



# IMF Working Paper

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## Dedollarization

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## **IMF Working Paper**

Monetary and Capital Markets Department

### **Dedollarization**

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#### **Abstract**

This paper provides a summary of the key policies that encourage dedollarization. It focuses on cases in which the authorities' intention is to gain greater control of monetary policy and draws on the experiences of countries that have successfully dedollarized. Unlike previous work on the subject, this paper examines both macroeconomic stabilization policies and microeconomic measures, such as prudential regulation of the financial system. This study is also the first attempt to make extensive use of the foreign exchange regulation data reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. The main conclusion is that durable dedollarization depends on a credible disinflation plan and specific microeconomic measures.

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## I. INTRODUCTION

1. **While dollarization is a rational response of economic agents to political or economic uncertainties, its adverse effects often motivate countries to reduce its level.**<sup>2</sup> Dollarization is also a rational reaction to interest rate arbitrage opportunities. It may have some benefits, and in extreme cases may be the only viable option available to a country. In the latter case, dollarization can be the choice of the authorities or a result of private agents' decision to stop using the local currency. However, most countries seek to limit the extent of dollarization, owing to its potential adverse effects on macroeconomic policies and financial stability. These include a reduction or loss of control of monetary and exchange rate policy, a loss of seigniorage, and increased foreign exchange risk in the financial system and other sectors.
2. **A successful dedollarization policy makes the local currency more attractive to residents than foreign currency.** Dedollarization entails a mix of macroeconomic and microeconomic policies to enhance the attractiveness of the local currency in economic transactions and to raise awareness of the exchange-risk related costs of dollarization, thus providing incentives to economic agents to dedollarize voluntarily. It may also include measures to force the use of the domestic currency in tandem with macroeconomic stabilization policies.
3. **Experience shows that, even in successful cases, dedollarization is protracted.** Dollarization remains persistent even when macroeconomic stability and the credibility of government policies have been (re)established, i.e., when the original causes of dollarization have been eliminated.<sup>3</sup> Once dollarization takes hold, economic agents are reluctant to switch back to using the local currency, because they lack confidence and the cost of redenominating transactions is high until consensus is reached among market participants on the use of the local currency. Indexation or a fixed exchange rate facilitates switching from foreign currency to local currency, but indexation may become persistent and the implicit guarantee of a fixed exchange rate can reinforce dollarization.
4. **This paper provides a summary of the key policies that encourage dedollarization.** Few studies of dedollarization have been undertaken, even though it is an important policy issue in many emerging and developing economies. This paper draws on the experiences of countries that successfully dedollarized and of those that have had less

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<sup>2</sup> The term dollarization in this note includes the use of any foreign currency, not just the U.S. dollar.

<sup>3</sup> According to Uribe (1997), market participants' accumulated experience in using foreign currency as a means of payment acts as an externality that reduces the private marginal cost of buying goods with foreign currency. The lack of confidence in the domestic currency last a long time following episodes of dollarization, despite significant improvements in macroeconomic fundamentals and increased portfolio diversification in economies where market participants were previously not allowed to invest in foreign-currency-denominated assets, provide an additional explanation for the persistence of dollarization (Havrylyshyn and Beddies, 2003).

success. While acknowledging that economic agents target a mix of foreign and domestic assets and liabilities to minimize the volatility of their portfolio, it does not address the optimal level of dollarization or policies to reduce the risks related to a given dollarization level.<sup>4</sup>

5. **The paper concludes that dedollarization requires credible macroeconomic stabilization complemented by microeconomic measures.** In addition to macroeconomic stabilization, two—way exchange rate volatility and stable and low inflation are key ingredients of dedollarization. Additional policies and measures are often necessary to break persistent dollarization and encourage the use of the local currency.

6. **The paper is organized as follows.** Following a brief overview of the causes and effects of dollarization in Section II, Section III discusses the macroeconomic and microeconomic policies and measures that contribute to dedollarization. Section IV analyzes the effect of dedollarization policies, in particular exchange rate volatility and prudential measures. An extensive review of the financial and prudential measures that can facilitate dedollarization are provided in Appendix I, Tables I—V.

## II. DOLLARIZATION

7. **Dollarization refers to the use by the residents of one country of assets (or liabilities) denominated in another country's currency (Baliño, 2003) and can take many forms.** Dollarization significantly differs according to (i) the type of assets (or liabilities) dollarized; (ii) whether the dollar has the status of legal tender<sup>5</sup> (official dollarization) or whether there is de facto dollarization; and (iii) the extent of dollarization (full or partial).<sup>6</sup>

8. **There are several different types of dollarization.** *Financial dollarization* involves the substitution of local currency assets or liabilities for foreign currency assets or liabilities. *Real dollarization* involves the indexation of domestic transactions to the exchange rate. *Transaction dollarization* or *currency substitution* means that the dollar (or another foreign currency) is used as a means of payment in domestic transactions (Armas, Ize, Levy, and

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<sup>4</sup> For a discussion of these issues, see Ize and Levy Yeyati, 2005; Ize and Levy Yeyati, 1998; Fernandez Arias, 2005; Galindo and Leiderman, 2005; Cayazzo, Pascual, Gutierrez, and Heysen, 2006; and Ize, Kiguel, and Levy Yeyati, 2005. Policies to decrease dollarization of domestic lending are discussed in several papers, e.g., Hilbers and others, 2005.

<sup>5</sup> Legal tender is defined as follows: resident creditors may not refuse accepting legal tender for the settlement of debt unless the parties agree otherwise. Foreign exchange regulations sometimes allow the use of other currencies for certain transactions in addition to the local currency, without granting them legal tender status.

<sup>6</sup> In 2009, only ten countries were fully and officially dollarized: they used the currency of another country as legal tender. However, the number of countries with nonofficial dollarization is much higher: according to the IMF's International Financial Statistics, 47 countries have foreign currency deposits exceeding 30 percent of total deposits, a threshold for highly dollarized countries according to Baliño, Bennett, and Borensztein (1999).

Yeyati, 2006). More than one type of dollarization can exist in a country. Obviously, measures for dedollarization have to reflect the prevailing type of dollarization. Table 1 shows the various assets and liabilities which can be subject to dollarization.

**Table 1. Liabilities and Assets Typically Dollarized**

	Household/Firms	Banks	Public Sector
Assets	Foreign currency cash	Foreign currency assets held abroad	
	Foreign currency bank deposits	Foreign currency credit to households and firms	Foreign currency held abroad by governments
	Foreign currency linked assets	Foreign currency credit to the public sector	
	Foreign currency assets abroad	Foreign currency linked assets	
Liabilities	Foreign currency debt	Foreign currency deposits of households, firms, and public sectors	Foreign currency denominated reserve requirements on foreign currency bank deposits
	Foreign currency linked liabilities	Foreign currency external debt	Net foreign currency bank credits
	Foreign currency liabilities abroad		External foreign currency debts
			Foreign currency indexed debts

Source: Reinhart, Rogoff, and Savastano (2003).

9. **Dollarization is commonly measured as financial institutions' holding of foreign exchange assets and liabilities.** These measures thus refer to financial dollarization. Financial sector asset dollarization is usually assessed by quantifying the loans granted by the resident financial sector to resident households and nonfinancial corporations. Financial sector liability dollarization is determined as the share in the total liabilities of foreign currency denominated deposits and debt issued by financial institutions. Due to data limitations, non financial sector dollarization is rarely measured, and foreign exchange in circulation is often omitted.<sup>7</sup>

<sup>7</sup> Data shortcomings make it difficult to assess dollarization. In many cases, data are available only on the foreign currency deposits of residents in the domestic banking system. Since foreign currency in circulation is difficult to observe, the literature typically measures dollarization by comparing foreign currency deposits to other monetary aggregates, for example to total deposits or to broad money. Baliño, Bennett, and Borensztein (1999) estimated the amount of dollars in circulation in certain emerging market economies using U.S. Treasury data on cash dollar exports and imports. They find that the amount of dollars exported into these countries may be two to four times the local currency in circulation. Reinhart, Rogoff, and Savastano (2003) calculate a composite index of dollarization, combining the share of foreign currency deposits in broad money, the share of the total external debt in GNP, and domestic public debt denominated or linked to foreign currency as a share of total government debt.

10. **Dollarization generally develops when the local currency performs its basic functions poorly compared to other accessible currencies.** The basic functions of a currency are reserve value, means of payment, and unit of account. The poor performance of the local currency in these functions encourages the development of various forms of dollarization, e.g. currency substitution develops if the local currency does not function properly as a means of payment. Real exchange rate instability, due to a high and volatile inflation rate, would motivate residents to denominate contracts in foreign currency when it ensures more stable purchasing power in terms of domestic consumption, fostering financial dollarization (Ize, Levy, and Yeyati, 2005).

11. **An asymmetric exchange rate policy that resists nominal appreciation while allowing for depreciation can facilitate dollarization by providing a one-way bet for preserving purchasing power by holding foreign currency deposits (FCDs) (Rennhack and Nozaki, 2006).** Conversely, resisting nominal appreciation can encourage borrowing in foreign exchange.

12. **Dollarization can have some benefits and may be a sign of increasing integration in the world economy.** Asset substitution may be a natural consequence of opening the economy and financial market liberalization (Baliño, Bennett, and Borensztein, 1999). Countries integrating into the world economy are increasingly exposed to shocks, which may require hedging and lead to some level of dollarization, which in turn may enhance closer integration with international markets and the development of domestic financial markets. Dollarization may mitigate exchange rate risk for foreign investors, increasing their confidence, thus boosting investments, and provides for portfolio diversification of residents. Allowing foreign currency deposits in domestic banks may help to remonetize the economy by encouraging a move from currency substitution to foreign currency deposits, provide funding to local banks, and reverse capital flight following episodes of unstable macroeconomic conditions. Lending in foreign currency may have a positive impact on domestic consumption and investment, and thus economic growth, through a reduction in the cost of credit. Therefore, there is an optimal level of dollarization that depends mainly on structural factors, such as the economy's size, openness, the degree of financial integration, and market development.

13. **Dollarization has also significant disadvantages that could offset its benefits and thus motivate country authorities to adopt dedollarization as a policy objective:**

- Dollarization limits the effectiveness of **monetary policy** (Ize, Levy, and Yeyati, 2005).
- Dollarized countries lose part or all of their **seigniorage**. The loss in revenues depends on the degree and type of dollarization and could be large for economies with high currency substitution. Moreover, the use of foreign currency also means that the country implicitly pays some seigniorage to the issuers of the other currencies.

- Dollarization reduces the efficiency of payments. Foreign banknotes are not always adapted to local business needs (small transactions), and the monetary authorities of dollarized countries cannot control the quality of the banknotes in circulation.
- Partial dollarization increases **balance sheet risks**. Direct exchange rate risks resulting from currency mismatches in banks' balance sheets may render the banking system more vulnerable. Further, indirect credit risks related to a devaluation arise if there is substantial dollar lending to nonhedged borrowers. A devaluation may offset the interest rate benefit from foreign currency borrowing, limit borrowers' ability to repay dollar debts, and potentially trigger or aggravate a banking and macroeconomic crisis.
- Dollarization increases the likelihood of a **liquidity crisis**. While lender-of-last-resort facilities can provide funding in domestic currency in the event of bank runs, they usually cannot provide unlimited funding in foreign currency. This may render foreign currency holders more prone to panic.

14. **Reducing dollarization requires comprehensive actions by the authorities.** While dollarization has pros and cons, it is likely that in many cases some degree of partial dollarization would be optimal. Estimating the optimal level of dollarization is beyond the scope of this paper. However, we argue that dollarization can exceed its optimum level and that it will often persist without official action.

### III. POLICIES FOR DEDOLLARIZATION

15. **Dedollarization usually requires a combination of macroeconomic policies and microeconomic measures to enhance the attractiveness of the local currency versus the foreign currency.** Against the backdrop of macroeconomic stabilization, several measures can foster dedollarization. These range from market-based measures that provide incentives to reverse currency substitution to measures that prohibit or strictly limit the use of foreign currency (forced dedollarization).

16. **Dedollarization is facilitated by proper sequencing of the policies and microeconomic measures.** Generally, the credibility of monetary policy needs to be reestablished to give full effect to measures to reverse dollarization. Since establishing monetary credibility may take a long time, certain policies and measures promoting voluntary dedollarization can be adopted during this period. In addition, measures to force dedollarization can also be taken in parallel with comprehensive stabilization policies. In either case, policy makers need to take account of risks, including capital flight, disintermediation, and banking sector instability.

17. **This section reviews the effects of dedollarization policies.** It shows that building on a credible macroeconomic stabilization, exchange rate variability, public debt management that shifts away from foreign currency denomination, and prudential

frameworks internalizing the risks of balance sheet dollarization are key ingredients of a durable dedollarization.

### A. Macroeconomic Stabilization

18. **The first step toward dedollarization is macroeconomic stabilization, focusing on the credible reduction and stabilization of inflation.** Stabilization policies include fiscal consolidation and appropriately tight monetary policy to reduce the inflation rate. Fiscal consolidation lessens the need for government borrowing from the central bank, and a tighter monetary policy reduces credit growth. Both policies restrain aggregate demand, resulting in a drop in inflation and, eventually, the appreciation of the real and/or nominal exchange rate. Credible policies curb inflationary expectations and lower the cost of stabilization. Against the backdrop of a durable disinflation, the need for hedging against inflation via holding foreign currency is significantly reduced, and demand for assets denominated in local currency can expand.

19. **Dedollarization policies need to be set up differently depending on the exchange rate arrangement.**

- *Under a genuinely flexible exchange rate regime*, the country is typically seeking to restore monetary policy autonomy.<sup>8</sup> The appreciation of the exchange rate following the contraction of money supply during the stabilization process can jumpstart dedollarization. Accordingly, intervention in the foreign exchange market should signal that the central bank is willing to accept nominal exchange rate appreciation (Brazil and Hungary).<sup>9</sup> Moreover, monetary authorities can envisage targeting inflation directly and thus enhance the stability of the inflation rate, which can be forecast more accurately, consolidating the benefits of the macroeconomic stabilization.<sup>10</sup>
- *Under less flexible exchange rate regimes*, a credible commitment to a fixed exchange rate would reduce the cost of macroeconomic stabilization because the authorities do not have to pay the cost of building reputation. However, the outcome depends critically on the credibility of the peg. Expectations of devaluation would increase FCDs, while expectations of intervention to help borrowers to pay their foreign exchange debt after a devaluation would continue to encourage borrowing in

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<sup>8</sup> Full dedollarization does not need to be the ultimate aim. In fact, some dollarization may be optimal as discussed in paragraph 11, in particular, in very open economies.

<sup>9</sup> Foreign currency deposits appear sensitive to foreign currency appreciation. For instance, Lithuania pegged its currency to the euro in the context of a currency board while most FCDs were denominated in dollars. The subsequent trend appreciation of the euro vis-à-vis the dollar led to a decrease in dollar denominated deposits and an increase in local currency and euro dominated deposits.

<sup>10</sup> According to Rennhack and Nozaki (2006), countries implementing inflation targeting perform better in reducing dollarization than other monetary arrangements.

foreign currency (moral hazard).<sup>11 12</sup> In addition, the continued linkage to the foreign currency does not allow for a (fully) autonomous monetary policy. Through dedollarization, the authorities' may aim to recover seigniorage, adapt the currency in circulation to domestic needs, introduce a more flexible exchange rate regime ultimately, or mitigate risks to financial stability.

20. **Dollarization may continue even if successful stabilization has increased the attractiveness of the local currency** (Reinhart, Rogoff, and Savastano, 2003). Although stabilization reduces the risks of using the local currency, it does not raise the private sector's consciousness about the risks of financial dollarization. Also, once the public has become accustomed to using foreign currency in domestic transactions, additional measures may be required to change this entrenched behavior, in particular, in the context of financial dollarization.<sup>13</sup>

21. **As a side effect of macroeconomic stabilization, strengthened confidence in the local currency could also support certain form of financial dollarization.** Public expectations of the local currency's appreciation provide a one-way bet for borrowing in foreign currency, supporting demand for foreign currency loans. As long as banks benefit from easy access to foreign financing (capital inflow), they would also benefit from the appreciation of the local currency by maintaining a short open position, encouraging lending in foreign currency. Although covered interest rate parity may hold in the medium to long term, generally there is arbitrage in the short-run since interest rate differentials often do not cover exchange rate fluctuations, encouraging economic agents to dollarize their balance sheet.

22. **The countries of Central and Eastern Europe (CEE) experienced a period of financial dollarization before October 2008 despite a relatively stable macroeconomic framework.** Given the prospects of European Union (EU) accession, privatization receipts, and successful macroeconomic stabilization, the expectation of a continuous appreciation of these countries' currencies vis-à-vis the euro became firmly entrenched. Associated with a positive interest rate differential for the local currency vis-à-vis the euro in order to control inflation, euro borrowing increased steadily, in particular for nontradable goods production. It is important to note that the key variable influencing financial sector asset dollarization is the expectation of real exchange rate appreciation. Therefore, asset dollarization can occur

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<sup>11</sup> Changes in expectations resulted in a surge in dollarization during the last years of the Argentinean currency board.

<sup>12</sup> Authorities sometimes try to help foreign exchange borrowers affected by a devaluation via a forced revision of foreign currency denominated debt contracts to reduce borrower obligations. In Argentina for instance, the crisis led to public intervention and different rates of *pesification* of assets/liabilities consistent with devaluation expectations.

<sup>13</sup> Successful macroeconomic stabilization and liberalization may temporarily boost dollarization by reversing capital flight and restoring local intermediation. As a result, some of the foreign currency earlier deposited on foreign currency accounts abroad and foreign currency cash holdings of residents may return to the banking system increasing at least temporarily the level of dollarization (Baliño, Bennett, and Borensztein, 1999).

under a peg as long as economic agents expect inflation to remain higher than foreign inflation, as was the case in Croatia.

23. **Additional policies and measures can help to reduce dollarization once a credible macroeconomic stabilization plan is in place.** They may be market based or forced depending inter alia on the extent dollarization has become entrenched. They include a wide gamut of policies and measures ranging from exchange rate policies to administrative measures to discourage the use of foreign currencies (see also Appendix I, Table I-V).

## **B. Market-Based Dedollarization Policies**

### **Exchange rate, monetary, and fiscal policies**

- **Exchange rate flexibility**—An exchange rate that can move in either direction would render the foreign exchange risk more apparent, thus introducing a disincentive to financial dollarization.<sup>14</sup> According to Rennhack and Nozaki (2006), a flexible exchange rate arrangement with less bias toward currency depreciation discourages financial dollarization. Hardy and Pazarbasioglu (2006) show that greater two-way exchange rate flexibility may deter foreign currency deposits, as they increase the risk of holding foreign currency assets. Confronted by foreign exchange risk on their assets and liabilities, banks and nonbanks develop hedging facilities over time but, due to the cost of hedging, they would also increase the share of their assets and liabilities denominated in local currency. However, a trend in the exchange rate could entrench the expectation of continuous appreciation/depreciation that could foster dollarization. The impact would nevertheless be different depending on the direction of the trend: the expectation of devaluation would increase liability dollarization (deposit) and currency substitution, while the expectation of appreciation would support asset dollarization.
- **Efficient liquidity management**—Strengthening day-to-day liquidity management by the central bank would make local currency more attractive as short-term interest rates become less volatile. The introduction of reserve requirements, standing deposit and lending facilities, and open market operations may help stabilize the domestic interbank rate. Furthermore, issuing medium-term paper as a benchmark for interest rates can improve monetary policy signaling and develop a yield curve (Poland). Similarly, the development of a well-functioning foreign exchange market and an adequate level of official reserves would ensure easy access to foreign exchange, diminishing the need to hold foreign exchange for precautionary reasons.

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<sup>14</sup> Ize and Levy Yeyati (2005) argue that in a context of high dollarization, a fully floating exchange rate regime may not be advisable because of its impact on assets and liabilities.

- **Fiscal consolidation**—Fiscal restraint can help reduce the need for government borrowing in foreign currency, thus directly reducing dollarization of government liabilities. It also lessens the need for central bank financing of government debt and contributes to decreasing differential between domestic and foreign interest rates.
- **Unbiased taxation**—A tax system that does not treat income from foreign currency more beneficially than income from local currency would not create a bias toward holding foreign currency assets. For example, interest earned on FCDs or bonds should not be exempted from taxation if taxes are levied on similar income from domestic-currency-denominated sources (Pakistan). Financial transaction taxes, if any, should be levied at least equally on foreign and domestic currency transactions (Bolivia).

### **Public debt management and financial market development**

- **Public debt management**—Active public debt management that aims at issuing local currency-denominated bonds (if necessary, inflation indexed) would dedollarize the government's balance sheet, foster the market for domestic paper, and allow for more exchange rate flexibility (Bolivia, Brazil, Israel, Mexico, and Turkey). However, this may result in higher debt service due to the higher interest rates on the government debt to compensate for exchange rate risk and may not be an option for countries where investors are unwilling to take exposure in local currency. It may however, reduce the consequences of devaluation or depreciation of the exchange rate on the official debt service. It may also foster some loan dollarization recurrence as the high local currency interest rate required to switch from foreign currency to local currency for the public debt would discourage private sector borrowing in local currency and encourage private loans in foreign currency.
- **Development of a domestic financial market**—A deep and liquid bond market provides flexible alternative investment opportunities to dollar deposits. Increasing the choice of local currency-denominated securities traded on the domestic capital and money markets may contribute to the decrease in dollar-denominated assets. Encouraging the development of the domestic investor base, such as pension funds, would likely support demand for longer-term local currency instruments and markets.
- **Alternatives to dollar-denominated assets**—In the absence of confidence in local currency-denominated assets, a credible indexation system can enhance investments in such assets. Ideally, indexation should be to local prices (for example, inflation indexed bonds) because this avoids the reference to foreign currencies and the likely co-movement between government revenues and debt servicing costs (Chile,

Colombia, Israel, and Mexico).<sup>15</sup> However, country experiences show that indexation may continue even if it is no longer necessary. In these circumstances, widespread indexation can also complicate macroeconomic management by introducing rigidities in the monetary transmission mechanism. The idiosyncrasies of indexation, e.g., inflation is not correctly measured, may also render foreign investors more reluctant to participate in the local market. The timing for eliminating indexation should be determined with great care.

- **Instruments to hedge currency risk**—Where exchange controls restrict hedging instruments, residents may have an incentive to build up foreign exchange holdings as an alternate hedge facility (Israel).

### **Financial policy and prudential regulation**

- **Financial liberalization**—Freeing banks from administrative controls on the determination of interest rates makes it more likely that domestic real interest rates will be positive, thus helping to promote the use of the local currency (Estonia, Haiti, and Hungary). A more competitive domestic financial system will also enhance the attractiveness of the local currency (Egypt and Poland).
- **Withdrawal of the legal tender status from foreign currency.** Dedollarization is unlikely to be achieved if the foreign currency remains the legal tender of the country, since it entrenches its legitimate use in local transactions.<sup>16</sup>
- **Increased usability of the local currency**—To decrease currency substitution, a domestic currency that is attractive for use needs to be provided. This means the continuous availability of domestic currency in the denominations best adapted to the needs of market participants. For example, larger denominations of riel banknotes increased the demand for local currency in Cambodia. Introducing a new currency may enhance the use of the local currency by providing banknote denominations more suitable for local transaction needs than foreign currency banknote denomination.
- **Government operations in local currency**—The government should operate in local currency to the extent possible. Raising taxes in local currency can support an increase in the demand for local currency, as can public payments for wages, goods, and services in local currency (Angola). In Peru, the government switched its public lending program to local currency.

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<sup>15</sup> In Mexico, foreign exchange linked government papers did not yield the desired result, while the use of *Unidades de Inversión* (bonds denominated in units of account indexed to daily inflation) has been much more successful in facilitating a move to long-dated domestic-currency-denominated fixed bonds.

<sup>16</sup> Presently, 15 countries have foreign currencies as a primary or secondary legal tender. They are highly dollarized (Bahamas, Bolivia, Cambodia, Haiti, Liberia, and Singapore), officially dollarized (Ecuador, El Salvador, and Panama), or currency board-like regimes (Bosnia, Brunei, Lesotho, Namibia, Swaziland, and Timor-Leste).

- **Use of foreign aid in local currency**—Foreign aid if used in foreign currency in the recipient country in may increase dollarization. In small or post-conflict countries, which often have a high degree of dollarization, foreign aid can play a large role in the economy. When possible, the in-country use of the aid should be denominated in the local currency to promote dedollarization.
- **Reserve requirements**— A regulatory bias of the reserve requirement framework for FCDs needs to be avoided. Local currency deposits (LCDs) should be subject to conditions which are at least as favorable as those applied on FCDs, while avoiding undue distortions, including those stemming from excessively high reserve requirements. Measures such as requiring banks to denominate reserve requirements on FCDs in local currency,<sup>17</sup> remunerating the reserve requirement on LCDs at a higher rate than the FCD reserve requirement (Bolivia, Honduras, Israel, and Nicaragua), or imposing higher reserve requirements on FCDs, would encourage banks to attract LCDs, thereby increasing the deposit interest rate differential.<sup>18</sup> Extending the reserve requirement base to nonbank financial institutions involved in dollar intermediation, such as leasing companies, or to unhedged creditors has also been observed in country practices (Croatia).
- **Payments system**—The domestic payments system should ensure local currency payments at terms which are at least as favorable as those for foreign currency payments. The central bank should offer convenient and low-cost payment services for domestic currency payments and should not favor payments in foreign currency (Angola and Lao P.D.R.). Peru imposed a 2 percent tax on checks denominated in foreign currency to discourage the use of foreign currency in payments.
- **Prudential regulations**—Measures aimed at ensuring proper management of foreign exchange risk and internalizing the true cost of doing business in foreign currency can help to create a level playing field for the domestic currency and eventually encourage dedollarization.<sup>19</sup> These include (i) narrow open foreign currency position limits<sup>20</sup> (Croatia and Turkey); (ii) higher liquidity requirements on FCDs (Angola and

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<sup>17</sup> See “Reserve Requirements on Foreign Currency Deposits,” MAE OP/95/1, 1995.

<sup>18</sup> These measures should be used only in cases of medium to low dollarization and successful disinflation. They could have significant drawbacks, for example, disintermediation or capital flight when dollarization is high. In addition, some of these measures may impose significant costs on the central bank, requiring its recapitalization.

<sup>19</sup> However, the trade-offs between prudential objectives and dedollarization need to be considered, as well. For example, reserve requirements imposed in local currency on FCDs automatically creates a currency mismatch for that part of the banks’ balance sheet.

<sup>20</sup> A narrow open position limit reduces the foreign exchange revaluation gains (and losses) for the banks and, thus, prevents that expected revaluation gains transpire into lower interest rates on foreign currency loans. The positions of non-banking institutions are sometimes also regulated (Appendix I, Table II). In the case of Croatia, the NOP limit was revised to include off-balance sheet exposure (options and indexed contracts), resulting for many banks to exceed their prudential limit.

- Uruguay) or foreign exchange loans (Croatia); (iii) charging a higher risk premium on dollar deposits participating in deposit guarantee schemes (Uruguay); (iv) higher capital and provisioning requirements on foreign currency loans especially to unhedged borrowers (Angola, Honduras, and Vietnam); (v) lower loan-to-value ratio to secure foreign exchange denominated loans (Hungary), and (iv) stronger collateral and valuation rules for foreign exchange denominated loans.
- **Effective supervision**—This can significantly contribute to the internalization of the risks resulting from balance sheet dollarization. Substantial efforts have been made in economies where foreign credit has been growing fast to monitor the risk taken by banking and nonbanking institutions. In particular, stricter internal controls have been imposed on banks to address the risk related to foreign exchange loans, and improved risk disclosure to borrowers has been required.
  - **Foreign exchange regulations**—No preference should be given to holders of foreign currency over those who only have access to domestic currency funding. For example, allowing residents to make outward capital transactions from their own foreign exchange resources while prohibiting the same transactions for domestic currency holdings can provide incentives to residents to accumulate foreign exchange for future transactions (Philippines).

### C. Forced Dedollarization

24. **Measures to force dedollarization are not recommended in isolation from market-based measures.** Many of the measures listed below involve interference with private contracts, often retroactively, and can diminish the confidence of market participants in the protection of property rights and contracts, with deleterious effects on the credibility of economic policies more generally. Nevertheless, there may be instances when the use of the dollar is so entrenched that market-based dedollarization measures by themselves are insufficient, and more forceful government intervention becomes necessary. However, these measures are likely to prove ineffective or even counterproductive unless accompanied by a strong macroeconomic stabilization plan.

#### **Measures that frequently failed**

- **Mandatory conversion of FCDs into domestic currency**—These measures frequently resulted in increased capital flight and disintermediation (Bolivia and Mexico in 1982 and Peru in 1985). In some instances, the authorities were obliged to reverse them (Bolivia and Peru).
- **Suspending access to FCDs**—The measure prevents depositors from withdrawing their dollar deposits from banks for a certain period (the length is not always determined in advance). Frozen FCDs could be indexed for inflation (Argentina) or redeemable in local currency (Pakistan). These measures jeopardize the trust in the domestic banking system and often lead to disintermediation and capital flight.

### Measures that more frequently achieved the expected results

- **Mandatory holding period for FCDs**—This measure may be coupled with the introduction of indexed domestic currency instruments (Israel). One likely disadvantage of this measure is that economic agents may be encouraged to keep foreign exchange in cash instead of depositing it on banks' accounts.
- **Mandatory use of local currency in domestic transactions and for listing the prices of goods and services**—The requirement to list domestic transactions in local currency is sometimes coupled with the obligation to make payments in domestic currency (Appendix I, Table IV). Disallowing the use of the foreign currency in internal transactions is a commonly used measure (Angola, Israel, Lao P.D.R., Peru, and many others). However, even if payments continue to be made in foreign currency, displaying prices in local currency can provide an additional impetus to dedollarization (Lao P.D.R).
- **Regulations that discriminate against the use of foreign currency**— Measures may include imposing limits on foreign currency borrowing or lending (Angola, Argentina, Israel, Lebanon, Turkey, and Vietnam), and excluding dollar deposits from the deposit insurance scheme (Venezuela).<sup>21</sup> Unless the public is well informed about the exclusion of the FCDs from the deposit guarantee scheme, it may encourage bank to accept more FCD.
- **Interest rate control on FCDs**—Controls, which cap the interest local banks may offer on foreign currency deposits, could also be used to encourage liability dedollarization (Bangladesh and India).
- **Capital controls**—The temporary imposition of surrender requirements on the foreign exchange proceeds of residents may lead to a rapid decline in FCDs.<sup>22</sup> Access to FCDs can be limited to certain economic agents (Mexico), or banks' cross border credit transactions can be prohibited or require prior approval (Appendix I, Table IV).

## IV. EXCHANGE RATE VOLATILITY, PRUDENTIAL MEASURES, AND DOLLARIZATION: CROSS-COUNTRY EVIDENCE

### A. Case Studies

25. **Argentina and Pakistan have carried out dedollarization in the context of a currency and banking crisis.** Although the measures forced dedollarization, they were

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<sup>21</sup> Limitations on foreign exchange lending may include: (i) limiting foreign currency loans to hedged borrowers; (ii) imposing a ceiling either in terms of amount or as a percentage of FCDs; (iii) prohibiting foreign currency loans altogether or to finance domestic transactions; and (iv) requiring prior authorization (Appendix I, Table II).

<sup>22</sup> Under a general surrender requirement, residents are obliged to sell their foreign currency receipts to local banks or the central bank. Hence, residents may not retain such receipts in foreign currency deposits.

necessary to mitigate a banking crisis. In 1998, a political shock and the ensuing capital flight, declining reserves, and the drying up of foreign liquidity forced the Pakistani authorities to withdraw the preferential treatment previously provided to FCDs. In parallel with macroeconomic stabilization, the authorities introduced a temporary freeze on FCDs and a number of exchange controls. Later, frozen deposits could be withdrawn in domestic currency or converted into medium-term dollar-denominated bonds. Although the opening of new FCDs was allowed, the preferential tax treatment of FCDs and the convenient forward cover scheme for banks that had encouraged dollarization were discontinued. Following macroeconomic stabilization, conditions normalized and the stock of FCDs represented only a relatively small part of deposits. Similar measures were introduced in Argentina with limited access to deposits by investors. In addition to limiting access to LCDs (*corralito*), in 2001, the authorities introduced a freeze on FCDs to limit capital flight and prevent bank runs. Although the freeze was abandoned in 2002 after the conversion of existing FCDs into pesos, the share of FCDs in private deposits remained significantly below the pre-crisis level, reaching about 10 percent by 2005.<sup>23</sup> In both Pakistan and Argentina, the temporary freeze on deposits eroded the credibility of the banking system, as reflected in the slow pace of private deposit growth in the aftermath of the crises.

**26. The success of dedollarization in noncrisis contexts typically cannot be attributed to microeconomic measures.**<sup>24</sup> In Chile, Israel, and Poland, the process began with a successful disinflation program, leading to a more flexible exchange rate and a monetary policy aimed at lower inflation. Dedollarization was a by-product of macroeconomic stabilization, which created an interest rate wedge in favor of the local currency. However, steps were taken in some or all of these cases to ensure that the prudential framework did not disadvantage the local currency and to shift the composition of public debt away from foreign-currency-denominated bonds.

**27. Successful macroeconomic stabilization supported by additional policies helped Israel to dedollarize its economy.** The gradual stabilization program in Israel brought down inflation from about 400 percent in 1984 to single digits in the late 1990s. In addition to macroeconomic stabilization, the program aimed at decreasing the foreign-currency-denominated part of the public debt and supported the introduction of hedging instruments to manage foreign exchange risks. These policies were reflected in the lengthening of the maturity of the public debt and a larger share denominated in domestic currency. Israel implemented higher reserve rates on FCDs, and offered alternative investment possibilities by introducing dollar indexed deposits and inflation indexed bonds. In addition, prudential

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<sup>23</sup> FCDs however increased gradually in Argentina since 2005, reaching 20 percent in 2010, as reported by the IMF's International Financial Statistics Department.

<sup>24</sup> Reinhart, Rogoff, and Savastano (2003) identify four cases of successful dedollarization: Chile, Israel, Mexico, and Poland, based on the following criteria: deposit dollarization falls by at least 20 percentage points and remains below 20 percent.

rules were introduced on foreign-currency-denominated loans to ensure adequate hedging of risks. Dollar-denominated deposits declined from 39 percent of total deposits in 1984 to 17 percent in 2002 (Galindo and Leiderman, 2005). Dollarization exhibited considerable inertia even after a decade of low inflation, possibly reflecting lingering doubts about the credibility of monetary policy. Banking supervision played a key role in ensuring that banks met the prudential requirements such as open position limits.

28. **Chile's experience shows that indexation introduced to avoid dollarization may persist even after macroeconomic stabilization has been achieved.** Despite the presence of indexation since the 1960s, by the 1990s Chile had successfully stabilized the economy, liberalized the financial sector, and gradually dismantled controls on international capital movements.<sup>25</sup> The government also undertook a debt conversion scheme to change foreign-currency-denominated debt into indexed debt. Although Chile adopted inflation targeting and allowed the peso to float freely in 1999, indexation continued to be prevalent. It was ultimately reduced by targeting a fixed nominal interest rate instead of the inflation indexed "real" interest rate. Subsequently, peso deposits increased and reached 90 percent of total deposits in 2010.

29. **In Poland, dedollarization was encouraged by a successful reform program and tight monetary policy.** In the early 1990s, following episodes of high inflation and frequent step devaluations, Poland embarked on a macroeconomic stabilization program, coupled with financial sector liberalization and the gradual opening of the capital account. In addition, domestic interest rates were raised well above foreign currency interest rates. The sharp reduction in inflation together with interest rate deregulation, which established positive real interest rates, resulted in an increase of zloty deposits to 50 percent of total deposits, while FCDs declined to 30 percent of broad money by end-1993 from 72 percent in 1989.

30. **Egypt dedollarized its economy in the context of macroeconomic stabilization and bank reform.** The share of FCDs to total deposits declined from 56 percent in 1991 to 22 percent in 1999 and further decreased to 18 percent by 2004. In 1991, the authorities launched a set of fiscal and monetary reforms to reduce inflation and liberalize the financial system, which was heavily controlled (credit ceilings, interest rate controls, and differential reserve requirements). The liberalization of the banking system led to a significant decline in inflation, positive real interest rates, and ultimately to the decline in FCDs.

## **B. Measuring the Effect of the Nominal Exchange Rate and Real Exchange Rate Volatility on Dollarization**

31. **We assume that increasing exchange rate volatility reduces both foreign exchange deposits and loans.** However, beyond a certain threshold, exchange rate volatility

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<sup>25</sup> According to Herrera and Valdes (2004), capital controls on inflows helped to contain the accumulation of foreign exchange risk through excessive borrowing abroad.

reflects a trend appreciation or depreciation of the exchange rate, which can lead to financial dollarization. Therefore, we estimate a nonlinear (quadratic) equation between financial dollarization and exchange rate volatility to determine the level of volatility beyond which the relation between exchange rate volatility and financial dollarization changes.

32. **The data sample is from the Monetary and Banking Time Series database of the IMF.** This database includes data on foreign currency deposits for 32 countries and on foreign currency loans for 21 countries during the period November 2001 to March 2009. The sample includes slightly more flexible and managed exchange rates than fixed exchange rates (Appendix IV).

33. **Explanation of the equation.** In the equation below  $FD_{i,t}$  represents the financial dollarization for the country  $i$  the time  $t$  (the sample is from January 1999 to March 2009),  $vol_{i,t}$  represents the past 125 days standard deviation of the exchange rates as a percentage of its average for the same period, and  $c_i$  is the country specific effect of unobserved country specificities. In order to identify different relations between foreign currency denominated liabilities and assets and exchange rate volatility,  $FD_{i,t}$  would be alternatively the share of foreign currency loans in total loans and the share of foreign currency deposits in total deposits.<sup>26</sup>

$$d(FD_{i,t}) = c_i + \alpha_1 vol_{i,t} + \alpha_2 vol_{i,t}^2 + \alpha_3 d(REER_{i,t}) + e_t \quad (1)$$

The number of variables in equation 1 has been extended to control for the macroeconomic context and autocorrelation. M2 as a percentage of M1 was introduced to control for financial development. Inflation ( $\pi_{i,t}$ ) reflects the macroeconomic stability. The lag of the financial dollarization was also introduced to deal with the inertia of the process and autocorrelation.

$$d(FD_{i,t}) = c_i + \beta_0 d(FD_{i,t-1}) + \alpha_1 vol_{i,t} + \alpha_2 vol_{i,t}^2 + \alpha_3 d(REER_{i,t}) + \beta_1 M1 + \beta_2 \pi_{i,t} + e_t \quad (2)$$

34. **Table 2 presents two estimates of the determinants of financial dollarization.**

- Exchange rate volatility has a significant impact and the expected sign on liability dollarization. The results are comparable for asset dollarization except that the relation is less significant. The exchange rate thresholds for asset and liability dollarization appear close.<sup>27</sup>

<sup>26</sup> Penal unit root tests for each variable are presented Appendix II.

<sup>27</sup> For this sample, the thresholds approximately stand at a standard deviation on a six month period of 5 percent of the period average.

- Changes in the real exchange rate are significant in both regressions. They tend to reduce deposit dollarization as expected, but they also seem to reduce asset dollarization.
- Inflation has a mostly positive influence on liability dollarization with a lag. This supports the assumption that the stability of the macroeconomic environment is conducive to dedollarization. The estimate shows a positive but not significant relation with asset dollarization.
- Financial dollarization, especially asset dollarization, appears to have a significant inertia as shown by the number of significant autoregressive terms.

**Table 2. Regression Explaining Financial Dollarization**

Dependent Variable	d(Foreign currency loans/total loans)	d(Foreign currency loans/total loans)	d(Foreign deposits/total deposits)	d(Foreign deposits/total deposits)
C	0.31 (0.44)	0.49 (0.22)	-0.12 (0.55)	-0.10 (0.58)
Dependent Variable (-1) <sup>1</sup>	-0.41 (0.00)	-0.42 (0.00)	-0.25 (0.00)	-0.25 (0.00)
Dependent Variable (-2) <sup>1</sup>	-0.11 (0.00)	-0.11 (0.00)	-0.10 (0.00)	-0.09 (0.00)
Dependent Variable (-3) <sup>1</sup>	-0.13 (0.00)	-0.14 (0.00)	...	...
Dependent Variable (-4) <sup>1</sup>	0.10 (0.00)	0.09 (0.00)	...	...
Inflation	-0.03 (0.82)	-0.08 (0.56)	0.01 (0.71)	0.02 (0.59)
Inflation(-1) <sup>1</sup>	...	...	0.09 (0.02)	0.11 (0.00)
M2/M1	-0.05 (0.30)	-0.07 (0.14)	0.001 (0.00)	0.001 (0.00)
M2/M1(-1) <sup>1</sup>	...	...	-0.001 (0.00)	-0.001 (0.006)
Volatility	-0.22 (0.18)	-0.15 (0.34)	-0.11 (0.06)	-0.09 (0.09)
Volatility <sup>2</sup>	0.02 (0.06)	0.011 (0.30)	0.01 (0.00)	0.01 (0.00)
d(REER)	...	-0.008 (0.86)	...	0.1 (0.00)
d(REER)(-1)	...	-0.12 (0.01)	...	-0.22 (0.00)
d(REER)(-2)	...	-0.17 (0.00)	...	...
Observation	1500	1500	2243	2243
Adjusted R-squared	0.16	0.17	0.09	0.10

<sup>1</sup> The estimates include all significant consecutive lags.

### C. The Effect of Measures to Mitigate Financial Dollarization in Croatia

35. **The Croatian authorities relied on a combination of prudential measures and capital controls to mitigate financial dollarization pressures in the context of a stable exchange rate.** Since 1994, the authorities have considered the stability of the Kuna as the basis of macroeconomic stability. Although dollarization stabilized, the level of dollarization remained high. To keep the financial sectors' balance sheet dollarization under control and deal with the risks of dollarization, the Croatian authorities have relied on marginal reserve requirements (MRRs), which targeted specifically liability dollarization, and foreign exchange liquid asset requirements (FX LAR), which targeted the asset side of financial institutions' balance sheet.<sup>28</sup> These measures aimed at encouraging the banks to reconsider their pricing of the foreign exchange risk (increase foreign exchange loan interest rate) and thus internalize the risk of financial dollarization.

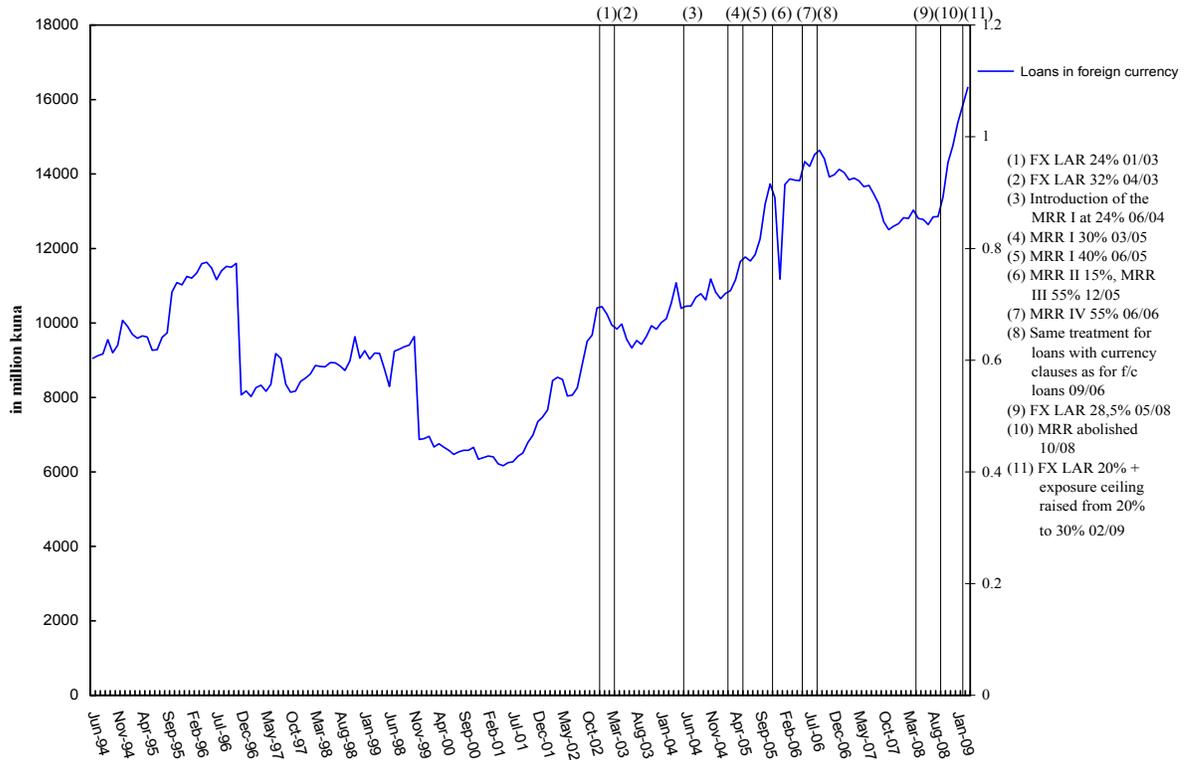
- **FX LAR**<sup>29</sup> obliged the banks to maintain a minimum level of their foreign currency assets in liquid assets on a daily basis.
- **MRRs** were introduced in stages between June 2004 and June 2006. The marginal requirement is based on the additional foreign currency funding attracted by banks. They were calculated as the positive difference between the average daily balance of sources of funds received from nonresidents and legal persons in a special relationship with the bank in a particular calculation period and in the initial calculation period. The different MRRs varied in terms of the initial calculation period and rates. All MRRs were maintained in foreign currency accounts with the Croatia National Bank (CNB) and were not remunerated.

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<sup>28</sup> MRRs contain an element of capital controls, since they are applied only on foreign exchange liabilities to nonresidents, while foreign exchange liabilities to residents are exempt from these requirements. The measures were eliminated in October 2008 when foreign exchange inflows dried up due to the global financial crisis.

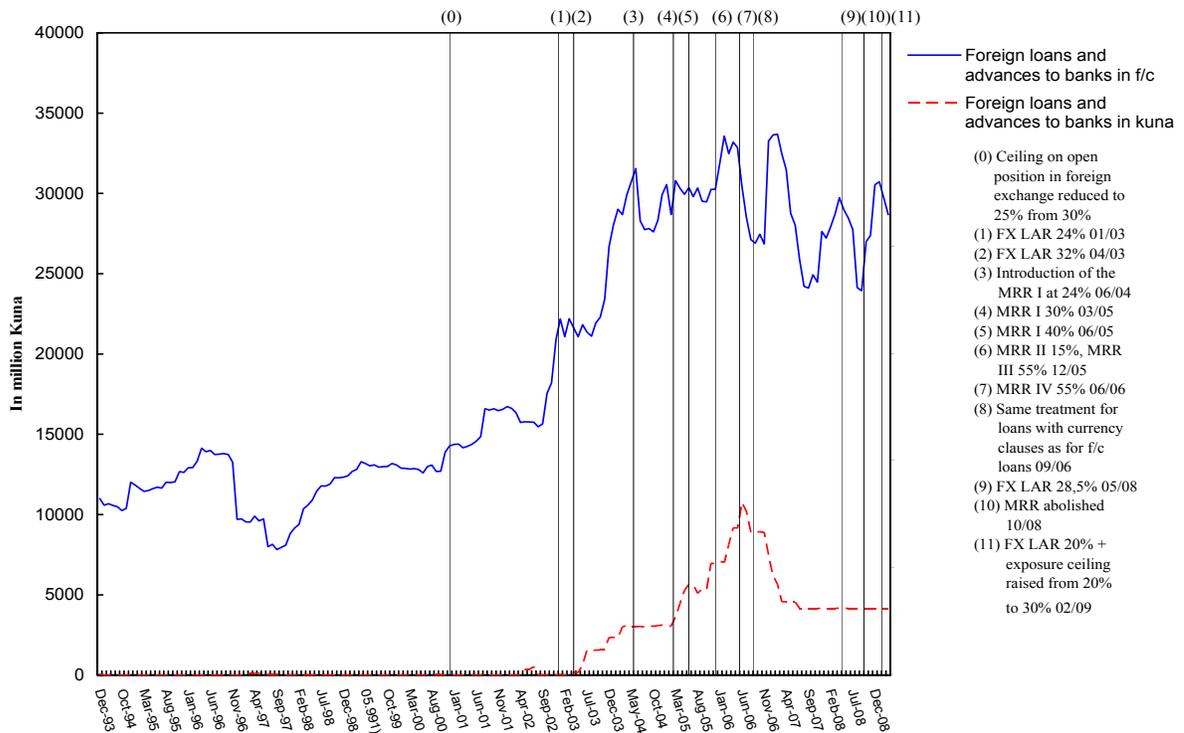
<sup>29</sup> All numbers quoted here can only be indicative since we are not comparing them to a counterfactual. Still they provide a picture of the effects of the regulatory policy implemented by Croatia on its financial dollarization.

Figure 1. Asset Dollarization and Prudential Measures in Croatia



Source: Central Bank of Croatia

Figure 2. Liability Dollarization and Prudential Measures in Croatia



Source: Central Bank of Croatia

36. **Since market participants often find ways to circumvent the regulation, there is a constant need for adjustments to maintain the efficiency of the prudential provisions.**

For instance, in 2005 the MRR was extended to the mushrooming financial leasing companies, whose sole purpose was to avoid the prudential regulation. Similarly, the MRRs were applied on foreign exchange indexed loans when they developed as an alternative to foreign exchange loans since they were subject to less regulatory constraints.

37. **The mix of the prudential measures and capital controls in Croatia appears to have succeeded in shifting risks to the nonfinancial sector at the expense of increased disintermediation.**<sup>30</sup>

The growth in the external debt differential between banks and the nonfinancial sector, indicate a significant shift to nonfinancial corporation borrowing after the introduction of MRR in June 2006. The average monthly growth rate of the external debt of banks fell from 1.81 percent, for the January 1999 to May 2006 period to a negative 0.90 percent for the June 2006 to September 2008 period. In contrast, the rest of the private sector increased its external debt by 2.95 percent a month during this second period, compared with a 1.11 percent monthly average growth rate for the first period. Further evidence of this policy related shift is the move back to bank borrowing since October 2008, after the abolition of all MRRs. Between October 2008 and February 2009, external debt of the banking sector grew by a monthly average of 4.07 percent, while that of the nonfinancial private sector rose by a monthly 0.72 percent.

38. **To quantify the impact of prudential measures on dollarization, we added to equation two (section IV C) a set of dummy variables for the dates when prudential measures were introduced.** They indicate the average change in asset or liability dollarization in the month of the introduction of the prudential measures compared to the rest of the period. We also introduce the dummy lagged by a period to control for the lagging effect of the measures. We do not consider further lags significant.

39. **Financial dollarization shows a moderate response to prudential measures in Croatia (Table 3).** Asset dollarization has been more sensitive to the MMR than to the LAR. On the other hand, liability dollarization seems to have reacted to the LAR more than to the introduction of the MRR. However, the lag indicates that the effect of the measures may have been short-lived as liability dollarization increased again rapidly after the introduction of the measures. Interestingly, the increase in the REER is positively correlated with asset dollarization for Croatia.

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<sup>30</sup> This point was brought to the attention of the authors by Ruben Atoyan.

**Table 3. Regression on the Effect of Prudential Measures on Dollarization in Croatia**

	d(Foreign currency loans/total loans)	d(Foreign deposits/total deposits)
C	-2.23 (0.00)	-0.13 (0.89)
Dependent Variable (-1)*	-0.15 (0.46)	-0.34 (0.00)
Inflation	-0.15 (0.04)	0.12 (0.33)
M2/M1	0.62 (0.00)	-0.02 (0.93)
Volatility	-0.28 (0.11)	0.24 (0.21)
d(REER)	0.099 (0.00)	0.06 (0.16)
LAR	-0.002 (0.98)	-0.41 (0.00)
LAR(-1)	0.043 (0.67)	0.46 (0.00)
MMR	-0.07 (0.00)	0.03 (0.49)
MMR(-1)	0.18 (0.55)	-0.05 (0.41)
Observation	87	
Adjusted R-squared	0.09	

Source: Staff calculation.

**V. CONCLUSION**

40. **A durable dedollarization requires credible macroeconomic stabilization and the implementation of additional policies.** Dedollarization entails restoring the proper functioning of a currency. Stable and low inflation increases the confidence in the local currency and renders hedging to preserve its purchasing power through foreign exchange holdings unnecessary. While a certain level of dedollarization can be achieved in the context of a fixed exchange rate regime, a flexible exchange rate arrangement appears to be more conducive to it. An exchange rate policy that allows two-way movements of the exchange rate introduces a disincentive to financial dollarization by rendering the foreign exchange risk more apparent.

41. **Specific policies and measures may be necessary to end persistent dollarization.** These can end the entrenched behavior of market participants by further increasing the attractiveness of the local currency. Adequate liquidity management decreases the volatility of the domestic interest rates, while public debt management can facilitate savings in local currency denominate instruments. Financial policies, prudential regulations and effective financial sector supervision can contribute to the internalization of the costs of foreign

exchange transactions, and administrative measures can ensure that local currency is available in convenient denominations and quality for local payments. Regulations and practices that favor foreign currency transactions could be changed to avoid a bias in favor of foreign currency. In certain cases, it may be necessary to implement measures to force the use of the domestic currency in tandem with macroeconomic stabilization policies.

42. **The data appear to provide broad support for the arguments advanced in this paper.** While measuring the effectiveness of the selected policies on dedollarization is challenging, as there is no single case of policies targeting solely dedollarization, the analysis provides some convincing results. It provides evidence that exchange rate volatility and inflation have significant effect on dollarization. It also shows that prudential regulation (in conjunction with capital controls) has an effect on both asset and liability dollarization; however, these are relatively short-lived as market participants find ways to circumvent them requiring further adjustments in the regulations.

**APPENDIX I. SELECTED COUNTRY EXPERIENCES WITH SPECIFIC DEDOLLARIZATION  
POLICIES AND MEASURES<sup>31</sup>**

**Table 1. Macroeconomic Policies and Public Debt Management**

Type of instrument	Type of dollarization	Measure introduced	Country (date)
Exchange rate policy	All dollarizations	Exchange rate flexibility	<b>Laos, P.D.R.</b> 1995 A floating exchange rate system was introduced.
			<b>Poland</b> 1995 - 2000 The National Bank allowed the external value of the zloty to fluctuate within margins of $\pm 7$ percent around the central rate. The trading band for the zloty was widened from $\pm 12.5$ percent in 1998 and to $\pm 15$ percent in 1999. It was allowed to float freely in 2000
Monetary policy	All dollarizations	Adjust policy rate	<b>Turkey</b> 2001 Foreign exchange interventions that allow for two- way foreign exchange volatility.
			<b>Poland</b> The monetary authorities reduced the spreads between zloty and foreign interest rates letting the zloty depreciate.
Fiscal policy (Taxation)	Deposit dollarization	Interest rate increase on LCD	<b>Turkey</b> 1995-1996 Hikes in central bank's rates.
			<b>Egypt</b> 1991-1999 <b>Estonia</b> 1992-1994 <b>Hungary</b> 1995-1996 <b>Lithuania</b> 1993-1997 <b>Lao P.D.R</b> 1997-2004 <b>Poland</b> 1989-1993 <b>Nicaragua</b> 1995-2000
Fiscal policy (Taxation)	Deposit dollarization	Exemption of local currency deposits from the financial tax (made	<b>Bolivia</b> 2006

<sup>31</sup> The information is based on several issues of the Annual Report on Exchange Rate Arrangements and Exchange Restrictions, IMF technical assistance reports, and central bank web sites. Countries included in this Appendix did not necessarily aimed at dedollarization or achieved successful dedollarization by introducing the listed policies or measures. Nevertheless, they provide examples of country practices which can be implemented as part of dedollarization policies.

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	Transaction dollarization	permanent for FCD) 2 percent tax on check payments in foreign currency	<b>Peru</b> 1988-1989
		Taxes and other payments in local currency	<b>Angola</b> 2001
(Public debt management)	Public debt dollarization	Eliminating indexation of public debt to dollar	<b>Bolivia</b> Since 2003
		Switch from dollar-denominated bonds to inflation-indexed debt	<b>Chile</b> (1984-1986)
		Switch to domestic-currency-denominated bonds to finance budget deficits	<b>Israel</b> 1995-2002 <b>Mexico</b> 1982 <b>Peru</b> 1985-1987 Including central bank securities <b>Turkey</b> 2002-2007 Sharp reduction of forex and forex indexed debt in total of the government debt

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**Table II. Financial Policy**

<b>Type of instrument</b>	<b>Type of dollarization</b>	<b>Measure introduced</b>	<b>Country (date)</b>
Developing alternative financial instruments	Financial dollarization	Inflation indexed substitutes	<b>Angola</b> 2001 <b>Bolivia</b> 2003 <b>Chile</b> 1989-1997 <b>Mexico</b> 1995-2002
		Interest rate indexed financial instrument Development of hedging markets (derivatives)	<b>Uruguay</b> 2001 Introduction of an inflation indexed unit of account for debt/financial assets. <b>Columbia</b> 1970s <b>Israel</b> 1990-2002 <b>Peru</b> 1985-1987 and 2002 In 2002, the CRBP began to issue bonds indexed on the exchange rate and denominated in local currency as a mechanism for intervening in the exchange market and as a hedging instrument for forward sales of dollars.
Developing local financial markets	Financial dollarization	Development of local currency market	<b>Angola</b> (2001)  <b>Peru</b> 1985-1987
Financial liberalization	Deposit dollarization	Domestic interest rate liberalization	<b>Armenia</b> 2006 <b>Egypt</b> 1991-1996 <b>Lithuania</b> 1993-1997 <b>Poland</b> 1989-1993
	Transactions dollarization	Improving the quality of the payment system in local currency	<b>Angola</b> 2001
Improving the usability of the local currency	Transaction dollarization	Improving the quality of the banknotes	<b>Angola</b> 2001
		Adjusting the denomination of the local currency adapted to local business needs	<b>Lao P.D.R.</b> 1997-2000

Table III. Prudential Regulation

Type of instrument	Type of dollarization	Measure introduced	Country (date)	
Ceilings on banks' FX exposure	Financial dollarization	Net open FX position limits as a percentage of banks' capital	<p><b>Turkey</b> (since 2002) 20 percent of the institution's own funds for all foreign currencies.</p> <p><b>Turkey</b> since 1999 Total net foreign exchange position to capital base was gradually reduced from 50 to 20 percent (all foreign exchange-indexed assets and liabilities were included in the calculation),</p>	<p><b>Bulgaria</b> since 2001 Net open foreign exchange position limit is 30 percent of own funds. Between 1998 and 2001, the ratio was 60 percent.</p> <p><b>Croatia</b> 2008 In April a new definition of the net open position was introduced that includes options and asymmetrically indexed contracts. This tightening resulted in many banks exceeding the 20 percent regulatory limit on net open positions to capital. The limit was increased to 30 percent in the face of the recent turmoil.</p>
			<p><b>Aruba</b> since 2006 No significant currency exposure is allowed.</p> <p><b>Bahamas</b> 2009 All Bahamian dollar contribution must be invested in Bahamian dollar assets.</p> <p><b>Bulgaria</b> since 2007, <b>Estonia</b> since 2006 No more than 20 percent of assets of a supplementary pension fund may be denominated in any currency other than Bulgarian leva and euros. For Estonia the rate is 30 percent (raised to 50</p>	<p><b>Honduras</b> since 2006 The short position in foreign currency is limited to 5 percent of own resources. The limit is 50 percent for the long position.</p> <p><b>Hong Kong, S.A.R.</b> since 2006 For the Mandatory Provident Fund schemes, at least 30 percent of a constituent fund must be held in HK dollar-denominated currency investments, as measured by effective currency exposure.</p>
		Ceilings on pension funds' currency exposure		

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		percent in 2009).	<b>Iceland</b> since 2006 Foreign exchange exposure is limited to 50 percent of total assets.
		<b>Chile</b> since 2006 Depending on the type of the pension fund, unhedged foreign currency denominated assets may range from 10 to 40 percent of its total resources. Range changed from 10 to 45 percent in 2008.	<b>Latvia</b> since 2006 For the contribution schemes, the limit is 10 percent of assets in a single currency (excluding the euro) and 20 percent for all currencies. For the premium schemes, maximum 30 percent of assets may be in currencies unmatching with the obligations, with a sub-ceiling of 10 percent per currency.
		<b>Columbia</b> since 2006 The short position is limited to 30 percent. It was 20 percent in 2006.	<b>Portugal</b> since 2006 The currency matching requirement is 70 percent.
		<b>Cyprus 2009, Greece</b> since 2006 Up to 30 percent of their assets covering technical reserves may be denominated in currencies other than the currencies of their liabilities.	
Bank's asset dollarization	Ceiling on foreign currency lending to FCD ratio	<b>Lebanon</b> 1994-2006 Limited to 60 percent of FCD	
		<b>Dominican Republic</b> 2008 Limited to 100 percent of FX resources in savings and time deposits.	
		<b>Uganda</b> 2008 Only short term lending is permitted. It must not reach 80 percent of a bank's total foreign currency deposits.	
	Ceiling on foreign currency lending to liabilities ratio	<b>Haiti</b> 2008 Lending may not exceed 50 percent of liabilities in FX.	

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		Ceiling on foreign currency lending to own funds ratio	<b>Romania</b> (September 2005, lifted January 2007) Ceiling on foreign exchange credit exposures arising from loans granted to unhedged individuals and legal persons (other than credit institutions) in the amount of 300 percent of own funds.	
	Liability dollarization	Ceiling on liabilities denominated in foreign currency to basic capital stock	<b>Mexico</b> since 1998 Up to 183 percent.	
Reserve Requirements	Deposit dollarization	Unified reserve requirement for deposits in both local and foreign currencies	<b>Angola</b> since 2003 The reserve requirement for demand deposits in both local and foreign currencies was unified at 15 percent. Previously, demand deposits in local currency were subject to a reserve requirement of 30 percent. <sup>32</sup>	
			<b>Croatia</b> 2000	
		Reserve requirement more favorable on local currency liabilities	<b>Armenia</b> since 2008 The reserve requirement is 12 percent for FCD and 8 percent for LCD. Previously a uniform rate of 8 percent applied.	<b>Romania</b> since 2006 The reserve requirement is 18 percent for LCD and 40 percent\$ for FCD.
			<b>Belarus</b> (since 2001) <b>Croatia</b> (2000) <b>Pakistan</b> (1998-2003), <b>Uruguay</b> (since 1999) Special reserve requirements on FCDs	<b>Serbia</b> 2008 Foreign exchange savings deposits made by individuals are included in the required reserves base at a rate of 40 percent against 25 percent for the local

<sup>32</sup> Since then, reserve requirements for demand deposits in both local and foreign currencies have been modified together.

		<p><b>Bolivia</b> 2001 A reserve requirement of 2 percent was applied to time deposits in domestic currency with a maturity of up to 60 days and to those in foreign currency with a maturity of up to 360 days.</p> <p><b>Honduras</b> since 1999 Reserve requirements are 25 percent for LCD and 50 percent for FCD</p> <p><b>Paraguay</b> since 2004 The reserve requirements for maturities up to 360 days are 26.5 percent for FCD and 15 percent for LCD.</p> <p><b>Peru</b> 1996-2007 FCD reserve requirements are 34 percent higher than LCD reserve requirements</p> <p><b>Haiti</b> 2008</p> <p><b>Croatia</b> 2009 The minimum kuna component of FX reserve requirements was raised from 50 to 75 percent.</p> <p><b>Croatia</b> since 1999</p> <p><b>Romania</b> since 2000</p> <p><b>Croatia</b> 1994-2006 <b>Serbia</b> Foreign currency assets kept by leasing companies in special accounts opened with banks are included in the required reserves base at a rate of 100 percent.</p> <p><b>Serbia</b> The reserve base also includes foreign</p>	<p>currency deposit. Foreign-currency-subordinated liabilities are included in the required reserves base at a rate of 20 percent.</p> <p><b>Turkey</b> since 2008 The RR is 6 percent for liabilities in local currency against 9 percent for foreign currency denominated deposits. This second rate was lowered from 11 percent in December 2008.</p> <p><b>Yemen</b> since 2008 For FCD, the rate is 20 percent against 7 percent for domestic currency deposits. The latter rate was brought down from 10 percent in April 2008.</p> <p><b>Serbia 2008</b> Banks may hold 35 percent of their foreign exchange required reserves in dinars, provided they meet specific requirements.</p> <p><b>Israel</b> 1990-2002</p> <p><b>Nicaragua</b> 1995-2000</p>
Banks' foreign currency external debt	Reserve requirement in local currency for FCD to encourage banks to attract LCD Differentiated reserve remuneration	Broadening the base for reserve requirement to prevent banks from borrowing abroad via local non-bank intermediaries	
Foreign currency loans	Including foreign currency loan in		

Liquid assets requirement	Foreign exchange liabilities	the reserve requirement base Foreign currency assets liquidity requirement	exchange loans at a rate of 45 percent.	<b>Mexico</b> since 1998 Banks must invest in liquid assets – as determined by the BOM and denominated in foreign currency – an amount calculated through the maturity structure of their liabilities payable in foreign currency.
			<b>Angola</b> since 2001 Liquid foreign currency assets must cover 50 percent of FCD.	<b>Peru</b> since 1998 The liquidity requirement is at least 20 percent of short term liabilities for foreign exchange. The liquidity requirement is only 8 percent for domestic currency.
			<b>Bolivia</b> since 2005 The marginal liquid asset requirement was increased to 7.5 percent and applied to foreign currency deposits exceeding 80 percent (reduced to 60 percent in 2007) of the total stock of foreign currency and domestic currency deposits as of March 31, 2005. The marginal requirement could be offset against increases in deposits in local currency.	<b>Philippines</b> since 2001 Depository banks with FCDUs and EFCDUs must maintain at all times 100 percent asset cover for their foreign currency liabilities. At least 30 percent of the cover requirement must be in the form of liquid assets. For FCDUs and EFCDUs of commercial and expanded commercial banks respectively, at least 70 percent of the cover must be maintained in the same currency as the deposit liability.
			<b>China</b> 1996-2007 Banks' foreign exchange liquid (1 year or less) assets should not be less than 60 percent of liquid liabilities and 30 percent of total foreign exchange assets.	
			<b>Croatia</b> since 2003 The required FX coverage of banks' FX liabilities was increased (24 percent of banks' foreign borrowing had to be held in foreign liquid assets) (Jan 2003). The coverage was further raised to 35 percent in February 2005, then lowered to 32 percent in March.	<b>Trinidad and Tobago</b> since 1996 A liquid asset ratio of 20 percent on FCD is
			<b>Cyprus</b> since 2003	

Premium for FCDs participating in guarantee schemes	Deposit dollarization	Higher insurance premium on FCD	The minimum required ratio of liquid assets to total deposits in foreign currencies was 75 percent between 2003 and 2008. Since, it has been reduced to 70 percent.	required. It was 25 percent until 2002.
		Exclusion from the government's deposit	<b>Egypt</b> since 1996 The liquidity ratio requirement applied to assets in foreign currency is 25 percent against 20 percent with regards to assets in Egyptian pounds.	<b>Turkey 2007</b> The foreign exchange liquidity ratio, which is the ratio of foreign exchange assets to foreign exchange liabilities, must be at least 80 percent. Asset and liability account calculations take into account liquidity capacity and demand features.
			<b>Honduras</b> since 1997 Liquidity requirements for FCD is 24 percent. It was 50 percent in 1997, 38 percent in 1998 and 30 percent in 2006 In 2009 some banks were exempted from the requirement.	<b>Uruguay</b> since 2008 Depends on maturity of obligations. Stricter for foreign currency deposits for all maturities.
			<b>Lebanon</b> since 1999 Liquid assets in foreign exchange may not be less than 30 percent of the total clients' deposits net interbank credit accounts, CDs, bonds, and subordinated loans maturing in less than one year. Brought down to 25 percent in 2001, 15 percent in 2002 and 10 percent in 2003.	
			<b>Uruguay 2001</b>	
			Staff recommendation for <b>Peru 2007</b>	
			<b>Venezuela</b> since 2006 FCD accounts are not insured by the government.	

Collateral requirements	Deposit dollarization	insurance scheme Disallowing the use of FCD as collateral	<b>Pakistan</b> 1998-2002	
Loan to value requirements	Loan dollarization	Lower loan to value ratio for loans in foreign exchange	<b>Hungary</b> The loan to value ratio is set at 80 percent for local currency loans, 60 percent for euro loans, and 40 percent for other currency loans	
Provisioning requirements	Banks' foreign currency credit to households and firms.	Tighter provisioning requirements on foreign currency loans	<b>Albania</b> 2007 An additional provision of 5 percent is required on all unhedged substandard and doubtful loans.	<b>Haiti</b> since 2002 Lending may not exceed 50 percent of liabilities in foreign currency.
			<b>Croatia</b> 2006, raised further in late 2007. Increased risk weight of unhedged foreign currency-denominated and indexed loans by 25 percentage points. All such loans extended to debtors with foreign exchange assets covering less than 80 percent of their foreign exchange liabilities are considered unhedged. Same treatment for indexed loans as for f/c ones (09/2006).	<b>Mozambique</b> since 2005 Bank must record a 50 percent provision on lending when there are strong doubts about repayments or when borrowers are non exporters, and a 100 percent provision for overdue credits.
		Extending provisioning requirements for foreign exchange (FX) credits to unhedged foreign-currency-denominated and indexed loans	<b>Romania</b> 2008 Provisioning requirements for FX credits extended to unhedged borrowers and broadened to include non-bank financial institutions	<b>Thailand</b> since 1997 Commercial lending denominated in foreign currencies to particular industries may be partially (50 percent) included as foreign assets.
			<b>Uruguay</b> 2001 Higher capital requirements for dollar	

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Stricter loan classification	loans to the non tradable sector <b>Romania</b> The authorities have refined regulations on provisioning and loan classification to take the exchange rate risk of the borrower into account.
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**Table IV. Supervisory Measures**

Type of instrument	Type of dollarization	Measure introduced	Country (date)
Raising currency risk awareness, measurement and management	Financial dollarization	Stricter enforcement of prudent risk management practices	<p data-bbox="948 352 1437 905"><b>Croatia 2006</b> Supervisors issued guidelines to banks requiring them to set up and maintain a comprehensive system of ongoing identification, measuring, monitoring, and controlling of currency-induced credit risk; (ii) develop a reliable system for granting loans exposed to the currency-induced credit risk; (iii) adequately manage the relationship between risk and the price of such loans; (iv) have in place a system of ongoing monitoring of this risk; and (v) develop adequate methods for management of this risk and build them into their credit policies and procedures.</p> <p data-bbox="948 947 1437 1079"><b>Israel 1990-2002</b> Strengthening supervision to ensure that banks maintain covered positions in their foreign currency activities</p> <p data-bbox="948 1121 1437 1503"><b>Poland</b> Monitoring of banks' quality of FX risk management, internal controls. The authorities developed a credit information database and formed a unit to monitor vulnerabilities from credit risk associated with FX denominated lending. moral suasion: From 2001, supervisors' warning of banks and written guidance from head of supervision.</p>

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Enhancing the offsite and on site monitoring toolkit to improve monitoring of banks' unhedged foreign exchange exposures  
Enhanced disclosure of risks to customers

**Croatia, Hungary, Poland and Romania**

1. Off-site tools: new or extended reporting forms, or targeted surveys.  
2. On-site inspections: increased focus on borrowers' foreign exchange exposures including asking banks to inquire and report on the largest customers' FX exposures.

**Poland**

Periodic surveys of banks' FX exposure by supervisors to obtain specific information on banks' foreign currency lending, including borrowers' appetite for foreign currency loans, percentage of customers hedging their exchange rate risks, the form of hedging offered to customers, foreign currency loans protected by guarantees, costs for hedging loans as ratio to the loan, loan classification and provisions made, foreign exchange positions, by currency, receipts/costs of foreign exchange transactions, extent of engagement in arbitrage transactions. Surveys followed up by action on procedures and banks stress tests.

**Hungary 2005**

Information on foreign currency risks to be included on the web page of the financial supervisory authority.

**Poland**

Press coverage of risks to households.

**Hungary from January 2005**

1. The contracts for mortgage loans in foreign currency must specify the risks to which their borrowers are exposed to.  
2. Banks are required to disclose their interest rate charges (APRC) on foreign currency loans.

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**Table V. Forced Dedollarization**

<b>Type of instrument</b>	<b>Type of dollarization</b>	<b>Measure introduced</b>	<b>Country (date)</b>	
Interest rate control	Deposit dollarization	Control on foreign currency deposit interest rate	<b>Bangladesh 1996-2009</b> <b>India 1996-2009</b>	
Restrictions on foreign currency loans	Asset dollarization-foreign currency loans to households and companies	Approval requirement for foreign currency loans	<p><b>Bahamas</b> since 1997 Exchange control approval is required to make loans to residents in foreign exchange.</p> <p><b>Bangladesh</b> since 1996 Lending is subject to prior approval from the BB.</p> <p><b>Burkina Faso</b> (since 2000), <b>Guinea-Bissau</b> (since 2006), <b>Guyana</b> (since 2008), <b>Mali</b> (since 2006), <b>Niger</b> (since 2006), <b>Senegal</b> (since 2006), <b>Togo</b> (since 1998) MOF authorization and BCEAO approval are required. For Guyana, no permission is needed when lending to an AD. Mali prohibited foreign currency lending between 2003 and 2005. Niger restricted such borrowing to resident individuals authorized to hold accounts in foreign currency.</p>	<p><b>Cote d'Ivoire</b> since 2001 MEF authorization and BCEAO approval are required.</p> <p><b>Morocco</b> since 2003 FEO is required for these transactions. Overdrafts are not permitted in foreign exchange accounts (since 2005).</p> <p><b>Fiji</b> since 1996 Loans for more than F\$5 million require the specific permission of the RBF. Until 1996, the threshold was F\$2 million.</p> <p><b>Papua New Guinea</b> since 2002 Subject to BPNG approval. Settlement must be in kina.</p> <p><b>Samoa</b> since 1999 Approval by the CBS is necessary.</p> <p><b>Ukraine</b> since 2002 Written permission from the NBU and a banking license are required.</p>

Foreign currency loans allowed only for specific activities

**Korea** since 2008  
Foreign currency loans are restricted to funding overseas transactions and capital investment by domestic firms.

**Macedonia** since 2002

Commercial banks may lend in foreign exchange to residents for current payments aboard. If legal entities intend to use the loan proceeds domestically, the loan proceeds must be received in denars. Previously such loans were banned.

**Nepal** since 2000  
Exporters, tourism-related businesses and specific industries are entitled to such credits.

**Pakistan** since 2004  
Only allowed for financing exports and imports against foreign currency deposits of banks. Such loans were banned from 1997 to 1999.

**Suriname** since 2007  
Banks may extend foreign exchange loans to residents subject to specific qualification requirements. From 2003 to 2007, only foreign exchange banks could grant such loans.

**Turkey** since 1999  
Resident banks may not extend credit in foreign currency to residents, except to those who are exporters, investors, Turkish entrepreneurs working abroad, residents conducting business related to international tenders held in Turkey and residents who are conducting business related to defense industry projects that have been approved by the Undersecretariat of the Defense Industry.

**Vietnam** since 2008  
Only allowed to pay for imports of goods and services, for direct investment abroad, or to repay advance external loans, which comply with the regulation on external borrowing and repayment, where the borrower is able to repay in foreign currency and where the local loan is more economical than external borrowing. The requirements used to be tighter.

Limited foreign currency lending to unhedged borrower	<p><b>Peru</b> 1985-1987</p> <p><b>Turkey</b> 1999-2003 Limited to hedged borrowers (foreign exchange earners)</p> <p><b>Dominican Republic</b> 2008 85 percent of loans in FX must be to borrowers generating FX</p>	
Maturity cap on foreign currency loans	<p><b>Cyprus</b> (since 2005) Maturity is capped at 15 years.</p>	
Foreign currency lending only to resident exporters	<p><b>Angola</b> since 1999 Banks are authorized to provide credit in foreign currency to exporters, up to a limit of 50 percent of the lending bank's deposits in that specific currency.</p>	<p><b>Jordan</b> 2008</p> <p><b>Rwanda</b> since 2005 The NBR must authorize the transaction.</p> <p><b>Sri Lanka</b> since 2000</p>
	<p><b>Argentina</b> 2002-2006</p> <p><b>Honduras</b> 1997-2006 Forty percent of funds from foreign exchange deposits may be given as credit to export-related activities, and 10 percent may be used for any purpose. In 2003, both these rates were raised to 50 percent and 15 percent respectively. In 2006 these requirements were abolished.</p>	
Prohibition of lending in foreign currency	<p><b>Brazil</b> 2008 Does not apply to on-lending of external foreign currency loans</p>	

			<p><b>Dominica</b> 2008  <b>Gabon</b> 2008  <b>Namibia</b> 2008  <b>Sierra Leone</b> since 1997  <b>Timor-Leste</b> since 2003</p>	
Restrictions on purchases of locally issued securities denominated in foreign exchange	Asset dollarization	Administrative approval is required	<p><b>Bangladesh</b> since 1996  Purchases are subject to prior approval by the central bank.</p> <p><b>Barbados</b> since 1998  Requires central bank approval.</p> <p><b>Benin</b> (since 1998),  <b>Burkina Faso</b> (since 2000),  <b>Guinea-Bissau</b> (since 2006),  <b>Mali</b> (since 1999),  <b>Niger</b> (since 2006),  <b>Senegal</b> (since 2001),  <b>Togo</b> (since 1998)  requires RCPSFM authorization, after MOF approval.</p>	<p><b>Gabon</b> since 2003  MEFBP must authorize such transactions.</p> <p><b>Guatemala</b> since 2002  Monetary Board authorization is necessary.</p> <p><b>Morocco</b> since 1996  The issuance and purchase of such securities are subject to FEO approval.</p> <p><b>Ukraine</b> since 2007  A license is required from the SSSMC.</p>
		Rating requirements	<p><b>Indonesia</b> since 2008  Banks may purchase locally issued bonds denominated in foreign exchange, subject to the requirement that the securities be investment grade and not be issued by their own group.</p>	

		Prohibition of purchases of locally issued securities in foreign currency		<b>Kyrgyz Republic</b> since 1998 Locally issued securities must be denominated in local currency.
Regulation discriminating against foreign currency accounts	Deposit dollarization	Require administrative approval for the opening of local foreign currency accounts	<b>Afghanistan</b> (since 2003), <b>Argentina</b> (since 2006), <b>Azerbaijan</b> (since 1996), <b>Bahamas</b> (since 1996), <b>Bangladesh</b> (1996-2001), <b>Barbados</b> (since 1996), <b>Belize</b> (since 1996), <b>Benin</b> (since 1996), <b>Bhutan</b> (since 1997), <b>Burkina Faso</b> (since 1996), <b>Cape Verde</b> (since 1998), <b>Central African Republic</b> (since 2007), <b>Chad</b> (since 1998), <b>China</b> (since 1996), <b>Comoros</b> (since 1998),	<b>Congo Republic</b> (since 2005) <b>Costa Rica</b> (since 2008), <b>Cote d'Ivoire</b> (since 1996), <b>Dominica</b> (since 1996), <b>Dominican Republic</b> (1998-2000), <b>Equatorial Guinea</b> (since 2004), <b>Eritrea</b> (since 2005), <b>Ethiopia</b> (since 1996), <b>Fiji</b> (since 1996), <b>Gabon</b> (since 2003), <b>Guinea-Bissau</b> (since 1996), <b>Lesotho</b> (1998-2003), <b>Mali</b> (since 2000), <b>Namibia</b> (since 1998), <b>Nepal</b> (since 1997), <b>Niger</b> (since 1998), <b>Poland</b> (1996-1999), <b>Samoa</b> (always), <b>Senegal</b> (since 1996), <b>Swaziland</b> (1996-2000), <b>Togo</b> (since 1996).
		Ban on foreign currency accounts of residents	<b>Cameroon</b> (1996-1998) <b>Gambia</b> (1998-2001), <b>Paraguay</b> (2007-2009) <b>Tonga</b> (1998-2000).	
Regulations discriminating against foreign currency as a means of payment	Transaction dollarization	Ban on foreign currency holdings	<b>Burkina Faso</b> (since 2002), <b>Senegal</b> (since 2003) Residents must surrender all foreign exchange earned abroad or domestically to an authorized	<b>Comoros</b> since 2004 Any foreign currency acquired must be converted at authorized financial institutions.

	intermediary bank within eight days of receipt. In Senegal, this applies for holdings exceeding CFAF 300,000.	
Ban on transfers of currency deposits between residents	<b>Israel</b> 1990-2002	
Limit on cash withdrawals	<b>Argentina</b> 2001–02 Until 2002 for LCD and freeze until 2003 for FCD (inflation indexed).	<b>Pakistan</b> 1998-2003 FCD freeze: redeemable in rupee immediately or for medium term bonds.
Requirement to list prices in domestic currency	<b>Peru</b> 2000-2005, <b>Brazil</b> (since 2003), <b>China</b> (since 2001), <b>Ghana</b> (since 2001), <b>Malawi</b> (since 2001).	
Granting legal tender status to the local currency only	<b>Angola</b> (2001)	
Ban on the use of foreign currency in domestic transactions	<b>Armenia</b> since 2001 Since 2005, noncash payments between legal entities, between sole entrepreneurs, and between sole entrepreneurs and legal entities may be denominated in foreign currency. <b>Azerbaijan</b> (since 2001), <b>Samoa</b> (always), <b>Trinidad and Tobago</b> (since 2003), <b>Tunisia</b> (since 2001), <b>Ukraine</b> Settlements among residents within the country may be effected in foreign currency only with the approval from the	<b>Columbia</b> 2003-2005 Exceptions are: transactions between and among mineral sector firms and services related firms; sales of fuel used in international transportation; purchases and sales of oil and gas by Ecopetrol and companies engaged in downstream and upstream activities; authorized local insurance and reinsurance contracts; and charges related to international transport services and payments through special accounts registered at

ANB in Azerbaijan, of the CBS in Samoa, of the CBTT for Trinidad and Tobago, of the CBT and MOF for Tunisia, and of the NBU for Ukraine,

**Bahamas** (since 2007), **Belarus** (since 2001), **Benin** (since 2005), **Bhutan** (since 2003), **Brazil** (since 2003), **Burkina Faso** (since 2006), **Burundi** (since 2003), **China** (since 2001), **Comoros** (since 2004), **Cote d'Ivoire** (since 2005), **Equatorial Guinea** (2009), **Ethiopia** (since 2001), **Gabon** (since 2003), **Georgia** (since 2003), **Ghana** (2001-2006), **Guinea** (since 2003), **Guinea-Bissau** (since 2006), **Malawi** (since 2001), **Mali** (since 2002), **Morocco** (since 2004), **Namibia** (since 2003), **Niger** (since 2006), **Papua New Guinea** (2002-2007), **Senegal** (since 2003), **Sri Lanka** (since 2004), **Thailand** (since 2001), **Togo** (since 2006), **Uzbekistan** (since 2002), **Venezuela** (since 2003), **Zimbabwe** (2002-2009)

For Namibia, invoices can be in foreign currency but actual payment must be in domestic currency.

the BR.

**Croatia** (since 2001), **Iran** (since 2004), **Kazakhstan** (since 2001), **Macedonia** (since 2003), **Malaysia** (since 2005), **Moldova** (since 2002), **Romania** (since 2005), **Russia** (since 2003), **Serbia** (since 2003), **Slovenia** (2005-2008), **Sudan** (since 2005), **Tajikistan** (since 2004), **Vietnam** (since 2003)

Allowed only in prescribed cases.

**Cyprus** 2001-2004, **Pakistan** (since 2006), **Swaziland** (since 2003)  
Actual payment between residents in foreign currency is permitted only when the residents involved maintain a foreign exchange account. For Pakistan, foreign currency accounts holders can freely transfer to each other funds but all obligations among residents must be settled in Pakistani rupees.

**Lao PDR** 1997-2000; 2004-2009

**Belize** (until 2001),  
**Belize** (since 2003)  
 Residents with earnings in foreign exchange may pay only their taxes, utility bills, and other expenses in US dollars. For Belize, until 2006, the prohibition on the use of foreign exchange also applied to foreign currency earners.

Mandatory conversion

Financial dollarization

Conversion of FCD and foreign-currency-denominated assets

**Argentina** 2001–02  
 In peso at 1.4 p/US\$1 and 1p/US\$1.

**Mexico** 1982

**Peru** 1985-1987  
 (FCDs reintroduced in 1987).

## Appendix II. Panel Unit Root Tests

- Foreign currency deposit as a percentage of total deposits

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.82297	0.0342	34	2882
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.84973	0.0001	34	2882
ADF - Fisher Chi-square	152.601	0.0000	34	2882
PP - Fisher Chi-square	196.001	0.0000	34	2899

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

- Foreign currency loan as a percentage of total loans

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.05405	0.4784	21	1754
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.70123	0.0000	21	1754
ADF - Fisher Chi-square	174.918	0.0000	21	1754
PP - Fisher Chi-square	220.788	0.0000	21	1776

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

- Inflation

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-28.5918	0.0000	32	2674
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-29.6705	0.0000	32	2674
ADF - Fisher Chi-square	773.892	0.0000	32	2674
PP - Fisher Chi-square	822.114	0.0000	32	2690

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

- Standard deviation of the exchange rate on a 125 day period as a percentage of the average exchange rate on the same period.

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	0.39758	0.6545	34	2753
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.94100	0.0000	34	2753
ADF - Fisher Chi-square	224.822	0.0000	34	2753
PP - Fisher Chi-square	107.259	0.0017	34	2834

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

- M2 as a percentage of M1

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.91227	0.0000	34	2637
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.14867	0.0158	34	2637
ADF - Fisher Chi-square	98.4822	0.0092	34	2637
PP - Fisher Chi-square	91.8443	0.0287	34	2650

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

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Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	3.90905	1.0000	33	2848
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	4.00810	1.0000	33	2848
ADF - Fisher Chi-square	48.7958	0.9443	33	2848
PP - Fisher Chi-square	45.9971	0.9711	33	2871

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Foreign currency deposits	Foreign currency loans	Exchange rate behavior
AZERBAIJAN	AZERBAIJAN	Managed
	BANGLADESH	Managed
BARBADOS		Fixed
BELARUS	BELARUS	Fixed
BOLIVIA	BOLIVIA	Managed
BURUNDI		Managed
	CAMBODIA	Managed
CANADA		Flexible
CAPE VERDE		Fixed
CHILE	CHILE	Flexible
COSTA RICA	COSTA RICA--C	Managed
CROATIA		Fixed
DOMINICA		Fixed
GRENADA		Fixed
GUATEMALA	GUATEMALA	Managed
HAITI	HAITI	Managed
HONDURAS	HONDURAS	Fixed
INDONESIA	INDONESIA	Managed
JAMAICA		Managed
KENYA		Managed
St KITTS		Fixed
KUWAIT		Fixed
	LESOTHO	Fixed
LITHUANIA	LITHUANIA	Fixed
St LUCIA		Fixed
	MEXICO	Flexible
MOLDOVA		Managed
NICARAGUA	NICARAGUA	Managed
PARAGUAY	PARAGUAY	Managed
QATAR		Fixed
ROMANIA		Flexible
SEYCHELLES		Fixed
SOUTHAFRICA		Flexible
	SURINAME	Fixed
	THAILAND	Managed
UKRAINE	UKRAINE	Fixed
URUGUAY	URUGUAY	Managed
ST. VINCENT		Fixed
	ZAMBIA	Flexible

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