WP/05/187

IMF Working Paper

Financial De-Dollarization: Is It for Real?

Alain Ize and Eduardo Levy Yeyati

INTERNATIONAL MONETARY FUND

 WP/05/187

IMF Working Paper

Monetary and Financial Systems Department

Financial De-Dollarization: Is It for Real?[1]

Prepared by Alain Ize and Eduardo Levy Yeyati[2]

September 2005

Abstract

De facto (unofficial) dollarization, defined as the holding by residents of assets and liabilities denominated in a foreign currency, is a policy concern in an increasing number of developing economies. This paper addresses the dollarization debate from this perspective, with the goal of setting the stage for a more detailed and focused discussion of whether de-dollarization should be a policy objective and, if so, how best to pursue this objective. We review existing theories of de facto dollarization and the extent to which they are supported by the available evidence, presents the main strategies for reform, and proposes a list of policy recommendations.

JEL Classification Numbers: E50, G21, G28

Keywords: Dollarization, Monetary policy, Prudential policy

Author(s) E-Mail Address: aize@imf.org, ely@utdt.edu

---

[1] An earlier version of this paper was presented at a conference on the Policy Implications of de Facto Dollarization, held in Lima, Peru, April 21–22, 2005. The authors would like to thank Roberto Chang and other participants at the Conference for their comments.

[2] Universidad Torcuato di Tella, Buenos Aires, Argentina and Inter-American Development Bank.

Contents Page

I. INTRODUCTION

Some important events and trends in recent years have intensified concerns about financial dollarization (FD). First, there is mounting evidence that FD has increased or remained stable despite declining inflation rates. Second, dollarization has greatly complicated the policy response in several crises and near-crisis episodes, and, in some cases, has been singled out as the source of financial vulnerability that triggered a crisis. Third, the widespread shift from fixed to more flexible exchange rate regimes has altered the policy landscape, highlighting the prudential consequences of exchange rate risk. As a result, the policy debate about de-dollarization has heated up. Is de-dollarization a realistic goal? Is it worth the trouble? If so, how can it be pursued? Oriented by these questions, this paper tries to summarize where we stand on what remains an ongoing debate.

The paper focuses on de facto (unofficial) dollarization, defined as the holding by residents of assets and liabilities denominated in a foreign currency that does not enjoy legal tender status. More precisely, the paper centers on domestic dollarization (namely, financial contracts between domestic residents such as onshore deposits and loans) rather than external dollarization (financial contracts between domestic and external residents such as external bonded debt), and on asset-liability dollarization rather than on currency substitution (that is, the use of the foreign currency for transaction purposes).[3]

Based on a comprehensive review of the theoretical and empirical literature, we address the following questions:

- How much do we know about the causes and dynamics of de facto dollarization?
- What are the key *strategic* policy options? Should countries—
    - aggressively seek to de-dollarize and, if so, should de-dollarization be viewed strictly as a by-product of good economic management (combat the causes rather than the symptoms) or should it be pursued as a goal in itself (which may require direct action to limit or reverse dollarization)—?
    - accept dollarization but learn to live with it by limiting its downsides and improving policy within the confines of a dollarized environment (better to bend than to break)—?

[3] However, there are some important points of intersection between external and domestic FD (including the fact that holders of external dollar assets are typically unknown) and between asset and currency substitution (including the fact that interest bearing assets also provide liquidity services) that cannot be ignored.

- call it quits and fully (officially) dollarize?

The paper also sets the stage for more detailed and focused discussions on a number of key *tactical* issues: (1) how (and how aggressively) to de-dollarize; (2) how to conduct monetary policy in a dollarized economy (and how to vanquish fear of floating); (3) how to implement prudential reform; and (4) how to promote local currency markets.

With this road map in mind, Section II lays the groundwork for the policy discussion by reviewing existing theories of de facto dollarization. Section III examines the extent to which the empirical evidence allow us to differentiate in practice between these competing theories. Section IV provides the necessary underpinning for policy reform by briefly discussing the costs and risks of dollarization. Section V presents the main strategic options for reform. Section VI concludes by proposing a list of policy recommendations as a function of the type and extent of dollarization.

II. Financial Dollarization as Financial Equilibrium: Theories of De Facto Dollarization

Any theory of financial dollarization must be supported by a consistent model in which *FD is the outcome of a financial equilibrium* between creditors and borrowers that both optimize the currency composition of loan contracts. Unlike payments dollarization (currency substitution), FD is immune to systematic differences in rates of returns (through arbitrage, interest rates adjust to equalize ex ante rates of return).

Instead, FD is all about risk differences. *Dollars are preferred to pesos because they are perceived to be less risky*. There are, however, two quite distinct ways to introduce risk, and these lead to models and paradigms with partly overlapping yet somewhat different focuses and policy implications. In turn, market, structural, and institutional characteristics affect the equilibria obtained under these paradigms. We will thus divide our review of the sources of FD into three categories. The first two stress differences in basic ways of modeling FD and, in particular, the role risk plays in the choice of currency in financial contracts. The third stresses different ways of combining these models, based on key environmental traits.

A. The Price Risk-Portfolio Paradigm

The easiest way to introduce risk is through uncertainty of real returns. This is the main starting assumption of the portfolio paradigm, which views FD as the result of an optimal portfolio choice by risk-averse lenders (and borrowers) responding to the probability distribution of real returns in each currency in a world with price risk but no credit risk. Somewhat different perspectives are obtained depending on whether a simple Capital Asset Pricing Model (CAPM) model or a consumption CAPM (CCAPM) model is used.

Under a CAPM model, risk-averse agents choose the currency composition that optimizes the risk-return profile of their portfolio, measured in units of the local consumption basket. In the simplest setup, the balance of the supply and demand of loanable funds in each currency

leads to uncovered interest rate parity (UIRP) and a minimum variance portfolio (MVP) allocation (Ize and Levy Yeyati, 2003).

In the absence of portfolio rebalancing transaction costs, the model shows that what matters is the *relative volatilities of inflation and the real exchange rate depreciation*, or, alternatively, the covariance of inflation and the *nominal* exchange rate relative to their variance (the "beta").[4] In turn, the beta is a measure of the exchange rate pass-through.[5] The dollar is preferred if the real exchange rate (which determines the volatility of real returns on dollar instruments) is stable relative to the inflation rate (which determines the volatility of real returns on peso instruments).[6]

Instead, with rebalancing costs, what matters is the *relative volatilities of peso and dollar real interest rates*. The dollar is preferred if dollar interest rates are more stable than peso rates.

Several interesting implications follow. First, a monetary policy that fails to stabilize inflation or that closely targets the real exchange rate stimulates dollarization. Thus, the observed dollarization hysteresis (namely, the persistent dollarization after years of subdued inflation rates) may be the result of exchange-rate-based stabilization efforts that stabilize inflation *and* the real exchange rate simultaneously (i.e., that reduce *absolute* volatilities without modifying *relative* volatilities). Second, FD should increase with the degree of openness and the presence of real dollarization (dollar pricing), as both induce a closer correlation between exchange rate and inflation shocks (a higher pass-through). Third, ceteris paribus, resident savers (borrowers) favor the local currency, as peso instruments mirror more closely their stream of future consumption (income).[7] For the same reason, from the standpoint of the resident investor, real assets (such as deposits indexed to the consumer

---

[4] Note that the sources of risk are not the expected inflation and devaluation rates, as they should be perfectly incorporated in the interest rate in each currency, but unexpected changes to these rates.

[5] The intuition is clear: in a world of perfect pass-through, the real (peso-dollar) exchange rate is constant and dollar real returns are risk-free. By contrast, a volatile exchange rate undermines the attractiveness of dollar instruments relative to pesos, if there is no pass-through.

[6] The dollar and peso are used throughout as markets for a more stable and a more volatile currency, respectively.

[7] This point, originally made by Thomas (1985), and discussed in more detail in Levy Yeyati (2004), may help explain why dollarization ratios are particularly high in international markets. See below.

price index, or CPI) should generally dominate dollar assets, as they minimize (or eliminate) the variability of real returns.[8]

Finally, the model highlights the role played by expectations and credibility. Exchange rate pegs are the clearest example. If the peg is fully credible, the dollarization ratio is undetermined, since both currencies are indistinguishable. FD is then driven by other considerations (e.g., the liquidity services played by each currency). However, if the peg is not fully credible, dollarization is explained by the distribution of the exchange rate and inflation (hence how monetary policy is expected to be managed) *after the collapse of the regime, no matter how improbable such a collapse*. Thus, because lack of credibility is persistent, improvements in monetary policy that would seem to favor the peso (as measured on the basis of recently observed volatilities) may fail to have any immediate impact on dollarization.[9]

The CCAPM version of the previous model extends portfolio smoothing to total incomes (rather than financial incomes exclusively). This introduces a *safe haven* effect as an additional determinant of financial dollarization. When economic activity (hence, consumption) is negatively correlated with the exchange rate, investors tilt their portfolios towards the dollar.[10] Thus, one would expect economies that have been frequently hit by sudden stops or political disturbances, resulting in sharp economic downturns and exchange rate depreciations, to exhibit a stronger preference for the dollar.[11]

CCAPM models have also been used to analyze the interaction between real dollarization (the dollar denomination of price or wage contracts) and financial dollarization. If the foreign currency protects real incomes from shocks better than the local currency, reflecting a pro-cyclical or erratic monetary policy and a strong correlation between domestic and international shocks, wages become dollar-denominated, raising the pass-through, and FD (Ize and Parrado, 2002).

---

[8] Note that the same is true for the borrower to the extent that the CPI is closely correlated with the price of the firm's output.

[9] More generally, the expected inflation response to sharp negative exchange rate shocks qualifies the results based on data for tranquil times; hence the need to estimate the MVP based on long, representative samples.

[10] This assumes that borrowers are less risk averse than creditors. With similar risk aversion, safe haven effects cancel out in equilibrium and only relative volatilities matter. On the other hand, if borrowers are not risk averse and creditors are also the owners of the firms, only safe haven effects matter.

[11] The fact that devaluations tend to be contractionary in highly dollarized environments, reflecting balance sheet effects, reinforces this effect in already dollarized countries.

In all cases, a distinctive characteristic of the portfolio models is that FD reflects an optimal response to the distribution of returns resulting from a possibly suboptimal policy environment. Thus, while FD is an unavoidable, and indeed healthy, outcome in a small economy largely open to trade, it may be a pathological manifestation of a poorly managed currency in a larger and/or closer economy where the real value of the currency is simply too volatile to serve as store of value. In this latter case, improving monetary management is the natural policy recommendation (*only "good" products sell*).

However, this is easier said than done. The weak monetary policy is not there by accident, and generally reflects a limited mandate following past mishaps that have eroded confidence in the monetary authority's capacity to do better (Cowan and Do, 2004). Broadening this mandate requires credibility, but getting credibility requires experience under a broader mandate: an asymptotic process that involves time and political costs.

B. The Credit Risk Paradigm

This approach differs from the previous one in that it shifts the focus from the volatility of returns as seen by risk-averse agents to the decisions of risk-neutral agents *in the presence of default risk*. This paradigm leads to different conclusions and highlights different channels of dollarization, depending on the market imperfection at play (market frictions, information asymmetries, distortions induced by deposit or government guarantees).

Perfect information

With perfect information, creditors fully internalize credit risk so that ex ante returns, including expected losses under default, equalize across currencies. At the same time, with limited liability, debtors prefer the currency for which the expected cost is lower in the event of no default. When liquidations are costly, the interaction of these two conditions results in the preferred currency being the one that limits expected bankruptcy costs, *hence credit risk* (Jeanne, 2002). The dollar is preferred when the probability of devaluation is small yet the peso premium large enough to induce an *interest rate-induced credit risk on peso loans that is larger than the currency-induced credit risk on dollar loans*. This situation is typical of economies where there is "fear of floating" or, in the limit, pegged or quasi-pegged regimes. By delaying needed policy responses to exchange rate misalignments, fear of floating limits the scope for currency risk while increasing that for interest rate risk. The less credible monetary policy is, the higher the ex ante nominal peso rate, the stronger the interest rate risk associated with peso lending, and hence, the stronger the dominance of the dollar over the peso.[12] However, even a fully credible currency (in the sense of a minimum expected pass-

[12] This result is reminiscent of earlier findings in the context of public debt markets (Calvo and Guidotti 1989). With lack of credibility, the very high nominal rates of peso bonds force the government to inflate so as to reduce ex post costs, thereby validating expectations. Dollar- (or inflation-) indexed debt is therefore more attractive than peso debt in that it does not induce such adverse monetary policies. The same argument extends to private debt

(continued…)

through) can be dominated by the dollar when fear of floating is acute and exchange rate overvaluations have a sufficiently strong impact on output, making the profile of debtors' repayment capacity more similar to that of dollar returns.

This paradigm draws the spotlight on the peso premium, since the latter is what makes peso loans more costly than dollar loans—hence more risky—in the event of no devaluation. Rigid exchange rate regimes tend to elicit an *asymmetric monetary response* that adjusts for undervaluations through price increases (instead of nominal appreciations) but which, due to nominal price rigidities, belatedly corrects for overvaluations through sharp nominal exchange rate devaluations. *In such policy environments, the dollar benefits relative to the peso due to the fact that it becomes a one-sided bet: its value can only go up, never down.*[13] Thus, the asymmetry of monetary policy penalizes the peso as much as its lack of credibility (Ize, 2005).

The endogeneity of monetary (exchange rate) policy also plays an important role. Once an economy is dollarized, the monetary authority may prefer a peg to a float, reflecting concerns for the financial stress caused by exchange rate devaluations in the presence of currency mismatches and balance sheet effects (Chamón and Hausmann, 2003; Ize, 2005).[14] Thus, the exchange rate distribution is strongly biased, with small (or no) change in most of the states, and long positive tails reflecting a minor probability of a sharp currency collapse. For similar reasons, once an economy intermediates in pesos, the monetary authority will avoid overvaluations that raise credit risk through high peso rates. Monetary policy endogeneity can thus lead to corner solutions in which full dollarization or full pesification are optimal, *given the monetary regime*.[15] In either case, the endogeneity of monetary policy induces hysteresis.

---

markets, but the trigger for relaxing monetary policy is a concern for the costs associated with financial stress rather than public debt. If private agents coordinate their actions, private dollarization can also *discipline* monetary policy (Cowan and Do, 2004). Dollarization may thus be thought as a "good (second best) equilibrium." However, the argument does not carry through with atomistic lenders and borrowers, where the marginal disciplining effect of dollarizing an individual contract is diluted.

[13] As in a noncredible exchange rate anchor, it is the *expectation* of such an asymmetric response that raises the peso premium.

[14] Chang and Velasco, 2004, obtain a similar conclusion, based on a CCAPM model in a world without credit risk.

[15] The term "corner solution" is used here in a broad sense and is meant to apply to extreme equilibria as well as to true corner solutions.

What does this model tell us about policy? As in the portfolio paradigm, dollarization is an *optimal (prudential) response to a suboptimal policy environment*. Currency diversification also has benefits, but for different reasons. Here, unless monetary policy endogeneity molds the monetary regime to fit the dollar, the MVP composition is optimal (at least for the economy as a whole) because it matches the loan to the income flow of the average borrower (hence its price response to a depreciation).

Also as in the portfolio paradigm, the solution is monetary. Allowing the exchange rate to be more flexible *(in both directions)* alters relative risks in favor of the peso. But, again, the policy recommendation should be qualified. The inability to precommit limits the feasibility (and credibility) of a change in the current monetary regime, which is optimal given the high dollarization (high dollarization provides its own seed). In turn, if the promise of a regime change is not time consistent, banks and supervisors should continue to assess risk (and choose the currency composition) based on the current regime.

But the model also points at institutional aspects. In particular, reducing liquidation costs (length of the bankruptcy procedure, judiciary costs, corruption), can reduce FD by limiting fear of floating.

Imperfect information

In the context of imperfect information where creditors cannot observe the currency exposure of the borrower, the marginal creditor cannot be sure that his mix is the same as that chosen by other creditors. Hence, he behaves strategically and chooses the mix that best protects him in a situation where—in the absence of enforceable contingent contracts or creditor coordination—first-best equilibria are not attainable. This leads again to corner solutions (full dollarization or full pesification).

Incentives for dollarization are exacerbated by the fact that the residual value of the failed investment is distributed among creditors on a pro rata basis. Dollar creditors fare better than peso creditors in default states due to the higher exchange rate that dilutes the value of residual peso claims relative to dollar claims.[16] This dilution effect results in the dollar being preferred to the peso *when the probability of default is perceived to be associated with a high exchange rate* (Broda and Levy Yeyati, 2003).[17]

---

[16] A similar argument can be made at the other end of the risk spectrum. When defaults are induced by overvaluations (e.g., due to price deflation), peso contracts (that carry higher nominal rates) benefit at the expense of dollar claims and the economy fully pesifies. Thus, both full dollarization and full pesification can be equilibrium solutions.

[17] By arbitrage, peso lenders should fare better in nondefault states. But, from the standpoint of limited liability borrowers that repay only in the latter, this implies a higher effective cost of peso funds and a preference for the dollar. Chamon (2001) and Aghion, Bacchetta, and Banerjee (2001) apply a similar argument to external bonded debt.

Here, the roots of dollarization are *market failures rather than policy failures*. Dollarization is a suboptimal response to a policy environment that may not necessarily be suboptimal. As long as a positive correlation between default risk and depreciation risk remains, which is likely to be the case in a highly dollarized economy, creditors are likely to continue lending in dollars. Thus, marginal policy reforms are unlikely to be effective.[18]

Moral hazard and prudential regulation

When deposits are guaranteed or banks (or firms) are bailed out in the event of bankruptcy, creditors may again no longer fully internalize credit risk. Instead, unless they have enough to lose if the event of default (i.e., enough capital at risk), they intermediate in the currency that maximizes *the option value of the implicit guarantee*.[19] The dollar is therefore preferred because it allows banks and their corporate borrowers to benefit from low interest rates in normal times and to pass on to the government, the deposit insurer, or the central bank the cost of servicing dollar obligations and rescuing failed financial or commercial institutions in the event of large depreciations (Burnside, Eichenbaum, and Rebelo, 2001; Broda and Levy Yeyati, 2003).[20]

As before with exchange rate policy, the ex post distribution of costs of a currency meltdown may be endogenous (and thus, anticipated by the agents) due to time inconsistency. Even in the absence of explicit guarantees, creditors may perceive that there will be a bailout in the event of massive financial distress induced by a currency collapse. Similarly, the central bank's capacity to provide *liquidity assistance* in foreign currency also enhances moral hazard and promotes the dollar by reducing banks' incentives for costly holdings of foreign reserves (Dooley 2000; Ize, Kiguel, and Levy Yeyati, 2005).[21]

---

[18] How the government should respond to this dollarization bias is not obvious. State-contingent contracts (that is, contracts that set interest rates based on the borrower's currency composition of liabilities) would do the trick of modifying market incentives to correct for the risk mispricing. However, emulating this with actual contracts is complicated. The same is valid for creditor coordination.

[19] As the value of an option depends positively on the volatility of the underlying asset, the holder of the option maximizes the risk associated with it.

[20] Implicit guarantees can be motivated by externalities (e.g., the economic or social costs of bankruptcies) or political economy (e.g., the strength of debtors as an interest group, relative to the taxpayers that ultimately foot the bill).

[21] A countercyclical monetary policy that tightens the monetary stance when dollar liquidity becomes scarce has similar effects (Caballero and Krishnamurthy, 2004).

Currency-blind prudential regulation that fails to reflect currency-specific risks exacerbates this problem and further benefits the dollar at the expense of the peso. Uniform deposit insurance and standard lender of last resort (LOLR) practice provide clear illustrations (Broda and Levy Yeyati, 2003). The same applies to prudential banking regulation, which emphasizes limits on open currency positions but disregards the potential currency mismatch of dollar debtors in the computation of capital requirements (Gulde et al., 2004, Levy Yeyati et al., 2004).[22]

In this paradigm, dollarization is a *suboptimal response to a suboptimal policy environment*. Dollar intermediation is again a one-sided bet, but this time reflecting the policymaker's inability to precommit. While there is no simple way out of the time inconsistency problem (massive defaults will almost surely elicit a response from the government), there certainly is room to address the prudential problem, ensuring that risks are fully internalized by all market participants through proper prudential requirements.

C. The Financial Environment

Dollarization should reflect the environment in which financial markets operate. In part, this reflects "facts of life," e.g., the size of the country and its integration (or lack of) with the world economy. But it also reflects the relative depth and efficiency of peso markets versus dollar markets, and the legal environment.

Small economies in a globalizing world

All else equal, countries that are more open to trade should be more dollarized, and dollarization should increase with trade integration. This comes out both from risk aversion models and credit risk models (Ize and Levy Yeyati, 2003; Luca, 2002). Similarly, in countries that have open capital accounts and become increasingly exposed to world shocks, the benefits of an independent currency decline and dollarization, both real and financial, should increase (Ize and Parrado, 2002). Because they are likely to be more open, smaller countries may thus be more dollarized. In this paradigm, dollarization is an optimal response

[22] This reluctance to acknowledge "currency difference" can reflect deliberate attempts to adopt dollar-friendly policies in the belief that FD promotes financial intermediation, or to erase any currency distinction to enhance the credibility of the peg, as in the limiting case of a currency board (de la Torre, Levy Yeyati, and Schmuckler, 2003; Gulde et al., 2004). More generally, the credibility of any exchange rate commitment will be undermined by the threat of a currency collapse that underlies the need for a prudential distinction across currencies. Indeed, FD could be thought of as a deliberate tie-up-your-hands strategy to increase the (financial and real) costs of inflationary policies. In either case, pegs may induce FD indirectly, through a more lenient prudential regulation of dollar operations.

to an environment that is given and unchangeable. Dollarization is therefore "good" and repressing is at best hopeless policy, at worst bad policy.

Market and legal imperfections

Dollarization may also arise because market or legal imperfections give an artificial edge to the dollar. On the domestic front, the existence of efficiency asymmetries—specifically, the existence of more efficient offshore intermediaries *that only intermediate in dollars*—induces dollarization through "offshorization" and by forcing domestic intermediaries to raise their peso margins so as to compensate for compressed dollar margins (Calvo, 2001; Ize and Powell, 2004).[23]

On the international front, some observers have claimed that emerging economies are unable to borrow internationally in the local currency (Eichengreen and Hausmann, 1999; Eichengreen, Hausmann, and Panizza, 2003b). The fact that economic size is virtually the only variable consistently related with external FD suggests that it may be a reflection of micromarket factors such as nonlinear transaction costs, network externalities, benchmarking and, most notably, liquidity risk that favor the broader and deeper dollar markets.[24]

However, an alternative reason why international market are not amenable to exotic currencies is suggested by the portfolio approach, which indicates that the local currency is more attractive to residents than to foreigners (Levy Yeyati, 2004).[25] Yet another potential explanation is *lower liquidation costs*: the larger the recovery value, the greater the dollar advantage (de la Torre and Schmukler, 2004). Thus, more efficient offshore legal arrangements (which may involve shorter bankruptcy procedures as well as less corruption and better creditor rights) enhance the attractiveness of the dollar in international contracts. At any rate, the absence of international peso markets implies that "offshorization" automatically translates into a narrowing of peso funding and greater dependence on dollar financing.

---

[23] While the opening of the domestic banking to more efficient foreign banks may have partly corrected for this imperfection, "offshorization" may continue to benefit from softer regulation (which induces regulatory arbitrage) and greater opacity (which induces tax evasion). Thin peso markets may also combine with a weak monetary policy to increase the volatility of peso interest rates and the appeal of dollar instruments.

[24] This would account for the fact that only a few currencies are customarily used for international issuance, even within the developed country set.

[25] This resident-nonresident distinction is in line with the evidence that debt de-dollarization has been driven by the deepening of domestic intermediation (Bordo, Meissner, and Redish, 2002), and is correlated with the negative link between external dollarization and the size of domestic financial markets (Claessens, et al., 2003, Eichengreen, Hausmann, and Panizza, et al., 2003a).

In this view dollarization is a *market response to suboptimal market, legal, or regulatory asymmetries that favor the dollar*. This paradigm offers the clearest case for government intervention and policy reform. Leveling the playing field by removing distortions, promoting local currency markets, and improving the legal framework are obvious policy implications. Yet, this path is not without problems, either. The constraints imposed by market size could be insurmountable: small countries may face an uphill task in developing peso liquidity—although fully funded pension funds have typically helped on this front. In addition, once local dollar markets have developed in a highly dollarized economy, the marketplace may become crowded and de-dollarizing through developing peso markets more difficult (this type of hysteresis is similar to that of the early literature on currency substitution).

III. What Guidance Does the Empirical Evidence Provide?

The hypotheses discussed in the previous sections have started to be systematically tested only recently and in ways that are fragmentary at best, mostly because of a lack of data, both on measures of FD and on reasonable proxies of the different theories. The fact that some of these theories have similar implications further complicates the empirical validation. We first briefly review the evidence in favor of a "structural" view of dollarization. We then review the extent to which dollarization is explained by MVP, as measured by observed volatilities and pass-throughs. We then discuss the evidence suggesting that "expected" MVPs might actually be much higher than "observed" MVPs, reflecting lack of monetary credibility and expectations of regime changes. We conclude by examining the extent to which "excess dollarization" may be explained by the existence of non-MVP, highly dollarized corner solutions reflecting monetary policy endogeneity, market imperfections, and moral hazard.

A. MVP—Based Explanations of Dollarization

De Nicoló, Honohan, and Ize (2003) (DHI) and Levy Yeyati (2005) (LY) represent the main efforts to test many of the previous aspects jointly. Starting with globalization factors, based on static cross-country regressions, both studies find that *trade openness does not appear to matter*, suggesting that other factors dominate (i.e., dollarization is generally higher than would be warranted by trade globalization). However, better intertemporal estimates are needed (there exists some limited evidence in DHI that countries that are more open dollarize more rapidly). There has been no attempt to link increasing dollarization with increasing globalization of shocks and economic cycles (financial globalization). Finally, there is evidence that *size matters* for external dollarization (Eichengreen, Hausmann, and Panizza, 2003a and 2003b; de la Torre and Schmukler, 2004), but not for domestic deposit dollarization (Levy Yeyati, 2005).[26]

[26] Size, however, may be proxying market liquidity, which plays a much more important role for securities markets than for bank deposits; hence, the different results.

Both DHI and LY find convincing cross-country evidence that the MVP explains a significant share of dollarization at the expense of the inflation rate, confirming early results in Ize and Levy Yeyati (2003).[27] While the interest volatility version of the portfolio model has not yet been tested, due to difficulties in obtaining data on dollar interest rates for a broad cross-section of countries, the generally much more volatile peso interest rates (particularly on the lending side) in dollarized economies (Barajas and Morales, 2003), is also consistent with a view in which *relative volatilities matter*.[28] In addition, there is some solid country-specific evidence directly supporting the portfolio view. In particular, in the context of regime changes, borrowers are more inclined to hedge their risks after exchange rates become more volatile (Martinez and Werner, 2001; Goldstein and Turner, 2004; Kamil 2005). The better performance of local currency bond markets in countries with better macroeconomic records and institutions (Burger and Warnock, 2003) can also be viewed as generally supportive of the portfolio approach.

There is as yet no systematic attempt to test for peso premia. While fragmentary evidence indicates that highly dollarized economies do not generally exhibit systematic peso premia at the level of deposit rates, peso lending rates are usually higher than dollar lending rates, reflecting higher peso banking spreads (Barajas and Morales, 2003). To the extent these margins reflect higher credit risk (higher provisioning costs), this could be interpreted as evidence in support of the credit risk paradigm.[29]

At any rate, MVP explains only a limited share of dollarization in cross-country estimates of FD. Similarly, while there is a clear correlation between FD and pass-through (Honohan and Shi, 2003; DHI; Reinhart, Rogoff, and Savastano, 2003), the elasticity of the pass-through with respect to FD is substantially less than one, confirming the limited share of dollarization explained by the "observed" MVP. Therefore, ample room remains for additional explanations. Evidence on what are the main driving factors behind this "*excess dollarization*" is scarcer and much less consistent.

The first major candidate is a discrepancy between "expected" and "observed" MVPs, reflecting persistent *lack of monetary credibility and expectations of regime changes*. Indeed,

---

[27] Reinhart, Rogoff, and Savastano (2003) show that countries with high dollarization exhibit higher inflation rates, but no empirical testing is conducted and no additional control is used. Indeed, both DHI and LY show that, *in the absence of other controls*, inflation is significantly correlated with FD, possibly due to an omitted variable problem.

[28] Volatility-based explanations are consistent with a portfolio view as much as with a credit risk view (higher volatility being associated with higher credit risk).

[29] If peso funding costs are not higher than dollar funding costs, the higher risk of peso loans would need to be explained by higher interest rate volatility.

the fact that FD is linked to MVP when the latter is computed based on a fairly long period suggests that expected volatilities matter more than recently observed volatilities, reflecting "peso problems" or slow changes in expectations.[30] The very steep peso yield curves (compared to dollar curves), even in apparently stable macro environments, lend further support to the lack of credibility view.

There is also broad evidence that *institutional variables* (legal framework, property rights, governance, etc.) also matter (DHI, Eichengreen, Hausmann, and Panizza, 2003a and 2003b). To the extent these variables proxy deeper underlying determinants of low institutional credibility, including as regards monetary policy, this could be viewed as further evidence of latent peso problems.[31]

B. Going Beyond MVP

Switching now from MVP-based interior solutions to highly (or fully) dollarized equilibria, the first candidate in support of corner solutions is monetary policy endogeneity. While there is a clear statistical cross-country link *between dollarization and fear of floating* (Levy Yeyati, Sturzenegger, and Reggio, 2002, Reinhart, Rogoff, and Savastano, 2004) the direction of causality has not been tested and the specific dynamics through which these two variables interact not fully identified. Indeed, they could also be a simultaneous consequence (causally unrelated) of deeper structural weaknesses.

In addition to policy endogeneity, the other key monetary policy feature that could explain the dollar's dominance is policy asymmetry. Early tests to check whether an asymmetric (skewed towards fat upper tails) distribution of the nominal exchange rate can explain dollarization are encouraging but more testing is clearly needed.[32]

Setting aside monetary policy, the dominance of the dollar can also be explained by safe haven effects or market imperfections (in particular imperfect information). In either case,

---

[30] Morales (2003) finds, for example, in the case of Bolivia that while an MVP measured on the basis of data that includes the hyperinflation period explains well current dollarization levels, more recent data (using the last 10 years) does not.

[31] In this case, however, the results should be taken with a grain of salt. On the one hand, they face important endogeneity problems, as institutional variables are often available only for recent periods and are highly correlated (and often displaced) by general development controls such as per capital GDP (LY). Moreover, the fact that most of these variables are highly correlated among each other complicates the identification of the precise institutional trait that plays a relevant role.

[32] See Rennhack and Nozaki (2005). Mechanical valuation effects (a depreciation tends to increase the share of dollars in the portfolios) may need to be isolated.

one should observe *a negative correlation between the exchange rate and output in highly dollarized economies* (in the imperfect information paradigm, the correlation between output and the exchange rate should reflect the correlation between the probability of default and the exchange rate, a key link underlying the preference for the dollar). Several empirical studies, including Galindo, Panizza, and Schiantarelli (2003), DHY and LY, provide some supporting empirical evidence in this direction.

A more direct, albeit quite fragmentary, bit of evidence pointing in the same direction is that large borrowers (which are more likely to have multiple creditors, hence to induce coordination failures) tend to be more dollarized than small borrowers (peso loans are also generally smaller than dollar loans). An alternative explanation, however, is that peso funding in highly dollarized countries is too narrow to accommodate the needs of large borrowers. There is indeed some evidence that *peso bond markets tend to be less deep than dollar markets* (de la Torre and Schmukler, 2004).

As regards moral hazard and prudential regulations, a recent study (Cowan, Kamil, and Izquierdo, 2004) corroborates the positive impact of currency-blind prudential regulation on FD (symmetrical deposit insurance for both peso and dollar deposits is correlated with greater FD). There is also some specific country evidence in support of the moral hazard view of *liquidity risk*. Restricting or eliminating LOLR induces banks to hold more liquidity (Gonzalez-Eiras, 2003).[33] There has been thus far no study of whether more capitalized banks are more reluctant to engage in dollar intermediation. The reluctance of banks to re-intermediate in the wake of regional currency turmoil, and the recent efforts made in some countries by some of the most conservative banks (but not by the weaker banks) to develop alternatives to the dollar and hold their liquidity in safer but lower-yielding foreign assets (rather than higher-yield domestic assets) could also be consistent with moral hazard. However, the evidence is still quite circumscribed.

IV. How Concerned Should Countries Be?

A. Monetary Policy Effectiveness

One early strand of the dollarization literature, inspired by currency substitution models, viewed dollarization as a potential problem for monetary policy effectiveness, based on the fact that monetary aggregates become more sensitive to changes in devaluation expectations. A more recent view emphasizes the higher pass-through and a weaker monetary transmission. The latter in turn derives from the fact that dollar rates and dollar inflows (which affect most savings and credit in a highly dollarized economy) are out of the control of the monetary authority. Moreover, domestic interest rates, through their impact on the

[33] A recent paper (Aspachs, Nier, and Tiesset, 2005) finds that in the case of U.K. resident banks, the greater the potential support from the central bank in the case of liquidity crises, the lower the liquidity buffer banks hold.

exchange rate, may affect the net worth of dollar-indebted borrowers in a way that neutralizes much of their impact. In any event, the view that "dollarization poses a challenge to the pursuit of a coherent and independent monetary policy" (Baliño, Bennett, and Borensztein, 1999) has not lost ground among policymakers.

Are these concerns verified in the data? On the one hand, FD has not been a significant impediment in *stabilizing inflation* (Reinhart, Rogoff, and Savastano, 2003). Using the exchange rate as a flexible anchor has done the job well. Indeed, it is well known that FD has remained at high levels *despite* the sharp decline in inflation in dollarized countries.

However, as already noted, dollarization is associated with higher exchange rate pass-throughs, which may limit, at least in principle, the flexibility of monetary policy and its countercyclical capacity.[34] Indeed, such concerns seem to be an important enduring determinant of fear of floating in highly dollarized environments.[35]

Finally, *as regards transmission capacity*, the effectiveness of the interest rate channel is diluted when most intermediation is in dollars. Dollar loans can expand freely as a result of dollar inflows and increases in domestic interest rates may have little effect on the perceived cost of dollar loans.[36] However, monetary policy may still operate through the exchange rate, by using the rate of crawl as a countercyclical instrument. Such a framework is not without problems (an increase in the rate of crawl aimed at activating the economy increases borrowing costs during the transition), but it appears to be working reasonably well in some cases. Its stronger potential drawback, however, is the adverse impact that large exchange rate movements can have on firms' balance sheets.

---

[34] Pass-throughs seem to have declined pari passu with inflation in dollarized economies, as in other economies. Moreover, there is some evidence of substantially lower pass-throughs during recessions, due to balance sheet effects and the countervailing effect of depressed demand (Carranza, Galdon-Sánchez, and Gomez-Biscarri, 2004).

[35] Notice, however, that the link between dollarization and the pass-through is neither simple nor unidirectional. In the porfolio model, dollarization is a reflection of the pass-through, which, in turn, is a reflection of (the lack of) monetary credibility.

[36] This should not matter if perfect uncovered interest rate parity (UIRP) applies, borrowers set their prices in local currency (the pass-through is moderate), and the exchange rate floats freely. Under such conditions, when the peso rate is increased, the cost of a dollar loan should increase pari passu with that of a peso loan, reflecting a jump appreciation followed by an expected exchange rate depreciation. However, the conditions above, particularly UIRP, are unlikely to be met in most cases.

B. Balance Sheet Effects

Indeed, the debate on the drawbacks of dollarization has revolved in recent years around the prudential issues deriving from the so-called *balance sheet effect,* when the increase in the local currency value of dollar liabilities outpaces the increase in the value of the borrower's assets or its income flow. To the extent that dollar debtors may no longer be able to service their loans, this can trigger corporate and banking crises (even if banks' currency positions are balanced by regulation), exacerbate sudden stops, cause output volatility, and ultimately result in costly self-fulfilling macroeconomic crises.[37] Yet, should devaluations be resisted, financial stress can also result from prolonged economic contractions caused by unadjusted real exchange rate overvaluations. On the deposit side, dollarization enhances the scope for systemic, self-fulfilling, liquidity crises, triggered by persistent deposit withdrawals that can at some point no longer be accommodated, due to limited holdings of liquid foreign assets.

These concerns seem to be empirically justified. Despite some dissenting views,[38] there is fairly good evidence suggesting that FD is indeed associated with a greater financial crisis propensity (including self-fulfilling runs on dollar liquidity), a limited use of exchange rate flexibility and, as a result, a greater output volatility. Dollarized countries: (1) have more fragile corporate sectors (Claessens and Djankov, 2000) and banking systems (DHI);[39] (2) are more exposed to contractionary devaluations (Galindo, Panizza, and Schiantarelli, 2003), devastating sudden stops (Calvo, Izquierdo, and Mejia, 2004), and public debt crises (Calvo, Izquierdo and Talvi, 2002), and banking crises (LY);[40] and (3) exhibit more output volatility (Reinhart, Rogoff, and Savastano, 2003; Eichengreen, Hausmann, and Panizza, 2003a; LY). In turn, the contractionary impact of real exchange rate depreciations (including through banking crises) limits the effectiveness of countercyclical monetary policy under large shocks (and, in the limit, reverts its effect).

---

[37] The vast analytical literature on the subject include Krugman (1999); Chang and Velasco (2000); Aghion, Banerjee, and Bacchetta (2001a and 2001b); Gertler, Gilchrist, and Natalucci (2001); Cespedes, Chang, and Velasco (2000); Caballero and Krishnamurthy (2002); Jeanne and Zettelmeyer (2002); and Calvo et al. (2003). See also Frankel (2004) for a survey of the different arguments on contractionary devaluations.

[38] The case for balance sheet induced contractionary devaluations at the micro level is still not entirely clear (Bleakley and Cowan, 2002, possibly due to the fact that they have been largely prevented by (widely anticipated) government bailouts.

[39] Corporates' exposure to large currency fluctuations is worsened by the fact that hedging markets are typically underveloped in highly dollarized environments, reflecting the heavily administered exchange rate management.

[40] This evidence is in line with Domac and Martínez Pería (forthcoming), and contradicts Arteta (2003), who finds that FD does not increase crisis propensity—albeit for a much smaller sample.

V. WHAT CAN BE DONE?

While the evidence discussed above allows us to make a case for a pro-active de-dollarization agenda, there is no precise blueprint to be followed by a prospective de-dollarizer. Indeed, the very feasibility of such an agenda remains controversial and needs to be viewed within a broad macroeconomic and institutional context. In countries where macroeconomic policies and/or the institutional framework are weak, de-dollarizing may amount to a rather futile attempt to deal with the fever without taking care of the sickness. Instead, de-dollarizing seems to make the most sense in those countries where dollarization persists notwithstanding sound monetary and fiscal policies and an improving (if not perfect) institutional framework. In such cases, overcoming dollarization hysteresis may be possible if done through a sufficiently broad and far-reaching policy agenda.

A. The Market-Driven Road to De-Dollarization

An active, market-driven, de-dollarization policy agenda should cover at least two fronts: (1) regulation should be revised so as to fully internalize the risks of dollar intermediation and provide more room for monetary policy; and (2) the use of the peso (and peso-based substitutes to the dollar) should be promoted.[41] The case for such a policy rests on the following premise: "good," market-friendly, de-dollarization policies should vanquish fear of floating, mitigate dollarization biases, and promote local currency and hedging markets. If all goes according to plan, dollarization should decline in response to good policies, in turn generating further room for policy changes. Such a "virtuous policy circle" should gradually undo what happened under the previous vicious circle of rising dollarization cum fear of floating.

However, cases of market-based de-dollarization are still few and far between (Reinhart, Rogoff, and Savastano, 2003; Galindo and Leiderman, 2005).[42] This might in part be because the chances of success of such an approach hinge to a large extent on whether there is dollarization hysteresis. In turn, this depends on whether FD gravitates around MVP (*an interior solution*) or exceeds MVP, possibly to the point of being a *corner solution* (the former being more likely in moderately dollarized economies, the latter in highly dollarized economies).

When FD approximates MVP, *de-dollarizing is equivalent to improving monetary credibility*. Unless FD has already declined to its equilibrium structural level (reflecting globalization),

---

[41] See Levy Yeyati (2003) and Gulde et al. (2004) for a detailed discussion along these lines.

[42] Recent reductions in financial dollarization in some highly dollarized Southern American countries, following more aggressive and better focused monetary policies, are also worth noting and encouraging. However, it is still too early to say how far those trends will extend.

any improvement in credibility should contribute to lower dollarization. Policy reform should thus concentrate on institutional and capacity building measures that gradually improve the central bank's capacity to conduct an independent and sound monetary policy. This being said, building up credibility can be difficult, as already noted. In particular, switching the monetary regime requires a mandate. Absent a crisis that drastically reshuffles the cards, legal reform that strengthens the central bank's independence can fail to pass and central banks may have a hard time demonstrating that they are capable of conducting a more independent monetary policy.

When FD exceeds MVP, exiting bad dollarized equilibria is likely to be more difficult, since the causes and consequences of FD tend to reinforce each other. In the imperfect information, multiple creditor paradigm, improving transparency might work at the margin. But as long as default and devaluation remain highly correlated in an economy that is already highly dollarized, the dollar's edge over the peso is unlikely to vanish altogether. Unless it creates sufficient incentives for coordination, based on improved information, even a credible switch to a free float-inflation targeting regime (that makes dollar lending more risky relative to peso lending) will not eliminate that correlation and will fail.

In the perfect information paradigm, things are less bleak. A decisive switch in monetary regime should do the trick. Yet, absent the ability to precommit, the central bank may be unable to deliver. The announcement of a switch to a float may not be credible and pesos may continue to be perceived as more risky than dollars. If so, dollarization is unlikely to change, continuing to subject the monetary authorities to fear of floating induced by concerns for the financial stability implications of exchange rate volatility.

Prudential reform (tightening prudential norms on dollar loans to the non tradable sector) may help at the margin increase the resilience of the banking system to currency risk, thereby opening more room for exchange rate flexibility. Yet, the main objective of prudential regulation should be to enhance the immediate stability of the financial system, rather than affecting dollarization. Since banks are lending in the least risky currency, given the current monetary regime, changing prudential norms to reflect an alternative assessment of relative risks would be inappropriate unless monetary policy actually changes. Indeed, as long as the monetary regime remains constrained, prudential requirements may need to be raised on peso loans as well as dollar loans.

The resulting excess regulatory burden during the transition towards de-dollarization could induce disintermediation or shifts to alternative (and perhaps more risky) forms of intermediation.[43] Moreover, if these forms of intermediation (such as offshore loans) remain dollar-based, dollarization may not substantially decline and monetary policy reform may stall. Ultimately, unless the authorities regulation is designed to eliminate this regulatory arbitrage, the attempt to exit high dollarization may fail.

---

[43] Risk shifting could include a shift towards shorter term peso liabilities, thereby increasing banks' exposure to liquidity risk (de la Torre and Schmuckler, 2004).

If the aim is to de-dollarize, policy makers should thus focus on alternative measures to promote the peso and encourage the use of peso-denominated instruments. These may include: (1) improvements in monetary management (such as changes in operational procedures that stabilize peso interest rates and enhance the transparency of monetary policy); and (2) a refocusing of public debt management towards peso-denominated instruments (to help deepen the local currency markets).

In this context, price indexation is often proposed as a better alternative to the dollar than the peso, particularly for the longer maturities. This can provide a *bridge* (midway station) towards pesification by facilitating the initial switch out of the high dollar equilibrium. As long as monetary credibility remains low, switching from dollars to price-indexed instruments will be easier than from dollars to pesos. Converting a nominal (peso) rate into a real rate eliminates the component of the peso premium that reflects inflationary expectations (a component that is expected to dominate at longer maturities). Once the economy is real peso based, the greater exchange rate flexibility (that reduces output risk and interest rate volatility in pesos) may in turn facilitate a second-stage switch to nominal instruments.

However, the value of indexed pesos tends to *fall* (reflecting the backward-looking indexation) in the event of a currency adjustment, whereas that of the dollar rises. Moreover, the liquidity of price-indexed instruments at times of crises (and agents' capacity to move in and out of them) is likely to be limited, particularly in incipient markets. In addition, broad acceptance in the market place of price-indexed instruments takes time and substantial supporting efforts, including as regards public debt management policy (Herrera and Valdes, 2004).

Thus, while indexed pesos should help (particularly in terms of providing an alternative to the dollar for long-dated instruments such as mortgages), they are unlikely by themselves to induce a spontaneous switch out of the dollar, unless their introduction is accompanied by a radical monetary policy switch towards a free float and by an active regulatory policy that makes them more appealing, including the development of peso bond markets that facilitate the pricing and trading of peso instruments. But if these conditions are in place, the introduction and promotion of price indexation could be viewed as an unnecessary and costly detour.

B. Should Countries Fight Dollarization Frontally?

Is the market-driven approach the only way? Should countries, instead, fight dollarization frontally? There is no consensus on this question. Measures to directly discourage dollarization (limits on dollar deposits or loans, taxes on dollar intermediation, forced conversion, etc.) could speed things up (and hence reduce transition costs) by cutting through the policy coordination maze. However, the conventional wisdom would argue that overnight (de jure) de-dollarization may be risky and ultimately costly, unless up-front measures can be taken simultaneously (or preferably ahead of time) to *boost credibility*. Forcing agents to use a currency that they distrust could lead to heavy disintermediation or risk shifting (de la

Torre and Schmukler, 2004). In turn, the costs resulting from disintermediation are likely to undermine the political support for a frontal assault on dollarization in the absence of a crisis. Attempting to mobilize (and maintain) political support for this approach by scaring away the public could backfire if it leads to a run on deposits. Thus, the central bank may be forced to remove restrictions on dollarization and the economy will quickly *re-dollarize with a vengeance*, as happened in Bolivia and Peru during the 1980s (Savastano, 1992).

However, the evidence on this is more mixed than often thought. The forceful de-dollarization in Mexico in 1982 resulted for a long while in the shift of dollar intermediation offshore, through capital flight and external borrowing by large corporations. Nonetheless, it may have helped set the stage for the recent comeback of the peso on the wake of strong improvements in monetary policy credibility. Similarly, the restrictions on dollar intermediation imposed after compulsory conversions in Pakistan and Argentina, while still too recent to judge may ultimately facilitate the growth of a more healthy and ultimately deeper local-currency-based intermediation. Indeed, the view of dollar advocates that dollarization contributes to financial deepening is contradicted by the evidence: if anything the link is negative, and the effect of legal restrictions beneficial (DHI, LY).[44]

Thus, while a gradual approach that only aims at putting some "sand in the wheels" of dollarization would be less risky, the question arises of whether the meager results are worth the trouble. Concretely, the slow pace of reform and the possibility of policy interruptions or reversals along the way raise the question as to whether a more forceful approach (supported by a stronger policy commitment) is desirable, at least in the case of very highly dollarized countries.

When there exists a clear consensus and backing for a drastic policy shift, a frontal assault on dollarization in a highly dollarized economy may be possible. While the ideal sequence would entail enhancing the credibility of monetary policy prior to taking drastic measures to switch out of dollarization, in practice a crisis may be needed to help generate such a support and set the bases for a drastic policy change—although in that case lack of monetary credibility may be a problem as the central bank may have to jump boats at mid-course without having established much of a reputation.

C. When Is It Time to Give It Up?

For some countries that are heavily dollarized, are small (with narrow markets and large tradable sectors), and whose central banks have low credibility and/or limited technical resources, a radical policy reform may be too costly to entertain. Moreover, countries that have adopted policies that are designed to ease the pain of dollarization and learn to live with it may have (unwillingly) undermined the political support for a regime change. If so, they may ultimately find dollarization to be irremovable. In such cases, the issue is whether a bi-

[44] See also Cowan, Kamil, and Izquierdo (2004).

currency regime, based on very high de facto dollarization, can provide a preferable alternative to full de jure dollarization.

As a currency board, a bi-currency system allows central banks to retain seignorage benefits. The main additional benefit of a bi-currency system is that it provides room (through altering the rate of crawl) for speeding up required adjustments in the real exchange rate, thereby limiting output volatility and the associated financial stress. Provided inflation is kept low, there seems to exist both theoretical and empirical support suggesting that this approach can work (real exchange rates can be depreciated without inducing substantial inflation). Yet, with continued dollarization, risks of financial stress will continue to exist. Hence, limiting financial vulnerabilities will require setting up adequate prudential buffers (solvency and liquidity), which come at a cost.

De jure dollarization also requires some buffers. However, it has the advantage of limiting the scope for "forced" devaluations resulting from self-fulfilling twin crises (a banking crisis culminating into a currency crisis/devaluation). Hence, it is preferable when the welfare costs and heightened financial vulnerability resulting from increased output volatility and financial exposure to output shocks are more than offset by the reduced exposure to self-fulfilling liquidity crises (and the resulting reduction in interest rates).

This might be the case for countries that seem to be part of an optimal U.S. dollar currency zone or have reached the end of the rope in terms of monetary policy credibility and/or financial instability. Other countries are likely to be better off with a bi-currency regime, at least until the "chips fall" and clearer (dollar or regional) currency areas emerge.

VI. CONCLUSIONS

A number of preliminary conclusions can be extracted from this survey. First, dollarization can no longer be systematically viewed as an unavoidable and largely inconsequential phenomenon. Instead, the time has come for countries to take a harder look at dollarization and formulate a comprehensive and well-coordinated policy agenda to deal with dollarization and its risks. Second, the policy agenda should be a function of the type and extent of dollarization, as well as the macroeconomic, institutional, and structural constraints facing the economy. The latter will define whether de-dollarizing is an option (and, if so, how best it can be achieved) or whether the policy agenda should limit itself to containing the risks resulting from dollarization without overtly seeking to reduce dollarization itself.

Moreover, dollarization is not all bad. In fact some dollarization may be desirable. Indeed, countries in which dollarization is nonexistent due to legal restrictions and which have credible monetary policies may consider, for efficiency reasons, liberalizing dollar accounts under a suitable prudential environment.

Those countries where dollarization is allowed but is quite limited and relatively stable only need to ensure that prudential norms and practices adequately internalize the credit risk of dollar loans. By contrast, countries where dollarization is substantial should consider a

proactive de-dollarization strategy as a policy option. When FD is consistent with the "warranted" MVP dollarization, this strategy should focus on, in addition to internalizing risks and promoting local currency markets, building up monetary credibility through institutional reforms and capacity building.

Countries that remain very highly dollarized notwithstanding substantial progress towards inflation stabilization are likely to be in a "corner" equilibrium where dollarization is above MVP. In such cases, whenever possible, the preferred strategy is to switch towards a more symmetrical and less constrained monetary policy (such as an inflation-targeting regime), supported by a tightening of prudential standards designed to make the financial system more resilient to exchange rate volatility. The use of more aggressive measures that directly limit dollarization might also be appropriate to help vanquish fear of floating and speed up the transition (thereby limiting its costs), but only as a complement to the monetary reforms described above, rather than as a substitute. Less intrusive, market-based measures, such as the promotion of price-indexed instruments can also help speed up the transition and smooth out its costs. Such measures are particularly advisable for countries where consolidating monetary credibility is expected to be a slow process.

In highly dollarized countries where no substantial progress can be made towards enhancing the credibility of monetary policy but that benefit from maintaining a bi-currency regime, a case may be built for the alternative of learning to live with FD. This entails, inter alia, building up sufficient prudential buffers to ensure that the exchange rate flexibility can be utilized without causing excessive financial stress. However, the cost of such buffers needs to be weighed against the potential benefits of greater exchange rate flexibility. Countries that are small, widely open, and clearly part of an optimal U.S. dollar currency zone or where little room is left for improving monetary credibility and financial stability may be better off switching to de jure dollarization.

Needless to say, before embarking on an overly ambitious policy agenda, dollarized countries should make all the necessary research efforts to understand well the roots of their dollarization, its risks and costs (hence the benefits of de-dollarizing as well as fully dollarizing), and the implications of policy reforms (including in particular the calibration of prudential reforms). Understanding the complexity of the phenomenon and its important economic implications is a natural first step.

REFERENCES

Aghion, P., and P. Bacchetta, and A. Banerjee, 2001a, "Currency crises and monetary policy in an economy with credit constraints," *European Economic Review*, Vol. 45, pp. 1121–50.

_____, 2001b, "A Corporate Balance-Sheet Approach to Currency Crises," CEPR Discussion Paper No. 3092, Swiss National Bank, Study Center Gerzensee.

Arteta, C., 2003, "Are Financially Dollarized Countries More Prone to Costly Crises?," International Finance Discussion Paper No. 763 (Washington, DC: Board of Governors of the Federal Reserve System).

Aspachs, O., E. Nier, and M. Tiesset, 2005, "Liquidity, Banking Regulation and the Macroeconomy: Evidence on Bank Liquidity Holdings from a Panel of UK-Resident Bank," Mimeo, London School of Economics.

Baliño, T., and A. Bennett, and E. Borensztein, 1999, "Monetary Policy in Dollarized Economies," IMF Occasional Paper No. 171 (Washington: International Monetary Fund).

Barajas, A., and R.A. Morales, 2003, "Dollarization of Liabilities: Beyond the Usual Suspects," IMF Working Paper No. 03/11 (Washington: International Monetary Fund).

Bleakley, H., and K. Cowan, 2002, "Corporate Dollar Debt and Depreciations: Much Ado About Nothing?," Working Paper No. 02–5 (Boston: Federal Reserve Bank of Boston).

Bordo, M., C. Meissner, and A. Redish, 2002, "How "Original Sin" was Overcome: The Evolution of External Debt Denominated in Domestic Currencies in the United States and the British Dominions," 1800–2000." Mimeo.

Broda, C., and E. Levy Yeyati, 2003, "Endogenous Deposit Dollarization," Staff Report No. 160 (New York: Federal Reserve Bank of New York). Forthcoming in the *Journal of Money, Credit and Banking*.

Burger, J., and F. Warnock, 2003, "Diversification, Original Sin, and International Bond Markets," International Finance Discussion Paper No.755 (Washington, DC: Board of Governors of the Federal Reserve System).

Burnside, C., M. Eichenbaum, and S. Rebelo, 2001, "Hedging and Financial Fragility in Fixed Exchange Rate Regimes," *European Economic Review,* Vol. 45, pp. 1151–1193.

Caballero, R., and A. Krishnamurthy, 2002, "A Dual Liquidity Model for Emerging Markets," *American Economic Review*, Vol. 92, pp. 33–37.

_____, 2004, "Exchange Rate Volatility and the Credit Channel in Emerging Markets: A Vertical Perspective," NBER Working Papers 10517 (Cambridge, Massachusetts: National Bureau of Economic Research).

Calvo, G., 2001, "Capital Markets and the Exchange Rate with Special Reference to the Dollarization Debate in Latin America," *Journal of Money, Credit, and Banking,* Vol. 33, pp. 312–34.

Calvo, G., and P. Guidotti, 1989, "Credibility and Nominal Debt: Exploring the Role of Maturity in Managing Inflation," *Staff Papers*, International Monetary Fund, Vol. 37, pp. 612–35 (September).

Calvo, G., A. Izquierdo, and L.F. Mejia, 2004, "On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects," NBER Working Paper No. 10520 (Cambridge, Massachusetts: National Bureau of Economic Research).

Calvo, G., A. Izquierdo, L.F. Mejia, and E. Talvi, 2003, "Sudden Stops, the Real Exchange Rate and Fiscal Sustainability: Argentina's Lessons," NBER Working Paper No. 9828 (Cambridge, Massachusetts: National Bureau of Economic Research).

Carranza, L., J. E. Galdon-Sánchez, and J. Gomez Biscarri, 2004, "Exchange Rate and Inflation Dynamics in Dollarized Economies," Faculty Working Paper No. 10/04, Pamplona: University of Navarra, School of Economics and Business Administration).

Cespedes, L.F., R. Chang, and A. Velasco, 2000, "Balance Sheets and Exchange Rate Policy," NBER Working Paper No. 7840 (Cambridge, Massachusetts: National Bureau of Economic Research).

Chamon, M., 2001, "Foreign Currency Denomination of Foreign Currency Debt: Has the Original Sin Been Forgiven but not Forgotten?" (Cambridge, Massachusetts: Harvard University), unpublished.

Chamon, M. and R. Hausmann, 2003 "Why Do Countries Borrow the Way they Borrow?," Unpublished, Harvard University.

Chang, R., and A. Velasco, 2000, "Financial Fragility and the Exchange Rate Regime" *Journal of Economic Theory,* Vol. 92, pp. 1–34 (May).

_____, 2004, "Monetary Policy and the Currency Denomination of Debt: A Tale of Two Equilibria," NBER Working Paper No. 10827 (Cambridge, Massachusetts: National Bureau of Economic Research).

Claessens, S., and S. Djankov, 2000, "Publicly Listed East Asian Corporates: Growth, Financing and Risks," In Asian Corporate Recovery: Findings from Firm Level Studies in Five Countries, ed. by D. Dwor-Frecaut, F. Colaco and M. Hallward-Driemeier (Washington: The World Bank).

Claessens, S., D. Klingebiel, and S. Schmukler, 2003, "Government Bonds in Domestic and Foreign Currency: The Role of Macroeconomic and Institutional Factors," Policy Research Working Paper Series No. 2986 (Washington: The World Bank).

Cowan, K., and Q.T. Do, 2004, "Financial Dollarization and Central Bank Credibility," World Bank Policy Research Working Paper No. 3082 (Washington).

Cowan, K. H. Kamil, and A. Izquierdo, 2004, "Macroeconomic Determinants of Dollarization: A New Look at the Evidence," Inter-American Development Bank.

de la Torre, A., E. Levy Yeyati, and S. Schmuckler, 2003, "Living and Dying with Hard Pegs: The Rise and Fall of Argentina's Currency Board," *Economía,* Vol. 5 No. 2, pp. 43–9.

de la Torre, A. and S. Schmuckler, 2004, "Coping with Risk Through Mismatches: Domestic and International Financial Contracts for Emerging Economies," World Bank Working Paper No. 3212 (Washington).

de Nicoló, G., P. Honohan, and A. Ize, 2003, "Dollarization of Bank Deposits: Good or Bad?," IMF Working Paper No. 03/146 (Washington: International Monetary Fund). Forthcoming as "Dollarization of Bank Deposits: Causes and Consequences," in *Journal of Banking and Finance*.

Domac, I., and M.S. Martínez Pería, forthcoming, "Banking Crises and Exchange Rate Regimes: Is There a Link?" *Journal of Monetary Economics*.

Dooley, M., 2000, "A Model of Crisis in Emerging Markets," *The Economic Journal* Vol. 110, pp. 256–72.

Eichengreen, B., and R. Hausmann, 1999, "Exchange Rates and Financial Fragility," NBER Working Paper No. 7418 (Cambridge, Massachusetts: National Bureau of Economic Research).

Eichengreen, B., R. Hausmann, and H. Panizza, 2003a, "The Pain of Original Sin," ed. by B. Eichengreen and R. Hausmann, in Debt Denomination and Financial Instability in Emerging Market Economies (Chicago: University of Chicago Press).

_____, 2003b, "Currency Mismatches, Debt Intolerance and Original Sin: Why They Are Not the Same and Why It Matters" NBER Working Paper No.10036 (Cambridge, Massachusetts: National Bureau of Economic Research).

Frankel, J., 2004, "Contractionary Currency Crashes in Developing Countries," prepared for the IMF Fifth Annual Research Conference, November 5, 2004. Forthcoming in *Staff Papers*, International Monetary Fund.

Galindo, A., and L. Leiderman, 2003, "Living with Dollarization and the Route to Dedollarization." IDB/World Bank conference, Financial Dedollarization: Policy Options, December 1–2 (Washington, DC).

Galindo, A., U. Panizza and F. Schiantarelli, 2003, "Debt Composition and Balance Sheet Effects of Currency Depreciation: A Summary of the Micro Evidence," *Emerging Markets Review,* Vol. 4, Issue 4, pp. 330-339.

Gertler, M., S. Gilchrist, and F. Natalucci, 2001, "External Constraints on Monetary Policy and the Financial Accelerator" Proceedings, Federal Reserve Bank of San Francisco.

Goldstein, M., and P. Turner, 2004, "Measuring Currency Mismatch: Beyond Original Sin,"' in "Controlling Currency Mismatches in Emerging Economies," Institute for International Economics.

Gonzalez-Eiras, M., 2003, "Liquidity Demand in the Presence of a Lender of Last Resort" (Buenos Aires: Universidad de San Andrés), unpublished.

Gulde, A.M., D. Hoelscher, A. Ize, D. Marston, and G. De Nicolo, 2004, "Financial Stability in Dollarized Economies," IMF Occasional Paper 230 (Washington: International Monetary Fund).

Herrera, L.O., and R. Valdes, 2004, "Dedollarization, Indexation and Nominalization: The Chilean Experience," Working Paper No. 261 (Santiago: Central Bank of Chile).

Honohan, P., and A. Shi, 2002, "Deposit Dollarization and the Financial Sector in Emerging Economies," World Bank Policy Research Working Paper No. 2748 (Washington).

Ize, A., 2005, "Financial Dollarization Equilibria: A Framework for Policy Analysis," forthcoming IMF Working Paper (Washington: International Monetary Fund).

Ize, A., M. Kiguel, and E. Levy Yeyati, 2005, "Managing Systemic Liquidity Risk in Financially Dollarized Economies," forthcoming IMF Working Paper (Washington: International Monetary Fund).

Ize, A., and E. Levy Yeyati, 2003, "Financial Dollarization," *Journal of International Economics,* Vol. 59, pp. 323–47.

Ize, A., and E. Parrado, 2002, "Dollarization, Monetary Policy, and the Pass-Through," IMF Working Paper No. 02/188 (Washington: International Monetary Fund).

Ize, A., and A. Powell, 2004, "Prudential Responses to De Facto Dollarization," IMF Working Paper No. 04/66 (Washington: International Monetary Fund).

Jeanne, O., 2002, "Why Do Emerging Economies Borrow in Foreign Currency?" IMF Working Paper No. 03/177 (Washington: International Monetary Fund).

Jeanne, O., and J. Zettelmeyer, 2002, "Original Sin, Balance Sheet Crises, and the Role of International Lending," IMF Working Paper No. 02/234 (Washington: International Monetary Fund).

Kamil, H., 2005, "Does Moving to a Flexible Exchange Rate Regime Reduce Corporate Balance Sheet Mismatches in Emerging Countries?," Mimeo, International Monetary Fund.

Krugman, P., 1999, "Balance Sheet Effects, the Transfer Problem, and Financial Crises," ed. by P. Isard, A. Razin, and A. Rose, in International Finance and Financial Crises, Essays in Honor of Robert Flood, Kluwer, Dordrecht.

Levy Yeyati, E., 2003, "Financial Dedollarization: A Carrot and Stick Approach," CIF Working Paper No. 8/2003 (Buenos Aires: Universidad Di Tella).

_____, 2004, "Dollars, Debts and the IFIs: De-dollarizing Multilateral Lending," CIF Working Paper No. 11/2004 (Buenos Aires: Universidad Di Tella).

_____, 2006, "Financial Dollarization: Evaluating the Consequences," forthcoming *Economic Policy* (January 2006).

Levy Yeyati, E., Martínez Pería, and Sergio Schmukler, 2004, "Market Discipline under Systemic Risk: Evidence from Bank Runs in Emerging Economies," World Bank Policy Research Working Paper 3440 (Washington).

Levy Yeyati, E., F. Sturzenegger, and I. Reggio, 2002, "On the Endogeneity of Exchange Rate Regimes," CIF Working Paper No. 11/2002 (Buenos Aires: Universidad Di Tella).

Luca, A., 2002, "Credit Dollarization, Bank Currency Matching, and Real Activity" (East Lansing, Michigan: Michigan State University), unpublished.

Martinez, L., and A. Werner, 2001, "The Exchange Rate Regime and the Currency Composition of Corporate Debt: The Mexican Experience," Presented at NBER Inter-American Seminar on Economics (July).

Morales, Juan Antonio, 2003, "Dollarization of Assets and Liabilities: Problem or Solution? The case of Bolivia," Presented at the Bank-Fund Annual Meetings.

Reinhart, C., K. Rogoff, and M. Savastano, 2003, "Addicted to Dollars" NBER Working Paper No. 10015 (Cambridge, Massachusetts: National Bureau of Economic Research).

Rennhack, R., and M. Nozaki, 2005, "Dollarization in Latin America," Paper presented at the Conference on the Policy Implications of De Facto Dollarization, Lima, Peru.

Savastano, M., 1992, "The Pattern of Currency Substitution in Latin America: An Overview," *Revista de Análisis Económico,* Vol. 7, No. 1, pp. 29–72.

Thomas, L.R., 1985, Portfolio Theory and Currency Substitution. *Journal of Money, Credit, and Banking,* Vol. 17.