Dollarization of the Banking System: Good or Bad?

by

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Abstract

This paper assesses the benefits and risks associated with dollarization of the banking system. We provide novel empirical evidence on the determinants of dollarization, its role in promoting financial development, and on whether dollarization is associated with financial instability. We find that: (a) the credibility of macroeconomic policy and the quality of institutions are both key determinants of cross-country variations in dollarization; (b) dollarization is likely to promote financial deepening only in a high inflation environment; and (c) financial instability is likely higher in dollarized economies. The implications of these findings for financial sector and monetary policies are discussed.

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I. INTRODUCTION

One of the most noteworthy features of globalization during the last two decades has been the rapid increase in de facto dollarization, i.e.,the domestic use of a foreign currency (typically the U.S. dollar) in most emerging market, developing, or transition economies. Foreign currency has increasingly been used, alongside the local currency, in all three of the classic functions of money (means of payment, store of value, unit of account).

In view of the increasingly easy access to offshore deposits (even when prohibited by law), partly as a result of growing globalization and progress in communications and information technology, the authorities have been confronted with an uneasy choice between allowing deeper financial intermediation at home though denominated in dollars, or pushing it offshore and stifling domestic financial innovation. While some countries have actively discouraged dollarization through administrative means, most have chosen to accommodate market forces by allowing financial intermediaries to offer dollar-denominated deposits (and loans) to their domestic customers. In many such countries the process has taken hold to the point where it is now appropriate to speak of a de facto "dual currency regime."

While highly dollarized countries could abandon their national currency altogether and opt instead for the exclusive use of foreign currency as legal tender, only a few have so far made that choice. But neither have such countries generally taken the steps needed to rehabilitate the local currency as the medium of choice in intermediation. In most cases, surges in dollarization have come in response to clearly identified episodes of monetary chaos that undermined the credibility of the local currency. The difficulties faced by national authorities in restoring their reputation and credibly committing to sound monetary policies seem to have raised the bar too high for most of those contemplating to follow this route, and many seem to regard dollarization as irreversible and not subject to policy influence.

Instead, by allowing a dual currency regime to take hold, the monetary authorities have hoped to have their cake and eat it. They have sought to expand intermediation by allowing the use of foreign currencies. Recognizing the heightened microeconomic risks of currency fluctuation under these circumstances, some have hoped to buy stability cheaply by closely tying their exchange rate to the dollar. But by retaining the possibility of employing exchange rate flexibility, the dual currency system seems to offer an insurance policy against large shocks that is not available with a currency board.

This paper explores the extent to which the fears and hopes which have led to this policy reaction are justified. Using a large sample of about a hundred countries, we provide clear empirical evidence on the three main points at issue. First, it is true that permitting dollarization can support a deeper financial system, but only in inflationary economies. Second, absolute pessimism with regard to the degree to which dollarization can be influenced by policy is not warranted: we show that policy does matter. Finally, we present evidence that intermediaries in dollarized financial systems seem prone to higher risk.

The empirical analysis begins with the determinants of deposit dollarization, building on the work of Ize and Levy Yeyati (2003), and controlling for the impact of relevant regulations. We find that macroeconomic policy—partly captured by the minimum variance portfolio

calculated from observed covariances—and the institutional structure are both key determinants of cross-country variations in dollarization.

Turning to the consequences of deposit dollarization, we extend the work of Honohan and Shi (2003) to find that allowing de facto dollarization has in practice promoted a deeper domestic financial system, but only in inflationary economies, i.e., dollarization has the effect of moderating the adverse effect of inflation on financial depth.

The third empirical component addresses the contribution of dollarization to risk in the banking system. Whether we measure this risk by the mean ratio of nonperforming loans, the volatility of deposits, or a proxy aggregate measure for a bank's "distance-to-default," we find that risk is heightened in dollarized economies.

The results point to a first-best policy of reducing dollarization's attractions through improved macroeconomic and institutional policies. Central banks wishing to reverse or contain the growth of dollarization face the same challenge any producer of goods and services faces: only products whose quality is reliable will sell. The experience of the few countries that have succeeded in reversing (or at least containing) financial dollarization by means of credible monetary policies and sound institutional frameworks supports this view.

Pending achievement of this first-best policy, the authorities need to address the risk environment, and to make sure that their own actions do not worsen it. Indeed, in a misguided attempt to avoid undermining the balance sheets of dollar borrowers and banks, monetary authorities faced with growing dollarization have in several cases moved to a brittle regime, becoming averse to sharp exchange rate movements and displaying acute "fear of floating" (Calvo and Reinhart, 2002). In turn, the perception of assured exchange rate stability by the private sector promotes the moral hazard of further dollarization. Even if agents are not unaware of the risk of devaluation, it seems safe to transact in dollars when everybody else does so not least because a bailout of depositors and debtors becomes more likely in the event of an abrupt policy regime change. This vicious circle can end in crisis. Instead of falling into the trap of a brittle crisis-prone exchange rate regime, the authorities need to deal with the externalities associated with currency mismatches through a more effective prudential policy that seeks to ensure that financial intermediaries and their customers internalize the risks of dollarization.

Although there is a large and growing body of literature on related issues such as the contributory role of currency mismatches in balance sheets to banking crises (cf. Goldstein and Turner, 2002), currency boards and full (de jure) dollarization,[2] home bias effects in portfolio selection (cf. for example Tesar and Werner, 1994), and foreign borrowing, the focus on dollarization has been largely from the perspective of foreign investors; the empirical literature on domestic dollarization (i.e., from the viewpoint of domestic investors) is comparatively sparse (see Honohan and Shi, 2003 and references therein). Instead, our

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[2] Especially arising out of the problems associated with the Argentine currency board. See, for example Mussa (2002), and De la Torre, Levy Yeyati, and Schmukler (2003).

paper focuses on a domestic policy agenda, i.e., measures that can be taken at home to make domestic intermediation more resilient and the local currency more attractive.[3]

Section II documents the rising trends in financial dollarization across the world and contrasts such trends with the general decline of inflation and the asymmetric evolution of other forms of dollarization, particularly real dollarization. Section III briefly reviews the literature on the determinants of domestic dollarization and presents new empirical results that extend previous findings in this area. Sections IV and V provide empirical evidence on the potential benefits of dollarization for financial development, as well as its risks. The following two sections address the policy response, covering both the need for heightened prudential action to ensure maximum internalization of dollarization risks (Section VI), and the implications of dollarization for monetary and exchange rate policy (Section VII). Section VIII concludes.

II. HOW BROAD AND UNIFORM IS THE MARCH TO DOLLARIZATION?

In this paper domestic financial dollarization is measured as the ratio of onshore foreign currency deposits to total onshore bank deposits.[4] This measure has obvious shortcomings. It assigns equal weight to demand deposits, reflecting payments dollarization, and time deposits, reflecting financial dollarization. On the other hand, it fails to include dollar cash and offshore deposits, which constitute a substantial fraction of investors' portfolios in some countries.[5] It also ignores nonbank holdings of financial instruments, such as government securities, shares in mutual funds, pension and insurance claims, and all derivative instruments, which probably constitute a dominant part of private portfolios in countries with more sophisticated financial systems.[6] Yet, it has the benefit of being the most readily available. Thus, our sample comprises 100 countries, including a large number of developing and emerging market countries, as well as countries that have transitioned from a centrally planned to a market economy and some industrial economies.[7]

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[3] The policy conclusions of our paper thus mostly coincide with those of Goldstein (2002).

[4] It is useful to distinguish among three generic types of dollarization that broadly match the three functions of money: *payments* dollarization (also known in the literature as currency substitution), is residents' use, for transaction purposes, of foreign currency in cash, demand deposits, or central bank reserves; *financial* dollarization (also referred to as asset substitution) consists of residents' holdings of financial assets or liabilities in foreign currency; *real* dollarization is the indexing, formally or de facto, of local prices and wages to the dollar. In turn, financial dollarization may be *domestic* (i.e., associated to claims of residents, including against the government), or *external* (i.e., associated with the claims of nonresidents against residents).

[5] On dollar cash holdings in transition economies, see Porter and Judson (1999). Offshore holdings of foreign exchange deposits are very sizable for many countries, especially in Africa (Hanson, 2002, 2003).

[6] In Mexico, for example, there are indications that claims on institutional investors, which are largely invested in dollars, have grown much faster than claims on banks during recent years. Moreover, the scope for dollar lending is enhanced through the use of derivatives, as banks lend a substantial fraction of their peso deposits in dollars and cover their exposure through forward foreign exchange transactions.

[7] Our sample encompasses the 1990-2001 time span but data for the full period are not available for all countries (see Appendix Table 1).

Very high rates of dollarization have been recorded in some countries in all regions of the world, with the overall maximum of almost 95 percent in Cambodia approached closely by the 93 percent recorded in Bolivia, and upwards of 80 percent in Bosnia-Herzegovina, Angola, and Georgia, for example and almost 70 percent in Lebanon. Clearly, however, the dollarization phenomenon has not affected all countries equally, with some countries remaining nearly untouched. In some cases, such as in Brazil, Colombia,[8] Thailand, Venezuela and some of the Caribbean islands, official prohibition of, or restrictions on, dollarization has limited dollarization.

With some exceptions, de facto dollarization has gained ground across the board in recent years. Annual trend growth in dollarization across the world during the past decade is estimated at about 1 percentage point per year (Box 1). All in all, 64 countries displayed a clear upward trend throughout the sample period. Yet, there have also been important variations in dollarization trends, both across regions and across countries. Dollarization increased most sharply in Latin America and the transition countries (Table 1; Figure 1); it also increased, albeit somewhat more moderately, in Africa, Asia, and the Middle East; it remained constant on average (and low) in the Caribbean region and the industrial countries. The evolution of dollarization over time has also varied substantially across countries (Box 2). A handful of countries, including Egypt among the developing countries, Israel and Mexico among the emerging market countries, and Poland, Hungary, Slovenia and Latvia among the transition economies, have experienced important reductions in dollarization in recent years.

Table 1. Evolution of Average Foreign Currency Deposits to Total Deposits
(in percent, unless otherwise indicated)

Regions	Number of countries	1996	1997	1998	1999	2000	2001
South America	8	45.8	46.1	49.4	53.2	54	55.9
Transition Economies	26	37.3	38.9	43.5	44.3	46.9	47.7
Middle East	7	36.5	37.2	37.7	37.5	38.2	41.9
Africa	14	27.9	27.3	27.8	28.9	32.7	33.2
Asia	13	24.9	28	26.8	28.8	28.7	28.2
Central America and Mexico	7	20.6	20.8	22	22.1	22.5	24.7
Caribbean	10	6.3	7.6	6.8	6.7	6.1	6.2
Developed countries	14	7.4	7.5	7.5	6.7	7	6.6

Sources: IFS, EDSS, and central banks' statistical publications.

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[8] Like Chile, Brazil and Colombia have also developed alternative indexation mechanisms, such as price-indexed or floating rate instruments.

Box 1. Estimating Trend Dollarization

Trend dollarization can be estimated from a pooled cross-section time series regression $y_{i,t} = \alpha_i + \beta y_{i,t-1} + \gamma t$, where y is dollarization and t the year. The estimated coefficient β is 0.63 with a t-statistic of almost 24; the estimated time trend coefficient γ is 0.32 with a t-statistic of almost 4. These estimates imply that the trend share of dollarization for each country, calculated as $(\alpha_i + \gamma t)/(1 - \beta)$, increases by about 0.9 percentage points per annum, while deviations from the trend line are closed at the rate of 63 percent of the deviation per annum.

Surprisingly, the data set as a whole reveals no indication of a ratchet effect. A simple test for this is to include the "maximum share to date" as an additional regressor (see Appendix Table 2). If there were a loose ratchet effect, then economies with a high previous dollarization should, all other things being equal, tend to have a high current dollarization. Thus, the historic high should have a positive effect, but in fact the estimated coefficient is both very small and altogether insignificant (t=0.3).

An additional point is worth mentioning: namely, there is an important mechanical valuation effect linking exchange rate changes with measured dollarization shares. If D is total value of domestic currency deposits, measured in local currency, F the total value of foreign currency deposits, measured in foreign exchange, and if E is the exchange rate, then the dollarization ratio y can be written $FE/(FE + D)$. Rearranging, we obtain: $1/y = 1 + D/FE$. Thus, even without any change in the values of D or F, a change in the exchange rate E will pass through to affect dollarization. A panel log-regression of the (log) change in y on both its lagged value and the change in exchange rate suggests that almost two-fifths of any exchange rate change over the previous year is passed through to next period's dollarization rate. Alternatively, fitting $y_{i,t} = \alpha_i + \beta y_{i,t-1} + \gamma t + \delta(e_{it} - e_{it-1})$, where e is the log exchange rate, we obtain fitted values as follows. The estimated coefficient β is 0.68 with a t-statistic of almost 26; the estimated time trend coefficient γ is 0.34 with a t-statistic of over 4. These estimates imply that the trend share of dollarization for each country, calculated as $(\alpha_i + \gamma t)/(1 - \beta)$, and as such assuming long-run exchange rate stability, increases by about 1.1 percentage points per annum, while deviations from the trend line are closed at the rate of 68 percent of the deviation per annum.

Box 2. Varied Dynamics

Running against the general experience, a handful of countries and areas had a systematic downward trend[1] during the sample period. The biggest reductions in our sample were in Bosnia and in Egypt; both are countries that recovered from very high inflation episodes; two other post-inflationary transition economies—Slovenia and Poland— also saw sizable reductions. More surprising is the presence in this group of Hong Kong SAR and Saudi Arabia. Despite the falls, all of the six countries and areas mentioned still have moderate-to high deposit dollarization—about 18 per cent and up. It should also be noted that two emerging market countries, Israel and Mexico, reported significant declines in dollarization during the first part of the 1990s (these declines do not show up in our sample for these countries, which starts in 1997).

A further handful of countries experienced a hump-shaped pattern, with dollarization first rising, then falling in the sample period. Two transition economies—Latvia and Hungary—are most conspicuous in this category.[2]

About a dozen display U-shaped curves: dollarization first falling and then rising. Six of these countries are transition economies in Central and Eastern Europe (Albania, Armenia, Czech Republic, Estonia, Georgia, Lithuania), and three are transition-type economies outside Europe (Mongolia, Mozambique, Republic of Yemen). Here we may suppose that initial attempts at stabilization succeeded in lowering initial high dollarization levels, but subsequently the general worldwide upward trend resumed. One (United Arab Emirates) is an offshore center. The last two (Chile and the Democratic Republic of the Congo) are different. The Democratic Republic of the Congo remains a most unstable macroeconomy as witness its always high dollarization ratio. Chile's ratio has fluctuated around an increasing, though still moderate trend.

Eight countries (Bahrain, Belarus, Ghana, Malawi, Nigeria, Russia, Tanzania, Ukraine) exhibit somewhat erratic movements. The remaining 63 countries have either fairly steady upward trends or only small movements.

1/ This analysis of contrasting trends is based on the following classification. A steady downward (upward) slope means that the latest figure is less (greater) than the maximum by more than 3 percentage points and there were no years in which the figure increased (decreased) by as much as 3 percentage points. U-shaped and hump-shaped patterns mean that the time series can be divided into upward and downward sloping subperiods, using the above definition. Countries with less than 3 percentage points bracketing max and min figures are said to have small movements, and the remainder are said have erratic movements.

2/ The two other largest countries in this category reflect special events: Greece's decline in 2001 reflects its adoption of the euro in that year; Indonesia's peak in 1997 surely owes much to the valuation effect of the sharp devaluation in that year.

The patterns in Table 1 and Figure 1 raise two basic questions: (i) why has financial dollarization continued to gain ground, on the whole? and (ii) what factors have influenced the contrasting experience of different countries? The first question is apparently all the more puzzling in view of the stark contrast between the rising dollarization and the declining worldwide inflation.

Figure 1. Dollarization and Inflation
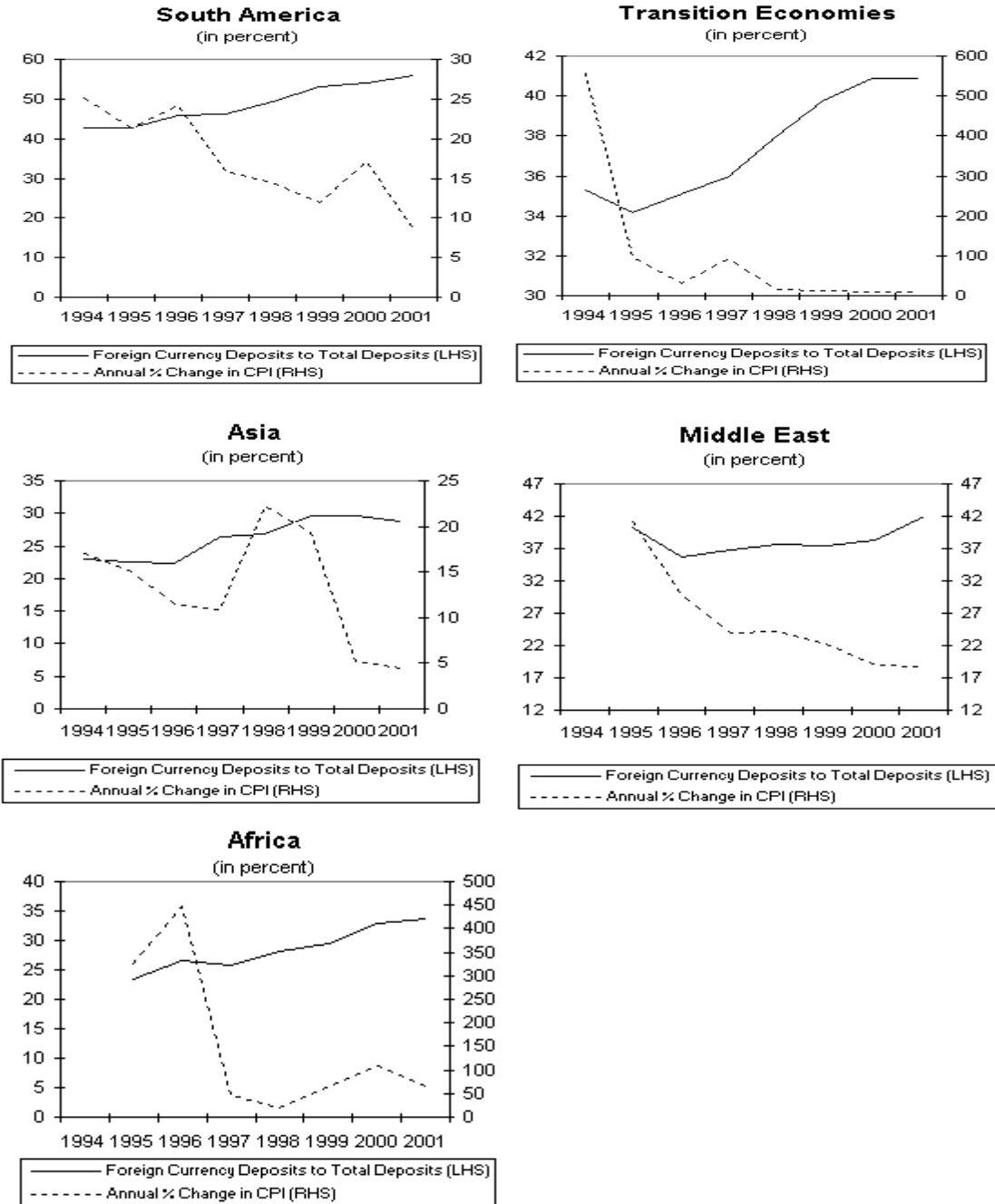
Before proceeding to explore these questions, some useful observations need to be made on the extent to which different forms of dollarization are correlated. Financial dollarization patterns, as measured by the dollarization of domestic loans (instead of deposits), are broadly similar. However, loan dollarization is generally lower than deposit dollarization as banks often maintain a sizable fraction of their foreign currency deposits in liquid correspondent accounts or sovereign assets abroad. The cross-country relationship between loan dollarization and deposit dollarization is less than proportional, with a 10 percent increase in foreign currency deposits resulting, on average, in a 7.3 percent increase in foreign currency loans (Figure 2).[9] This asymmetry appears largely to reflect the inherent risks attached to dollar intermediation, that induce banks to limit their dollar loans and maintain large dollar liquidity buffers.

Figure 2. Deposit and Loan Dollarization
(logarithmic scale)
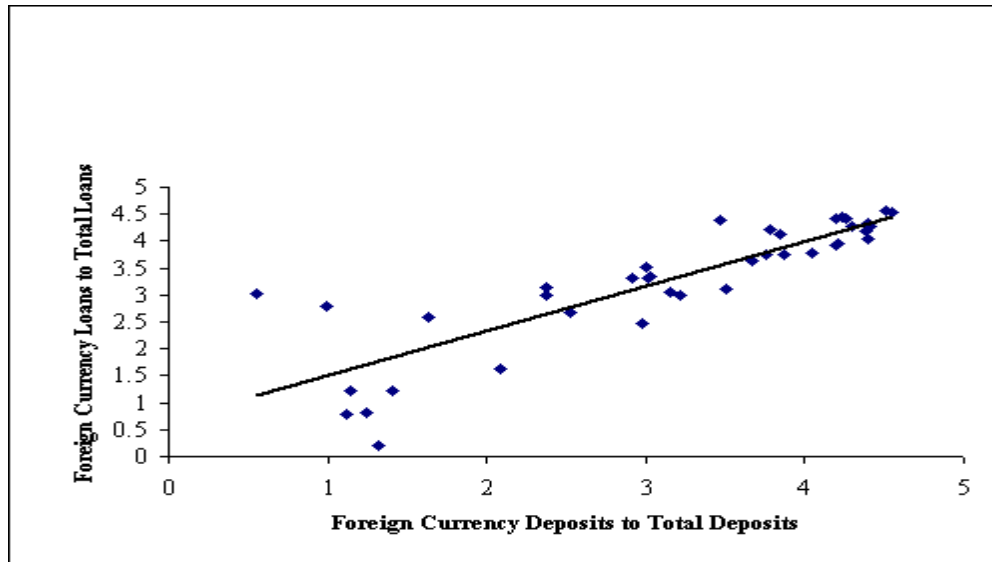
On the other hand, real dollarization (the use of the dollar for price and wage contracts) appears to remain generally limited, even in financially highly dollarized countries. While data limitations prevent a direct measurement, the pass-through of exchange rate changes into prices provides useful indirect evidence. A clear positive correlation exists between financial and real dollarization (Figure 3). However, the relationship is subjected to substantial variability and is much less than proportional (the elasticity between financial dollarization and real dollarization is only about 0.25), suggesting that other factors are at play than those causing financial dollarization.[10] This broad-brush econometric evidence is

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[9] This asymmetry was first detected by Honohan and Shi (2003).

[10] Here we use the estimates of the one-year pass-through reported in Choudhri and Hakura (2001). Similar evidence is reported in Honohan and Shi (2003).

supported by casual evidence in highly dollarized countries, such as Bolivia and Peru, which indicates that the vast majority of wages continues to be paid in local currency, with only few exceptions (such as for some top executives).[11]

Figure 3. Financial and Real Dollarization
(in percent)
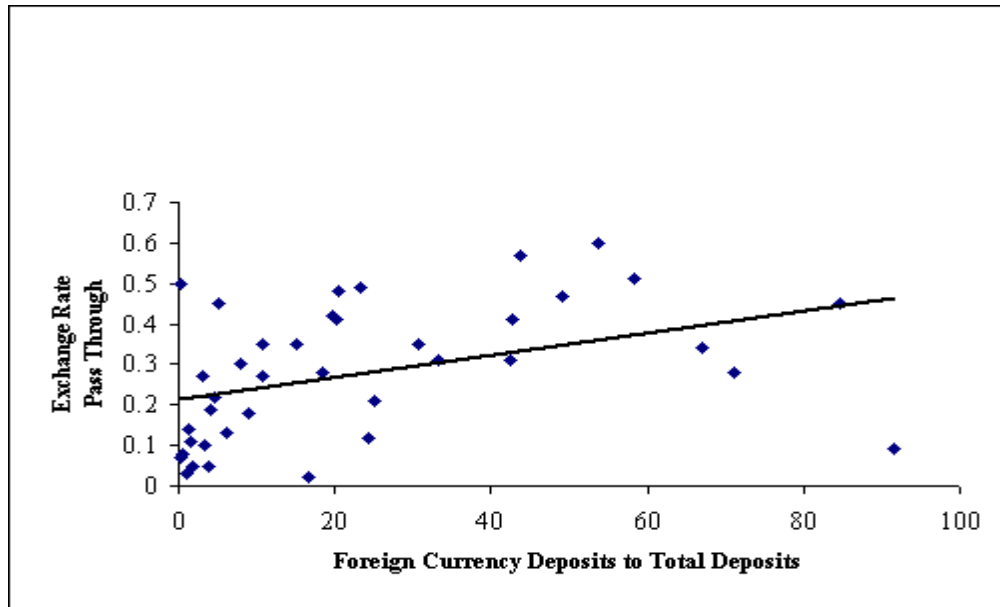
III. **WHAT CAUSES DOMESTIC DOLLARIZATION?**

A. Theory

Explanations for payments dollarization have been amply discussed in the currency substitution literature, based on inflation differentials that penalize the holdings of domestic currency.[12] While some holdings of foreign currency deposits may also simply reflect the convenience of having transactions balances in the currency of payments, especially by corporates involved in foreign trade, this cannot explain dollar holdings in the financial

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[11] Nonetheless, dollar indexation in the real sector appears to have made inroads over the years. In Bolivia, for example, it now affects most utility prices, pensions, parts of the tax system, accounting standards, and some supplier contracts. In Peru, a number of services, including residential and commercial leases, real estate, professional services, and insurance premia, are priced in dollars.

[12] While the persistent use of the dollar once inflation has abated (hysteresis) has been amply documented in the currency substitution literature, based on transaction costs and "network" externalities, the opposite phenomenon, the persistent use of the local currency for payments, even at the height of hyperinflations or when financial dollarization has become practically universal, is equally noteworthy. The wide availability of local cash, which is supplied at no cost, and the injection of local currency through public sector payments activates Gresham's Law, e.g., the public disposes of the "bad" local currency it receives by using it for payments and keeps the "better" currency (the dollar) under the mattress.

system on the observed scale. As term deposits, rather than demand deposits, constitute the bulk of total dollar deposits, explanations for financial dollarization clearly need to be based on different premises. Under the reasonable premise that interest rate parity holds, at least approximately, interest rate differentials should offset any predictable inflation differential, equalizing expected returns in both currencies. Thus, while inflation levels may still matter at the margin (to the extent they distort the intertemporal pattern of debt-servicing costs), explanations for financial dollarization must essentially be based on volatilities rather than levels. Domestic residents should prefer to denominate contracts in foreign currency when its purchasing power in terms of domestic consumption is stable (e.g., the expected volatility of the real exchange rate is low) relative to that of the local currency (as measured by the expected volatility of inflation).

Based on a static CAPM model with risk averse borrowers and lenders, Ize and Levy Yeyati (1998) find considerable support for this hypothesis. Domestic financial dollarization can be largely explained across a wide spectrum of countries through minimum variance portfolio (MVP) allocations that reflect a closed equilibrium in the market for loanable funds and depend on the relative volatilities of inflation and the real exchange rate. Ize and Levy Yeyati explain the permanence of domestic financial dollarization after inflation has abated by the fact that the volatility of the real exchange rate may have declined as much as (or more than) that of inflation. They find this to have been the case in several of the highly dollarized Southern American economies and interpret it as a manifestation of "fear of floating."

This simple portfolio approach provides a number of useful additional insights. In particular, it identifies a causal channel from globalization to financial dollarization (due to the higher weight of tradable goods in the consumption basket, more open economies should be financially more dollarized) and between financial dollarization and financial repression (unremunerated reserve requirements or administrative limits on interest rates on local currency deposits should depress local currency intermediation, particularly under an inflationary environment; see Ize and Levy Yeyati, 1998, and Catão and Terrones, 2001). Strikingly, the portfolio approach explains the increased dominance of the dollar over weaker currencies as contract maturities lengthen. The uncertainty attached to future inflation (a nominal variable) rises without bound over the time horizon, unlike that of the real exchange rate, which is anchored by a long-term purchasing power parity condition.[13]

Observed variances and covariances need not correspond to their expected values, however, notably where there is a nonegligible probability of a major regime change ("peso effect").[14] Thus, the persistence of dollarization can also be explained by credibility effects as enduring fears of a collapse of the monetary regime and a return to high and unstable inflation lead to a persistent wedge between expected and observed volatilities. In the extreme case of a fixed

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[13] The relative stability of U.S. real interest rates (together with the constancy of the real exchange rate over the long term) provides an additional reason for preferring dollar-denominated long-term instruments to long-term local currency instruments (which are generally more exposed to interest rate risk). This argument is formally developed by Campbell, Viceira, and White (2002) in an intertemporal portfolio model.

[14] Persistent high excess returns on local-currency-denominated assets accompanying exchange rate stability, punctuated by occasional sharp devaluations and negative excess return events, is a stylized feature of numerous emerging market economy experiences (Cochrane, 1999).

peg, such as a currency board, the preference for dollars only depends on expectations of how monetary policy would be managed in the event of a collapse, no matter how remote this eventuality (Ize and Parrado, 2002). The probability and modalities of such a collapse are likely to reflect a host of factors, including fiscal discipline, as well as the institutional, political, legal, and even cultural environment. Proxy variables capturing systematic differences in these dimensions can thus be expected to have some explanatory power for dollarization in addition to observed volatilities.

Lack of monetary credibility can also explain dollarization without resorting to portfolio effects, when combined with the possibility of debt defaults. Calvo and Guidotti (1989) provide an early illustration of this effect in the context of public debt. Lack of monetary credibility (deriving from the monetary authorities' inability to precommit) can raise the cost of domestic currency debt to the point where it becomes optimal for the government to effectively default on the debt (through inflation). In such cases, the local currency ceases to be an effective medium for financial contracts. Instead, indexed debt (including dollar debt) becomes the medium of choice. Jeanne (2002) shows that lack of monetary credibility can similarly undermine the usefulness of the local currency in private contracts. The expectation of a depreciation under a fixed peg (that increases the risk premium on local currency debt) induces a shift to the dollar because it increases the probability of default on local currency loans and, hence, increases the cost of insurance against devaluations. The rationale is much the same as that of a driver who, faced with an increase in his insurance premium, decides to drive without insurance.[15]

In all of the above papers, it is important to note, however, that dollarization is a rational response to a weak monetary policy. The level of dollarization chosen by private agents conditional on a given underlying macro volatility and monetary regime yields an optimal currency mix in terms of risk-cost trade-offs.

In contrast, the possibility of debt defaults can promote *socially excessive* dollarization when combined with moral hazard. In McKinnon and Pill (1999), Dooley (2000), Schneider and Tornell (2000), and Burnside, Eichenbaum, and Rebelo (2002), the source of moral hazard is government intervention that provides free insurance against currency risk. When borrowers and lenders expect to be bailed out by governments in the event of a large depreciation, they do not fully internalize the risks they bear when borrowing in foreign currency. Instead, they benefit from low and stable dollar rates as long as the exchange rate holds and expect the government to insure them against potential losses in the event of a large depreciation. Because it is hard for governments to convincingly precommit not to bailout, the maintenance of a stable exchange rate in a dollarized economy can be perceived as an implicit commitment of the monetary authorities. Thus, reneging on this commitment is viewed as a "catastrophic" systemic event calling for government intervention. In this

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[15] While contracting in local currency provides a way for borrowers to protect themselves against a large potential increase in the cost of debt, this insurance benefit disappears when the high cost of insurance can itself cause a default. Borrowers prefer then to borrow in dollars because (for a moderate devaluation probability) the odds of defaulting on dollar loans are lower than those of defaulting on local currency loans. Risk in this model is not measured by historic volatility and second moments but by first moments, as reflected in risk premia.

paradigm, large international reserves and exchange rate pegs (or quasi-pegs) can thus encourage financial dollarization by enhancing the value of the government guarantee.

Moral hazard can also arise due to market failures or a deposit insurance. In Aghion, Bacchetta, and Banerjee (2001) and Chamon (2001), because borrowers are more likely to default when the exchange rate depreciates and their debt is in dollars, they do not internalize the actual cost of dollar borrowing. At the same time, because creditors do not observe the currency composition of borrowers' total debt, and local currency claims get diluted relative to dollar claims under a liquidation, they require a high premium on local currency loans, thereby increasing the cost of borrowing in local currency. In equilibrium, incentives for excessive dollar borrowing are thus generated from both the supply side and the demand side of the market for loanable funds. Broda and Levy Yeyati (2003) show that, by limiting the risk of lending in dollars, a deposit insurance that applies uniformly across all deposits exacerbates such incentives for dollarization.[16]

B. Empirical Estimates

Basing our specifications on the above theoretical discussion, we conducted cross-section estimates of the determinants of dollarization levels. Results are reported for three alternative dependent variables: (i) the 2001 level of deposit dollarization (ratio of onshore foreign currency deposits to total bank deposits); (ii) the average level for available years during the sample period 1990-2001; and (iii) a calculated country-specific equilibrium level for 2001, based on a simple trend-augmented autoregressive model. The second and third alternatives have the advantage of being available for more countries; the third is intended to take account of the many countries which experienced substantial variation in dollarization during the sample period and for which the simple average would be unrepresentative of the equilibrium situation at the end of the period. In the event, results for the three alternative dependent variables are quite similar, as are those (unreported) for a fourth, namely the maximum level of dollarization recorded for each country during 1990-2001.

To account for the impact of administrative restrictions on dollar deposits, we constructed a dummy variable based on several indicators.[17] The main additional explanatory variables

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[16] Risk factors can also work against dollarization. For instance, the risk of local bank failure could encourage the export (legal or otherwise) of all but local currency transactions balances to offshore banks, thereby lowering (onshore) dollarization. The same would apply to the risk of expropriation or capital levies, more so if these were expected to be selectively applied to foreign exchange deposits (as with compulsory conversions at off-market rates in the case of Mexico, 1982 and Argentina, 2001 to mention just the most well-known). Fear of imposition of capital controls or the introduction of non-market-clearing exchange rates would fall into the same category.

[17] The IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* contains information about the regulatory position in this regard. Our summary of the major features is tabulated in Appendix Table 3 for the countries in our dollarization sample, along with particulars for a handful of other countries included as controls. These additional countries are included because they either have or had in the recent past rather restrictive rules about resident onshore foreign currency deposits. Not surprisingly, most of the countries for which we have data on dollarization have a fairly liberal regime. Indeed, the trend has been generally towards liberalization in this regard. For example, the table provides an instant explanation for the very low rate of dollarization recorded for tiny Dominica: this can easily be attributed to the restrictive rules. On the other hand, although Appendix Table 3 shows our own simple composite index of restrictiveness, it is not possible from the

(continued)

employed in the estimation are intended to capture the risk environment. They include:
(i) risk measures based on observed price movements: the "warranted" dollarization share
based on the minimum variance portfolio calculated from historic variances and covariances
of prices and exchange rates (as discussed above),[18] and the correlation between the price of
foreign exchange and GDP as a measure of the potential of the dollar as a real hedge;[19]
(ii) proxies for policy credibility effects, including the rate of inflation;[20] the adoption of a
formal inflation targeting regime; institutional variables based on the measures of political
and institutional development originally assembled by Kaufman, Kraay, and Zoido-Lobaton
(KKZ, 1999) and a measure of legal protections of creditors;[21] and (iii) a dummy regional
variable for countries in transition.[22]

The results reported in Regression Tables 2 (A, B and C) show that the "market share" of
foreign-currency-denominated deposits does respond as anticipated to indicators of the
overall risk environment. Regression 1.1 shows the role of the core regulatory and market
risk factors. The dummy variable measuring administrative restrictions is highly significant
with a coefficient that implies that shifting from completely unrestricted to highly restricted
would lower dollarization by about 37 percentage points. The predicted minimum variance
portfolio is also highly significant with a coefficient that implies that an increase of
2 percentage points in the minimum variance portfolio would increase actual dollarization by
almost 1 percentage point. These two variables remain significant through all of the
specifications explored and their coefficients remain of the same order of magnitude
throughout, though with the minimum variance portfolio's impact falling to about one for
three instead of one for two.

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information provided to be confident of having obtained a fully satisfactory overall index. For example, when
the *Report* states that prior approval is required, it is not clear how much discretion is applied and whether
implicit or unreported requirements for such approval are significant.

[18] The calculation is $\lambda = \dfrac{V(\pi) + Cov(\pi, s)}{V(\pi) + V(s) + 2Cov(\pi, s)}$ where π is inflation and s is real depreciation. The underlying
model assumes uncovered interest parity and thus the minimum variance portfolio depends only on price and
exchange rate covariances (cf. Ize and Levy-Yeyati, 2003).

[19] Because exchange rate depreciations are often accompanied by output drops when caused by external shocks
or confidence crises, the dollar may be viewed as a "safe haven" by depositors if it provides high financial
returns at a time when real incomes are falling.

[20] The rate of inflation, measured as a multi-year average, is seen as a measure of overall macroeconomic
stability and credibility and not as a rate of return: after all it is not the opportunity cost of holding interest-
bearing local currency deposits.

[21] The legal protections variable employed is based on the historic origin of each country's legal system and
draws on extensive recent econometric analysis of the relevance of legal protection of creditors for different
aspects of financial development (cf. La Porta et al., 1998; Levine et al., 1999).

[22] We also used trade openness in unreported equations, but it was not significant.

Table 2-A. Cross-sectional Determinants of Dollarization
(Dependent Variable: 2001 dollarization)

Equation:	1.1		1.2		1.3		1.4		1.5		1.6	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	30.6	***8.9	50.2	***10.0	44.47	***7.6	40.3	***5.3	28.6	***3.4	31.6	***3.7
Restrictions on doll	-7.48	***3.1	-6.90	***4.2	-8.24	***4.4	-8.69	***4.6	-7.59	***4.2	-8.01	***4.6
Min. var. portfolio	46.6	***3.7	34.8	***3.0	35.2	***2.7	31.8	***2.4	33.4	***2.6	30.2	**2.4
Inflation (log)			8.16	***4.7	4.74	*1.9	3.73	1.3	2.50	0.9	2.72	1.0
Institutions					-9.26	**2.0	-10.3	**2.2	-8.92	**2.0	-6.88	1.5
Transition							8.39	1.4	17.2	***2.7	16.3	***2.7
Legal protections									13.9	**2.2	13.7	**2.3
Inflat Targeting											-11.6	*1.9
R-squared / NOBS	0.221	78	0.406	72	0.439	70	0.457	70	0.491	70	0.511	70
Adjusted R-squared	0.200		0.380		0.404		0.414		0.442		0.456	
S.E. of regression	24.1		21.4		21.1		20.9		20.4		20.2	
Log likelihood	-357.4		-320.8		-310.1		-309.0		-306.7		-305.3	

Equation:	1.7		1.8		1.9		1.10		1.11		1.12	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	33.7	***4.2	31.8	***3.7	34.6	***3.5	36.5	***3.7	48.7	***6.3	37.6	***3.9
Restrictions on doll	-7.50	***4.0	-8.0	***4.4	-6.44	***3.5	-6.61	***3.6	-7.65	***3.9	-6.02	***3.3
Min. var. portfolio	30.8	***2.7	30.1	**2.5	25.2	**2.1	26.9	**2.2	28.1	**2.2	22.2	*1.9
Inflation (log)	4.40	**2.1	3.13	1.2	3.90	1.3	4.11	1.4	5.36	*1.7	5.25	*1.8
Institutions			-4.43	0.9	-2.47	0.5	-2.86	0.6	-7.23	1.5	1.16	0.2
Transition	16.9	***2.8	17.0	***2.9	12.3	***11.7	9.81	1.5	-0.50	0.1	15.7	**2.5
Institutions x Transn	-13.9	**2.4	-10.8	*1.7							-20.6	***3.1
Legal protections	15.9	**2.5	14.8	**2.4	17.6	**2.2	16.0	*1.9			18.3	**2.1
Inflat Targeting	-13.4	**2.3	-11.7	*1.9	-12.0	1.5	-9.86	1.2			-9.94	1.2
GDP-hedge					-5.14	0.9	-8.64	1.2	-13.0	**2.1	-7.52	1.2
GDP-hdg x Transn							12.1	1.1	20.8	**2.1	10.6	1.1
R-squared / NOBS	0.516	70	0.522	70	0.520	56	0.529	56	0.477	56	0.560	56
Adjusted R-squared	0.462		0.460		0.438		0.437		0.413		0.462	
S.E. of regression	20.0		20.1		20.0		20.0		20.5		19.6	
Log likelihood	-304.9		-304.5		-242.4		-241.8		-244.8		-239.9	

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 2-B. Cross-sectional Determinants of Dollarization
(Dependent Variable: Average Dollarization)

Equation:	1.1		1.2		1.3		1.4		1.5		1.6	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	26.3	***8.5	43.5	***10.0	39.2	***7.6	34.7	***5.1	25.8	***3.6	27.9	***3.7
Restrictions on doll	-5.65	***3.6	-5.02	***3.8	-5.87	***3.9	-6.4	***4.2	-5.47	***3.7	-6.33	***4.4
Min. var. portfolio	38.0	***3.5	29.9	***2.7	30.7	**2.4	26.7	**2.1	27.8	**2.3	25.6	**2.1
Inflation (log)			7.04	***4.9	4.60	**2.3	3.45	1.4	2.44	1.1	2.69	1.2
Institutions					-6.39	*1.8	-7.63	**2.0	-6.80	*1.9	-4.59	1.2
Transition							9.39	*1.7	15.9	***2.9	15.9	***2.9
Legal protections									10.8	**2.1	11.2	**2.2
Inflat Targeting											-9.32	1.5
R-squared / NOBS	0.199	84	0.382	77	0.401	75	0.432	75	0.462	75	0.488	75
Adjusted R-squared	0.179		0.357		0.367		0.390		0.414		0.434	
S.E. of regression	20.5		18.5		18.4		18.1		17.7		17.5	
Log likelihood	-371.5		-331.9		-322.3		-320.4		-318.3		-312.7	

Equation:	1.7		1.8		1.9		1.10		1.11		1.12	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	29.6	***4.5	28.0	***3.8	29.6	***3.7	30.7	***3.9	42.5	***6.1	31.8	***4.0
Restrictions on doll	-6.01	***4.1	-6.34	***4.4	-4.97	***3.4	-4.99	***3.5	-5.11	***3.2	-4.72	***3.4
Min. var. portfolio	26.2	**2.3	25.6	**2.1	20.4	*1.7	21.5	*1.8	21.4	*1.7	18.5	1.5
Inflation (log)	3.86	**2.2	2.93	1.3	3.63	1.6	3.85	*1.7	5.36	**2.1	4.52	*1.9
Institutions			-3.19	0.8	-0.11	0.6	-0.15	0.0	-4.17	1.0	2.19	0.5
Transition	16.0	***3.0	16.3	***3.0	12.7	0.0	11.3	**2.1	1.83	0.3	14.8	***2.7
Institutions x Transn	-8.91	*1.9	-6.67	1.3							-13.7	*1.9
Legal protections	12.3	**2.4	11.7	**2.3	16.5	**2.2	15.8	**2.5			16.8	***2.7
Inflat Targeting	-10.8	*1.9	-9.42	1.5	-9.54	***2.7	-8.02	1.0			-8.32	1.0
GDP-hedge					-2.61	1.2	-4.58	0.9	-7.09	1.4	-4.46	0.9
GDP-hdg x Transn							7.89	0.8	13.8	1.6	7.44	0.9
R-squared / NOBS	0.490	74	0.494	74	0.504	59	0.510	59	0.426	60	0.529	59
Adjusted R-squared	0.436		0.432		0.425		0.420		0.349		0.431	
S.E. of regression	17.5		17.6		17.0		17.0		17.9		16.9	
Log likelihood	-312.6		-312.3		-245.9		-245.5		-253.9		-261.0	

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 2-C. Cross-sectional Determinants of Dollarization
(Dependent Variable: Calculated Trend Dollarization)

Equation:	1.1		1.2		1.3		1.4		1.5		1.6	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	30.4	***9.0	49.9	***9.6	44.8	***7.7	40.8	***5.3	31.6	***3.8	34.0	***4.1
Restrictions on doll	-5.77	***3.3	-5.26	***3.8	-6.47	***4.0	-6.90	***4.3	-5.98	***3.8	-6.70	***4.3
Min. var. portfolio	40.8	***3.5	29.4	**2.5	29.2	**2.1	25.7	*1.8	26.8	**2.0	24.3	*1.8
Inflation (log)			7.96	***4.4	4.98	**2.2	3.97	1.5	2.92	1.1	3.17	1.2
Institutions					-8.14	**2.1	-9.23	**2.3	-8.38	**2.2	-6.16	1.5
Transition							8.26	1.4	15.0	**2.4	14.7	**2.5
Legal protections									11.2	**2.0	11.3	**2.1
Inflat Targeting											-10.1	1.6
R-squared / NOBS	0.184	84	0.381	77	0.409	75	0.429	75	0.457	75	0.477	74
Adjusted R-squared	0.163		0.355		0.375		0.387		0.409		0.422	
S.E. of regression	22.7		20.1		19.9		19.7		19.3		19.2	
Log likelihood	-380.0		-338.2		-328.0		-326.7		-324.8		-319.5	

Equation:	1.7		1.8		1.9		1.10		1.11		1.12	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	36.4	***4.6	34.2	***4.1	35.7	***4.0	36.5	***4.1	48.5	***6.1	38.0	***4.3
Restrictions on doll	-6.26	***4.0	-6.72	***4.3	-5.56	***3.7	-5.57	***3.7	-5.83	***3.4	-5.21	***3.5
Min. var. portfolio	25.2	**2.0	24.3	*1.9	18.2	1.4	19.0	1.4	19.6	1.4	14.8	1.2
Inflation (log)	4.76	**2.1	3.48	1.4	3.88	1.4	4.03	1.5	5.64	*1.9	4.95	*1.8
Institutions			-4.40	1.0	-1.82	0.4	-1.84	0.4	-6.04	1.4	1.37	0.3
Transition	14.8	**2.5	15.2	**2.5	11.9	**2.0	10.9	*1.9	1.16	0.2	15.8	***3.0
Institutions x Transn	-11.5	**2.2	-8.41	1.4							-18.8	***3.0
Legal protections	12.8	**2.3	12.0	**2.2	16.7	**2.5	16.2	**2.3			17.6	**2.5
Inflat Targeting	-12.1	**2.0	-10.2	1.6	-10.7	1.3	-9.73	1.1			10.1	1.2
GDP-hedge					-3.33	0.7			-7.64	1.3	-4.49	0.8
GDP-hdg x Transn									12.44	1.3	4.69	0.5
R-squared / NOBS	0.478	74	0.485	74	0.492	59	0.494	59	0.423	60	0.524	59
Adjusted R-squared	0.422		0.422		0.411		0.401		0.345		0.425	
S.E. of regression	19.2		19.2		18.8		19.0		19.7		18.6	
Log likelihood	-319.5		-318.9		-251.9		-251.8		-259.6		-250.0	

 ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Inclusion of the inflation rate (in log form) substantially improves the fit of the simplest regressions (regression 1.2). The estimated coefficient implies that a doubling of inflation increases dollarization by about 5 percentage points. Yet, it loses significance as structural and institutional proxies for credibility effects are added in, suggesting both that credibility effects are important *and* that credibility (and inflation) have important structural and institutional underlying determinants. In particular, regression 1.3 shows that the unweighted normalized mean of the six institutional quality variables of KKZ has the predicted sign. An improvement of one standard deviation in institutional quality lowers fitted dollarization by almost 10 percentage points. To the extent countries with weaker institutions are more likely to engage in government bail outs, the significance of institutional variables can be viewed as providing indirect support to the moral hazard interpretation of dollarization. All in all, this equation states that almost half of the cross-country variation in dollarization rates is explained by country differences in institutional quality, regulatory frameworks, and the macroeconomic environment. Inclusion of other variables, including the transition and inflation targeting dummies, and the GDP hedge variable, finds correct signs and marginally significant individual coefficients, but without much significant improvement in the overall fit of the equation.[23]

As noted, the increase in dollarization experienced by many countries appears puzzling when viewed exclusively in light of the dynamics of inflation. While the relatively short time span of our sample limits the scope for a full-fledged intertemporal analysis (further work is clearly needed to fully explore dollarization dynamics) a simple regression of dollarization dynamics, measured as the difference between 2001 dollarization and average dollarization, yields interesting and plausible results (Table 3). In particular, increases in observed dollarization are partly explained by increases in warranted dollarization. In view of the declining inflation, this seems to be consistent with a "fear of floating" interpretation, i.e., warranted dollarization rose because the volatility of the exchange rate fell even more than that of inflation. Increases in trade are also significant, suggesting that globalization may partly be responsible for the general upward trend in dollarization (albeit not the cross-country differences). Finally, dollarization trends appear to have been affected by the level (not the rate of change) of institutional quality and regulatory restrictions, suggesting the existence of complex dynamic interactions.

Table 3. Changes in Dollarization

Dependent Variable	Constant	RESTR	INST	DTO	DMVP	R2	Adj. R2	Countries
DDOLL	**4.28	**-1.78	**-3.95	**0.16	**4.75	0.24	0.19	62
t-stat	(3.37)	(-2.25)	(-3.05)	(2.12)	(2.51)			

Notes: DDOLL is the difference between 2001 dollarization and average dollarization, RESTR is the indicator of restrictions on dollarization, INST is the unweighted index of KKZ institutional quality indicators, DTO is the change in an indicator of trade openness, and DMVP is the change in the minimum variance portfolio measures between 1995 and 2001. ** and * indicate significance at the 5% and 10% levels, respectively.

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[23] Note that because of varying availability of data, the sample size varies, depending on the additional explanatory variables included, complicating the comparison of fit. Nevertheless, regression 1.6, including the transition and inflation targeting dummies and the legal protections variable is preferred to any of the others 1.3 to 1.8 by a log-likelihood ratio test at the 95 per cent level. At the stricter 99 per cent level, the inclusion of further variables beyond the three in regression 1.3 would not be justified.

IV. HAS DOLLARIZATION PROMOTED FINANCIAL DEVELOPMENT?

No study has so far attempted to assess directly the impact of dollarization on financial deepening.[24] Intuitively, it seems that allowing dollarization should help keep more of financial intermediation onshore, by offering depositors an inflationary hedge. After all, the empirical evidence that inflation damages financial sector development is quite convincing.[25] Generally speaking, it may be taken as a rough rule of thumb that monetary depth increases by about 3 percentage points for every $1,000 increase in GDP per capita and by about a quarter of a percentage point every year, but *falls* by about half a percentage point for every percentage point rise in the medium-term inflation rate (World Bank, 2001).

In particular, a recent study by Boyd, Levine, and Smith (2001) looks closely at the cross-country long-term determinants of financial depth and other measures of financial sector development focusing on the role of inflation. In addition to inflation, they include as controls the level of GDP per capita, the level of schooling (to measure overall economic development), a count of the number of revolutions and coups (to measure political stability), the black market premium on foreign exchange (an indicator of price distortions), and the ratio of central government expenditure to GDP.[26] Despite the inclusion of these control variables (not all of which prove to be significant), the average inflation rate in 1960-95 is found to be strongly negatively correlated with the average level of financial depth over the same period.[27]

More direct evidence on the impact of dollarization on financial development can be inferred from the negative experience of countries that have undertaken a forced conversion of dollar deposits into local currency, including Mexico and Bolivia in 1982 and Peru in 1985. As documented in Savastano (1996) and Baliño et al. (1999), the highlight of these experiences was a brutal contraction of onshore domestic intermediation. In Bolivia and Peru, intermediation only recovered once dollar deposits were reallowed.[28] Similar evidence can be derived from the experience of some countries that have repressed the use of the dollar and have not actively developed alternative indexation mechanisms (such as Ecuador, Guatemala, and Costa Rica). Faced with the regulatory and supervisory distortions resulting from the very rapid growth of offshore banking intermediation, most of these countries were led eventually to liberalize their regulations on foreign exchange deposits.

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[24] Honohan and Shi (2003) did examine the effects on interest rate spreads and on the ratio of local loans to deposits.

[25] While inflation volatility should also be included in an analysis of financial deepening, the level and variance of inflation tend to be highly correlated in practice, whether on a cross-country or time series basis, which makes it quite difficult to disentangle their relative importance.

[26] They do not include measures of legal rights and accounting quality, found to be very important determinants of financial depth in Beck, Loayza and Levine (2000), though that paper does not include inflation among the explanatory variables. See also Bordo and Jonung (1993).

[27] Similar evidence for the bond market is reported by Burger and Warnock (2003) who find that the level and volatility of inflation play an important role in explaining the development of local currency bond markets.

[28] In Mexico, banking intermediation recovered during 1988-94 as the exchange rate anchor and steady appreciation increased the attractiveness of peso instruments. However, the recovery proved to be ultimately unsustainable and the tequila crisis was followed by a prolonged period of renewed stagnation.

An econometric assessment of the impact of dollarization on financial development requires attention to endogeneity, as many of the factors influential for monetary depth are also among the determinants of dollarization.[29] Indeed, coexistence of financial shallowness and dollarization could be reflections of the same macroeconomic events rather than being causally linked. In this context, it is not very surprising that adding dollarization to log inflation in a simple cross-sectional least squares regression of financial depth, measured as share of M2 to GDP, yields a negative coefficient (Regression 2.1 in Table 4)[30] (Regression 2.9).

For high inflation countries, however, more dollarization is associated with deeper financial systems. An interaction term between dollarization and inflation has a strongly significant positive coefficient (equation 2.2), implying that dollarization has the effect of moderating the adverse effect of inflation on financial depth, exactly what theory predicts.[31] It is important to note that this effect is robust to estimation by two-stage least squares where the actual level of dollarization is substituted by its predicted value using institutional and other instruments (including the administrative restrictions on dollarization) (equation 2.3).[32] GMM estimation also confirms the effect (equations 2.7 and 2.8). Including the level of dollarization as well as the interaction term gives similar results (equations 2.10-2.15).[33]

Thus even though dollarization may have little impact on monetary depth where risk factors summarized by inflation are low, our regression results show that, where inflation is high, dollarization allows an economy to retain more monetary depth than it otherwise would.

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[29] While we limit our testing to quantitative rather than "qualitative" measures, dollarization may also contribute to improve the depth and quality of financial intermediation. In particular, the average maturity of dollar loan contracts is generally longer than that of local currency contracts. At the same time, bank spreads on dollar intermediation are generally narrower than those on local currency intermediation (see Barajas and Morales, 2003). Formal testing of such effects is hampered by the limited data availability and the need to sort out endogenous market segmentation effects associated with currency denomination.

[30] Somewhat surprisingly, though, the same result is obtained by an instrumental variable method that includes as instruments the main underlying determinants of dollarization (regulatory, macroeconomic or institutional).

[31] The threshold level of yearly inflation beyond which dollarization deepens financial intermediation is in the 20-30 percent range.

[32] The level of income per capita—a standard variable in such a context, is also significant (equation 2.5), though collinear when included along with institutional quality variables which are also significant when included separately (equation 2.4). The outliers Hong Kong SAR and Lebanon are excluded in these regressions; if they are included, the main effect is preserved as long as a dummy for offshore centers is included (equation 2.6). The results shown for the average sample period dollarization are confirmed when this is replaced by the actual or computed period end dollarization (not reported).

[33] Although the sign of the dollarization term is positive and significant in the GMM estimate, the overall effect of an increase in dollarization on financial depth continues to be negative for low levels of inflation as the interaction term (which is negative due to a negative log of inflation) dominates the dollarization term.

Table 4. Determinants of Monetary Depth

Equation:	2.1 Coeff.	t-Statistic	2.2 Coeff.	t-Statistic	2.3 Coeff.	t-Statistic	2.4 Coeff.	t-Statistic	2.5 Coeff.	t-Statistic	2.6 Coeff.	t-Statistic	2.7 Coeff.	t-Statistic	2.8 Coeff.	t-Statistic
Variable																
Constant	0.335	***4.9	0.234	***5.6	0.243	***5.1	0.286	***5.6	0.141	**2.2	0.137	1.5	0.301	***9.4	0.133	***3.8
Doll	-0.280	**2.5														
Doll x Log (inflat)			0.144	***3.7	0.174	***2.9	0.175	***3.0	0.162	***3.3	0.212	***2.7	0.132	***3.2	0.167	***6.0
Log (Inflation)	-0.075	***4.1	-0.116	***7.1	-0.117	***4.5	-0.101	***3.8	-0.129	***4.7	-0.156	***4.0	-0.054	**2.3	-0.106	***5.4
Government							0.082	**2.0					0.108	***3.9		
GNP/cap									0.233	***2.9	0.141	1.1			0.258	***6.7
Offshore center?											0.786	***4.7				
Instruments							A		B		B		A		B	
Countries and areas omitted	HKG,LBN		HKG,LBN		HKG,LBN		HKG,LBN		HKG,LBN		HKG,LBN		HKG,LBN			
R-squared / NOBS	0.387	69	0.444	69	0.315	47	0.372	47	0.477	42	0.474	43	0.262	47	0.428	42
Adjusted R-squared	0.368		0.427		0.283		0.328		0.436		0.419		0.211		0.383	
S.E. of regression	0.194		0.185		0.164		0.159		0.148		0.208		0.173		0.154	
Log likelihood/Method	16.8	OLS	20.2	OLS		2SLS		2SLS		2SLS		2SLS		GMM		GMM

Equation:	2.9 Coeff.	t-Statistic	2.10 Coeff.	t-Statistic	2.11 Coeff.	t-Statistic	2.12 Coeff.	t-Statistic	2.13 Coeff.	t-Statistic	2.14 Coeff.	t-Statistic	2.15 Coeff.	t-Statistic
Variable														
Constant	0.373	***4.3	0.166	*1.9	0.088	0.6	0.146	1.0	-0.067	0.5	0.045	0.2	-0.060	1.1
Doll	-0.296	*2.0	0.167	0.9	0.345	1.1	0.309	1.1	0.467	*1.7	0.424	1.0	0.516	***4.2
Doll x Log (inflat)			0.195	***2.7	0.301	**2.4	0.288	**2.4	0.346	***3.0	0.366	**2.1	0.328	***5.4
Log (Inflation)	-0.051	**2.1	-0.135	***4.8	-0.173	***3.1	-0.152	***2.8	-0.204	***3.8	-0.226	***2.9	-0.179	***5.3
Government							0.079	*1.9						
GNP/cap									0.227	***2.9	0.126	1.1	0.246	***6.3
Offshore center?											0.753	***4.3		
Instruments							A		B		B		B	
Countries omitted	HKG, LBN		HKG, LBN		HKG, LBN		HKG, LBN		HKG, LBN				HKG, LBN	
R-squared / NOBS	0.230	47	0.450	69	0.349	47	0.403	47	0.511	42	0.477	43	0.517	42
Adjusted R-squared	0.195		0.425		0.304		0.346		0.458		0.407		0.465	
S.E. of regression	0.175		0.185		0.162		0.157		0.145		0.210		0.144	
Log likelihood/Method		2SLS	20.6	OLS		2SLS		2SLS		2SLS		2SLS		GMM

Notes: Dependent variable: M2/GDP.

Instruments: Set A= Institutions, Polstab, Regqual, Voice, Corrupt, Legorigf, Trans, log(Inflation), Maxerate, Offcenter, Offshoredeps, Restrict(i), Min. Var. Portfolio; Set B=Set A + Gnppcppp. Note that instruments are not available for all countries.

Note: Doll x inflat means: Dollarization average x log (inflation) (coeff is multiplied by 100).

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

V. ARE DOLLARIZED FINANCIAL SYSTEMS INHERENTLY FRAGILE?

Financially dollarized systems have been conspicuous among recent high-profile financial crises. The Mexican 1982 "mex-dollar" crisis was an early illustration of such events.[34] There were a number of similar more recent episodes, particularly in Asia, Southern America, and Eastern Europe. The 2002 Argentina financial crisis and its ripple effects on its highly dollarized neighbors brought home the realization that domestic dollarization can greatly increase the fragility of financial systems.

Dollarized financial systems are exposed to both solvency and liquidity risks. As regards solvency, the main risk results from currency mismatches in the event of large depreciations. Currency mismatches can affect banks' balance sheet directly, or indirectly by undermining the quality of their dollar loan portfolio. In view of the tight regulatory limits generally applied to banks' open foreign exchange positions, it is mainly through its indirect effect on credit risk that use of dollars generates vulnerability.[35] Banks with large domestic dollar liabilities must balance their foreign exchange positions by either extending dollar lending to local currency earners or holding dollar assets abroad. To maintain their profitability and satisfy the pent-up demand for loans, they end up on-lending domestically a large share of their dollar deposits (Honohan and Shi, 2003), effectively transferring the currency risk to their unhedged clients and retaining the resulting credit risk.

The scope for currency mismatch is exacerbated by the wedge between financial and real dollarization. When most prices and wages continue to be set in local currency while financial dollarization is widespread, real and financial transactions are effectively made in different currencies. Thus, large depreciations can have catastrophic effects. Nor is this wedge limited to the private sector. A similar wedge may affect governments whose tax revenue is in local currency but that borrow in foreign currency to limit short-run debt-servicing costs or signal their commitment to a stable exchange rate. When the domestic banking system holds large claims against the government, public sector insolvency can thus immediately lead to banking insolvency. Moreover, as stressed in the balance sheet literature, currency mismatches in the event of large depreciations have broad macro-systemic ripple effects, particularly in terms of output losses, that compound the deterioration of banks' financial situation.

Systemic risk can also lead to the emergence of a risk premium on dollar deposits in local banks, to the extent that depositors fear that the banks may not be able to provide external dollar liquidity on demand in the event of a currency crisis. It is as if "local dollars," in the form of deposits at local banks, are a different currency to U.S. dollar deposits held offshore in the United States or a credible financial center. Yet, in the case of a drop in confidence

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[34] The Mexican 1982 crisis was triggered by an apparent loss of macroeconomic control, with a rapidly expanding fiscal deficit and public debt, and weak and confusing monetary and exchange rate management. The large claims of commercial banks on the government introduced a direct channel of transmission from fiscal insolvency to bank insolvency. A very similar sequence of events took place in Argentina during the more recent crisis.

[35] However, as documented by Garber (1996) in the case of Mexico, regulatory limits on banks' open positions are not always effective, however, as banks' positions in derivatives may be misreported.

leading to a flight to the U.S. dollar and a run on banks, banks need to pay off their dollar liabilities falling due at par. In the absence of an asset price adjustment that restore equilibrium through an exchange rate overshoot (as would be the case for local currency deposits), convertibility may not be sustainable or credible unless liquid dollar liabilities are backed by sufficient liquid dollar assets abroad. Instead, banks may run out of dollar liquid reserves and central banks of international reserves to provide dollar liquidity support.[36] When this happens, deposit contracts may need to be broken and disruptive or confiscatory measures taken, thereby validating creditors' fears and justifying the run.

Liquidity and solvency crises are clearly interrelated. By undermining the solvency of borrowers and banks, the credit risk deriving from a large devaluation heightens the risk of deposit withdrawals by concerned depositors, whether in anticipation of or as a reaction to the devaluation.

To test for the existence of dollarization-specific vulnerabilities, we run cross-country regressions of banks' exposure to solvency and liquidity risk on dollarization. We used a semi-log specification to allow for nonlinearities,[37] controlled for changes in underlying macro volatility, and used a standard instrumental variable method to control for potential reverse causality. As regards solvency risk, we consider two measures: the Z-index (Z) computed with 1995-2000 data, and the 2001 ratio of the nonperforming loans to total loans (NPL).[38] As controls for macroeconomic volatility, we use the MVP determinants of dollarization taken individually. Results show that the deposit dollarization ratio has a clear negative impact on both solvency proxies[39] (Table 5).

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[36] While under a floating exchange rate regime, central banks could in principle provide liquidity support in local currency against dollar deposit withdrawals, the impact on the exchange rate of such support is likely to be explosive, unless dollar deposits are converted at a fixed exchange rate (i.e., the terms of deposit contracts are not respected).

[37] Nonlinearities arise from the boundedness of the dollarization variable, that is a percentage. Linear specifications yield the same qualitative results, but their explanatory power is significantly lower than semi-log specifications.

[38] The Z index is a proxy of the probability of insolvency of a firm germane to measures of "distance to default." It measures systemic risk potential when aggregated for a set of systemically important banks. It is defined as the ratio $(ROA+K)/S$, where ROA is the return on assets, K is the equity capital-to-asset ratio, and S is the standard deviation of returns on assets. Thus, a larger value of Z indicates a smaller risk profile, which can be attained by improving efficiency (increasing ROA), greater diversification (decreasing S), or lower leverage (increasing K) (see, for example, De Nicoló (2000) and De Nicoló et al., (2003)). The Z-index data are taken from De Nicoló et al., (2003).

[39] Arteta (2003) finds that the probability of a banking crisis is not significantly affected by dollarization. However, his sample, as well as his methodology, are not comparable with ours.

Table 5. Dollarization and Solvency Indicators

Panel A
Dependent variable: Natural Logarithm of Z-index

Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	**1.26	7.8	**1.24	6.7	**1.38	6.5	**1.32	5.8
Average doll	**-0.01	-2.0	**-0.01	-2.1	**-0.01	-2.0	*-0.02	1.9
INFV			-0.03	-0.2			-0.01	-0.8
RERV			--0.12	-0.4			0.13	0.4
corr(INF,RER)			0.16	1.0			0.14	0.9
R-squared / NOBS	0.054	58	0.111	49	0.052	56	0.101	66
Adjusted R-squared	0.037		0.030		0.035		0.002	
Method	OLS		OLS		2SLS		2SLS	

Panel B
Dependent variable: Natural Logarithm of NPL ratio

Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	**1.62	7.8	**1.39	6.7	**1.13	3.8	**1.08	3.5
Average doll	**0.02	3.4	**0.02	3.7	**0.03	3.9	**0.03	3.1
INFV			**-0.02	-3.2			**-0.14	-3.1
RERV			**0.35	3.5			**0.23	2.4
corr(INF,RER)			-14.0	-0.7			-6.88	-0.4
R-squared / NOBS	0.143	63	0.235	54	0.281	62	0.286	53
Adjusted R-squared	0.129		0.173		0.269		0.226	
Method	OLS		OLS		2SLS		2SLS	

Notes: Average doll is the 1990-2001 average foreign deposit to total deposit ratio. INFV is inflation volatility, RERV is real exchange rate volatility, and corr(INFV,RER) is the correlation of inflation and the real exchange rate, computed on quarterly data for the 1995-2001 period. The coefficients of IFV, RERV and corr(INF,RER) are multiplied by 100. Instruments in the 2SLS regressions are: a constant, transition, restrict, Voice, Govteff, Polstab, Regqual, and Corrupt. ** and * indicate significance at the 5% and 10% level respectively.

We then run similar regressions for liquidity risk, based on the correlation between deposit growth volatility (measured as the standard deviation of total deposit growth, computed with yearly data over the period 1990-2001) and deposit dollarization. Deposit dollarization is also found to increase deposit volatility (Table 6).

Table 6. Dollarization and Deposit Volatility
Dependent variable: Natural logarithm of deposit growth volatility

Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	**2.09	13.4	**1.96	11.9	**1.51	6.4	**1.67	7.3
Average doll	**0.03	5.1	**0.03	4.7	**0.05	6.4	**0.04	4.8
INFV			**0.04	2.0			**0.13	2.3
RERV			*0.04	1.7			**0.14	6.5
corr(INF,RER)			-11.72	-0.9			-8.99	-0.6
R-squared / NOBS	0.288	96	0.381	77	0.328	84	0.495	66
Adjusted R-squared	0.281		0.355		0.320		0.461	
Method	OLS		OLS		2SLS		2SLS	

Notes: Average doll is the 1990-2001 average foreign deposit to total deposit ratio. INFV is inflation volatility, RERV is real exchange rate volatility, and corr(INFV,RER) is the correlation of inflation and the real exchange rate, computed on quarterly data for the 1995-2001 period. The coefficients of IFV, RERV and corr(INF,RER) are multiplied by 100. Instruments in the 2SLS regressions are: a constant, transition, restrict, Voice, Govteff, Polstab, Regqual, and Corrupt. ** and * indicate significance at the 5% and 10% levels, respectively.

While the majority of dollarization-related crises in dollarized financial systems has so far taken place in a number of Latin American and transition economies it is worth noting that dollar intermediation appears to be much deeper and more deeply ingrained in Latin America than in other parts of the world. The ratio of foreign currency deposits to GDP is substantially higher than in Latin America than in transition economies or (non Latin American) low-income countries (Table 7). Similarly, a much higher proportion of dollar deposits is onlent locally rather than held abroad. At the same time, the public holds a much higher fraction of its dollar deposits at home rather than abroad.[40]

When combined with a higher degree of capital account openness and exposure to capital flows, it is not hard to imagine why dollarized Latin American countries could be more exposed to recurrent financial instability. In particular, liquidity risk is likely to be less of an issue in countries where local dollar deposits are small in absolute magnitude and more distant substitutes for assets held abroad or under the mattress. In addition, both liquidity risk and solvency risk are clearly more limited when a large fraction of foreign currency deposits is held abroad rather than onlent locally. This also suggests, however, that the exposure to financial fragilities could even out over time throughout the world as dollar intermediation deepens and countries' capital accounts open up.

Table 7. Indicators of Domestic Dollar Financial Intermediation: 2001
(in percent)

	Foreign Currency Deposits to GDP	Foreign Assets to Foreign Currency Deposits	Cross-border Deposits to Foreign Currency Deposits
Latin America 1/	21.1	53.7	124.0
Transition economies 2/	8.8	104.1	130.9
Low income 3/	7.8	260.7	472.1

1/ Includes 15 South and Central American countries.
2/ Includes 23 transition economies.
3/ Includes 13 African and 12 Asian countries.

VI. THE CASE FOR PRUDENTIAL ACTIVISM

Despite the added systemic fragility, it does not necessarily follow that prudential regulation should be tightened.[41] Only if the fragility of dollarized financial systems can be traced to heightened and hitherto unrecognized externalities would that be the case. As discussed in

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[40] While data limitations restrict the scope for similar cross-country comparisons of dollar cash holdings, there are indications that these are particularly important in many of the transition economies (see Havrylyshyn and Beddies (2002)).

[41] No specific guidelines have so far been issued by the Basel Committee on Banking Supervision on how to counteract risk exposure by banks and their customers in dollarized economies. Instead, supervisors have substantial discretion as to how to address these risks.

Section III, dollarization itself largely arises as protection against risk and, absent externalities and moral hazard, does not call for prudential reform. A case for imposing tighter, currency-specific, prudential requirements to limit the risks of dollarization would thus have to be based on a finding that the level of dollarization, though privately optimal, was socially excessive.

The presence of moral hazard is particularly clear, as the systemwide nature of the risks related to dollarization creates a herd-effect in regard to indirect exchange rate risk arising through increased credit risk on foreign currency lending. Bank depositors that expect to be bailed out in the event of a catastrophic exchange rate depreciation will not require banks that lend in foreign currency to local currency earners pay a risk premium on their deposits. This, in turn, removes banks' incentives to limit the risk they take by intermediating in dollars or adequately provisioning against those risks. Instead, they are better off not to provision since it allows them to limit their losses in the event of a catastrophic depreciation (e.g., it enhances the option value of walking away). Bailout expectations similarly induce dollar borrowers to discount the real cost and risks of dollar borrowing. By penalizing the more prudent banks, competitive forces can help broaden across all banks the failure of at least some of the participants to fully internalize risk. Instead, the owners and other insiders of a bank which experiences widespread loan-losses associated with an exchange rate collapse can expect much more favorable treatment from the authorities in the crisis resolution phase if it has been in the company of many other banks facing the same risk. Knowing this, bankers will assume indirect credit risk more freely than they would in isolation.

Similar moral hazard failures affect banks' exposure to liquidity risk. The large international reserves held by central banks and abundant associated provision of liquidity support in the event of systemic runs provide free insurance benefits. Thus, banks have limited incentives to accumulate dollar liquidity on their own, if they know that all banks will be similarly affected and, hence, will need to be supported.[42] Instead, competitive pressures will tend to penalize those banks that set aside more liquidity or otherwise take measures to limit the liquidity of their liabilities.

Thus, a first objective of prudential reform is to level the playing field between the local currency and the foreign currency by ensuring that market participants adequately internalize dollarization risks. A secondary objective is to boost the capacity of dollarized financial systems to withstand liquidity or solvency shocks, thereby enhancing the scope for a more flexible and smoother monetary and foreign exchange policy. However, it should do so *without unduly constraining financial development and repressing the need for currency diversification.* This latter objective is likely to gain importance as financial systems across the world deepen and become more integrated.

Provided the necessary information and skills are available, a flexible regulatory approach, based on statistical risk management models such as value-at-risk, should thus be preferable to one based on discretionary application of administrative restrictions and quantitative

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[42] Gonzalez-Eiras (2000) provides direct evidence of such effects. He finds that the introduction in Argentina of a credit contingent line to expand liquidity support to banks led domestic banks to reduce their domestic liquidity relative to foreign banks (that were less dependent on such support due to their increased reliance on support from parent banks).

limits. Such an approach would avoid thwarting sound risk management by banks and limit the scope for regulatory distortions on portfolio diversification.

In undeveloped market environments, tighter prudential requirements on foreign currency loans might have to be based on simple rules of thumb such as ceilings on gross as well as net foreign exchange exposure, rather than trying to rely on sophisticated risk calculations (Honohan and Stiglitz, 2001). In more sophisticated markets the requirements could take the form of specific reserves proportional to the excess value-at-risk assumed by a bank when denominating loans to unhedged borrowers in foreign currency rather than in local currency. The definition of an appropriate value-at-risk cutoff would need to be based on a macroeconomic and statistical analysis of shocks and needed exchange rate responses. In view of the macro-systemic nature of such simulations, a first pillar-type approach (i.e., a specific capital charge) might be needed in many (if not most) cases. However, to ease the impact on the banking system of a large depreciation and limit the potential for a credit crunch, it would be preferable that these reserves not be part of the regular capital adequacy requirements. Instead, flexibility should be allowed to draw down the reserves in times of need and gradually rebuild them once used.[43]

As regards liquidity risk, regulations should similarly aim at letting banks bear the full risk (and cost) of assuming liquid dollar liabilities. Currency-specific liquidity requirements that require that banks back their most liquid dollar liabilities against liquid dollar assets abroad (or at the central bank) seem to provide a suitable mechanism for internalizing such risks. In the case of branches of foreign banks, strong, legally binding assurances of support from parent banks might be acceptable in lieu of liquid reserves when the parent meet appropriate criteria, such as high ratings by international rating agencies and sufficient size in relation to their local branch. By adjusting the policy response to the underlying risk, this should limit the overall regulatory burden on the banking system and hence be less constraining to its development capacity.[44]

VII. THE CASE FOR MONETARY REFORM

In discussing the case for monetary reform, the first point worth recalling from Section II is that increased dollarization has often coincided in recent years with lower inflation. Indeed, with a few exceptions, most highly dollarized economies have demonstrated in recent years a fairly reasonable stabilization record, down in many cases to the single digit level. Thus, setting aside issues of credibility and sustainability, from a pure stabilization perspective it can be argued that financial dollarization has not generally been a strong impediment against an effective monetary policy.

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[43] In countries where deposit insurance premia are adjusted for risk, rates could also be differentiated by currency.

[44] However, by benefiting the branches of large international banks over indigenous banks, this could have broader consequences for the future of the banking system that need to be carefully assessed. An early discussion of the potential benefits of expanded dollarization for foreign banks can be found in Swoboda (1968).

That dollarized countries have achieved relatively low inflation levels is hardly surprising, however, in view of the fact that they have used the exchange rate as their key nominal anchor. A more significant issue is whether dollarized countries can follow an independent monetary policy, which indeed is unlikely when the exchange rate is used as life line. There is good evidence that dollarized countries are more prone to "fear of floating" (Levy Yeyati, Sturzenegger, and Reggio, 2002). Due to lack of monetary credibility and financial system vulnerabilities (as discussed above), the monetary authorities are concerned about the adverse macroeconomic and financial impact of large exchange rate fluctuations. But the more they target the exchange rate, the less attractive the local currency becomes, and, hence, the more dollarized the economy. Such endogeneities provide a fertile ground for multiple equilibria and adverse dynamics in which rising dollarization and exchange rate rigidities play back on each other.[45]

A seemingly puzzling fact in this context is that many countries with high financial dollarization continue to experience rather low real dollarization in the sense of denominating prices and wages in dollar terms (as shown in Section II, while the pass-through is correlated with financial dollarization, it is comparatively much smaller in magnitude). As shown by Ize and Parrado (2002), this asymmetry can be explained based on the comparative attractiveness of the local currency for denominating price and wage contracts.[46] By enhancing real price and wage flexibility, the local currency provides a better buffer against output or employment fluctuations. However, this is conditional on monetary policy playing an active countercyclical role, which appears to be inconsistent with fear of floating.

This apparent disconnect between the monetary activism needed to maintain a low real dollarization and the fear of floating resulting from high financial dollarization disappears once the discontinuous, highly nonlinear nature of monetary policy in dollarized countries is taken into account. Even if central banks target the exchange rate under normal conditions, they are ready to let go under exceptionally large shocks. Indeed, as emphasized in Section VI, the time inconsistency and moral hazard resulting from fear of floating is precisely what exacerbates financial dollarization. In contrast, *the rainy-day benefits of retaining the local currency* (the exchange rate is expected to depreciate under exceptionally large shocks that call for major real exchange rate realignments) is what maintains the attractiveness of the local currency for real contracts, i.e., maintains real dollarization in check.

Recent experiences support this interpretation. Both the Asian and Southern American countries with high financial dollarization (including Argentina) have experienced in recent years major nominal and real exchange rate realignments triggered by deepening regional crises and contagion effects. The experience of the Southern American countries is

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[45] Ize and Parrado (2002) and Chamon and Hausmann (2002) develop models with multiple dollarization equilibria, based on optimal endogenous monetary policy frameworks.

[46] Ize and Parrado show that because firms and workers set their prices and wages in advance, real dollarization should respond to similar factors as those affecting financial dollarization. In particular, it should reflect the relative volatilities of the local and foreign currencies. Unlike financial dollarization, however, real dollarization should also reflect quantity uncertainty, e.g., uncertainty about employment and output. Thus, denominating price and wages in local currency is preferable if it provides a buffer against employment or output fluctuations, which should be the case if the monetary authority uses (or is expected to use) monetary policy countercyclically.

particularly revealing. Faced with steep exchange rate depreciations in neighboring countries, several dollarized Southern Cone countries were faced with a painful choice between maintaining their exchange rate and enduring trade and output pressures, or letting their exchange rate depreciate and enduring financial sector difficulties. In the event, they chose the latter. The problem, therefore, is not that monetary policy in highly dollarized economies is ineffective. Instead, the problem is the highly nonlinear way in which it operates, which gives rise to enormous costs.

The first best approach out of this quandary is, of course, a clean policy break, i.e., a switch to a free float backed by a strong inflation anchor, such as through the adoption of full-fledged inflation targeting. Targeting inflation instead of the exchange rate should lead to a gradual process of de-dollarization and limit the scope for catastrophic policy breaks. The change in policy regime should be accompanied by the simultaneous (gradual) adoption of prudential reforms to internalize and limit dollarization risks (as described in the previous section) and measures to promote and facilitate the use of the local currency (such as efforts to develop markets for local-currency-denominated public securities, perhaps including price-indexed securities, and a strengthening of monetary management and payment services in local currency). In some cases, these measures may need to be complemented by structural and institutional measures (such as strengthening legal rights for creditors, the quality of accounting, and, more generally, the quality and accountability of government) aiming at consolidating expectations of respect by the government for private contracts.

While the inherent difficulties in de-dollarizing should not be underestimated, by providing a consistent and transparent policy signal, such a comprehensive package of mutually reinforcing measures, if sustained, offer the best chances of success. Countries should over time experience a "virtuous cycle" in which de-dollarization enhances the scope for monetary autonomy, leading in turn to a further decline of dollarization.

Nonetheless, the road to de-dollarization and an independent monetary policy is unlikely to be smooth and easy.[47] To begin with, there might be limited political appetite in heavily dollarized economies for decoupling monetary policy from the dollar. In many cases, such an approach may need to be gradual. In particular, the switch away from exchange rate targeting may require a careful step-by-step approach that initially limits the scope for large exchange rate fluctuations while allowing for a gradual rebuilding of confidence. However, due to time inconsistency and moral hazard, maintaining a steady course could be difficult and subjected to potential setbacks. Moreover, fiscal, institutional, political, and technical constraints may continue to undermine the credibility and effectiveness of the central bank, even when a suitable legal and operational framework has been put in place. If so, letting go of the exchange rate could further undermine the local currency and increase (rather than reduce) dollarization. Thus, in some cases, it might be preferable to recognize at the outset that the ultimate goal of restoring the credibility of the local currency as an independent currency is out of the country's reach.

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[47] Achieving full monetary independence can, by itself, be a major undertaking. Even emerging economies with limited dollarization and nominally floating exchange rates have had a difficult time using monetary policy for counter-cyclical purposes.

Countries that cannot let go of the dollar are left with two options. The first option, maintaining a dual currency regime, only makes sense if it delivers a usable degree of monetary independence at a reasonable cost. A tightening of prudential standards (i.e., introducing solvency and liquidity buffers) can help achieve this goal by making the financial system more robust and resilient (hence limiting the risks and costs of banking crises) and enhancing the scope for a more active monetary policy and flexible exchange rate.[48]

The second option is to fully dollarize. By ensuring that the currency used for financial transactions is the same as that used for real transactions, official dollarization eliminates the potential for currency mismatches and depreciation-induced systemic banking crises. At the same time, by limiting both currency risk and country risk, it may reduce banks' funding costs and contain (but not eliminate) the risk of a liquidity crisis.[49] However, full dollarization also introduces important financial vulnerabilities by limiting the economy's capacity to cope with shocks and magnifying output fluctuations.[50]

VIII. CONCLUSIONS

Whether financial authorities like it or not, foreign-currency-denominated deposits represent an alternative liquid asset that is to some degree everywhere attractive to investors and bound to acquire increased relevance with globalization. Some countries have outlawed the holding of foreign currency deposits in onshore banks granting local currency an effective monopoly, at least for onshore finance. Such a strategy is especially unattractive for a country unable to deliver macroeconomic stability. Private agents are driven offshore in their search for a hedge and financial development is hindered. But it does not follow either that a dual currency regime with high dollarization is the best feasible option. True, it can help retain financial depth in the face of inflation, but getting inflation under control is a more satisfactory way of promoting financial development. And the more dollarized the system, the riskier it is.

The road to reducing dollarization and its risks should be based on a two-lane approach that both discourages the use of the dollar and enhances the attractiveness of the local currency as a medium of intermediation and. Thus, measures are needed to ensure that hidden externalities are properly internalized through an enhanced prudential environment. In addition, a credible commitment to price stability is clearly needed. The monetary authorities need to improve the quality of their product. While it could be objected, at least in the case of

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[48] The effectiveness of monetary policy can also be enhanced through improving its transparency. Following the example of inflation targeters, even countries that continue to use the rate of crawl as their main operational instrument (instead of the interest rate) would gain clarity by linking more systematically changes in the instrument to the attainment of the policy goal.

[49] See Berg and Borensztein (2000) and Powell and Sturzenegger (2000).

[50] Real exchange rate adjustments are likely to be needed, no matter what, in response to shocks. If these adjustments are not facilitated through nominal exchange rate adjustments, they will take place through price adjustments brought about by larger recessions. The resulting financial system stress could be more severe than that incurred under a flexible exchange rate system.

already heavily dollarized economies, that they come too late in an already crowded marketplace where the dollar has taken a dominant position, the counterargument is that the local currency should have a natural constituency in countries where monetary independence makes sense. Because of its unique shock-buffering capacity, the local currency, if well managed, should gain a high and stable market share. However, policymakers should resist the tendency to respond to high dollarization with a fear of floating that limits the benefits of their currency and boosts instead dollarization.

The importance of institutional variables in explaining dollarization suggests that the policy reform agenda should also include measures to strengthen the institutional environment and send a clear signal that good policies are here to stay. In particular, the government's capacity and willingness to minimize the other risks of financial contracting in local currency should be of importance. Aspects that could help create a favorable environment for contracting include enforcement of adequate legal rights for creditors, quality of accounting, political stability, relatively undistorted goods markets and the overall quality of government, as has been shown by empirical studies of the determinants of financial depth more generally (including those cited above). The relevance of institutional variables could also be interpreted as sounding a note of caution, however, if viewed as a manifestation of deeply rooted hindrances to achieving monetary credibility. The degree of policy persistence and consistency needed to remove these roadblocks could be considerable in many cases.

Table 1. Foreign Currency Deposits to Total Deposits

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	max	max-min	shape
Albania	na.	na.	na.	Na.	30.8	30.6	31.8	28.9	23.5	25.2	27.8	32.1	32.1	8.6	U
Angola	na.	na.	na.	Na.	na.	25.4	52.2	59.1	73.2	81.1	83.7	81.0	83.7	58.3	
Antigua and Barbuda	5.0	5.5	5.5	3.7	4.6	3.8	4.3	5.5	5.5	5.6	7.3	5.7	7.3	3.5	D
Argentina	47.2	48.1	47.1	52.2	55.6	57.1	57.5	56.2	58.4	61.8	64.7	73.6	73.6	26.5	
Armenia	na.	na.	na.	Na.	72.2	52.8	59.9	74.3	72.1	80.0	81.2	79.7	81.2	28.4	U
Austria	na.	na.	na.	Na.	na.	na.	na.	1.3	2.1	2.1	2.3	1.7	2.3	1.0	S
Azerbaijan	na.	na.	na.	Na.	na.	49.1	50.2	57.2	62.8	66.9	78.0	81.0	81.0	31.9	
Bahamas, The	2.1	2.5	2.9	2.2	1.5	1.8	1.3	1.7	2.2	1.8	2.8	2.7	2.9	1.6	S
Bahrain	na.	39.7	34.7	38.8	41.3	42.2	40.6	39.1	na.	na.	na.	na.	42.2	7.5	E
Bangladesh	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.4	S
Barbados	3.5	3.3	4.1	5.7	9.6	15.8	11.7	17.5	11.9	9.7	6.4	6.9	17.5	14.2	H
Belarus	na.	na.	na.	Na.	na.	na.	na.	na.	63.9	53.5	69.4	66.0	69.4	15.9	E
Belize	na.	na.	na.	Na.	na.	na.	2.3	2.4	2.1	2.7	1.9	1.9	2.7	0.8	S
Bhutan	na.	na.	na.	4.1	4.1	3.7	3.0	2.0	3.3	5.0	2.1	0.3	5.0	4.6	D
Bolivia	81.6	80.7	81.2	81.4	78.5	78.3	91.6	91.7	91.9	92.6	92.4	91.5	92.6	14.3	
Bosnia-Herzegovina	na.	na.	na.	Na.	na.	na.	85.6	86.3	88.8	63.8	54.6	62.5	88.8	34.1	D
Bulgaria	na.	38.4	29.1	23.0	35.8	29.5	53.3	53.4	53.2	52.6	54.3	57.2	57.2	34.2	
Cambodia	na.	na.	na.	85.7	85.7	91.9	94.0	94.1	92.5	92.3	93.2	94.6	94.6	9.0	
Chile	na.	na.	na.	Na.	6.5	5.0	3.6	3.5	5.8	8.5	9.0	10.7	10.7	7.2	U
China,P.R.: Mainland	na.	na.	na.	Na.	na.	na.	na.	na.	7.9	8.0	8.9	8.0	8.9	1.0	S
Hong Kong SAR	na.	59.6	58.8	55.2	53.5	49.5	45.0	44.0	44.0	45.5	47.1	45.0	59.6	15.6	D
Comoros	na.	na.	na.	Na.	na.	na.	na.	na.	0.2	0.5	0.5	0.7	0.7	0.5	S
Congo, Dem. Rep. of	na.	na.	na.	Na.	na.	na.	69.7	50.3	50.6	32.2	43.5	57.0	69.7	37.5	U
Costa Rica	26.8	34.8	32.4	30.4	31.1	40.9	35.7	38.3	41.8	41.1	41.1	43.8	43.8	17.0	E
Croatia	na.	na.	na.	Na.	59.3	66.6	67.6	68.9	73.8	73.6	71.1	71.2	73.8	14.5	
Czech Republic	na.	na.	na.	9.0	8.0	6.3	7.1	12.7	12.7	13.4	13.2	12.5	13.4	7.1	U
Denmark	na.	2.2	2.8	3.0	3.3	3.3	3.6	3.2	3.2	4.1	4.4	4.7	4.7	2.4	S
Dominica	na.	2.7	3.4	3.1	2.4	2.4	1.2	2.1	2.6	2.7	2.6	3.2	3.4	2.2	S
Ecuador	13.3	14.5	20.0	16.9	15.6	19.2	22.3	23.6	36.9	53.7	53.7	53.7	53.7	40.4	
Egypt	54.3	55.6	37.0	32.0	32.0	31.6	27.2	22.6	22.1	22.0	23.3	25.0	55.6	33.6	D
El Salvador	4.1	3.4	4.9	4.1	5.0	5.5	7.0	8.1	8.5	8.8	8.9	8.9	8.9	5.5	
Estonia	na.	33.7	28.9	6.8	16.4	16.1	14.5	19.8	20.0	18.5	23.9	20.8	33.7	26.9	U
Finland	na.	na.	na.	Na.	na.	na.	4.2	4.1	3.4	2.3	2.1	3.0	4.2	2.2	S
Georgia	na.	na.	na.	Na.	66.7	40.1	46.4	58.4	68.7	79.0	77.9	81.5	81.5	41.4	U
Ghana	na.	na.	na.	Na.	na.	25.6	29.2	30.6	22.8	29.7	30.8	na.	30.8	8.0	E
Greece	na.	na.	na.	Na.	22.7	24.1	22.6	29.5	35.2	30.9	29.8	19.6	35.2	15.6	H
Guatemala	na.	na.	na.	Na.	na.	0.0	0.0	0.2	0.3	0.2	0.1	5.1	5.1	5.1	
Guinea	na.	na.	na.	Na.	na.	19.0	22.6	24.4	24.8	27.9	31.1	28.0	31.1	12.1	

Table 1. Foreign Currency Deposits to Total Deposits (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	max	max-min	shape
Guinea-Bissau	29.6	36.3	46.3	50.7	50.5	50.5	57.9	0.0	0.0	0.0	0.0	0.0	57.9	57.9	
Haiti	na.	na.	na.	Na.	na.	na.	na.	29.6	30.6	33.8	39.1	42.5	42.5	12.9	
Honduras	1.8	3.9	6.6	9.0	16.9	22.1	31.9	27.2	27.6	27.9	28.7	33.1	33.1	31.3	
Hungary	na.	na.	18.4	23.5	24.7	30.5	27.0	24.6	23.9	22.0	21.8	20.5	30.5	12.1	H
Indonesia	na.	na.	18.2	19.7	20.1	19.7	19.4	28.3	22.2	19.4	20.8	20.1	28.3	10.0	H
Israel	na.	na.	na.	Na.	na.	na.	na.	18.0	20.5	19.3	18.7	18.5	20.5	2.4	S
Italy	na.	na.	na.	Na.	na.	na.	3.0	3.9	4.0	3.9	4.2	na.	4.2	1.2	S
Jamaica	na.	na.	11.9	12.5	21.0	18.9	22.1	18.4	21.0	20.5	23.0	23.3	23.3	11.4	
Japan	na.	na.	na.	Na.	na.	na.	8.4	8.9	6.9	4.9	5.8	5.5	8.9	4.0	D
Kazakhstan	na.	na.	na.	Na.	na.	na.	na.	na.	36.4	46.5	50.3	56.9	56.9	20.5	
Kenya	na.	na.	na.	Na.	na.	7.9	7.2	9.0	9.3	11.9	15.5	15.2	15.5	8.3	
Korea	0.6	1.5	1.1	0.7	0.5	0.5	0.9	3.3	4.7	2.6	3.4	3.5	4.7	4.2	
Kyrgyz Republic	na.	na.	na.	Na.	na.	32.9	33.0	41.0	63.4	61.7	66.1	65.1	66.1	33.2	
Lao People's Dem. Rep.	17.8	10.5	67.0	49.1	49.7	57.3	54.4	65.9	76.3	89.6	84.9	82.7	89.6	79.2	
Latvia	na.	na.	na.	40.5	39.6	50.4	52.5	50.7	43.8	46.1	45.2	43.9	52.5	12.9	H
Lebanon	na.	na.	na.	68.2	59.1	60.6	53.4	60.1	60.7	56.6	62.3	69.2	69.2	15.8	
Lithuania	na.	na.	na.	62.7	38.8	40.6	38.2	32.6	36.4	43.8	45.7	46.6	62.7	30.1	U
Macedonia, FYR	na.	na.	na.	Na.	na.	na.	na.	55.5	56.7	51.4	55.2	65.4	65.4	14.0	
Malawi	na.	na.	na.	Na.	20.6	10.8	11.3	14.6	31.2	16.9	22.0	14.6	31.2	20.4	E
Malaysia	na.	na.	na.	Na.	na.	na.	0.9	1.8	2.3	2.5	3.3	3.7	3.7	2.8	S
Mexico	na.	na.	na.	Na.	na.	na.	na.	5.6	6.2	7.3	10.4	10.8	10.8	5.2	
Moldova	na.	na.	na.	Na.	na.	na.	20.3	19.3	43.8	49.6	48.8	48.0	49.6	30.3	
Mongolia	na.	na.	na.	41.5	25.8	27.3	29.4	41.0	35.9	45.4	43.7	39.3	45.4	19.6	U
Mozambique	na.	na.	na.	Na.	na.	53.6	54.0	44.0	43.1	43.2	45.0	55.3	55.3	12.2	U
Netherlands Antilles	18.3	20.3	19.7	19.0	18.8	20.5	17.8	17.1	16.1	17.0	16.3	17.7	20.5	4.4	
Netherlands	na.	na.	na.	Na.	na.	na.	na.	3.9	4.0	4.0	4.7	4.1	4.7	0.8	S
New Zealand	5.6	4.8	3.5	4.2	2.8	2.8	4.5	3.2	4.7	2.7	3.4	3.1	5.6	2.9	S
Nicaragua	40.3	36.2	46.0	60.2	59.6	67.8	62.3	64.5	68.1	67.8	70.4	71.0	71.0	34.8	
Nigeria	na.	na.	na.	Na.	1.2	4.1	2.6	2.1	3.0	7.4	5.4	5.0	7.4	6.2	E
Norway	na.	na.	na.	Na.	na.	na.	4.1	4.0	3.6	3.4	3.5	na.	4.1	0.7	S
Paraguay	na.	na.	na.	43.4	40.4	37.9	46.6	51.8	59.7	62.5	62.2	66.9	66.9	29.0	
Peru	45.5	62.9	66.4	70.4	66.3	64.8	67.7	63.8	63.8	65.7	68.3	66.0	70.4	24.9	
Philippines	na.	na.	na.	Na.	na.	24.7	30.4	32.4	32.6	31.5	32.3	30.7	32.6	7.9	
Poland	na.	35.3	33.8	40.2	39.0	27.6	22.6	22.7	18.6	18.9	17.5	18.9	40.2	22.7	D
Romania	3.6	3.7	18.4	36.2	27.2	26.9	27.7	33.3	37.1	43.1	46.8	49.0	49.0	45.4	
Russia	na.	na.	na.	40.8	39.8	28.5	27.5	25.0	44.0	41.1	37.4	34.3	44.0	19.0	E
São Tomé & Príncipe	na.	na.	na.	Na.	na.	38.7	42.7	46.4	51.5	51.1	49.6	44.4	51.5	12.8	H
Saudi Arabia	30.0	27.2	24.0	26.3	25.1	23.4	20.4	19.8	21.3	20.2	18.7	17.9	30.0	12.1	D
Slovak Republic	na.	na.	na.	12.5	14.3	12.6	11.4	11.8	16.4	16.3	17.6	17.7	17.7	6.3	

Table 1. Foreign Currency Deposits to Total Deposits (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	max	max-min	shape
Slovenia	na.	52.4	49.0	49.3	41.0	42.1	39.5	33.7	30.2	31.1	34.5	36.1	52.4	22.2	D
South Africa	na.	0.2	0.3	0.5	0.5	0.7	1.5	2.3	3.5	3.5	4.2	6.2	6.2	6.0	
Spain	na.	na.	na.	Na.	na.	na.	1.8	2.2	1.9	1.7	1.8	1.5	2.2	0.7	S
St. Kitts and Nevis	16.4	14.6	14.7	17.1	13.3	21.3	19.0	23.6	25.5	21.2	32.7	30.3	32.7	19.4	
St. Vincent & Grenadines	0.6	0.9	0.5	1.0	2.1	1.6	1.2	2.0	2.5	3.1	1.5	1.2	3.1	2.6	S
Sweden	na.	na.	na.	Na.	1.8	1.0	0.9	1.6	1.3	1.8	2.1	1.1	2.1	1.2	S
Switzerland	na.	na.	na.	Na.	na.	na.	na.	na.	0.2	0.1	0.6	0.1	0.6	0.5	S
Tadjikistan	na.	na.	na.	Na.	na.	na.	41.5	43.6	62.8	72.4	67.8	na.	72.4	30.9	
Tanzania	na.	na.	na.	17.9	21.2	28.1	24.2	26.1	25.2	29.5	30.2	32.9	32.9	18.4	E
Thailand	0.1	0.2	0.2	0.3	0.2	0.3	0.4	1.3	1.1	1.4	1.4	1.3	1.4	1.3	S
Trinidad and Tobago	na.	na.	na.	9.2	16.6	18.3	21.5	24.3	24.1	25.5	27.8	24.4	27.8	18.6	
Turkey	25.9	32.7	37.3	42.1	50.1	49.9	47.5	48.8	45.1	47.2	46.6	58.2	58.2	32.3	
Turkmenistan	na.	na.	na.	Na.	na.	na.	na.	na.	33.0	30.9	30.1	na.	33.0	3.0	S
Uganda	na.	na.	na.	15.7	17.1	17.6	18.4	18.2	18.1	29.4	29.9	na.	29.9	14.2	
Ukraine	na.	na.	10.6	25.0	42.2	36.8	30.4	25.8	39.1	43.7	38.4	32.4	43.7	33.2	E
United Arab Emirates	36.5	33.1	29.3	23.7	23.4	20.9	21.5	21.2	21.6	23.3	24.2	25.4	36.5	15.6	U
United Kingdom	na.	na.	na.	Na.	na.	na.	8.9	13.5	13.3	12.7	15.1	16.6	16.6	7.7	
Uruguay	na.	na.	na.	78.4	79.6	78.6	77.2	78.2	79.0	80.8	81.6	84.6	84.6	7.4	
Uzbekistan	na.	na.	na.	Na.	na.	na.	na.	13.8	13.0	7.5	na.	na.	13.8	6.3	D
Venezuela, Rep. Bol.	na.	na.	na.	Na.	0.1	na.	0.0	0.0	0.0	0.4	0.2	0.3	0.4	0.4	S
Vietnam	na.	na.	44.9	42.0	41.8	34.6	32.1	34.1	36.6	40.5	41.2	43.4	44.9	12.8	
Yemen, Republic of	na.	12.4	10.2	9.3	6.4	51.8	41.4	46.3	51.3	52.6	51.1	52.7	52.7	46.3	U
Zambia	na.	na.	na.	Na.	10.2	20.1	27.3	28.2	42.6	40.1	53.2	42.7	53.2	43.0	

Table 2. Maximal and Estimated Trend Shares of Foreign-Currency-Denominated Deposits

%		Max	Trend		%		Max	Trend
Angola	AFR	83.7	89.0	Netherlands Antilles	LAC	20.5	21.6
Comoros	AFR	0.7	0.9	Nicaragua	LAC	71.0	69.6
Ghana	AFR	30.8	32.2	Paraguay	LAC	66.9	60.7
Guinea	AFR	31.1	30.4	Peru	LAC	70.4	72.7
Guinea Bissau	AFR	57.9	25.4	São Tomé & Principe	LAC	51.5	50.6
Kenya	AFR	15.5	14.8	El Salvador	LAC	8.9	10.9
Malawi	AFR	31.2	17.6	St. Kitts and Nevis	LAC	32.7	26.9
Mozambique	AFR	55.3	49.2	St. Vincent & Grenadines	LAC	3.1	5.2
Nigeria	AFR	7.4	6.9	Trinidad & Tobago	LAC	27.8	28.2
South Africa	AFR	6.2	6.4	Uruguay	LAC	84.6	83.5
Tanzania	AFR	32.9	31.2	Venezuela	LAC	0.4	1.1
Uganda	AFR	29.9	27.3	Guatemala	LAC	5.1	3.8
Zaïre	AFR	69.7	43.2				
Zambia	AFR	53.2	46.1	Bahrain	MED	42.2	44.1
				Lebanon	MED	69.2	62.6
Antigua and Barbuda	LAC	7.3	8.8	Saudi Arabia	MED	30.0	23.8
Argentina	LAC	73.6	65.1	United Arab Emirates	MED	36.6	26.1
Bahamas, The	LAC	2.9	5.7	Yemen, Republic of	MED	52.7	47.3
Barbados	LAC	17.5	13.3	Israel	MED	20.5	19.9
Belize	LAC	2.7	2.9				
Bolivia	LAC	92.6	91.6	Cambodia	EAP	94.6	96.4
Chile	LAC	10.7	9.3	China	EAP	8.9	8.4
Costa Rica	LAC	43.8	43.5	Hong Kong SAR	EAP	59.6	49.3
Dominica	LAC	3.4	5.7	Indonesia	EAP	28.3	24.1
Ecuador	LAC	53.7	39.8	Japan	EAP	8.9	6.3
Haiti	LAC	42.5	42.5	Korea	EAP	4.7	6.0
Honduras	LAC	33.1	29.7	Lao People's Dem. Rep.	EAP	89.7	76.2
Jamaica	LAC	23.3	24.9	Malaysia	EAP	3.8	4.6
Mexico	LAC	10.8	11.4	Mongolia	EAP	45.4	37.7

Table 2. Maximal and Estimated Trend Shares of Foreign-Currency Denominated Deposits (Continued)

	%	Max	Trend			%	Max	Trend
New Zealand	EAP	5.6	6.7		Slovakia	ECA	17.7	18.1
Philippines	EAP	32.6	34.7		Slovenia	ECA	52.4	38.9
Viet Nam	EAP	44.9	40.8		Spain	ECA	2.2	2.6
Thailand	EAP	1.5	4.4		Sweden	ECA	2.1	3.0
					Switzerland	ECA	0.6	0.3
Albania	ECA	32.1	30.6		Tajikistan	ECA	72.4	74.3
Armenia	ECA	81.2	75.0		Turkey	ECA	58.3	54.5
Austria	ECA	2.3	2.7		Turkmenistan	ECA	33.1	28.4
Azerbaijan	ECA	81.0	76.5		Ukraine	ECA	43.7	41.6
Belarus	ECA	69.4	64.2		United Kingdom	ECA	36.6	17.8
Bosnia-Herzegovina	ECA	88.8	64.1		Uzbekistan	ECA	13.8	6.1
Bulgaria	ECA	57.2	50.4					
Egypt	ECA	55.6	28.9		Pakistan	SAR	31.0	23.7
Estonia	ECA	33.7	19.4		Bangladesh	SAR	0.5	3.8
FYR Macedonia	ECA	65.4	61.9		Bhutan	SAR	5.0	4.3
Finland	ECA	4.2	3.4					
Georgia	ECA	81.5	70.0					
Greece	ECA	35.2	28.4					
Hungary	ECA	30.5	27.3					
Italy	ECA	4.2	5.8					
Kazakhstan	ECA	56.9	63.0					
Kyrgyz Republic	ECA	66.1	65.6					
Latvia	ECA	52.5	49.4					
Lithuania	ECA	62.7	39.0					
Moldova	ECA	49.6	52.3					
Netherlands	ECA	4.7	4.7					
Norway	ECA	4.1	4.7					
Poland	ECA	40.2	26.2					
Romania	ECA	49.0	42.4					
Russia	ECA	44.0	35.5					

Table 3. Restrictiveness of Rules on Resident Holdings of Foreign Currency Deposits Onshore, 2000

	Mean dollar.	Firms	House-holds	Prior Approval	Free switch	Index		Mean dollar.	Firms	House-holds	Prior Approval	Free switch	Index
Albania	28.8			P		1	Kyrgyz Republic	51.9				N	0
Angola	65.1				N	0	Lao People's Dem.Rep.	58.8				N	0
Antigua & Barbados	5.1	E		P			Latvia	45.9					0
Argentina	56.6					0	Lebanon	61.1					0
Armenia	71.5					0	Lithuania	42.8					0
Austria	1.9				N	0	Malawi	17.8	E	E		N	2
Azerbaiján	63.6					0	Malaysia	2.4		X			2
Bahamas, The	2.1				N		Mexico	8.1	E	E		N	2
Bahrain	39.5			P	N	1	Moldova	38.3					0
Bangladesh	0.3	E	E	P	N		Mongolia	36.6					0
Barbados	8.9	E	E	P		3	Mozambique	48.3				N	0
Belarus	44.6				N	0	Netherlands	4.2				N	0
Belize	2.2			P		1	Neth Antilles	17.3					0
Bhutan	3.1				N	5	New Zealand	3.8				N	0
Bolivia	86.1					0	Nicaragua	59.5					0
Bosnia-Herzegovina	73.6				N	0	Nigeria	3.9				N	0
Bulgaria	43.6					0	Norway	3.7				N	0
Cambodia	91.5					0	Pakistan	24.9	X	E			3
Chile	6.6					0	Paraguay	52.4					0
China	8.2	E		P	N	2	Peru	64.3					0
Hong Kong SAR	49.8				N		Philippines	60.6					0
Comoros	0.5			P	N	1	Poland	26.8				N	0
Costa Rica	36.5					0	Romania	29.4				N	0
Croatia	69.0				N	0	Russia	35.4				N	0
Czech Rep	10.5					0	São Tomé & Principe	46.4					0
Denmark	3.4				N	0	Saudi Arabia	22.9					0
Dominica	2.6	E	X	P		4	Slovakia	14.5			P	N	1
Ecuador	28.6					0	Slovenia	39.9					0
Egypt	32.1					0	South Africa	2.1				N	0
El Salvador	6.4				N	0	Spain	1.8				N	0
Estonia	19.9					0	St. Kitts & Nevis	20.8	E		P		4
FYR Macedonia	56.9				N	0	St. Vincent & G.	1.5					
Finland	3.2				N	0	Sweden	1.4				N	0
Georgia	64.8				N	0	Switzerland	0.3				N	0
Ghana	28.1					0	Tajikistan	57.6					0

Table 3. Restrictiveness of Rules on Resident Holdings of Foreign Currency Deposits Onshore, 2000 (Continued)

	Mean dollar.	Firms	House-holds	Prior Approval	Free switch	Index		Mean dollar.	Firms	House-holds	Prior Approval	Free switch	Index
Greece	26.8					0	Tanzania	25.0					0
Guatemala	0.8		P	N	1		Thailand	21.3	E	X	P	N	4
Guinea	25.4				N	0	Trinidad & Tobago	21.3					0
Guinea Bissau	26.8			P	N	1	Turkey	44.3				N	0
Haiti	35.1	E				3	Turkmenistan	31.4	E	E	P		3
Honduras	19.7				N	0	Uganda	20.6					0
Hungary	23.7	E				1	Ukraine	32.4			P	N	1
Indonesia	20.8					0	United Arab E.	25.4				N	0
Israel	19.0					0	United Kingdom	13.4				N	0
Italy	3.8				N	0	Uruguay	79.8					0
Jamaica	19.3					0	Uzbekistan	11.4				N	0
Japan	6.7				N	0	Venezuela	0.1				N	0
Kazakhstan	47.5	E	E	P		3	Viet Nam	39.1	E	E		N	2
Kenya	10.9				N	0	Yemen, Rep. of	35.0				N	0
Korea	1.9					0	Zaire	50.6					0

Source: IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions 2001*. For firms and households, *E* denotes that only the documented proceeds of exports or remittances can be lodged to the account; *X* denotes accounts not permitted or limited to a very narrow category of holder. *P* denotes prior approval required. *N* denotes local currency accounts cannot be freely converted into foreign currency accounts. *Index* is a composite index obtained by assigning *E=P=1, X=2* and summing.

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