ambitious industrialization program borrowing from the international capital markets. The economy expanded at rates of 8%-9% between 1978 and 1981, inducing an acceleration of the inflation rate, which remained about 20% yearly. Given the fixed NER, the RER appreciated and current account deficit soared.<sup>18</sup>

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<sup>18</sup> The oil shock also had a similar impact on Venezuela's economic performance. Public expenditure soared, the RER appreciated substantially, and foreign debt accumulated. For details, see Rodriguez (1985).



The next important change in the external context occurred in late 1979, when the Federal Reserve modified the orientation of monetary policy, thus, prompting a rise in international interest rates. The further increase in oil prices in 1979 should also be mentioned, because it had a large negative impact on Brazil's external accounts. These changes did not trigger drastic changes in the macroeconomic policies. However, all the economies that had been involved in the process of financial globalization shared one important feature: they maintained large current account deficits and accumulated foreign debts. Even Brazil, which followed a different path than most of the other recently globalized Latin American countries -avoiding appreciation of the RER and maintaining its previous growth strategy- suffered the consequences of the shock. The persistent current account deficits and the accumulation of foreign debt had left its economy vulnerable to changes in external financial conditions as well.

## The 1980s

The rise in international interest rates and virtually nil access to foreign finance in the early 1980s triggered massive balance of payments (and in some cases financial) crises in Argentina, Brazil, Chile, Mexico, Peru, Uruguay and Venezuela. The immediate reaction of national authorities to this new external scenario was to reorient macroeconomic policies to cope with the effects of the *debt crisis*. All countries relied on significant devaluations and oriented their monetary and fiscal policies towards the management of the fiscal and external disequilibria and their repercussions. Colombia was an exception. Since it had had a more cautious approach to external borrowing during the boom period (i.e. it only contracted foreign debt during 1979-1982 and with smaller doses), the change in the external financial conditions did not have such a harsh impact on its economy. In fact, Colombia was the only major Latin American country that managed to get through the early 1980s with positive GDP growth rates.

Between 1982 and 1990, the interaction of Latin American countries with international financial markets was limited to a series of negotiations of the external debt inherited from the crisis. During this period, foreign credit was rationed and subject to negotiations with the creditor banks and the IMF. The countries had to make substantial payments to honor at least part of their external obligations. However, not all of the major countries in the region performed the same during this period. Two main elements help explain the differences in their performances: first, the gap between the external financial needs and the financial aid provided by the international financial institutions (IMF, World Bank and Inter American Development Bank); and second, the inflationary processes that followed the devaluations of the early 1980s. Both factors were substantially more favorable for Chile and Colombia, as compared to Argentina, Brazil and Mexico.

In the case of Colombia, the needs of external finance were relatively manageable. Chile, on the contrary, was the country with the highest debt/GDP ratio in the region and its needs for external credit were bulky. However, it managed to receive the largest proportion of the disposable resources for the region from the international institutions and also to engineer a favorable debt restructuring (Ffrench-Davis, 2002 chap. 4). On the other hand, in both Chile and Colombia the inflation rate – although it accelerated after the crises, it never surpassed 35% a year. For these reasons, both countries managed to balance their external accounts and avoid sharp devaluations after the first round of external adjustment. In the context of a manageable inflation rate, both countries used exchange rate regimes oriented towards preserving a stable RER. Colombia continued with the passive crawling peg regime that had been launched in the late 1960 and sustained a modest economic performance. Chile put into practice an innovative crawling bands regime in 1984

targeting a SCRER aimed at generating a significant trade surplus to compensate for the lack of external finance. Given that the initial fluctuation bands were too small, the system initially resembled a standard passive crawling peg. Later, in the second half of the 1980s, the fluctuation bands were gradually increased and then substantially sharpened in the early 1990s. The implementation of the crawling peg and crawling bands arrangement coincides with the beginning of the period of the highest and most sustained growth in Chile's history. Section 5 analyzes this experience in greater detail as the paradigmatic Latin American example of exchange rate regime targeting the RER in the post debt crisis period.

The size of the external gap and the acceleration of inflation following the crises intensely affected the economic performance of Argentina, Brazil and Mexico. For these countries, the 1980s were a *lost decade*. In Mexico, the inflation rate passed from being around 30% annually to above 100% after the crisis. Between 1984 and 1986, it remained oscillating around annual figures of 60-70% and then accelerated again in late 1986, reaching rates above three digits up until mid 1988, when a successful stabilization program managed to bring down inflation. In Argentina and Brazil, inflation rates never fell below three digits, except immediately after launching the heterodox stabilization plans in the mid 1980s, when inflation rates transitorily descended to 2-digit figures. None of these three countries managed to close the external financial gap and reach a restructuring agreement with their creditors. In order to induce external adjustments, they continually relied on sharp devaluations. All three countries attempted to stabilize prices with programs that targeted external and financial equilibria. These programs also included some sort of agreement with the international financial institutions and the foreign creditors. However, external credit rationing made it increasingly difficult to maintain external and fiscal equilibria, forcing the authorities to devalue. Devaluations, in turn, accelerated the inflation rate.

By the mid 1980s, the inflationary process tended to accelerate in both Argentina and Brazil. In order to stop these developments, Argentina in 1985 and Brazil in 1986 launched the so-called heterodox stabilization programs.<sup>19</sup> These were shock-therapy plans in which a pegged NER was used as the main nominal anchor. One special characteristic of these programs was that the authorities substantially devalued the domestic currencies before the peg. The Southern Cone programs had taught that stabilization plans are typically followed by real appreciation due to inertial inflation after the fixation. The ex-ante devaluation was meant to compensate for such an expected appreciation, but also because the authorities wanted to reach an *ex-post* competitive RER. Given the lack of foreign credit, external balance could only be achieved by substantial trade surpluses, for which a competitive RER would be crucial. The initial conditions of the programs also required external and fiscal equilibria compatible with the fixed exchange rate. To that end, agreement with the external creditors and the international financial institutions aiming to soften the credit constraint was also essential. The heterodox component of the plans was the use of incomes polices (price and wage controls) to coordinate the dynamics of the labor and goods markets with the fixed exchange rate and to stop the widespread use of indexation mechanisms. Another innovative element of these programs was the monetary reforms that included the introduction of new currencies (the *Austral* in Argentina and the *Cruzado* in Brazil). The plans were initially successful in both reducing inflation significantly and in fostering economic recovery. However, the difficulties

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<sup>19</sup> Almost simultaneously, Israel implemented a stabilization program that shared many similarities with those in Argentina and Brazil. The Israeli plan was successful at stopping inflation and also contributed to the recovery of the economy. For details, see Fischer (1987) and Bruno (1988).

involved in preserving the external and fiscal balance led to new devaluations and fiscal adjustments that resulted in the acceleration of inflation and recessions.<sup>20</sup>

After reaching an inflation rate of 165% in 1987, Mexico launched a stabilization program in 1988, which shared some similarities with those previously implemented in Argentina and Brazil. The *Pacto de Solidaridad Económica* (Economic Solidary Pact) was a plan that combined fiscal adjustment, a pegged NER and incomes policies. The program was successful in bringing inflation down. One year later, it was reformulated. The fixed exchange rate regime was replaced by a crawling peg following a small rate of devaluation. In November 1991, the crawling peg was replaced with a band within which the NER was allowed to fluctuate. The ceiling of the band was increased by small daily adjustments, while the floor remained constant. Since the stabilization program was launched, the RER tended to appreciate and the economy started to register increasing current account deficits. However, contrary to the experience of Argentina and Brazil with the heterodox plans, Mexico was not forced to give up the exchange rate regime and devalue its currency in order to achieve external balance. The change in the international financial conditions during the late 1980s helped the country maintain its macroeconomic policies. The highly liquid environment, low international interest rates and especially the restructuring of its external debt in 1989 under the Brady Plan made Mexico a very attractive destination for international investors. Thus, Mexico began the 1990s with a macroeconomic configuration characterized by an (asymmetric) crawling band within which the NER remained virtually fixed, rapid liberalization of trade and finance, RER appreciation and both increasing current account deficits and increasing capital inflows. This configuration persisted until 1994, when the fear of foreign investors concerning the sustainability of the (virtually) fixed exchange rate triggered a reversal of capital flows and a balance of payments crisis.<sup>21</sup>

## The 1990s

The change in the international financial conditions beginning around 1989 represented another turning point for macroeconomic policies in Latin America. As in the second half of the 1970s, this new period was also characterized by high liquidity and low interest rates in international financial markets. In such a context, in 1989 the US government launched the Brady plan, which aimed to help highly indebted countries relieve their debt burden with international banks. Debt was converted into bonds –called Par and Discount– collateralized with US Treasury bills. After Mexico, Costa Rica (1989), Venezuela (1990), Uruguay (1991), Argentina (1992), and Brazil (1992) signed debt restructuring agreements within this framework. The increased deregulation of domestic financial systems in developed economies also contributed to this process by widening the group of institutions demanding assets from these new emerging market countries. Overall, these changes in the international context “pushed” capital from developed countries into the developing world (Calvo et al., 1993). For Latin American countries, this new international context meant the end of the external credit rationing they had faced during the 1980s. Mexico, Argentina Brazil and Chile became the main recipients of foreign capital, but Colombia, Peru and other countries also received significant volumes. Capital inflows to Latin America peaked in 1993, fell in 1995 as a consequence of the Mexican crisis and grew again until the eruption of the Asian crises in 1997-1998.

Once again, national macroeconomic policies adapted to the new international context according to the previous evolution of the economies and national policy agendas. Two polar strategies can also

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<sup>20</sup> Analyses of the characteristics of the Argentine Austral Plan can be found in Frenkel (1987) and Heymann (1987). For details of the Brazilian Cruzado Plan, see Bacha (1987).

<sup>21</sup> See Dornbusch and Werner (1994) and Ros (2001).

be identified for this period. Argentina, Brazil and Mexico, which had unsuccessfully fought high inflation and remained stagnant during the 1980s, welcomed the novel international financial context because it made viable to carry stabilization programs using the NER as nominal anchors without facing the external credit constraint that prevailed in the previous decade.

As mentioned above, Mexico launched the *Pacto de Solidaridad Económica* based on an almost fixed exchange rate. Argentina did so even more aggressively, launching the so-called “convertibility” regime in early 1991, which was characterized by the fixed exchange rate of the domestic currency against the US dollar (AR\$/ \$ 1) and the establishment of a currency board system by law. The convertibility was implemented concurrently with liberalizing measures including an almost complete liberalization of trade flows and full deregulation of the capital account of the balance of payments. There was also an impressive process of market-friendly reforms, targeting the privatization of a large proportion of state-owned enterprises. The stabilization program also involved price negotiations between the government and several productive sectors, aimed at reinforcing the effect of the exchange rate peg as a nominal anchor on inflation. The program was very successful at curbing high inflation. However, as occurred in Mexico, stabilization came together with RER appreciation, large current account deficits and growing external debt, which finally ended up in a dramatic currency and financial crisis in 2001-2002. Section 4 analyses the case of the Argentine convertibility regime in detail.

The case of Brazil is similar. The country had received significant capital inflows during the early 1990s, but at that time the authorities found them problematic as they hindered the conduct of monetary and the exchange rate policies based on a passive crawling peg regime. The new international context became functional to macroeconomic policy only in 1994, when the Real Plan was launched. The stabilization program was implemented in three steps.<sup>22</sup> First, a comprehensive adjustment of fiscal accounts, implying substantial cuts in the federal budget, was implemented. The second stage included a monetary reform, in which a new unit of account (the Unit of Real Value, URV) pegged to the US dollar was introduced. The goal of this second stage was to facilitate the gradual re-denomination of existing contracts -with overlapping indexing mechanisms- in the new URV. Since the value of the URV was fixed in terms of US dollars, the conversion of the contractual system into URV helped eradicate indexation mechanisms from the economy.<sup>23</sup> Finally, in July 1994, once the process of re-denomination of the contractual system into the new unit of account was concluded, the central bank started to issue the URV. The URV, latter re-named as *Real*, began to operate as the new currency. Under the new exchange rate regime, the monetary authority was committed to selling FX reserves once the price of the *Real* reached one US dollar, but was not obliged to intervene when the *Real* was worth more than one dollar. As in the cases of Mexico and Argentina, the purpose of this semi-fixed regime (also called the asymmetric band) was to provide an anchor for inflation. The effects of the Real Plan on the RER, the external accounts and debt accumulation were similar to those observed in Mexico and Argentina, and the process finally led to an exchange rate crisis in early 1999.

The other polar strategy during the 1990s was that followed by Chile and Colombia. Unlike Argentina, Brazil and Mexico, these countries had been growing since the mid 1980s (especially Chile), while maintaining relatively manageable inflation rates. Chile and Colombia also adapted their

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<sup>22</sup> For a detailed analysis of the political and economic conditions in which the Plan Real was implemented as well as its results, see Bacha (2002).

<sup>23</sup> The intellectual roots of the monetary reform are due to a paper by Persio Arida and Andres Lara-Resende (1985), popularized by Rudiger Dornbusch (1985) as the “Larida proposal”.

macroeconomic policies to the new international financial conditions, but always while trying to maintain a cautious orientation regarding capital inflows and their effects on the real economy. Their macroeconomic policies aimed to preserve the configuration of relative prices and external trade, which were at the core of their ongoing growth strategies. Capital inflows, particularly short term flows, were considered potentially damaging, because they could induce RER appreciation and have destabilizing effects on monetary policy. Given that inflation was not as severe a problem as in Argentina, Brazil and Mexico, these countries oriented their macroeconomic policy so as to preserve a relatively competitive RER, while providing at the same time enough monetary autonomy to achieve a gradual deceleration in the inflation rate. To that end, macroeconomic policy was configured around two key elements. First, a crawling band regime, which was meant to maintain a SCRER in the medium run while generating NER volatility in the short-run. Second, since the degree of NER volatility was not enough to guarantee monetary policy autonomy, both countries also adopted regulations on the capital account. This gave monetary policy enough room to target a gradual decrease in inflation rates. Thus, without using the NER as a nominal anchor, both Chile and Colombia achieved a gradual deceleration of inflation during the first half of the 1990s and maintained relatively high rates of economic growth (especially Chile).<sup>24</sup>

Peru represents a singular and interesting case in this narrative. During the 1980s, the country followed a similar path to those of Argentina, Brazil and Mexico, including the implementation and failure of a heterodox stabilization program and the acceleration of inflation, which ended in a hyperinflationary episode in 1989-90. Thus, like the other three countries, Peru began the decade with high inflation and a stagnant economy. However, as occurred in Chile and Colombia, the macroeconomic policy followed during the early 1990s managed to reduce inflation significantly without fixing the NER. In 1990, the central bank of Peru stopped targeting the NER and adopted a system of monetary targets and managed floating. The restrictive monetary policy between 1990 and 1992 led to a substantial RER overvaluation (i.e. the rate of NER depreciation was significantly below the rate of inflation), which helped decelerate the inflation rate (Dancourt, 1999). Up until 2002, when the country adopted an inflation-targeting regime with “pure” floating, the central bank maintained this policy relying on interventions in the FX market as the main mechanism to control the quantity of money and manage the NER. The strategy proved to be successful to reduce the inflation rate without generating recessionary trends. Between 1994 and 2002, the economy expanded at about 4% annually and the inflation rate fell from about 40% to less than 3%.

The rise of international interest rates in early 1994 was an important factor causing the Mexican currency crisis. Speculation against the peso during that year finally forced the authorities to let it float in December 1994. The economy contracted by 6.2% in 1995 and many domestic banks went bankrupt. The *tequila* effect spread to Argentina, which also suffered a sudden stop of capital inflows. Granted a voluminous financial assistance package led by the IMF, the Argentine authorities managed to preserve the convertibility regime in 1995. That did not prevent, however, the recessive impact of capital outflows on the activity level (-2.8%) or the severe financial crisis that led many domestic banks to bankruptcy. The Asian and Russian crises in 1997-1998 affected Brazil, whose external account was showing signs of vulnerability. In 1998, the current account deficit had reached 4.5% of GDP and the RER a level 30% lower than the average of the 1980s. In January 1999, after several months of resisting a persistent speculation against its FX reserves, the Brazilian central bank

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<sup>24</sup> Analyses of the Colombian experience with the crawling-bands-cum-capital-controls strategy can be found in Ocampo and Tovar (2003), Villar and Rincon (2000) and Williamson (1996). The case of Chile is discussed in greater detail in section 5.

decided to let the Real float. The financial contagion of the Asian and Russian crises and the currency crisis in Brazil triggered a prolonged depression in Argentina beginning in the second half of 1998 and ending in a financial and external crisis in 2001-2002. The consequent economic collapse resulted in a 21% contraction in GDP with respect to the peak of mid 1998 and an increase in the unemployment rate to 21.5 percent, leaving half the population below the poverty line. The government also declared a massive default on its external debt. In Section 4, we analyze the Argentine experience under the convertibility regime as the paradigmatic example of the three major Latin American countries that during the 1990s oriented their exchange rate policies to stabilize prices.

As opposed to Argentina, Brazil and Mexico, Chile, Colombia and Peru did not suffer external crises during the 1990s. Certainly, the RER in both Chile and Colombia followed appreciating trends between the mid-1990 and the unfolding of the Asian crises in 1997-1998. These trends were, in fact, facilitated by the monetary authorities of these countries, who decided to drive the bands downwards in the mid 1990s. These decisions were supported by their understanding that a real appreciation was justified in terms of economic fundamentals. The fact that the Mexican crisis had not significantly affected capital inflows to these economies, combined with a widespread belief during that time that capital flows to emerging markets were a permanent (and stable) phenomenon, strengthened monetary authorities' conviction that RER appreciations were required. However, the resulting appreciation experienced by these countries was moderate and short-lived compared to those in Argentina, Brazil and Mexico. This difference helps to explain their relatively more robust external conditions and their greater degree of freedom to control the exchange rate when the crises hit their economies. Nonetheless, the Asian and Russian crises had a negative impact on Chile, Colombia and Peru. The greater flexibility of the exchange rate regimes in Colombia and Peru did not prevent the negative domestic financial effects of NER depreciation and capital outflows, and both Colombia and Peru suffered financial crises in 1999.

## The 2000s

The Mexican crisis of 1994, but more markedly the Asian and Russian crises of 1997-1998 induced important changes in the views of policy makers and economists concerning the choice of exchange rate regimes in developing countries. A number of authors began to argue that in a world of high capital mobility, intermediate regimes were highly prone to currency crises. Thus, a notion gradually started to emerge suggesting that developing countries should either have a pure floating exchange rate or a hard peg regime –such as a currency board or full official dollarization. The IMF was especially emphatic about the benefits of the polar regimes suggested by this view (Fischer, 2001). The prevalent opinion actually favored pure floating regimes as a better institutional setting to deal with the admitted volatility of capital flows. However, since Argentina's convertibility –and other hard pegs in a few small countries like Hong Kong- had survived these crises, the prevalent view reserved a status for hard pegs as a corner solution for a few special cases.

Most Latin American countries opted for “pure” floating and inflation targeting (FIT) for their exchange rate and monetary regimes. After the crisis, Mexico let the peso float while using a monetary policy of monetary aggregates to control inflation. In 1999, the country switched to an inflation targeting monetary regime, with a monetary instrument to determine the interest rate that later evolved into the formal utilization of an overnight interest rate. Also in 1999, Brazil, Colombia and Chile joined the club of Latin American FIT countries. Brazil did so as a result of the currency crisis it suffered at the beginning of that year. Both Chile and Colombia had already been utilizing

annual targets of inflation since 1990 and 1991 respectively. Although they were not labeled as inflation targeters at that time, these countries can be considered pioneers in the implementation of such a regime in the region. Peru had been using managed floating jointly with a monetary regime based on quantitative monetary targets since the early 1990s. In 2002, the central bank formally adopted a “pure” floating and an inflation targeting regime. Initially, the authorities kept monetary aggregates as main policy instrument, but in 2003 they switched to overnight interest rate, coupled with sterilized interventions.

Despite their public statements about their exchange rate regime choice, none of the Latin American FIT countries have let their currency float the way assumed under a conventional FIT arrangement (Chang, 2008). Central banks in Latin American FIT countries have not had a passive role in the determination of the NER and therefore their exchange rate regimes are better classified as managed floating. Evidence shows that central banks in these countries have set their reference interest rate in reaction to NER movements. A priori, this is not inconsistent with a pure FIT regime. Given that the NER is an important transmission mechanism for monetary policy and that its level and changes have important effects on inflation and aggregate demand, FIT central banks can use the interest rate (i.e. policy instrument) to influence inflation through its effects on the NER (Mishkin and Schmidt-Hebbel, 2002). However, the behavior of the central banks in Latin American FIT countries has gone beyond influencing the NER via interest movements. Intervention in the FX market has been common practice. Moreover, as documented by Chang (2008), central banks in the Latin American FIT countries have explicitly claimed a right to intervene in the FX market. Even the central bank of Chile -which announces the scope and timing of its interventions to make them transparent for the public-, can hardly be considered a pure floater.

Between the late 1990s and the early 2000s, intervention in the FX market appeared to be motivated by the attempt to avoid substantial NER depreciations. Some analysts have interpreted their behavior as a case of “fear of floating”. According to Calvo and Reinhart (2002), there are two main reasons why countries may fear to float. First, nominal depreciations are likely to accelerate inflation. In this regard, FX interventions appear to be a policy instrument that complements overnight interest rates in curbing inflation, as explained above. For instance, De Gregorio et al. (2005) explain that the Central Bank of Chile decided to intervene in the FX market to contain the depreciation pressures during 2001 and 2002 generated by the 9/11 attack, the convertibility collapse in Argentina and turbulence in Brazil due to the presidential elections. According to the authors, the authorities believed that in these episodes the NER overreacted and that a monetary tightening would have unnecessarily deepened the cycle. Chang (2008) cites memorandums from the central bank of Brazil invoking similar arguments for their FX interventions during the turmoil before the presidential elections in 2002. Second, sudden upward movements in the NER can have undesired balance sheet effects in dollarized economies. With this motivation, interventions are meant to target financial stability as a policy objective in its own right. Peru, the country with the most dollarized financial system among the Latin American floaters, is probably the best example –if any- of this case.<sup>25</sup> As some analysts have observed, given the high degree of financial dollarization, the Peruvian version of the FIT policy has had an explicit focus on ameliorating NER fluctuations that can affect the normal behavior of the financial system (Dancourt, 2009). Moreover, the central bank has

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<sup>25</sup> In December 1999, 82% of credit in Peru’s financial system was denominated in dollars. Since then there was an explicit policy to de-dollarize the economy. By December 2008, the level fell to 52%. Other dollarized countries, like Argentina, Bolivia and Uruguay, have also taken explicit measures to reduce financial dollarization in their economies during the 2000s.

purposely accumulated FX reserves so that it can serve as lender of last resort in dollars in case of a bank run (Dancourt, 1999 and Armas and Grippa, 2006).

Between 2004 and 2008, international financial markets increased their appetite for risk leading to an unprecedented surge in capital flows to developing countries. The policy reaction in many of these countries was to actively intervene in the FX market; but contrary to what is expected under the fear of floating hypothesis, central banks purchased FX. Two main explanations have been offered to understand this behavior. One suggests that countries accumulate reserves to reduce NER volatility and to prevent large swings of the NER due to international capital volatility (Aizenman and Lee, 2007). The other indicates that it is the consequence of a development strategy based on an exchange rate policy aimed at preserving an undervalued RER or SCRER (Dooley et al, 2007). This latter strategy has sometimes been labeled as neo-mercantilism.

During this period, central banks in Latin American FIT countries accumulated a substantial volume of FX reserves. The process of reserve accumulation, however, was not homogenous across countries. Between 2004 and 2008, Brazil quadrupled its stock of FX reserves, Peru more than tripled it and Colombia doubled it. Mexico, although increasing the stock of FX reserves during this period (+50%), had a less systematic strategy. The Central Bank of Chile had a more passive role in the FX market: it only began to accumulate reserves persistently in mid 2007, increasing its stock of foreign exchange reserves by 50% between that period and Lehman Brothers' collapse. However, the accumulation of FX by the fiscal stabilization funds during the copper price boom since 2004 helped substantially to avoid a massive exchange rate appreciation without requiring the intervention of the central bank. Many analysts, including the authors of this paper, interpret this recent trend as an effort to prevent excessive appreciations of the RER.<sup>26</sup> It is important to notice, however, that the latter does not mean that these countries followed a SCRER or neo-mercantilist strategy: preventing excessive RER appreciations markedly differs from pursuing a stable and competitive RER. In the last section of this paper, we make the claim that preventing excessive real appreciations can be understood as part of a broad precautionary motive. In our view, the recent trends of exchange rate policies in Latin American FIT countries are better interpreted as an example of this general motive, rather than the result of pursuing a SCRER or neo-mercantilist strategy.

There are several reasons making it inappropriate to include the Latin American FIT countries within the neo-mercantilist group. First, as documented by Chang (2008), all central banks from these countries have made explicit statements that they do not pursue exchange rate targets. They claim that under their regimes exchange rates are determined by fundamentals and interventions are only meant to avoid excessive deviations from fundamental levels. Certainly, claims may contradict actual actions. However, they seem to be backed by the actual behavior of their RERs. In none of these countries does the behavior of the RER resemble that observed in other countries where authorities explicitly asserted that they were following SCRER strategies, as in Chile with the crawling bands (1985-1995) or in Argentina with the managed floating after the convertibility crisis (2003-2008), which is commented on below.

Second, the RERs in the FIT countries have tended to be substantially more volatile. Table 1 reports the coefficient of variation (standard deviation over mean) of the RER as an indicator of volatility.<sup>27</sup> With the exception of Mexico and Peru, the RER has been substantially more volatile in the FIT

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<sup>26</sup> See Chang (2008) for the cases of Brazil, Colombia and Peru, Agosin (2009) for Chile and Dancourt (2009) for Peru.

<sup>27</sup> The reported RER are the bilateral RER against the US, deflated by CPI indexes. The periods utilized for each experience exclude the year in which each regime was implemented.



countries than in the countries experimenting with a SCRER (Argentina 2003-08 and Chile 1985-95). The RER has been particularly volatile under the Brazilian FIT: the RER has been 259% and 209% more volatile than under the managed floating in Argentina and the crawling bands in Chile, respectively. It is also interesting to notice that the switch from the crawling bands to the FIT has resulted in more volatility in the RER of Chile (+65%).

**Table 1**  
**RER volatility**

	Coefficient of Variation	Variation (%) against Arg (2003-08)	Variation (%) against Chile (1985-95)
Argentina (2003-08)	0.068	0%	-
Chile (1985-95)	0.079	-	0%
Brazil (2000-08)	0.244	259%	209%
Chile (2000-08)	0.130	91%	65%
Colombia (2000-08)	0.153	125%	94%
Mexico (2000-08)	0.050	-26%	-37%
Peru (2003-08)	0.066	-3%	-16%

Mexico and Peru preserved stable RER, but at substantially appreciated levels. Mexico followed a persistent real appreciation trend since late 1996, which ended in early 2002 with a RER even more appreciated (about 8% lower) than the year before the *tequila* crisis (1994).<sup>28</sup> Between early 2002 and the fall of Lehman Brothers in September 2008, the RER remained slightly more depreciated than during the pre-*tequila* crisis, but more appreciated than the 1980-2001 average. In Peru, the RER was maintained relatively competitive during the 2002-2007 compared to the average prevailing during the 1990s. However, it remained substantially appreciated if the comparison is made with the average during the 1980s.

In the other Latin American FIT countries, significant appreciation trends were also observed. When the inflation targets were threatened, central banks did not hesitate to induce NER appreciation to meet them. This was clearly observed in the wake of rising inflation fuelled by the surge in food and energy prices beginning in 2004. All central banks raised interest rates and allowed the NER to appreciate with the aim of limiting the pass-through from imported inflation. In Brazil, the RER depreciated between its currency crisis in early 1999 and late 2002 due to a succession of adverse shocks, including the Argentine 2001-2002 crisis, its domestic energy crisis in 2001 and capital flight due to the political uncertainty around the election of President Lula Da Silva in 2002. Beginning in late 2002, the RER followed a systematic appreciation trend, which has been substantially exacerbated since 2004. This trend lasted until Lehman Brothers' bankruptcy. At that moment, the RER had reached a minimum about 8% lower than the pre-1999 crisis and about 30% lower than the 1980-2008 average. The trajectory of the RER in Colombia was similar to that in Brazil. After a period of sustained depreciation resulting from similar adverse shocks, the RER followed a persistent appreciation trend. By mid 2008, its level reached the lowest level in 24 years, 27% lower than the 1980-2008 average. The post-2002 appreciation in Chile was softer, although it

<sup>28</sup> Graphs 1 to 6 in the appendix show the bilateral RER with the US (deflated by CPI indexes) between 1980 and 2008 in Argentina, Brazil, Chile, Colombia, Mexico and Peru. Each series has a base equal to 1 for the average RER between 1980 and 2008.

also accelerated since 2004. By mid 2008 the RER reached a level about 18% lower than the average of the 1980-2008 period.

Several authors have emphasized the greater volatility and the appreciation bias that have characterized the behavior of the RER in the Latin American FIT countries. Galindo and Ros (2008) show that the FIT arrangement in Mexico has had an appreciation bias. Using VAR econometrics, they find that this has resulted from an asymmetric monetary policy, which has been tightened when the NER depreciates, but not loosened when it appreciates. Similarly, Barbosa-Filho (2008) claims that the Brazilian central bank has also followed an asymmetric monetary policy, which has been the responsible for the RER appreciation. He observes that between 2000 and 2006, inflation targets were met only in the years in which the RER experienced substantial appreciation. Agosin (2009) estimates a Markov-switching model for the behavior of the RER in Chile. He finds that the shift from the crawling bands to the FIT arrangement coincides with a regime switch in the model. Similar to the evidence in Table 1, Agosin also finds that the volatility of the RER corresponding to the first regime (crawling bands) is substantially lower than the one in the second regime (FIT).

In its search for greater flexibility, Argentina followed a somewhat different path than that of the FIT countries. After the 2001-2002 crisis the authorities tried to recreate a macroeconomic regime similar to that in Chile during the crawling bands period. However, instead of adopting such a regime, the central bank followed a pragmatic managed floating arrangement, which implicitly aimed to combine a certain degree of short-run NER volatility with the preservation of a SCRER in the medium run. The exchange rate policy has also had an explicit goal of FX reserve accumulation meant to protect against volatility in international financial flows. The SCRER combined with fiscal discipline (to which the public debt restructuring in 2005 contributed substantially) provided the economy a sound macroeconomic configuration. It was the first time in its modern history that Argentina maintained external and fiscal surpluses for such a long period (2002-2008). This macroeconomic configuration was undoubtedly a key factor in explaining the sharp acceleration of growth. Since the second half of 2002, the economy grew steadily at annual rates of 8-9%, maintaining a relatively dynamic export performance. By 2006-07 the economy started to show signs of accelerating inflation and by 2008 due to political conflicts and the effects of the international financial crisis, the pace of economic growth decelerated significantly. Section 5 analyzes the Argentine experience with a managed floating regime targeting a SCRER.

## The Exchange Rate As a Nominal Anchor

### The *tablitas* in the Southern Cone

The so-called Southern Cone stabilization plans refer to the exchange-rate-based programs implemented in Argentina, Chile and Uruguay in late 1970s, in which pre-announced schedules of devaluations (*tablitas*) played a key role as nominal anchors. At the time these programs were implemented, the three countries were fighting against high inflation rates, which had settled down since the hyperinflationary episodes that followed the collapse of “populist” policies in the early 1970s.<sup>29</sup> In all three countries, military coups took power in the mid 1970s and first tried to stabilize with policies based on shifting from multiple to single exchange rates, fiscal restraint (especially in Chile and Uruguay) and reducing the rate of monetary expansion. Inflation, however, remained die-hard. This led to a second phase, starting in 1978, in which authorities in the three countries appealed to the exchange rate policy as a nominal anchor.

The *tablitas* were active crawling pegs, where the central banks pre-announced the future values of the nominal exchange rate over a specified horizon. In all three cases, the schedule described an upward trajectory of the exchange rate, starting with an initial rate of devaluation lower than the ongoing inflation rate and followed by successively decreasing rates. The decelerating rate of devaluation would eventually converge to zero at which time the exchange rate would remain fixed. Chile was the only country where the peg actually occurred (in mid-1979); in both Argentina and Uruguay, the schemes were abandoned before reaching that point.

The *tablitas* were applied in the context of broad economic liberalization programs. All three countries followed, with differing intensities, the liberalization of both the current and the capital accounts of the balance of payments, the deregulation of previously-repressed domestic financial markets and, especially in the case of Chile, the privatization of state-owned firms. There was also an explicit attempt to balance the fiscal accounts, which was especially successful in Chile and Uruguay.<sup>30</sup> The objective of these reforms was not to stabilize prices; they were thought (like their successors of the Washington Consensus) as measures to achieve greater economic efficiency and growth. However, they were also meant to play some complementary role in stabilizing prices.

The pre-announcement of the exchange rate path was the key element of the stabilization strategies. The *tablitas* were inspired by the Monetary Approach to the Balance of Payments (MABP) developed in the 1970s at the University of Chicago (Frenkel and Johnson, 1976). In a context of (fairly) open trade, a decelerating rate of devaluation has a direct effect on reducing inflation of traded good prices. This was not, however, the key channel through which the exchange rate policy was expected

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<sup>29</sup> Populism is a label widely used in Latin American political discourse to characterize governments that legitimate their policies by appealing to the opposition between “the people” they supposedly represent and “the elites”. It has also been used in economics to characterize certain unsuccessful attempts to change income distribution, without paying sufficient attention to macroeconomic consistency. See, for instance, Canitrot (1975) and Dornbusch and Edwards (1989).

<sup>30</sup> The order in which reforms were made differed from country to country. An important difference regarded the sequence of current and capital account liberalization. Argentina and Uruguay first opened financially and then later reduced tariffs, whereas Chile conducted a deeper trade liberalization program first and opened to capital transactions in a later stage. The different strategies triggered a voluminous literature on the optimal sequence of liberalization. The predominant view, partly inspired by the initial success of Chile’s reforms, suggested that countries should first attempt to remove distortions in domestic goods and capital markets and achieve a balanced fiscal budget, then liberalize international trade, and only later open the capital account (McKinnon, 1982). For a critical assessment of the sequencing literature, see Fanelli, Frenkel and Taylor (1992).

to affect domestic prices. The effect of the pre-announcement would be to lower inflationary expectations. Disclosure of future values of the exchange rate was an attempt to affect expectations of forward-looking contracts and thus provide a nominal anchor for future prices. According to the MABP, a reduction in expected inflation would raise the demand for money, facilitating the absorption of the money supply and, thus, lowering the inflation rate. To succeed, however, the announcement should be credible so to induce expectations in the right direction. Under the MABP, in which the balance of payments is thought to adjust to money market disequilibrium, achieving the desired expected rate of inflation requires consistency between the rate of variation of the exchange rate and the creation of domestic credit by the central bank (Calvo and Fernandez, 1982). In particular, a deceleration in the rate of variation of the exchange rate requires a reduction in the creation of domestic credit. Since central banks can create domestic credit by financially assisting the treasury or commercial banks, a view inspired by the MABP would predict that a pre-announced schedule of decreasing devaluations would be successful in reducing inflationary expectations if it is accompanied by a reduction in the monetization of the fiscal deficit. The credibility of the announcement relies on fiscal austerity (Blejer, 1983).

The implementation of the *tablitas* did not yield the expected results.<sup>31</sup> Inflation decelerated after the programs were launched although at a much slower pace than that involved in the devaluation schedules. Inertial inflation remained high due to the effects of backward-looking contracts, including wage indexation, but also due to the indexation of many non-tradables such as housing rents, school fees and mortgage payments. The slower speed of deceleration of non-tradable prices compared to that of tradables (which more closely followed the schedules of devaluations) led to appreciation of the RER. On the other hand, the deceleration of expected exchange rate devaluation initially led to a fall in nominal domestic interest rates, as the uncovered interest parity theorem would suggest. However, due to inflationary inertia and exchange rate risk, the interest rate did not fall sufficiently to equilibrate the yields between similar domestic and foreign assets. The interest rate differential triggered a substantial capital inflow to all three countries. The impact of greater liquidity combined with RER appreciation facilitated the expansion of economic activity. The resulting deficit in the current account was more than offset by capital inflows, allowing for FX reserves accumulation by the Central Bank.

In all three countries, this initial expansionary phase was followed by a gradual increase in domestic interest rates and a deceleration of capital inflows. The higher cost of capital combined with the substantial RER appreciation was a negative combination for the profitability of firms producing tradable goods, whose activity and employment levels contracted substantially, especially in Argentina and Chile. In a context of stagnant economic activity and a substantial current account imbalance, the expectation that the exchange rate rule would be abandoned increased. This resulted in a further reduction of capital inflows and liquidity and higher interest rates due to higher risk premia. This situation finally led to financial distress in the banking system. In all three countries, banking crises arose about one year before the abandonment of the exchange rate rule.<sup>32</sup>

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<sup>31</sup> For a detailed description of the stylized facts of the stabilization program in Argentina see Canitrot (1981), Frenkel (1983a) and Fernandez (1985); for the Chilean case, see Ffrench-Davis (1983) and Corbo (1985) and for the Uruguayan case, see Hanson and de Melo (1985).

<sup>32</sup> In Argentina the banking crisis started in the second quarter 1980 and the exchange rate regime was abandoned in March 1981; in Chile, they occurred in the second half of 1981 and in June 1982 respectively. In Uruguay there was a problematic financial situation from 1981 and the exchange regime was abandoned in November 1982. Obviously, in these three cases the devaluation worsened the financial problems.

Most analyses of the Southern Cone experiments agree that the collapses arose from the perverse macroeconomic configuration consisting of high real interest rates and overvalued RER. A *transitory* rise in the real interest rate together with an appreciated RER, however, is not inconsistent with the expected results of the programs. Based on a framework *a la* Dornbusch (1976) with perfect capital mobility and sluggish adjustment in the goods markets, Rodriguez (1982) develops a model showing that a successful stabilization program based on a *tablita* would make the *real* interest rate fall first and then rise, together with an initial appreciation and then depreciation of the RER. A stylized fact of these experiences, however, is that the *nominal* interest rate began to rise after an initial decreasing phase. According to the MABP paradigm on which Rodriguez's framework is based, the *nominal* interest should have followed a decreasing path until equating with the international interest rate.<sup>33</sup> A rise in the nominal interest rate, simultaneous with the deceleration of the rate of devaluation, is indicative of an increasing risk premium. Theoretical efforts were made to explain the behavior of the risk premium as an endogenous result of the stabilization program. One popular explanation, also based on the MABP, pointed to a potential inconsistency between the programmed exchange rate devaluations and the creation of domestic credit via public deficit monetization. This explanation found support in the Argentine experience, where authorities had little success at reducing the fiscal deficit (Calvo and Fernandez, 1982). It is hard to reconcile, however, with the Chilean and Uruguayan cases, where fiscal balance was achieved before launching of the *tablitas*. The failure of inflation to converge international levels, the appreciation of the RER and the rising risk premium must be explained by other factors.

More plausible stories focus on the destabilizing effects of capital account convertibility in the context of poorly developed domestic financial systems (Diaz Alejandro, 1985), and the effect of current account imbalances on worsening expectations that the exchange rate rule will be maintained. Frenkel (1983b), for instance, develops a portfolio balance model showing that the risk premium increases as an endogenous result of an enlargement of current account imbalances. The model is aimed at illuminating a context similar to those observed in the implementation of the *tablitas*, where financial agents try to take advantage of the significant spreads between the yields of foreign and imperfect substitute domestic assets arising from credible fixed or predetermined exchange rates and capital account convertibility. The behavioral story behind the model is as follows. Given the spreads, few local players take advantage of the arbitrage opportunities initially, issuing foreign debt to do so. Their exposure to risk essentially depends on the probability that the exchange rate rule is altered (i.e. the exchange rate risk). From the viewpoint of the individual investor, engaging in external borrowing to exploit an arbitrage opportunity has no significant effect on the sustainability of the exchange rate rule. However, since the first movers are exploiting significant benefits, other players have strong incentives to jump in, even when by doing so their combined actions may have negative macroeconomic consequences.

The macroeconomic consequence of financial arbitrage is where all the action happens. Capital inflows expand liquidity and credit in the economy. As a result, domestic interest rates and spreads fall, and output and employment grow. The expansion of aggregate demand leads to increases in non-tradable prices, which under fixed or predetermined exchange rate regimes generate a RER appreciation. The real appreciation can be reinforced by the effect of inertial inflation arising from

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<sup>33</sup> This prediction results from assuming that the uncovered interest parity (UIP) holds permanently. The UIP suggests that the domestic nominal interest rate ( $i$ ) has to be equal to foreign nominal interest rate ( $i^*$ ) plus the expected rate of variation of the NER ( $e$ ):  $i = i^* + e$ . If the path of pre-announced decreasing rates of devaluation contained in the *tablita* is credible, the domestic nominal interest rate reduces systematically down to the level of the foreign interest rate exactly when the exchange rate is finally fixed ( $e = 0$ ).

backward-looking contracts, as in the case of the *tablitas*. The combined effect of the RER appreciation and economic growth worsens the current account. This gradually weakens the credibility of the exchange rate rule. As the probability of exchange rate devaluation increases, the risk premium and the domestic nominal interest rate also increase. The balance sheet of the domestic financial system -which is short on foreign currency and long in local assets - becomes increasingly fragile to potential NER changes. Capital inflows are retained by the increase in the domestic interest rate; however, there eventually comes a point at which no interest rate can attract new external financing. Capital outflows force the central bank to abandon the exchange rate rule. The final outcome is a sequential or simultaneous twin (external and financial) crisis.

These dynamics fit the stylized facts of all three Southern Cone failed stabilization attempts. Furthermore, this analysis can be extended to explain the external and financial crises in Latin America during the 1990s (Taylor, 1998 and Frenkel, 2004). These are the cases of stabilization programs based on fixed or semi-fixed exchange rates commented on in the previous section: the Mexican “Economic Solidary Pact” program that ended in the 1994 crisis, Brazil’s Real Plan of 1994 that led to the currency crisis of 1999, and Argentina’s convertibility regime implemented in early 1991 that collapsed in 2001. In these experiences, the economies followed a boom-and-bust cycle led by the behavior of capital movements. All of them started with the implementation of liberalization and exchange-rate-based stabilization programs that gave rise to a profitable environment for financial arbitrage between domestic and foreign assets. The Southern Cone *tablitas* were not unique, but simply the first experiments of this type.

### Argentina’s currency board, 1991-2001

High inflation has been a major concern for Argentine policy makers since 1970. The so-called high inflation regime was a complex set of institutions, rules and practices that developed as an adaptation to the long-lasting inflationary environment (Frenkel 1990). This regime collapsed with two hyperinflationary episodes in 1989 and 1990. The second episode was temporarily controlled by the implementation of a set of stringent fiscal and monetary measures. In a context of high uncertainty, the central bank contributed to stabilizing expectations by following a managed floating policy aimed at keeping the nominal exchange rate relatively stable. In the meantime, the inflation rate remained very high, around 11% per month. The resulting RER appreciation led in early 1991 to a new round of runs against the peso and a rise in the exchange rate. Fearing that rapid NER depreciation could lead the economy into a third hyperinflationary episode, the government fixed the exchange rate.

Under the authorities’ view, however, a simple peg would not be enough to stabilize. Given Argentina’s long history of failed stabilization attempts, the prevalent view was that the stabilization program should be made as credible as possible. In order to reinforce its credibility, in March 1991 the congress established a fixed parity between the domestic currency and the U.S. dollar by law (the so-called convertibility law), and the full backing of the monetary base with FX reserves. The convertibility law transformed the central bank into a currency board: any issuing of domestic currency by the central bank should be backed by an equivalent purchase of U.S dollars.<sup>34</sup> To further influence private sector expectations, a few months later the government replaced the denomination of the local currency (Austral), making one unit of the new currency (Peso) equivalent to one U.S. dollar (AR\$/\$ 1). It was also allowed to set contracts either in pesos or in foreign currencies.

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<sup>34</sup> In 1992, the currency board was marginally relaxed, leaving the central bank some room, although very narrow, to finance the federal government and banks, and to carry out other financial operations.

As mentioned above, the currency board was implemented concurrently with liberalizing measures including, from early 1991, an almost complete liberalization of trade flows and full deregulation of the capital account of the balance of payments. There was also an impressive process of market-friendly reforms, targeting the privatization of a large proportion of state-owned enterprises. The stabilization program also involved price negotiations between the government and several productive sectors, aimed at reinforcing the effect of the exchange rate peg as a nominal anchor on inflation.

The program was very successful at curbing high inflation. After having reached four-digit annual inflation rates during the hyperinflation period, the rate of increase of domestic prices fell swiftly and steadily after the first quarter of 1991. The program had an immediate stabilizing effect on the prices of tradable goods, which rapidly converged to international inflation. The deceleration of non-tradable price inflation was not as fast. The CPI inflation rate, a proxy of non-tradable price inflation, dropped substantially, but remained considerably higher than foreign inflation until the end of 1994, when it finally converged to international levels.<sup>35</sup>

There are three aspects of the convertibility regime that are worth mentioning. First, given the legal constraints on the central bank's ability to autonomously manage the monetary base, the business cycle was almost fully dependent on the balance of payment result. The accumulation (contraction) of FX reserves by the central bank would lead to an endogenous expansion (contraction) of the monetary base and bank's credit, which fostered (depressed) domestic demand and output. Thus, balance of payments imbalances tended to adjust through output and employment changes rather than via prices.

Second, despite the high credibility enjoyed for a long time, the convertibility regime did not affect the private sector's preference for dollar-denominated assets. Bank deposits in pesos systematically offered a higher interest rate than that of dollar-denominated deposits, but this did not stop the persistent increase of the proportion of dollar-denominated bank deposits. Banks, for their part, hedged their balance sheets against exchange rate risk by offering dollar-denominated credits, no matter whether debtors' main source of income was in pesos or dollars. The proportion of both assets and liabilities in the local banking system in dollars grew to more than 60% in the last years of the regime.

The last aspect worth mentioning relates to the level of the RER. The above-mentioned asymmetric speed of convergence between tradable and non-tradable inflation rates following the stabilization program implied a real appreciation of the peso. This was not unforeseen: as described in previous sections, RER appreciation has been a typical result of exchange-rate-based stabilization programs in Latin America. By late 1994, the multilateral (or effective) RER and the bilateral RER with the U.S. were 59% and 53% lower than the average of 1980-1989, respectively. This significant appreciation did not, however, result from the asymmetric response of tradable and non-tradable prices to the stabilization program. About three quarters of the appreciation occurred during 1990, when the central bank followed a managed floating policy targeting a stable NER in a context of high inflation rates. In other words, the RER was substantially appreciated when the convertibility was launched. The authorities were not unaware of the potential problems resulting from the uncompetitive RER they were validating when they fixed the exchange rate. Their priority at that moment, however, was to avoid a third hyperinflationary episode with potentially catastrophic economic, political and social

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<sup>35</sup> See Damill, Frenkel and Maurizio (2002) for details.

consequences.<sup>36</sup> The competitiveness problem was accentuated by the succession of devaluations in developing countries since 1997, particularly that of Brazil in 1999.

Under the convertibility regime, Argentina experienced two periods of sustained capital inflows that spurred growth. The first occurred between the launching of the stabilization program and the contagion of the Mexican crisis in 1995. The second was shorter; it began shortly after the “tequila effect” and stopped in mid 1998, after the Asian and Russian crises. From that point on, the economy remained locked in a contractionary spiral that led to the dramatic collapse of the convertibility regime in 2001-2002. This involved abandonment of the currency board, devaluation of the peso, a crisis in the banking system and default on the external public debt.

Many interpretations have been elaborated about the convertibility collapse. A common explanation is that expansionary fiscal policy starting in the late nineties was inconsistent with a currency board (Mussa, 2002). In this line of reasoning, Argentina’s experience during the convertibility regime showed that a currency board alone does not impose responsibility on government spending. The emphasis on fiscal irresponsibility as the main cause of the convertibility crisis is at a minimum controversial. An analysis of the fiscal figures reveals that the authorities followed a contractionary policy from 1999 and that the increase in public expenditure was mainly due to increasing debt services (Damill, Frenkel and Juvenal, 2002).

Others have pointed to the perverse combination of RER appreciation and financial dollarization in triggering and determining the dimension of the crisis (Perry and Serven, 2003). It seems uncontroversial that the RER was significantly misaligned by the end of the convertibility regime and that its correction imposed a substantial negative balance sheet effect on those who had a negative net asset position in foreign currencies. Thus, no explanation of the convertibility collapse can overlook the relevance of these factors. It is important to note, however, that *a priori* neither of them was a necessary ingredient of the currency board regime. They arose from specific local circumstances. A relevant question is whether the implementation of the currency board played any role in influencing their development.

A stylized fact of exchange-rate-based stabilization programs is that they are typically followed by RER appreciations (Kiguel and Liviatan, 1992). But, as mentioned above, in the case of Argentine convertibility, the RER was already significantly appreciated at the time of fixation. Given that the improvement in labor productivity and supply-side measures were insufficient to correct the lack of competitiveness in the tradable sector, a significant deflation of domestic non-tradable goods prices would have been required to correct the RER misalignment. It is well documented in economics, however, that prices are downward inflexible.<sup>37</sup> And even if they were not, the also well known debt-deflation effect (Fischer, 1933) may have undermined this adjustment mechanism. In this regard,

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<sup>36</sup> In late 1992, once inflation had been stabilized, Finance Minister Domingo Cavallo suggested that the RER was appreciated. This led to a massive run against the FX reserves of the Central Bank. The event made clear that a NER adjustment would undermine the credibility of the exchange rate rule, thus threatening price stability. The authorities aimed to correct the loss of competitiveness instead by means of supply side policies, including the privatization-cum-deregulation program in energy, telecommunications, ports and transportation, flexibilization of the labor market and a reduction in taxes. See Cavallo and Cottani (1997).

<sup>37</sup> In the case of Argentina during the convertibility regime, Damill, Frenkel and Maurizio (2002) argue that labor market legislation played, at most, a minor role in the downward inflexibility of wages and show that wages of low-skilled workers were quite flexible according to international standards.



Argentina's experience under convertibility highlights the importance of avoiding an appreciated RER when implementing an exchange-rate based stabilization program, as subsequent adjustments may prove to be problematic. But it also makes clear the trade-off that policy makers face when implementing these programs. Granted that the RER will appreciate after the plan is implemented, they would like to depreciate the NER before fixing it, as attempted in the heterodox programs in Argentina and Brazil in the mid 1980s. However, given that the pass-through of NER movements to domestic prices is high in high inflation environments (Choudhri and Hakura, 2006), a substantial depreciation of the NER before fixing may fail to stabilize prices and might even lead to an acceleration of inflation. This trade-off suggests that policy makers should carefully consider not only how to implement an exchange-rate based stabilization program, but also what potential exit options they have if they need to abandon it.

A second issue regards the influence of the currency board (if any) on the increase of financial dollarization during the period. In theory, regimes that minimize the volatility of the NER should tend to favor the demand of assets denominated in domestic currency. The greater the commitment to exchange rate stability, the greater should be the use of the domestic currency as store of value. The dollarization of Argentina's banking system during the 1990s is at odds with this prediction. Some have argued that the stability provided by the currency board was perceived as an implicit guarantee and led the private sector to misperceive the exchange rate risk in their balance sheets (Galvani et al 2003). With hindsight, we know that the government should have induced the private sector to contract in domestic currency, especially for those operating in the non-tradable sector.

But, even if the dollarization of the financial system had been limited, the balance of payments crisis probably would not have been avoided. As mentioned in the previous subsection, Argentina under the convertibility regime can be interpreted as a case of perverse dynamics following a stabilization plan based on exchange rate anchoring and balance of payments liberalization. The typical RER appreciation deriving from such a macroeconomic configuration tends to stimulate domestic demand for tradable goods beyond domestic supply. If there is no early correction of the RER misalignment, a persistent current account deficit may lead to an unsustainable accumulation of external debt. Since in developing countries, external debt is denominated in foreign currency (Eichengreen and Hausmann, 1999), the required RER depreciation could make foreign-indebted domestic agents (in either the private or public sector) bankrupt.

## Exchange rate regimes targeting the RER

### Crawling bands in Chile, 1984-1999

The collapse of the *tablita* experiment pushed the Chilean economy into a deep depression. In 1982-83, output fell almost 18% compared with the peak in 1981, the unemployment rate approached 20% of the labor force (and surpassed 30% if excluding the people under emergency employment programs), and more than 50% of the population went under the poverty line. Simultaneously, there was a massive default on private external debt and the domestic financial system had to be bailed out by the public sector at a cost of around 26% of GDP. During those years, the (erratic) exchange rate policy aimed to lessen the FX shortage, thus allowing a significant depreciation of the local currency through a series of discrete nominal devaluations. Tight controls on FX transactions were also reintroduced during these years.

By late 1983, economic activity had stopped falling and financial variables had stabilized. In such a context, General Augusto Pinochet's administration announced the implementation of a crawling peg, in which the NER would be adjusted on a monthly basis according to the previous month's inflation minus an estimate of external inflation (around 2% annually). At the moment of the announcement (December 1983), the RER was about 60% higher than that prevailing at the moment of the *tablita* collapse. The implementation of this PPP-rule at a substantially more competitive level was not arbitrary. The RER appreciation during the stabilization program and its consequences had had a negative impact on the perception of both authorities and economists, who deemed the avoidance of RER misalignments as a priority for exchange rate policy (Corbo et al., 1986). Besides, the lack of foreign credit resulting from the default on external debt and the negative terms of trade forced the economy to make a significant current account adjustment. Achieving and maintaining a more competitive RER was seen as a natural policy response to facilitate such an adjustment.<sup>38</sup>

In August 1984, a fluctuation band of  $\pm 0.5\%$  was introduced. The NER was allowed to float freely within the band defined around the "central parity", which was in turn determined by the PPP-rule. The bands would be subsequently increased in several increments.<sup>39</sup> From this moment until September 1999, when the central bank decided to let the peso float, Chile followed this exchange rate regime based on PPP-adjusting moving bands that has been labeled "crawling bands" (Williamson, 1996).

Pursuing a competitive RER via a PPP-rule (and occasionally through significant discrete nominal devaluations) entailed a risk of accelerating the inflation rate. But, the drastic scarcity of FX under which the economy was operating left the authorities with no choice: they had to prioritize external competitiveness over price stability (Vergara, 1994). The potential trade-off between the two objectives, however, was not necessarily binding. Given the high level of unemployment and capital underutilization, the inflationary pressures on non-tradable goods and services were mild.<sup>40</sup> Thus, with the objective of reducing the external deficit and given that the economy was operating far

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<sup>38</sup> A simple calculation of the external adjustment results from comparing the current account balance between 1981 and 1988. The former is the year in which GDP reached the pre-crisis peak, and the latter in which GDP returned to the 1981 level. According to such a calculation, the adjustment was 17.4% of GDP, from a deficit of 18.5% to one of 1.1%.

<sup>39</sup> The band was widened to  $\pm 2\%$  in June 1985, to  $\pm 3\%$  in June 1988, to  $\pm 5\%$  in June 1989 and  $\pm 10\%$  in January 1992.

<sup>40</sup> Williamson (1996) also highlights the "ruthless nature" of the Pinochet dictatorship in keeping wage inflation in check as a relevant factor.

below full employment, between 1984 and 1989 the government managed the NER to target a SCRER. In this period, the RER was on average 75% higher than in 1982, while the inflation rate fluctuated around a similar or even lower level than the one prevailing before the implementation of the crawling bands.<sup>41</sup> During this 6-year period, the economy underwent a rapid recovery (6.3% annually), exports grew steadily (about 7% annually) and the current account deficit was substantially reduced.

In late 1989, Chile celebrated its first democratic election in years. In the months previous to the election, the NER jumped to the top of the bands. Uncertainty regarding whether the new democratic government would maintain its policy orientation, as well as the rising current account deficit generated expectations of a NER depreciation in the FX market. This translated into an excess demand for foreign currency and a rise in the NER. In 1990, once President Patricio Aylwin took office and confirmed the continuity of the exchange rate regime, a sudden change in market sentiment was observed. A surge of capital inflows led to a steady excess supply of FX, forcing the central bank to intervene in the opposite direction in order to sustain the NER on the lower bound of the bands.

The inflow of capital was neither a transitory nor a country-specific phenomenon. As mentioned in section 3, motivated essentially by external factors (e.g. low interest rates in the US), in the early 1990s, international capital flowed into many Latin American countries, which became attractive emerging markets for foreign investors. The massive and persistent inflows of capital that Chile experienced during this period posed a policy dilemma for the authorities. In late 1989, the Pinochet administration had declared the independence of the central bank and established an explicit mandate for price stability as its main policy objective. To pursue this objective, the central bank began to follow a contractive policy, raising short-term interest rates. In parallel, a moderately contractive fiscal impulse was also implemented. By late 1990, the inflation rate began a soft deceleration trend. The contractionary monetary policy, however, attracted flows of foreign capital. In order to keep the NER within the bands, the central bank had to intervene systematically in the market, absorbing the excess supply of FX. The resulting monetary emission was partially sterilized.

The situation that the central bank was facing at the beginning of the 1990s is an example of the well-known policy *trilemma* of a small open economy. Once Chile started to attract capital inflows, the conduct of monetary and exchange rate policies targeting both the RER (via the NER) and interest rates faced complexities. The fact that the inflation rate was still high by international standards (around 20%), implied that the monetary authority had to set domestic nominal interest rates high enough to achieve real interest rates that would induce a deceleration of inflation. Therefore the level of domestic nominal interest rates was substantially higher than those in the international markets even after adjusting for the expected depreciation of the NER. This (adjusted) interest rate differential implied a quasi-fiscal cost for the central bank, when implementing sterilized interventions in the FX market. At this juncture, the authorities faced essentially three options: 1) let the peso float and therefore appreciate both the nominal and the real exchange rate, 2) assume the quasi-fiscal cost of the sterilized interventions or 3) limit capital mobility. The initial solution was a compromise between the three.

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<sup>41</sup> During 1989, the inflation rate accelerated substantially. Many analysts suggest that this was mainly a result of the expansive policies that the Pinochet administration pursued with electoral motivations. See Williamson (1996) and Ffrench-Davis (2002).

First, in mid-1991, Chile introduced a non-remunerative reserve requirement (*encaje*) of 20% in the central bank for a year to loans from foreigners and later on to some equity transactions. The *encaje* was meant to reduce the return that a foreign lender would obtain by lending in Chile at the international interest rate. It was expected that short-term speculative flows would be discouraged and thus the appreciation trends would be softened.

Second, in January 1992, after one and a half years of maintaining the NER on the lower bound of the bands with this strategy, the central bank ceded to market pressure and revalued the “central parity”. To increase the degrees of freedom of monetary policy, it was also decided to widen the bands from  $\pm 5\%$  to  $\pm 10\%$ . The authorities had resisted the appreciation pressures because they feared that capital inflows would be *transitory*. However, the persistent inflow of capital ended up convincing them that Chile was facing a *permanent* supply of foreign saving that was substantially higher than during the post-crisis period. The change in the diagnosis also changed the focus of exchange rate policy. From that moment onwards, instead of pursuing a competitive RER, the exchange rate policy was oriented towards maintaining an “equilibrium” RER, defined as that RER compatible with a medium-run current account deficit of 3-4% of GDP. This figure was thought to be a “reasonable” amount of foreign savings received from abroad for a developing country in the process of catching up, while keeping the ratio of foreign debt to GDP constant (Zahler, 1998).

Finally, in July 1992, after increasing the *encaje* to 30%, the authorities switched the peg against the US dollar to a basket containing the three principal world currencies: US dollar (45%), deutsche mark (30%) and Japanese yen (25%). The main intention was to introduce short-term noise in the US dollar-peso exchange rate and thus discourage speculative capital movements. It was also during this year that the central bank started to intervene in the FX market not only when the NER was close to the bands, but also to manage its floatation within the band.

In the period 1991-94, the appreciation pressures continued. The NER moved systematically below the central parity and on some occasions very close to the floor of the bands. Nevertheless, the exchange rate policy, helped by the *encaje*, was successful in keeping the RER relatively stable, allowing only for a soft appreciation. The focus of exchange rate policy on a real target did not undermine the goal of monetary policy to reduce inflation. During this period, the inflation rate went down from 22% to 11%. At the same time, the still competitive RER stimulated economic activity while keeping the external accounts in check. GDP and exports grew at average rates of 6.8% and 8.5% respectively, and the current account deficit averaged 1.9% of GDP. Social indicators also improved: real wages increased by 20%, the poverty rate fell significantly from 38% to 27% and the unemployment rate from 8.2% to 7.8%.

The persistence of capital inflows well above the targeted current account deficit seem to have persuaded the authorities that the RER needed to appreciate. In November 1994, the central parity was appreciated by 10%. Contrary to Argentina and other emerging market economies, the Mexican crisis of January 1994 had no significant effect on Chile. Foreign capital continued to flow systematically and the view favoring a real appreciation was reinforced. Although the crawling band regime was not abandoned, exchange rate policy was reoriented in order to help monetary policy reduce inflation. With that goal, between late 1995 and the contagion of the Asian crises in late 1997, the NER was kept virtually constant within the bands.

The effect of the crises did not change central bank’s priority for price stability. In the more volatile scenario, the authorities reduced the bands significantly (2% for the upper limit and 3.5% for the lower bound) and intervened in the FX market in order to smooth the NER depreciation generated

by the reversion of capital flows. Instead of taking advantage of the situation to introduce a readjustment of the RER, intervention aimed at avoiding an acceleration of the inflation rate above the official target. The reduction of the bands, however, undermined the credibility of the crawling bands and when the Russian crisis unfolded, the peso suffered an intense speculative attack. The authorities increased the bands to a symmetric  $\pm 7\%$  and announced a gradual broadening of the bands, which would reach 16% in 1999. To maintain the NER within the bands -and therefore contain the acceleration of inflation- the central bank raised the interest rate from 8.5% to 14%. The emphasis on price stability over RER targeting was finally institutionalized in September 1999, when the central bank formally switched to a “pure” floating regime and eliminated the *encaje*.

### Managed floating in Argentina, 2002-2008

The story of Argentina after the collapse of the currency board in 2001-02 in many ways resembles the Chilean experience with the crawling bands. Both episodes were preceded by severe financial and balance of payments crises, default on external debts, a pronounced contraction in economic activity and a dramatic worsening of social conditions. In both cases, the recuperation of economic activity was associated with pragmatic macroeconomic policies that tried to attend to the external and fiscal imbalances, while providing incentives for tradable activities. In both cases, the exchange rate policy was oriented towards maintaining a SCRER.

Argentina formally abandoned the currency board (AR\$/\\$ 1) in January 2002 in the midst of a severe political and economic crisis. The authorities initially aimed to control capital outflows and stabilize the foreign exchange (FX) market by introducing a dual exchange rate regime, but the strategy was rapidly abandoned in favor of a floating system. In a context of high political and economic uncertainty, where the central bank was running out FX reserves, the NER skyrocketed, reaching a peak close to AR\$/\\$ 4 in July 2002. Given the distrust in banks (due to the banking crisis) and in the Treasury (due to the default), the economic depression and the accelerating inflation generated by the NER depreciation, the U.S. dollar appeared to be the only secure asset to allocate savings.

The stabilization of the FX market started in July 2002. The central bank introduced controls on FX -including the obligation to surrender export proceeds greater than \$1 million- and pursued more active intervention, selling US dollars in the market. Both the NER and RER began a downward trend. Despite this appreciation, the RER remained at very competitive levels. In July 2003, when the government started to intervene actively in the FX market in the opposite direction -now to contain the appreciation pressure- the multilateral (or effective) RER was 93% higher than during the convertibility regime (1991-2001) and 23% higher than the average during the period from 1980 to 2001. The decision to contain the appreciation pressure was motivated by the official diagnosis that awarded the SCRER a key role in both the recovery of output and employment and in the improvement of the external and fiscal balances.<sup>42</sup> From that point forward, the government gradually started to make more explicit reference to the importance of preserving a SCRER in the official economic strategy.

The central bank, however, never made an explicit statement regarding the existence of a RER target. According to their official statements and documents, the permanent intervention in the FX

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<sup>42</sup> The positive effect of the competitive RER on the fiscal accounts derived from the taxes revenues on traditional (agricultural) exports introduced in the beginning of 2002, which accounted for about 2.3% of GDP, a magnitude almost equivalent to 55% of the federal primary surplus. See Damill et al (2009).

market was oriented towards accumulation of international reserves for precautionary purposes; namely, to protect the economy from international capital market volatility (Redrado et al 2006). 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 range between AR\$ 2.8 and AR\$ 3.1 up until the beginning of 2007. The nominal fluctuation within this interval made the multilateral (or effective) RER remain stable around a level almost 100% higher than the average of the convertibility regime. The bilateral real exchange with the US dollar also remained relatively stable at competitive levels, although it began a soft appreciation trend in early 2005.

The management of the SCRER strategy during this period was not exempt from challenges. In 2002, when the Congress passed a law revoking the currency board, the government decided to maintain the central bank's independence with a primary mandate of pursuing low inflation. Given that the economy was still absorbing the effects of the crisis and domestic financial markets had shrunk significantly, central bank authorities considered that the monetary transmission mechanisms of the interest rate were uncertain and weak. Instead of following an inflation-targeting scheme as the other Latin American FIT countries, they opted to follow a more pragmatic policy based on broad quantitative monetary targets. From 2003 on, targets were announced at the beginning of every year through the central bank's monetary programs, where authorities committed themselves to maintain monetary aggregates within a certain range. Under this regime, monetary targets were meant to operate, at least in theory, as a nominal anchor.

A stylized fact during this period was that the upper bounds of the monetary targets ended up being systematically lower than the monetary expansion that resulted from the central bank's interventions in the FX market to attain a SCRER. Since the size of the monetary base created by the buying interventions in the FX market tended to exceed the programmed expansion of the monetary base, an 'excess' of monetary expansion had to be absorbed. To achieve this goal, the central bank relied on sterilization operations via the issuing of notes (LEBACs).<sup>43</sup> Given that during most of this period the FX market operated with an excess supply of dollars, the monetary authority managed to reconcile the two policy objectives with two instruments. With interventions in the FX market, the central bank controlled the NER as a mean to achieve the SCRER target. With the sterilization operations in the money market, it maintained monetary aggregates within the preannounced ranges, aiming to provide a nominal anchor for the private sector's inflationary expectations.<sup>44</sup>

It is usually argued that sterilized interventions are useful only for short periods. They are seen as transitory instruments because the costs of sterilization tend to increase over time and therefore to generate quasi-fiscal imbalances. As discussed in the previous subsection, Chile's experience with

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<sup>43</sup> Other significant, although relatively minor, sources of monetary contraction were: 1) the repayment from 2003 to 2006 by commercial banks of the debt accumulated with central bank for its financial assistance during the crisis, 2) the Treasury's purchases of the central bank's foreign exchange reserves to serve the debt with the multilateral financial institutions and 3) the use of fiscal and quasi-fiscal surplus by the Treasury and other official agencies to accumulate foreign exchange reserves. See Frenkel and Rapetti (2008) for details.

<sup>44</sup> Inspired by Chile's experience with the *encaje*, the Argentine government introduced capital controls in June 2005. The government required that all capital inflows –excluding the issuing of new private and public debt, international trade financing and foreign direct investment– were subject to a 30% unremunerated reserve requirement for at least a year. The introduction of the controls, however, showed no evidence of ameliorating the supply of dollars in the FX market. The implementation left open ways to avoid the reserve requirements; for instance, through the stock market by buying domestic assets abroad (in dollars) and selling them domestically (in pesos). Analysts and market practitioners believed that controls were ineffective and even the authorities did not reject the idea that they were introduced more as a signal of the official willingness to maintain the SCRER strategy than as an effective control mechanism.

crawling bands during the 1990s is an example of this potential problem. It would be wrong, however, to conclude that sterilized interventions lead invariably to an unsustainable quasi-fiscal balance. In the Argentine experience during this period, where (contrary to the Chilean case) domestic interest rates were relatively low, this policy was maintained without eroding the central bank's net worth, which actually tended to register quasi-fiscal surpluses.<sup>45</sup>

Following the SCRER strategy, Argentina experienced one of the most successful growth episodes in its economic history.<sup>46</sup> From mid-2002 to mid-2008, the economy grew at an 8.5% average annual rate. The favorable external conditions -especially the high international prices of the agricultural commodities that the country exports- were important, but explained only part of the economic performance. It was the expansion of the whole tradable sector (exportable and import substitutive activities) that pulled the economy up and put it on a rapid growth path. Volatile economic growth in Argentina has traditionally been associated with external deficits. During the post-convertibility period, on the contrary, the economy expanded while maintaining a stable current account surplus. Analysts tend to agree that the dynamic behavior of output, employment and investment has been associated with the positive effects of the SCRER on tradable activities.

One negative aspect of economic performance during this period was inflation, which started to accelerate in 2005.<sup>47</sup> Part of the observed inflation was due to the gradual adjustment of some tradable prices to the devaluation of 2002, which were still adjusting during 2004 and 2005. Another inflationary factor was the global rise in commodities prices, especially during 2007. However, evidence seems to suggest that inflation accelerated as an endogenous result derived from tightening conditions in the labor market and the (excessively) rapid expansion of demand in the non-tradable sector. The initial phase of rapid growth (from mid-2002 to mid-2004) occurred in a context of highly underutilized capacity and high unemployment and underemployment in the labor market. As the economy recuperated, aggregate investment reacted with high sensitivity to economic growth. Thus, with the exception of some particular sectors, capacity remained far from fully utilized. However, the reduction of unemployment and underemployment, which changed from 17.3% and 17.1% in 2003 to 7.9% and 8.8% in 2008, contributed to the rise of nominal wages. In many sectors, this led to real wage increases far beyond productivity growth. For instance, in the manufacturing sector between the first quarter of 2003 and the last quarter of 2007, nominal wages rose 175% while average productivity per worker increased about 20%. The nominal average unit labor cost increased 130%. In the same period, manufacturing wholesale prices rose 50%.

An aspect that deserves mention regarding the acceleration of inflation is the lack of coordination in macroeconomic policy. Given that monetary and exchange rate policies focus on preserving a SCRER – which was intended to put the economy on a high growth path – fiscal policy could have been used to moderate aggregate demand when inflationary pressures arose. On the contrary, public spending expanded well above the increase of tax revenues from 2006, which represented an expansionary fiscal impulse to already fast-growing aggregate demand.

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<sup>45</sup> A sterilization policy can be sustainable even if the domestic interest rate is moderately higher than the international rate adjusted by exchange rate variation. For a precise discussion on the sustainability condition, see Frenkel (2007).

<sup>46</sup> Since the Great Depression of the 1930s, this growth episode is only comparable with the performance between 1964 and 1974 commented on in section 3. See Albrieu and Fanelli (2009) for details.

<sup>47</sup> The CPI inflation rate was 6.1% in 2004, 12.3% in 2005 and 9.8% in 2006. In January 2007 the government introduced controversial methodological changes in the construction of the CPI index. Since then, the official figures have been systematically lower than private estimates. For instance, according to the private consulting firm Buenos Aires City, the CPI inflation rate for 2007 and 2008 was 25.7% and 23%, respectively, whereas the official estimates were 8% and 7%, respectively.

Parallel to the acceleration of inflation, since early 2007 the management of economic policy suffered a gradual degradation. The general recognition that the government was manipulating the CPI (and later on other official statistics) triggered a process of capital outflow starting in mid-2007. Sovereign bonds that were issued in domestic currency during the debt restructuring of 2005 had an indexation clause to CPI inflation. The manipulation of the index was perceived by the international financial community as a sort of default. The Argentine risk premium rapidly returned to the pre-restructuring levels (around 2000 basic points), after having reached 200 basic points in 2006. Another problematic episode occurred during the second quarter of 2008, when the government got into a severe dispute with the agricultural sector about the level of tax rates on agricultural exports. The official proposal of raising the tax rates did not get parliamentary approval. The episode eroded government's popularity and added new sources of political and economic uncertainty. During the dispute, capital outflow intensified and by the time that the effects of the crisis caused by the bursting of the U.S. housing bubble reached emerging markets, the economy had already started to show signs of recession.

## Concluding remarks

Probably the most important conclusion that can be drawn from our analysis is that the *level* of the RER has had a significant influence on the macroeconomic performance of Latin American countries. In particular, the experiences reviewed suggest that an excessively appreciated RER can lead to disastrous outcomes affecting short and medium term growth. The experience in the region thus corroborates the consolidated view that overvalued RER have detrimental effects on economic growth (Easterly, 2005). The exchange rate regime choice may not be neutral in that regard. Our historical narrative illustrated how fixed and semi-fixed exchange rate regimes focused on price stabilization can lead to excessive RER appreciation and balance of payment and financial crises. The Southern Cone experiences of the late 1970s and that of Argentina during the 1990s, both reviewed in section 4, attest that crises can reach the dimension of great depressions. After these negative experiences, there seems to be agreement among Latin American macroeconomists and policy-makers that avoiding pronounced real appreciation should be a central objective of any macroeconomic policy.

A second important lesson that emerges from our analyses is that in the process of integration with international financial markets, Latin American countries have gradually converged –through different national paths- towards the adoption of more flexible exchange rate regimes. Certainly, pegs have shown to be essential in providing a nominal anchor in contexts of high inflation or hyperinflation. But even in the cases that have been successful in conquering inflation, the phasing-out has proven to be traumatic, as the experiences of Argentina under the convertibility regime and Chile under the *tablita* best illustrate. Under conditions of moderately high inflation (say 30% per year), experience has shown that it is possible to reduce inflation gradually without using the exchange rate as an anchor. The case of Chile between the mid 1980s and the mid 1990s -where the deceleration of inflation occurred in a context of rapid growth and robust external accounts- is a clear example of this. However, although a crawling band regime is much more flexible than a currency board, both Chile and Colombia found that it lacked enough flexibility to deal with capital flows and by the late 1990s both countries shifted to more flexible regimes.

Under conditions of low inflation, as has been the case of all major economies since the late 1990s, flexibility has shown to be highly valuable. The lack of commitment to the level of the NER



provides the economy flexibility to adjust to external shocks without resulting in reputational costs for the monetary authorities. The lack of commitment also eliminates the incentives of one-way bets in the FX market by speculators. In their portfolio choices between domestic and foreign assets (and liabilities), private agents have to assume the exchange rate risk. Therefore, a lower exposure to NER variations and lower financial fragility to external shocks is likely to be observed.

Lack of commitment should not be understood as synonymous with pure floating. On the contrary, this is not the regime with the least degree of commitment. In both pure and managed floating, the monetary authority has no commitment regarding the level of the NER. However, in the former the central bank commits itself not to intervene in the FX market and to allow the NER to be determined by market forces. A managed floating regime is more flexible because it allows the monetary authority to intervene whenever it considers necessary. This extra degree of freedom seems to be highly valued among Latin American central banks, since in their search for greater flexibility none of them adopted a pure floating regime. By the early 2000s, all central banks of the major countries in the region switched to managed floating regimes. These include not only the self-declared Argentinean managed floating, but also those of the FIT countries.

The benefits of a managed floating regime are that it provides the same flexibility to absorb unexpected shocks as a pure floating regime, while also entitling the monetary authority to intervene in the FX market and influence the determination of the NER. In developing countries, this option is most dear given the potentially large effect of capital flows on the behavior of the NER and the importance of this relative price in the determination of other nominal and real variables. Central banks in developing countries may want to preserve the ability to influence the determination of the NER for two main reasons: 1) to reduce its volatility and avoid misalignments and 2) to influence its trend.

Managed floating regimes in Latin America have been accompanied by a systematic and massive accumulation of FX reserves. This has not been a peculiarity of the region, but a common feature among developing countries since the Asian crises. As discussed in section 3, there have been two main explanations for this behavior: the precautionary and mercantilist views. Each of them is rooted in the motives for influencing the behavior of the NER mentioned above. According to the mercantilist view, reserve accumulation helps preserve a SCRER (at least in the medium-run), which is used to promote tradable activities. The precautionary view suggests that countries accumulate FX reserves to reduce NER volatility and prevent large swings in the exchange rate. Among major Latin American countries, Argentina is the most transparent example of reserve accumulation for mercantilist motives. In section 3, we explained why it would be misleading to classify reserve accumulation by the Latin American FIT countries as mercantilist. In our view, the motivation has been prevention.

Why would countries accumulate FX reserves for precautionary motives? After the successive currency and financial crises during the 1990s, most economists and policy makers agree that capital flows can have destabilizing effects on exchange rates. These effects can take different forms. Capital movements can cause excessive short run volatility of exchange rates or lead to long swings away from fundamentals. Central banks may want to prevent excessive short-run volatility in order to provide domestic agents a more stable relative price system and thus facilitate resource allocation. The rationale for preventing extended departures from fundamental levels is easier to understand, since substantive exchange rate misalignments usually come with high economic costs. Regarding this latter point, it is important to notice that prevention refers both to cases of excessive

depreciation (i.e. overshooting) and appreciation (i.e. undershooting). The analysis of reserve accumulation with precautionary motives has typically focused on the first effect and overlooked the second.

In order to prevent non-fundamental runs against local currency, central banks need to have a certain volume of FX reserves. What is the optimal volume required for that purpose? As mentioned in section 3, several criteria have been suggested; the most popular indicating that FX reserves should be at least equal to the monetary base, M2, short-term foreign debt (i.e. the Greenspan-Guidotti doctrine), or 10% of GDP (i.e. the Jeanne-Ranciere guideline). The motivation of these criteria is ultimately to provide an indicator for an unobserved variable; namely, the volume of FX reserves that the public considers sufficient for the central bank to determine the NER. If this criterion is met -in other words, if the public believes that the central bank has enough reserves to satisfy the private demand for FX at the current NER- then betting on a future depreciation would not be profitable. Given that this optimal level is uncertain, central banks may have incentives to accumulate somewhat above conventional measures. However, even considering this reserve over-accumulation bias, many studies have shown that accumulation, especially among Asian countries, has gone far beyond what any of these indicators suggest. Should this be interpreted as an indication that recent reserve accumulation has been driven by another motivation such as, for instance, the mercantilist strategy? Not necessarily. Conventional precautionary indicators specify the amount of FX reserves that are required to prevent a non-fundamental speculative attack or overshooting. Once that level (plus an extra amount due to uncertainty) is reached, central banks would not need to accumulate additional reserves to prevent a potential sudden stop. However, if in such situation they face a voluminous capital inflow that drives the exchange rate to excessively overvalued levels, they would feel forced to intervene in order to prevent non-fundamental appreciation pressures. This additional accumulation of reserves -that would take conventional indicators beyond optimal levels- would also be generated by precautionary motives. In this case, central banks would accumulate reserves to prevent an exchange rate undershooting.

The excessive appreciation pressures that Latin American FIT countries faced since 2003 led them to accumulate reserves, not to preserve a SCRER, but to prevent an exchange rate undershooting. This seems to be especially the case in Brazil, Chile, Colombia and to a lesser extent, Mexico. Their exchange rate regimes have mainly been oriented towards the achievement of low inflation, while avoiding unsustainable trends of the RER in both directions. Interventions in the FX market were useful for avoiding excessive depreciation between 1999 and 2002 and excessive appreciation during the boom period of 2003 to 2008. Despite the interventions, the RER in these countries has tended to be more volatile and prone to appreciation than what is expected in a country following a SCRER strategy.

The case of Peru is harder to classify. The managed floating regime has certainly maintained RER stability, but not at an especially competitive level. Peru shared the motivations of the other FIT countries, but its managed floating with intense FX interventions has also been directed towards avoiding RER volatility in order to preserve the stability of the highly dollarized domestic financial system.

Reserve accumulation in Latin America has proven to be useful. There is little doubt that the large stocks of FX reserves -together with the greater NER flexibility- were essential to help central banks handle the impact of the international financial crisis of 2007-2008 (Ocampo, 2009). Despite the skeptical assessment by many analysts (Rodrik, 2006) and even the IMF, it would be a hard task

to persuade central banks in Latin American about the inefficiencies of accumulating FX reserves after this experience.

The analysis in this paper has also presented evidence about the importance of using exchange rate policy to manage the behavior of the RER. Our historical narrative suggests that Latin American economies tended to perform better when the exchange rate policy managed –with different degrees of intensity– the RER. In particular, some successful experiences of growth acceleration in the region have coincided with periods in which the exchange rate policy was purposely oriented towards preserving a SCRER. For instance, the arguably two most successful growth experiences in Latin America during the post World War II period have occurred in parallel with the implementation of exchange rate regimes targeting a SCRER. These experiences are the Brazilian *miracle* starting in the late 1960s simultaneous with the implementation of the crawling peg, and Chile's experience with the crawling bands between the mid-1980s and mid-1990s. There are also other important cases in which this correlation between the exchange rate policy and economic performance is observed. These are the crawling pegs in Argentina and Colombia between the mid-1960s and mid-1970s and the managed floating in Argentina since 2002.<sup>48</sup> Certainly, this observation should not be interpreted as indicating that exchange rate regimes targeting a SCRER are *the* explanation behind the success of these experiences. Economic growth and development are complex processes that involve the combination of many social, political and economic factors, most of which economists are still trying to understand. In any case, our historical narrative of exchange rate policies in Latin American supports the conclusion reached by a body of empirical studies mentioned in section 2, which indicate that an undervalued RER tends to foster economic growth in developing countries. In this regard, this paper suggests that the exchange rate policy can make an important contribution to economic development by preserving a SCRER.

Policies oriented towards preserving a SCRER are not free from obstacles. The level of the RER, by determining the relative price of domestic and foreign goods, affects aggregate demand. Given the unemployment rate, aggregate demand affects the price level. A sustained excessively undervalued RER would ultimately lead to a rise in prices and therefore to a real appreciation. If the exchange rate policy tries to preserve the original RER level by devaluing the domestic currency, the strategy would lead to the acceleration of inflation. It is not unusual to find cases of policies that, in trying to preserve a SCRER, end up accelerating the inflation rate. Some of the experiences mentioned in this paper illustrate this point. During the years that the crawling peg was used in Colombia (1967-1991), the inflation rate followed a soft but persistent upward trend. Argentina's recent performance with the managed floating regime, in which the inflation rate accelerated significantly since 2007, is another eloquent example. It would be wrong, however, to conclude that this is an unavoidable result of any exchange rate policy focused on a SCRER. For instance, the inflation rate in Chile under the crawling bands regime decreased substantially.

The experience of Chile between the mid 1980s and mid 1990s is an example of the macroeconomic coordination required to manage a SCRER policy. This policy configuration combined a crawling band regime, capital controls, countercyclical fiscal policy and an autonomous monetary policy with a reference interest rate as a policy tool. The combination of crawling bands, sterilized interventions and capital controls allowed the central bank to avoid the policy *trilemma* and simultaneously set the

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<sup>48</sup> It is interesting to note that the first four of these cases are among the few experiences of growth accelerations identified by Haussmann et al (2005) in the Latin American region. The case of Argentina in the post convertibility period is not included in the authors' sample but still meets their criteria to be labeled as episode of growth acceleration. See Albrieu and Fanelli (2008).

interest rate and the NER. Fiscal policy was used (although not always) to moderate aggregate demand pressures. With these policies –coupled with others focused on microeconomic aspects- the authorities managed to preserve a SCRER, reduce inflation, promote rapid growth of both exports and GDP, and avoid external and financial crises during turbulent periods. This successful trajectory lasted more than a decade.

The strategy was abandoned because the authorities understood that the policy of simultaneously targeting the NER and setting the interest rate was incompatible with financial integration. They interpreted that the quasi-fiscal cost due to sterilized interventions of about 0.5% of GDP was an indication that the policy would not be sustainable over time.<sup>49</sup> The shift to a FIT regime was the option the authorities chose to provide macroeconomic policy the flexibility required to deal with international capital movements. With this new orientation, the preservation of the SCRER and capital controls was sacrificed. Another option would have been to shift to a managed floating regime and preserve the focus on the SCRER. Given that the preservation of this objective may have hindered monetary policy autonomy, the maintenance of capital controls would probably have been required.

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<sup>49</sup> A common view in economics suggests that sterilized interventions can only be used in the short-run and are unsustainable for longer periods. Frenkel (2007) shows the conditions under which they are sustainable in the long run. Sterilizations can be unsustainable if they imply quasi-fiscal costs. In that case, their sustainability would depend on the overall fiscal balance and the growth rate of the economy. They would be perfectly sustainable if they manage to keep the public debt-GDP ratio stable around a level considered acceptable by creditors. The trade-off between costs and benefits of sterilized interventions should ultimately be decided by governments. Regarding the cost of sterilization in Chile in the mid 1990s, John Williamson (1996) pointed out: “[if paying 1%–1.5% of GDP] is the price of preserving a model that works, it would be cheap” (p. 30).

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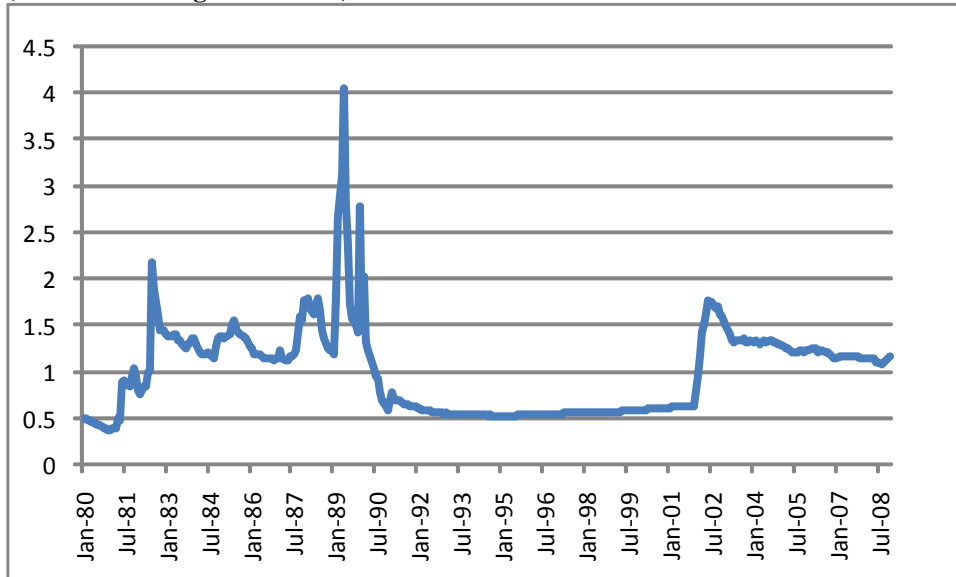
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# Appendix

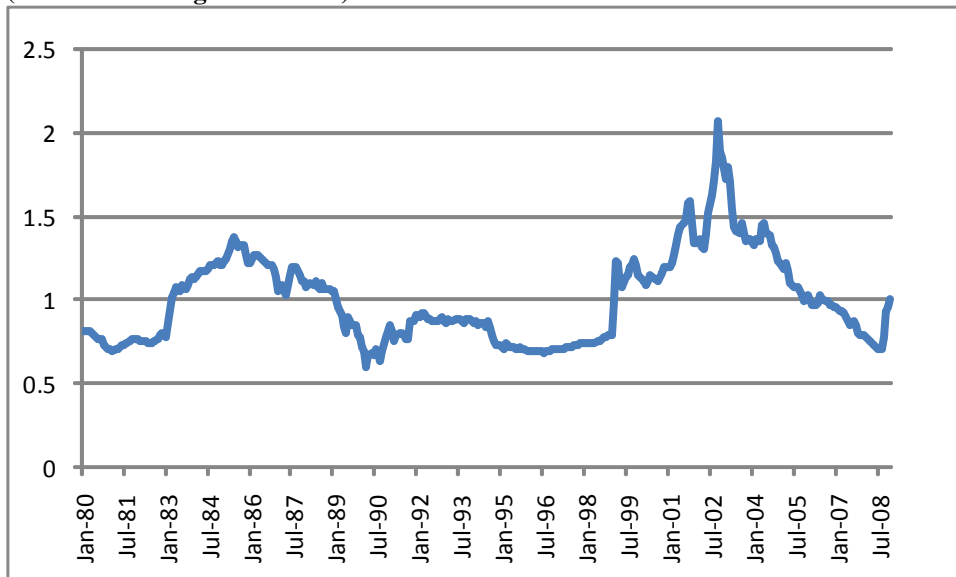
## Argentina

**Bilateral RER with the US, deflated by CPI indexes  
(Index 1 = average 1980-2008)**



## Brazil

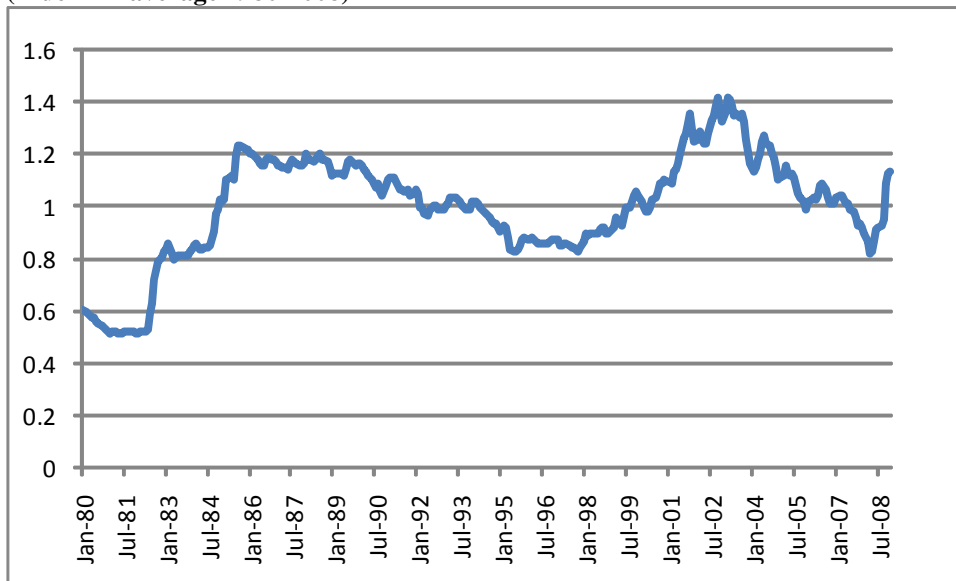
**Bilateral RER with the US, deflated by CPI indexes  
(Index 1 = average 1980-2008)**



**Chile**

**Bilateral RER with the US, deflated by CPI indexes**

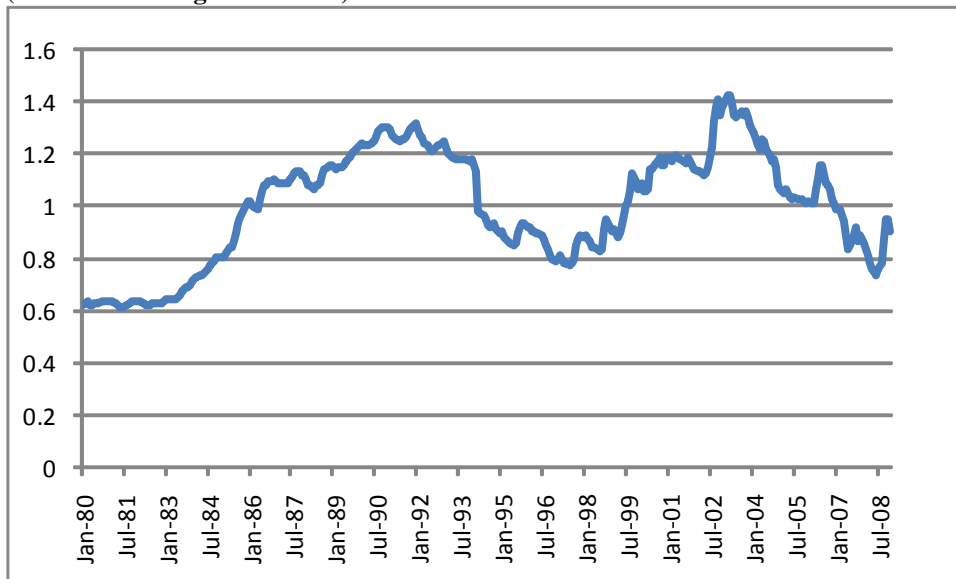
**(Index 1 = average 1980-2008)**



**Colombia**

**Bilateral RER with the US, deflated by CPI indexes**

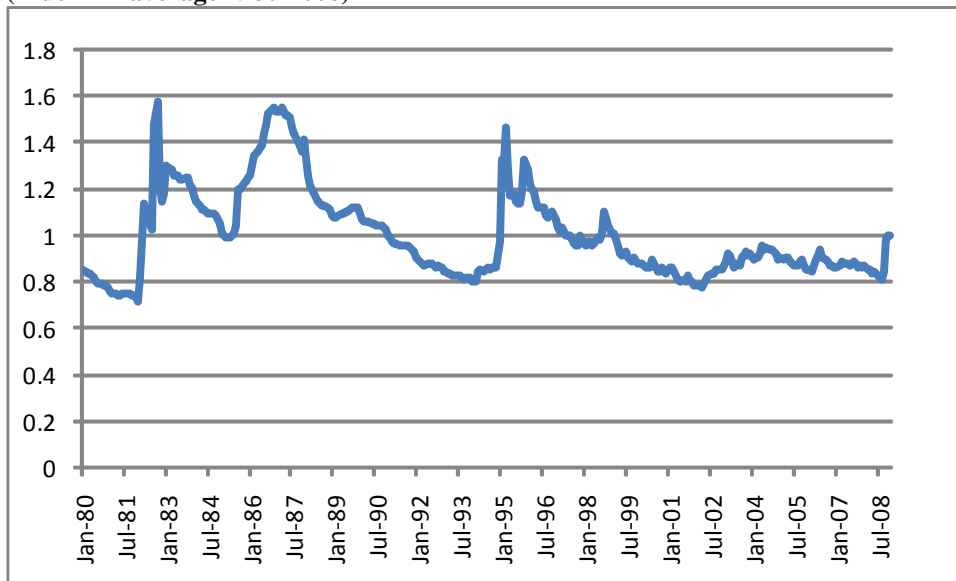
**(Index 1 = average 1980-2008)**



**Mexico**

**Bilateral RER with the US, deflated by CPI indexes**

**(Index 1 = average 1980-2008)**



**Peru**

**Bilateral RER with the US, deflated by CPI indexes**

**(Index 1 = average 1980-2008)**

