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## **Exchange Rate Regimes**

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## 1. INTRODUCTION

The choice of the exchange rate regime (ERR) has direct implications on the evolution of key nominal variables of the economy (inflation, relative prices) and, as a result, on output growth and volatility, and income distribution. Moreover, it may affect many other fronts related to nominal issues such as trade (influenced by real exchange rate levels and exchange rate stability) and finance (as a peg may foster financial intermediation at the cost of building currency imbalances).

This concise survey of a vast literature will focus on two aspects that have been at the center of the empirical literature. First, section 2 deals with the identification of de facto ERR understood as the policy maker's reaction function, as opposed to the simple characterization of variables such as the interest rates or the exchange rate. Next, section 3 discusses the channels through which ERR may influence economic outcomes. In turn, section 4 revisits the history of ERR, highlighting how regime choices reflected the channels postulated in the literature, the policy lessons from past experiences, and a changing global environment. Finally, section 5 takes stocks of the current state of the discussion, and concludes.

## 2. EXCHANGE RATE REGIMES (ERR)

To summarize something that will become clear by the end of this chapter, the characterization of ERR in the real world is plagued by definitional and measurement problems that make any particular definition quite controversial. Hence, before getting into the subject, we need to be precise about what we understand by ERR and how we identify them in the data. To that end, it is useful to start with a

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<sup>1</sup> UTDT and Brookings Institution. Prepared for the Elsevier's Encyclopedia of Financial Globalization, edited by Gerard Caprio, and with Thorsten Beck, Charles Calomiris, and drwas from the chapter "Monetary and Exchange Rate Regimes" written with Federico Sturzenegger for Elsevier's Handbook of Economic Development, Volume 5, edited by Dani Rodrik and Marc Rosenzweig.

taxonomy of ERR that goes beyond the standard three-way scheme (fix, float, intermediate regimes), as a first step to discuss the nature of alternative regimes and how they can be mapped into policy variables and economic outcomes.

## 2.1. Taxonomy and classification

The ERR choice set could be seen as a ladder that climbs from full flexibility towards increasing exchange rate rigidity (Figure 1), in practice it is often characterized by a simplified breakdown: Fixed regimes that commit to keeping the nominal exchange rate at a given level (typically, through central bank purchases and sale of foreign currency); floating regimes that allow the exchange rate to move according to market forces by avoiding intervention, and regimes in between that combine restricted flexibility with occasional intervention, often grouped under the intermediate level.

This three-way partition comprises a variety of arrangements. Intermediate options include *crawling bands*, where the exchange rate is allowed to fluctuate within a band, around a central parity that is adjusted periodically according to a pre-announced schedule; *crawling pegs* where the band collapses to a fixed (but adjustable) exchange rate; *horizontal bands*, where the currency is allowed to fluctuate within a pre-determined zone around a fixed central rate and, “*dirty*” *floats*, which denote managed exchange rate regimes that do not explicitly follow any of the previous schemes. Fixed regimes, in turn, cover *conventional pegs*, *currency boards*, where autonomous monetary policy is ruled out by design, and the peg is backed by a stock of liquid assets denominated in the peg currency enough to cover base money and ensure unlimited convertibility of domestic notes and coins, the unilateral adoption of a *foreign currency as sole legal tender* (*de jure* “dollarization”, for short),<sup>2</sup> and *monetary unions* (common currencies areas), which are harder to classify in terms of flexibility because their members peg against each other but may float vis a vis other currencies.

The IMF reports a monetary and exchange rate policy table that largely reproduces this taxonomy. Table 1 reports the IMF groupings with minor modifications. As can be seen, the non-float group includes a wide array of alternatives, with 10 countries falling within the *de jure* dollarization category, 10 currency board agreements, 53 “conventional” pegs, 44 managed floats and 40

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<sup>2</sup> While typically it is the US dollar that is used, the term is just a convention for the use of any foreign currency as national legal tender.

independent floaters. As any ERR classification, this particular grouping involves some controversial choices like the inclusion of Argentina's "dirty" float with other conventional pegs, the Chinese peg as "crawling" and, most notably, EMU member as floats. As noted, monetary unions are hard to classify. Three of them are grouped by the IMF either as currency boards (the ECCU) or as conventional pegs (CAEMC and WAEMU) –in the table, we prefer to group them as common currency pegs, as they entail, unlike conventional pegs, a harder commitment to the fixed parity and, with the substitution of the national currency for a common one, the loss of monetary policy autonomy. The fourth one, the euro zone (EMU) is classified as a floating regime, a decision based on the flexibility of the euro vis a vis other currencies that from an economic perspective appears debatable given the intra euro zone trade links and the absence of a centralized fiscal authority.<sup>3</sup>

The table also illustrates the correlation between the ERR and monetary policies, as reflected by the clustering of countries along the diagonal (shaded in grey in the table). Pegs naturally use the exchange rate as the nominal anchor, whereas floaters rely on an alternative anchor. However, actual policies often tend to differ significantly from stated intentions. Official pegs may be realigned if it is at odds with other economic objectives (for example, monetary policy or economic activity) or with the market (in the case of a currency run). Conversely, official floaters may choose to intervene to dampen exchange rate volatility.

Figure 1 shows the distribution of monthly changes in the exchange rate among fixers and floaters classified according to the IMF's *de jure* regime classification.<sup>4</sup> As can be seen, many *de jure* pegs display large monthly exchange rate variations, while many floats exhibit very little exchange rate variability (Figure 1). The same can be said of the distribution of reserve changes (a proxy for exchange rate intervention), which looks comparable across *de jure* regimes (Figure 2).

At any rate, *de facto* ERR classification has proved so challenging as to span a small literature on its own. In all cases, these attempts relied, to different degrees, on policies observed, and as such have

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<sup>3</sup> The IMF classification of monetary unions focus instead on the behavior of the common currency relative to other currencies: flexible in the case of EMU, pegged with the euro in the case of the African currency unions, and a currency board against the US dollar in the case of the Caribbean union.

<sup>4</sup> The IMF's *de jure* classification which reported regimes as officially informed by the countries' monetary authorities, was discontinued in 2000.

been dubbed *de facto* classifications of exchange rate regimes. Table 2 succinctly describes the most widely used classifications.<sup>5</sup>

These classifications combine statistical methods and reliance on the *de jure* classification to different degrees. Ghosh, Gulde, and Wolf (2003) move away from the original IMF coding to compute a z-score variable which combined the mean and variance of monthly depreciation rates and then mapped this continuous score into three *de facto* regimes (pegged, intermediate, and floats). Reinhart and Rogoff (2004; RR) verified the compatibility of the *de jure* regime with the observed one; if this was found to be incompatible, they classified according to the volatility of the nominal exchange rate, identifying fixers with stable parities and floaters with more volatile parities. Others relied on purely statistical methods. Levy Yeyati and Sturzenegger (2001, 2005; LYS) computed the volatility of reserves and the nominal exchange rate, and then used cluster analysis to group countries: those with high exchange rate volatility and little reserves volatility go into the float cluster; those with high reserves volatility and little exchange rate volatility were assigned to the fix cluster, and those with moderate to high volatility in both dimensions were assigned to the intermediate cluster.

Many recent classifications have relied on exchange rate volatility at the expense of policy intervention (Table 2). As a result, countries with large exchange rate corrections were grouped as floats regardless of the policy response, while countries in stable environments were classified as pegs regardless of the degree of intervention. In turn, mistaking flexibility with volatility may throw into the float category economies facing external or strong market pressure, both situations correlated with subpar economic performance, thereby biasing the evaluation of alternative regimes.<sup>6</sup>

In addition, there are a number of unresolved issues casting doubt on the consistency of existing classifications, including the choice of a *reference currency* again which to measure exchange rate volatility (does the country look to the dollar, the euro, the yen, a basket when thinking of exchange rate intervention?), the role of *monetary unions* (should euro countries with substantial intra euro zone trade be seen as pegs or floats?), and the measuring of *nontraditional forms of intervention* (such as currency swaps or forwards, or verbal intervention). Because of all these caveats, alternative ERR classifications are often used in empirical economics with the proper care, and seldom in isolation.

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<sup>5</sup> Tavlas et al. (2006) provide a comprehensive survey.

<sup>6</sup> LYS attempt to address this problem by computing an exchange rate and reserves volatility pair for each observation, and assigning them to ERR by similarity, according to their relative values.

## 2.2. Trends

The literature has highlighted two main trends in the way countries choose their ERR. On the one hand, there is the view that, since the end of Bretton Woods in the early 1970s, countries have steadily moved away from the US dollar pegs, and in favor of more flexible regimes. On the other hand, there is the so-called “bipolar view,” in vogue during the 1990s, that postulated that, in a financially globalized world, intermediate regimes and conventional pegs had become increasingly costly in terms of monetary policy autonomy (and inherently fragile to speculative attacks), and therefore tended to disappear in favor of either floats or “hard” pegs (currency board agreements and regimes with no national legal tender).<sup>7</sup>

Figure 3 compares the evolution of regimes choices over time based on the IMF *de jure* regime classification as well as RR and LYS *de facto* alternatives. The first two show a trend toward floats that accelerated in the 1990s and reversed in recent years; in the third classification, the trend is less pronounced and the regime distribution more stable. Differences aside, pegs still appear to be the prevalent choice, with floats losing ground in recent years. This distribution, however, masks important regional differences. For example, according to LYS, Latin American countries have embraced flexible arrangements (together with inflation targeting) with *de facto* floats doubling between 2000 and 2004, whereas emerging Asia has preserved its bias toward managed floats and heavy intervention.<sup>8</sup> The perceived trend towards floating regime may be reflecting the fact that large developed economies tend to favor more flexible arrangements (Figure 4).<sup>9</sup>

Traditionally, standard classifications have characterized exchange rate rigidities from a symmetric perspective, that is, focusing on exchange rate and reserve volatility without distinguishing between interventions to avoid a depreciation from those intended to avoid an appreciation. Underlying this focus is the Mundellian framework in which these rigidities amplify real shocks, both positive and negative. But the direction of intervention is not irrelevant, for at least two reasons. First,

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<sup>7</sup> See Eichengreen (1994) and Fischer (2000), among others. Obstfeld and Taylor (2004) provide a good account of the connection between financial globalization and ERR choice building on the “impossible trinity” or trilemma of monetary and exchange rate policies.

<sup>8</sup> Emerging economies are defined here as those included in the Emerging Market Bond Index Global Portfolio compiled by J. P. Morgan, which requires that the country has issued frequently traded sovereign bonds in international markets.

<sup>9</sup> As noted, the euro zone, the peculiar case of a floating common currency, is singled out in the chart. If it were classified as a peg (as it usually is), the chart would display a slight jump in the new millennium; if it were classified as a float, the float group would represent 80% of the world economy by 2004.

the price rigidities that introduce a role for exchange rate adjustments are generally asymmetric as well: prices tend to adjust upwards much more easily than downwards. Second, the motivation of intervention (and possibly its effects) differs with its direction: the prevention of a depreciation may be geared to avoid financial distress or high inflation; the prevention of an appreciation may result from the target of an undervalued currency to gain competitiveness or reduce the odds of a traumatic depreciation in the future (as discussed in detail below).

This bias has been common in the literature, where ERR are identified on the basis of exchange rate volatility (RR; Shambaugh, 2004) and the *absolute* value of interventions (LYS). This may lead to inconsistencies when justifying some of the empirical regularities. For example, Calvo and Reinhart (2002) argue that fear of floating responds to devaluation fears within economies with financial dollarization and a high pass-through (often as a result of the latter), where an exchange rate correction may lead to balance-sheet losses of currency mismatched debtors, and to high inflation. If so, intervention should be more responsive to depreciation pressures, than to appreciation pressures that should pose a less immediate concern. But then the methodology used to characterize fear of floating should address the one-sided nature of the policy. On the other hand, in recent years, intervention has been increasingly geared to preserving an undervalued exchange rate, to protect growing economies from the adverse effect of an appreciating currency – a modern incarnation of the traditional “mercantilist” view. Again, in this case the policy scheme would be clearly asymmetric: only upward exchange rate moves would trigger intervention.

Levy Yeyati and Sturzenegger’s (2007) extension of the LYS classification tries to address these asymmetries by showing how the share of intermediate regimes that intervene, purchasing reserves (as opposed to selling them), has evolved over time (Figure 5). Predictably, most developing countries defended their exchange rate anchors by selling reserves in bad years, and intervene in the opposite direction in good years, a pattern most notably present in the 2000s. As it turns out, conventional “defensive” pegs associated with *fear of floating* represented only 20% to 30% of the managed floats in 2004. In light of the pro-float trend discussed above, this evidence appears to indicate a comeback of proactive exchange rate policies with a different, mercantilist twist.

### 3. WHY DO WE CARE ABOUT ERR?

At the risk of oversimplifying, we can divide the economic literature on the implications of the choice of ERR on key economic into three broad issues: (i) effects on growth (including on output volatility

and crisis propensity); (ii) effects on prices (most notably, through the use of exchange rate anchors to inflation rates); and (iii) effects on other macroeconomic variables such as trade and finance. This section provides a brief survey of each of them in order.

### 3.1. ERR AND GROWTH

Several hypotheses have been presented on the link between ERR and growth. From a global perspective, fixed exchange rates were viewed as one of the important drivers behind the development of international financial markets at the end of the nineteenth century, and as a factor fostering cross border market integration, with similarly beneficial effects on efficiency and growth.<sup>10</sup> The Mundellian paradigm shifted the attention to domestic factors by focusing on the role of the exchange rate as shock absorber: to the extent that volatility conspires against long-run growth (Ramey and Ramey, 1995), flexible regimes are likely to deliver a more stable and, as result, stronger economic performance. In addition, others have suggested that rigid arrangements are prone to exchange rate misalignments (Aizenman and Glick, 2005) that invite speculative attacks and currency crises, with the associated adverse growth effect.

Empirically, exchange rate policies are often found not to be a growth factor for industrial countries. By contrast, the evidence is more nuanced for developing economies. Levy Yeyati and Sturzenegger (2003) found that flexible regimes lead to faster growth, whereas Rogoff et al. (2005) argue that the result applies only to advanced developing economies. Differences in the empirical findings on the ERR-growth relationship can in principle be attributed to the regime classification procedure. For example, exchange rate volatility is often taken as an indication of regime flexibility. Indeed, most classifications fail to control for currency crises, a time at which exchange rates and reserves tend to respond more to market pressures than to the original regime choice. If so, peg failures (typically associated with bad economic outcomes) would likely be coded as floats, while stable floats would be recorded as intermediate or pegged regimes.<sup>11</sup> Moreover, even in classifications that control for exchange rate intervention fail to capture alternative intervention mechanisms such as interest rates, currency derivatives, or capital controls. Naturally, part of the empirical divergence lies in the

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<sup>10</sup> Johnson (1956) provides an early defense.

<sup>11</sup> These two arguments suggest a potential bias of classifications based on exchange rate variability to find flexibility associated with bad outcomes—and an opposite bias for codings where flexibility is associated with no policy intervention.

complexity of the various channels involved in the link between ERR and growth, which can hardly be captured by reduced-form tests typically reported in the literature.

Studies of the relation between EER and output volatility, and the role played by the exchange rate as shock absorber, also have a long tradition in international finance, starting from the conventional premise that under floating (fix) exchange rates, the economy has a greater ability to adjust to real (nominal) shocks.<sup>12</sup> Testing the differential output response to real shocks under alternative ERR has received some attention in recent years. Empirically, if nominal prices are (downward) inflexible, the output response to (negative) real shocks should be attenuated under floating regimes. Edwards and Levy Yeyati (2005) found evidence that terms of trade shocks get amplified in countries that have more rigid exchange rate regimes, and confirmed that the response to terms of trade shocks is asymmetric: the output response is larger for negative than for positive shocks. Broda (2001) tackled the same question using a VAR model to compute the way in which terms of trade shocks affect growth, and found that the effect of a 10% change in the terms of trade has a greater influence on growth under fixed than under flexible exchange rate arrangements.

### 3.1. ERR AND INFLATION: ANCHORS

Exchange rate pegs have typically been associated with what could be broadly referred to as a “deficit in monetary credibility,” reflected in high inflation expectations, inflation inertia (backward indexation to past inflation), and a low impact of monetary policy announcements. Underlying this credibility deficit there is a time inconsistency problem: inflation expectations increase nominal interest rates thereby raising the fiscal deficit of an indebted government and making it optimal for the government to dilute its debt burden through inflation –inducing equilibrium inflation, and generating an inflation bias.<sup>13</sup> In this case, the use of an exchange rate anchor may make dilution more costly, to the extent that abandoning the anchor entails some (political or economic) reputation cost. In other words, if a low inflation target is not credible, the peg works as a second-best commitment mechanism.<sup>14</sup> “Hard” pegs provide an extreme example of this reasoning, as they add to the exit cost in

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<sup>12</sup> This view goes back to Meade (1951) and Friedman (1953). See also Dornbusch (2001).

<sup>13</sup> See, among others, Calvo (1978), Barro and Gordon (1983) and, for open economies, see Giavazzi and Pagano (1988).

<sup>14</sup> Some authors have suggested that the channel may work in the opposite direction: flexible rates provide more credibility. That is the argument, for example, in Tornell and Velasco (2000), on the basis that fiscal mismanagement implies costs in the long run under fixed regimes but is immediately apparent when exchange rates are flexible, which then provides the strongest incentives for consistent fiscal behavior.

a number of ways, including by establishing the peg through a binding legal framework, fostering the use of the peg currency in everyday transactions, and even eliminating altogether the national currency in the case of unilateral dollarization.

An exchange rate anchors, much in the same way as an inflation target, has the additional advantage of coordinating expectations. In high inflation economies where agents tend to index prices partially to the exchange rate to minimize inflation risk, an exchange rate anchor provides a vehicle to transition from backward indexation to past inflation, to forward indexation to a pre-announced exchange rate path. Canavan and Tommasi (1997) made this point to argue that, with incomplete information and imperfect monitoring, policy makers would prefer visible anchors like the peg even if the latter limits the ability to respond to external shocks.

From an empirical perspective, the literature has focused on the link between exchange rate regimes—and, in particular, varieties of exchange rate anchor such as (crawling) bands and pegs—and the inflation rate. Overall, there seems to be agreement on the fact that pegs are associated with lower inflation, even after controlling for money creation.<sup>15</sup> The result is robust to controlling for the presence of a peg in a standard monetary equation, which indicates that the benign effect of the peg may work through the anchoring of expectations rather than through the imposition of monetary discipline. However, the direction of causality and, more importantly, the duration of the effect are more controversial.

Among the many qualifications raised by these studies, perhaps the most troubling is the well-known fact that failed pegs tend to collapse to floats, which in imperfectly specified tests may result in a spurious association between floats and high inflation. Intuitively, in the long run, pegs may influence monetary policy, but they are also endogenous to it, as they cannot be sustained in the face of persistently high inflation. This may explain why empirical findings suggest that only long-lasting pegs are significantly linked to low inflation levels in the long run (Levy Yeyati & Sturzenegger, 2001). Ultimately, the effectiveness of a peg as an anti-inflation device remains debatable, as it

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<sup>15</sup> See Ghosh et al. (2003), Levy Yeyati and Sturzenegger (2001), and Rogoff et al. (2005). This suggests that countries with higher pass-through coefficients will tend to benefit the most from the immediate impact of the anchor on inflation expectations—and explains why they were its most active promoters.

depends on the policy maker's ability to reign in the fiscal deficit.<sup>16</sup> If that is not fully achieved, his willingness and ability to refrain from monetary financing would inevitably be offset by fiscal needs, leaving the exchange rate anchor as a short-term patch. The declining effectiveness –and shortening life span– of successive (failed) exchange rate stabilization in Latin American countries in the 1980s and 1990s attest to the limits of exchange rate anchors in the presence of fiscal dominance.

### 3.5. OTHER LINKS: TRADE, FINANCE

There is vast body of work on the **integration channel** between ERR and trade, namely, the “optimal currency area” premise that the transaction costs of currency conversion (which includes not only the bid-ask spreads but also currency risk due to potential losses from exchange rate variations) introduces an implicit barrier for cross-border transactions. In this context, whereas a peg would remove transactions costs due to exchange rate flexibility, a monetary treaty would additionally foster foreign direct investment and intra industry trade by preventing competitive devaluations.

The findings on this front are mostly based on gravity models, and point at a positive but small effect of exchange rate stability.<sup>17</sup> By contrast, Rose (2000) argued that the adoption of a common currency increases bilateral trade by about 200%. However, these findings have since been greatly qualified due to potential endogeneity (a common currency was more likely to be adopted in the presence of strong trade links), and sample bias (most common currency pairs include subnational entities with historical and political links with the currency issuer, a case more affine to unilateral dollarization of small economies than to monetary unions between countries of comparable economic development).<sup>18</sup>

Studies of the possible associations between **ERR and financial development** have focused on two distinct channels. The first one is related to the consequences of exchange rate instability on cross-

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<sup>16</sup> There seems to be some evidence on the benign effect of hard pegs on fiscal discipline. Ghosh et al. (2003) argue that countries on currency boards tend to run tighter fiscal policies, whereas Fatas and Rose (2000) find that currency boards are associated with fiscal restraint (although, somewhat surprisingly, this restraint does not carry on to unilaterally dollarized economies or to members of a monetary union).

<sup>17</sup> Among many others, see Thursby and Thursby (1987) and Parsley and Wei (2001).

<sup>18</sup> Rose and Stanley's (2005) meta-analysis of 34 previous studies placed the estimated increase between 30% and 90%. Moreover, more recent estimates using data from the European Monetary Union go as low as 5-10% (Micco, Stein, & Ordoñez, 2003) and 4% (De Nardis, De Santis, & Vicarelli, 2007).

border flows and domestic market development, and documents the costs of nominal instability (moderate to high inflation, even if it is predictable) in terms of the demand for local assets and the deepening of local financial markets (Boyd, Levine, & Smith, 2001; Khan, Senhadji, & Smith, 2006).

A second channel concerns the implication of exchange rate regimes (most notably, pegs) on the degree of financial dollarization, where the latter is defined as the use of a foreign currency to denominate financial assets and liabilities held by residents. In a nutshell, this literature points to four potential motives that may make a peg more conducive to the use of a foreign currency in financial transactions. The first motive, starting from the assumption that risk-averse resident investors choose their asset portfolio to optimize the real risk/return profile (in terms of the local consumption basket), argues that the dollar share of domestic savings and loans depend on the inflation risk of local currency assets (i.e., the volatility of the inflation rate) relative to the currency risk of dollar assets (i.e., the volatility of the real depreciation rate) (Ize & Levy Yeyati, 2003). If so, an exchange rate anchor that stabilizes the real exchange rate in a context of volatile inflation would stimulate financial dollarization. A second motive is associated with the so-called “peso problem” (a large local currency interest rate premium due to persistent devaluation expectations), typically associated with imperfectly credible exchange rate anchors. In the presence of nonlinear liquidation costs, the currency composition of debt is optimally chosen to minimize the probability of default and liquidation. Thus, if the devaluation threat is large but improbable, the borrower may opt for the less costly dollar funding (Jeanne, 2005). A third motive highlights the fact that financial dollarization introduces externalities that, in turn, generate the perception of implicit debtor guarantees (Burnside, Eichenbaum, & Rebelo, 2001): if the social cost of massive bankruptcies following a currency crisis makes a debtor bailout *ex post* optimal for the government, borrowers would anticipate this bailout underpricing currency risk.<sup>19</sup> Finally, a fourth motive linking the two relates to financial regulation (Broda and Levy Yeyati, 2006): a currency-blind regulation that fails to price in the additional risk of dollar lending, would encourage dollarization. To the extent that pegs call for currency-blind regulation (since a regulation that flags currency risk would undermine the credibility of the peg), they tend to facilitate financial dollarization.<sup>20</sup> With the caveat that scarce data and slow dynamics limit the accuracy of the analysis

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<sup>19</sup> The argument goes beyond the case of bailouts: any implicit debtor insurance, to the extent that defaults are correlated with the real exchange rate, would favor dollarization. For example, the accumulation of international reserves may fuel the dollarization of the banking sector, if they are perceived by commercial banks as increasing the probability that the central bank provides dollar liquidity in the event of a dollar shortage (Broda & Levy Yeyati, 2003).

<sup>20</sup> See De la Torre, Levy Yeyati, and Schmukler (2002) for a discussion in the context of the Argentine currency board.

of financial dollarization beyond simple cross-country comparisons, recent work has found support for the portfolio view (De Nicoló, Honohan, & Ize, 2005; Levy Yeyati, 2006), and for the presence of implicit guarantees in association with pegs, in the form of increased larger unhedged short currency positions at the firm level (Werner & Martinez, 2002).

The multiplicity of effects described above has played a part in the way countries actually choose their ERR, as a brief review of the empirical literature on regime choices indicates (Table 3). The next section explores in more depth how these policy choices have evolved over the post-Bretton Wood years.

## 4. EXCHANGE RATE POLICIES IN THE POST BRETTON WOODS ERA

The policy discussion surrounding the costs and benefits of alternative ERR involves both country- and time-specific aspects that tend to change over time. In this light, we can map the evolution of the several determinants of the regime choice identified in the literature into the various phases of the ERR debate during the post-Bretton Woods era. This broader perspective provides a natural approach to bridge the analytical arguments and the empirical findings, on the one hand, and actual policy decisions on the other.<sup>21</sup> With this in mind, this section offers a brief narrative of the ERR debate, connecting the international and local connect to different “trends” in the choice of regimes.<sup>22</sup>

### 4.1. Exchange rate anchors in the 1980s

A casual review of the exchange rate debate in the late 1980s and early 1990s shows that the discussion largely revolved around the role of the exchange rate as nominal anchors in a high inflation environment. The academic literature mirrored these concerns, assessing the merits of exchange rate-based stabilizations (ERBS) coupled with income policies (namely, the coordination of wages and prices around the exchange rate target), to offset the inertial nature of inflation in the presence of backward indexation, once more traditional money-based stabilizations.

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<sup>21</sup> This helps explain why ERR, and more generally exchange rate policy considerations, have remained at the forefront in the ever changing developing world, while they played a secondary role in advances economies.

<sup>22</sup> This sections draws from Levy Yeyati and Sturzenegger (2010).

Kiguel and Liviatan (1992) and Vegh (1992) documented that ERBS appeared to lead to an initial and temporary consumption boom that tended to end in a contraction, whereas money-based stabilizations often induced an initial recession followed by a boom. Calvo and Vegh (1993) provided a formalization: in their model, a one-shot credible stabilization tended to have the same result regardless of the anchor of choice, but transitory or not perfectly credible exchange ERBS lowered interest rates in the short run, fueling a consumption and output boom (and a trade deficit) in the short run that were reversed once the program collapsed. On the other hand, non-credible money-based stabilizations were expected to increase the demand for money jacking up interest rates in the short run, appreciating the exchange rate and causing a recession in the short term. Calvo and Vegh's "temporariness" argument provided a fairly strong rationale for ERBS from the perspective of myopic politicians eager to obtain significant short-run effects.<sup>23</sup>

As noted, the effectiveness of an exchange rate anchor depends critically of the absence of fiscal dominance of monetary policy, the prevalence of which accounts for the large list of unsuccessful ERBS, and explain why they ultimately run out of favor.<sup>24</sup> However, this sequence of failed stabilization plans lied at the root of the gradual recognition by policy makers of the costs of chronic inflation and the benefits of fiscal moderation and central bank independence, a development that explains the better fiscal performance and declining inflation rates of the 1990s.

## 4.2. Financial integration and financial crises in the 1990s

As inflation subsided and financial integration deepened in the second half of the 1990s, the ERR debate shifted the focus to the interplay of two contrasting features of financial development. First, the fact that, in a financially globalized world, capital controls became increasingly ineffective. As in the early years of the twentieth century, growing financial integration and sophistication strengthened the restrictions imposed by the *impossible trinity*—previously circumvented due to the absence of *de facto*

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<sup>23</sup> Bruno, Di Tella, Dornbusch, & Fischer (1988) offer a good sample of applied ERBS studies in emerging economies during this period: modeling of the interaction of money, wages, prices in Israel; the effect of wage indexation and wage freezes in Brazil; the stabilizing role of the exchange rate in an economy with dollar pricing (Bolivia); an income policy-based program in Mexico.

<sup>24</sup> The dynamics of monetary financing of the deficit in a way that is inconsistent with an exchange rate anchor was at the core of the first generation models of currency runs pioneered by Krugman (1979), originally motivated by the balance of payments crisis of the 1970 and 1980s.

financial integration (Obstfeld & Taylor, 2004)—making exchange rate stability more costly in terms of the loss of monetary policy autonomy.<sup>25</sup> Alternatively, high frequency cross-border flows made the coupling of a peg and an autonomous and often inconsistent monetary policy inherently fragile to currency runs and speculative attacks.

Second, the role of financial dollarization, which introduced currency exposures that raised the risk associated with exchange rate jumps, rendering pegged regimes more attractive. Indeed, it was the risk of balance sheet losses to financially dollarized governments and firms in the event of a devaluation—stressed in third generation models of currency crises popularized in the context of the Asian crisis (Chang and Velasco, 2001; Burnside, Eichenbaum, and Rebelo, 2001)—that led to the definition of *fear of floating* (Calvo & Reinhart, 2002). In turn, to the extent that financial dollarization detracted from the benefits of a flexible exchange rate in that balance-sheet effects of a devaluation could outweigh the gains in terms of competitiveness and enhanced external demand, exchange rate flexibility could be seen as a source of volatility, and “hard” pegs could be viewed as a reasonable second-best option.<sup>26</sup>

The combination of these two factors led naturally to the “bipolar” view (Fischer, 2000) that pointed at fully floating or superfixed regimes (“hard” pegs) as the only viable alternative for financially integrated developing economies—at the expense of inherently vulnerable conventional pegs. When combined with the fear of floating view, this approach derived into what could be called a “unipolar view” (Calvo, 2000) that argued that hard pegs were the only sensible option for financially integrated dollarized economies: if devaluations were contractionary due to balance-sheet effects, a flexible ERR would only amplify the cycle, rather than smooth it out as in the Mundellian world.<sup>27</sup> Thus, exchange rate anchors evolved from a signal to coordinate inflation expectations into a legal constraint on the behavior of the Central Bank—or, in the extreme case of *de jure* dollarization, the elimination of the Central Bank altogether.

But while hard pegs were being endorsed by multilateral organizations in the late 1990s in line with the success of the currency board in Argentina in coping with the tailwinds of the Mexican

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<sup>25</sup> The impossible trinity refers to the inability to sustain simultaneously three policy objectives: an independent monetary policy, open capital markets, and fixed exchange rates: If monetary policy and open capital markets are priorities, exchange rates need to float. If exchange rate and capital markets are priorities countries cannot have an independent monetary policy. If monetary policy and exchange rates are priorities capital markets need to be shut down.

<sup>26</sup> See, for example, Hausmann et al. (1999) and Dornbusch (2001).

<sup>27</sup> Frankel (2005) provides a good discussion of balance sheet effects and contractionary devaluations.

Tequila crises in 1994 (Balino and Enoch, 1997), policy was turning in the opposite direction. Paradoxically, by the turn of the century the failure of Argentina's currency board to ensure fiscal and monetary discipline casted doubt on the premises underscoring the unipolar view. The market discipline that would impose a hard budget constraint on the government in the absence of monetary financing did not materialize: capital markets tolerated procyclical overindebtedness, and pulled off in bad times triggering a debt default. On the other hand, the fact that, at the time of the currency run, the contraction of the monetary base caused by the unsterilized sale of reserves (the automatic interest rate defense against a currency run embedded in a currency board) was "sterilized" by the issuance of fiat money by the national and subnational governments showed that not even monetary discipline could be guaranteed by the hard peg (De la Torre, Levy Yeyati, and Schmukler, 2002). Not surprisingly, the 2000s witnessed a trend among emerging countries that prioritized the inflation rate, rather than the exchange rate, as the key nominal anchor, which started, predictably, in economies with relatively low levels of financial dollarization (Chile, South Africa, Brazil). Ultimately, the debate in the new millennium appears to have converged to an inverted unipolar view, where flexible regimes are seen as the only sustainable choice for financially integrated and sophisticated economies.

### 4.3. Float cum inflation targeting (FIT)

The declining degree of dollarization, combined with the improved monetary credibility built in the low inflation 1990s, explain the growing popularity of the float pole of the bipolar view in recent years. Recent changes in debt composition have allowed developing economies to use the inflation rate rather than the exchange rate as the main policy target. This has led some observers to salute the combination of float plus inflation targeting (FIT) as a new, more resilient ERR paradigm (Rose, 2007).

FIT is used in practice to denote a broad variety of regimes, going from a soft inflation target (in the form of a wide inflation band), to the more canonical IT scheme that includes, additionally: (i) a legal commitment to price stability as the primary goal of monetary policy, (ii) a dissemination strategy that allows agents to replicate and anticipate the policy decision context (if not the actual policy decision); (iii) direct accountability of the central bank management for attaining the targets.<sup>28</sup>

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<sup>28</sup> Truman (2003) provides a comprehensive and general discussion of IT. Price stability need not be the only mandate; IT may assign a role for output stability (e.g., the Reserve Bank of Australia). The same is true for financial stability in financially dollarized economies like Perú or Uruguay, although in those cases the application to the IT club is still under consideration.

From an operational point of view, an inflation targeting regime typically implies identifying an intervention variable, usually a reference interest rate for funds offered by the central bank. This rate is defined and discussed in regular meetings, the proceeds of which are made available to the public, sometimes with a lag.

Historically, middle income developing countries adopting IT proceeded gradually from the soft version that in the early years usually coexists with a dirty exchange rate regime (Mishkin, 2006) to the more canonical version. FIT in emerging economies faced a severe test during the 2007-2008 boom-bust cycle in commodity prices and the associated inflation rollercoaster.<sup>29</sup>

In this context, the interplay between exchange rate policies and the IT framework in developing countries has been more problematic than the formal commitment to a flexible exchange rate embedded in the IT framework would indicate. As food and energy inflation put pressure on commodity exporting inflation targetters to raise interest rates, central banks resisted appreciation pressures (due both to the improved terms of trade and the associated, procyclical capital inflows) by intervening heavily in the exchange market and adding to the growing stock of international reserves – until the deepening of the financial crisis in late 2008 reversed these trends. More generally, while FIT has been heralded as the triumph of floating regimes, international reserves in the developed world have been steadily growing, even in economies that formally subscribed to the FIT camp, which may signal a new breed of active exchange rate policy to which we turn next.

#### 4.4. Leaning-against-the-wind exchange rate intervention

Unlike in the 1990s, where financially dollarized economies resisted depreciation because of the presence of currency mismatches and widespread dollar indexation, in recent years central bank intervention have been mostly leaning against the appreciation wind. While, according to the IMF, 28 middle-income developing economies officially adopted a FIT policy, many countries (including, for example, Argentina, China, Colombia, Malaysia, Thailand, as well as inflation targetters Brazil, Israel or Poland) still pursue active exchange rate intervention policies and a few of them (Argentina in 2005, Thailand, and Colombia in 2006, Brazil in 2009) introduced controls on capital inflows to countervail the appreciation of their currencies.

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<sup>29</sup> Supply shocks unrelated to domestic demand are often transitory and, for this reason, partially dismissed under the IT framework by targeting an adjusted (core) price index less sensitive to supply swings. In developing economies, the lack of institutional credibility led central banks to favor the more sensitive headline CPIs over opaque core measures more prone to be perceived as biased indicators of genuine inflation.

This comeback of exchange rate policies has been attributed, alternative to a prudential motive to: (i) cope with mean-reverting (and potentially destabilizing) exchange rate upswings that increase the propensity to suffer dollar liquidity runs in the downturn, and (ii) a revival of mercantilist policies aimed at maintaining an undervalued currency as a means to protect the domestic industry from international competitors. We examine both motives in turn.

#### 4.4.1. The prudential motive

The first interpretation of the current surge in international reserves in developing economies shown in Figure 6a and 6b, had to do with prudential considerations, specifically, the fear of a foreign currency liquidity shortage of the type that caused the emerging market financial crises in the late 1990s and early 2000s. According to this view, the rapid accumulation of precautionary reserves in the aftermath of a crisis at home (or episodes of financial contagion) accounts for the less-than-perfectly flexible exchange rates in many developing economies in the early 2000s (Aizenmann and Lee, 2007).

An alternative argument could be conceived for a similar intervention policy with a more explicit exchange rate objective: leaning against appreciation during cyclical expansions may be seen as the countercyclical prudential response to procyclical (and largely exogenous) swings in capital flows and real exchange rates. Limiting the transitory (and possibly excessive) appreciation of the local currency through the accumulation of foreign reserves would be in this context a preventive strategy to limit the amplifying effect of procyclical cross-border and to minimize the real exchange rate adjustment (and associated balance sheet effects) during the recessive phase.<sup>30</sup>

Most of the economies that faced financial crises in the 80s and 90s are no longer financially dollarized, or have seen their external debt-to-GDP ratios fall dramatically in recent years, at the time that the pace of reserve accumulation was still accelerating. If prudential concerns associated with aggregate currency mismatches and balance-sheet effects were behind the initial surge in intervention, these presently appear to play a much smaller role.

It is important to note, however, that, even in the absence of financial dollarization, governments are often willing to mitigate excessive exchange rate volatility, as illustrated, for example, by the massive foreign exchange intervention by central banks during the currency selloffs in late 2008 and early 2009. But this aspect of the prudential motive (namely, reserve accumulation as a by-product of exchange rate smoothing policies) is closer to traditional capital controls and macro prudential policies

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<sup>30</sup>See Levy Yeyati (2005) and Caballero and Lorenzoni (2006).

than to the precautionary view of reserves as a liquidity cushion in the event of a shortage of foreign exchange.<sup>31</sup>

At any rate, the fact that reserve purchases are concentrated in countries like China, Japan, and oil producing economies (Figure 7), which historically have held a positive net foreign asset position and have not gone through a dollar liquidity crisis, suggests that the precautionary aspect of reserve accumulation explains only part of the intervention story.

#### 4.4.2. The mercantilist motive

Prudential issues and currency mismatches certainly play a role in the revival of the “mercantilist” view of intervention: the undoing of financial dollarization, inasmuch as it relaxed the balance-sheet concerns behind fear of floating, recovered the expansionary gains of a depreciated exchange rate. Indeed, the main hypothesis of the mercantilist view (namely, the pro-growth consequences of an undervalued currency) depends critically on the absence of the currency mismatches. In this context, the key aspect underlying the mercantilist motive goes back to an old unresolved question: Does a temporarily high real exchange rate exert a persistent positive effect on economic growth? If so, does this effect come from an increase in external demand, from a decline in the demand for imports (with a concomitant increase in the demand for domestic products), or from lower labor costs and increased profitability of the corporate sector?

A number of recent papers examined the issue and provided some supportive evidence to that end. While this body of work tends to agree with the idea that mercantilist interventions and undervalued currencies are associated with faster growth, they are far less clear about the specific channels at play. Testing for the presence of export-led dynamics, Rajan and Subramanian (2005) analyze the impact of foreign aid and show an adverse effect on sectors with a higher exported share, which they attribute to the effect of the real appreciation associated with the inflow of funds. Inverting this Dutch disease argument, a real depreciation would foster the growth of export-oriented firms.<sup>32</sup> Some offer an alternative argument: in a reversion of Diaz Alejandro’s (1965) contractionary devaluation story, Levy Yeyati and Sturzenegger (2007) argue that because devaluations reduce labor costs in terms of

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<sup>31</sup> If so, it could be argued that reserve holdings are too large from a purely precautionary perspective and should, therefore, be managed as long-term savings rather than short-term liquidity (Summers, 2006).

<sup>32</sup> However, due to the way in which they measure sector growth, the effect may capture the higher price level perceived by the exporter as a result of the devaluation, rather than actual growth.

producer prices, they increase firm profitability and real investment, rather than fuelling capital flight as in the past.<sup>33</sup>

However, many of these studies suffer from a potential endogeneity problem, to the extent that intervention may also be the result of good economic conditions (including faster growth). But even if the direction of causality implied by these findings were true, the effectiveness of the policy (its side costs, and the persistence of its benign effect) remains untested.

The costs of reserve interventions are less straightforward than they sound in theory. In principle, in the presence of foreign currency-denominated external debt, the marginal cost of carrying reserves would be equal to the marginal cost of the external debt that implicitly funds them (alternatively, the opportunity cost of foreign currency liquidity for the country) net of the returns obtained on reserves. These costs would typically follow the country's sovereign spread over the risk-free rate. But, to the extent that liquid reserves often reduce the sovereign spread paid on the total debt stock, the marginal cost of carrying reserves for indebted economies may be significantly lower than the spread.<sup>34</sup>

Alternatively, the purchase of reserves can be unsterilized (funded by money printing), or sterilized through the sale of local currency-denominated debt. The first option introduces inflation pressures: the real appreciation materializes—albeit over a longer time—through a change in domestic prices rather than in the nominal exchange rate.

The second option pays the local currency interest rate and, ultimately, may result in central bank quasi fiscal losses. However, sterilized intervention of this kind is seldom accompanied by higher interest rates, because appreciation expectations tend to depress borrowing costs in the local currency. Instead, to the extent that intervention simply delays the transition to an appreciated exchange rate, it should ultimately lead to a loss in the form of changes in the local currency value of international

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<sup>33</sup> Levy Yeyati and Sturzenegger (2007) show that depreciations work not so much through the trade channel but through an increase in savings and investment associated with the regressive income distribution effects of devaluations. Also, Rodrik (2009) documents the benign effect of exchange rate undervaluation on the manufacturing sector, although his measure of undervaluation is criticized by Woodford (2009).

<sup>34</sup> To the extent that, for a given net debt stock, a larger stock of liquid foreign currency assets may tighten the sovereign spread, the resulting gain in rollover costs should be net out from the spread in computing the marginal cost of reserves (Levy Yeyati, 2006). For alternative takes on the cost of precautionary reserves, see also Rodrik (2006) and Jeanne and Ranciere (2006).

reserves, as the exchange rate appreciates toward the new equilibrium.<sup>35</sup> Thus, mercantilist reserves accumulation would be costly if appreciation pressures are permanent.

By contrast, if appreciation turned out to be a transitory phenomenon due, for example, to cyclical inflows or transitory terms of trade shocks, the reversion of the exchange rate to its earlier, more depreciated level eliminates much of the intervention cost. Moreover, in the presence of cyclical fluctuation, a leaning-against-the-wind central bank that allows the exchange rate to follow its fundamental trend over a smoother path is likely to profit from excessive exchange rate volatility. At any rate, the fact that equilibrium exchange rates are in practice so difficult to assess makes an ex-ante evaluation of long-term intervention costs quite challenging.

Ultimately, advocates of reserve accumulation had their belated recognition in the midst of the financial crisis of 2007-2008, when the stock of reserves enabled financially integrated emerging economies to control the pace of the exchange rate adjustment needed to offset the rapid unwinding of foreign investment positions and the terms of trade shock—triggered by the global recession that in the 1990s may have caused a stream of balance of payment crises. As a result, the prudential motive—or, more precisely, the policy of smoothing out the cyclical pattern of exchange rates—looks, a fortiori, a plausible justification for reserve accumulation. As noted, the two motives are not at odds with each other: fears of an eventual reversal of fortunes may be in the minds (and often in the words) of many policy makers in developing countries targeting an undervalued currency as a development tool in the good years.

## 5. TAKING STOCK

The ERR debate is far from closed: as the pros and cons of alternative ERR evolve both with country characteristics and the global context, so does the preferred exchange rate policy mix. On the one hand, exchange rate anchors that were popular in the developing world in the context of high, inertial inflation and partial dollar indexation lost their edge when fiscal restraint and central bank autonomy helped win the inflation battle and pass-through coefficients declined—at a time when financial integration rendered pegged regimes more vulnerable to inconsistent policymaking and self-fulfilling

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<sup>35</sup> Note that, under the interest rate parity condition, the difference between the local currency interest rate and the expected appreciation rate should equal the dollar interest rate so that, if expectations are unbiased, the cost of sterilized purchases of reserves should ultimately be, on average, similar to purchases directly funded by dollar debt, the only difference being that, in the first case, it is the central bank that bears the currency risk.

attacks. On the other hand, the recent deleveraging and dedollarization process in the developing world increased the scope for flexible exchange rates to recover the countercyclical role that they had in the classic Mundellian open economy framework.

The fact that most medium and large developing economies (and virtually all industrial ones) reveal a preference for exchange rate flexibility and non-exchange rate anchors simply reflects this evolution. However, pegs still represent more than half of the IMF reporting countries—particularly, small ones—indicating that exchange rate stability is still favored by small open economies that give priority to the trade dividend of stable exchange rates, and find the conduct of an autonomous monetary policy inefficiently costly.

The mercantilist's variety of a managed exchange rates should not be viewed as a newcomer to the ERR map: it comes from the traditional view of an undervalued currency as a barrier to international competition that underlie Asian export-led models, and is not qualitatively different from the fixed exchange policies adopted in the wave of capital flows to emerging economies in the early 1990s. Rather than a distinct ERR that aims at a *persistently* undervalued local currency as a substitute for tariff barriers, in practice it looks closer to the countercyclical leaning-against-the-wind smoothing of high-frequency exchange rate variability fueled by procyclical cross-border flows—which in financially integrated economies may lead to unwarranted swings in the real exchange rate. As the heavy reserve sales during the 2008-2009 selloffs illustrated, foreign exchange intervention is intended to limit sharp currency swing in both directions.

While it may be too early to judge empirically the success of FIT or leaning-against-the-wind exchange rate policies, the literature examined in this chapter shows that both local and global developments contribute to the choice and performance of alternative ERR over time, and that the evolution of the ERR debate owes as much to economic theory as it does to economic history.

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