

# **FINANCIAL DOLLARIZATION: EVALUATING THE CONSEQUENCES**

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## **Abstract**

Financial dollarization has been placed at the forefront of the policy debate in many developing economies, for reasons that include its influence on inflation performance and, most prominently, the currency imbalance and associated financial fragility that it introduces for the economy as a whole. This paper contributes to this debate by revisiting the evidence on the impact of FD on inflation, financial fragility and economic performance in light of a new updated database. It finds evidence that financially dollarized economies tend to display higher inflation rates, higher propensity to suffer banking crises and slower and more volatile output growth, without significant gains in terms of domestic financial depth.

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## I. Introduction

As defined in Ize and Levy Yeyati (2003), financial dollarization simply denotes an empirical observation: the holding by *residents* of foreign currency-denominated assets and liabilities, including bank deposits and loans as well as non-bank assets such as commercial paper or sovereign debt.<sup>2</sup> The descriptive nature of this definition implicitly recognizes that the presence of FD is merely a symptom of a weak currency problem (namely, the rejection of the local currency as store value) for which the literature has already advanced and tested a number of alternative explanations.<sup>3</sup>

However, regardless of the underlying causes, the presence of financial dollarization has been increasingly seen both in academic and policy circles as a source of concern due to its potential implications in terms of monetary instability, financial fragility and overall economic performance. The purpose of this paper is to evaluate empirically whether and to what extent these implications are verified in the data.

There are many reasons why financial dollarization has been placed at the forefront of the policy debate. First, inasmuch as financial dollarization influences the pricing behavior of firms and individuals, dollarized economies are induced to limit wide fluctuations in the nominal exchange rate due to their deleterious impact on inflation performance. As Chang and Velasco (2000) point out, “any scheme to control the rate of inflation at a short horizon must control, to some extent, the nominal exchange rate.” Moreover, financially dollarized economies may exhibit a more elastic price response to monetary shocks as onshore dollar assets are more readily available as a safe haven against inflation.

More recently, the financial dollarization debate has centered around the incidence of the associated currency mismatch. In this regard, while some dollarization may be required by producers of tradables as a hedge against exchange rate risk, widespread financial dollarization inevitably introduces a currency mismatch for the economy as a whole (either at the domestic banks’ balance sheets through local currency on-lending of foreign currency funds, or through real exchange rate exposure of dollar borrowers with income largely denominated in non-tradables as in the case of most local producers or the public sector). This mismatch, and the resulting real exchange rate exposure, amplifies the impact of real shocks through its negative effect

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<sup>2</sup> In what follows, following what has become standard in the dollarization literature, dollar and foreign currency, and peso and local currency are used interchangeably.

<sup>3</sup> Existing explanations point at portfolio hedging considerations (Ize and Levy Yeyati, 2003), time inconsistency problems related to the temptation to dilute local currency obligations through inflation (Calvo and Guidotti, 1989), the incidence of implicit debtor guarantees (Burnside et al., 2001), currency-blind financial regulation (Broda and Levy Yeyati, 2003) and signaling problems (De la Torre et al., 2003), among others. See De Nicoló et al. (2003) and Levy Yeyati (2003) for a discussion and empirical testing of some of these hypotheses.

on debtors' balance sheets, possibly leading to financial fragility, a concern that has been flagged by most of the recent currency and financial crises.<sup>4</sup>

On the other hand, inasmuch as this currency imbalance and the associated sensitivity to large real devaluations conditions the willingness of the monetary authorities to use the exchange rate as a shock absorber,<sup>5</sup> the authorities' unwillingness to let the real exchange rate fluctuate may feed back into financial dollarization, as dollar debtors anticipate either a stable real exchange rate or, if this strategy becomes unsustainable, a government bail out.<sup>6</sup> Finally, this RER exposure may explain the procyclical pattern of international capital flows to developing economies, as negative real shocks that tend to depreciate the local currency increase the leverage ratio of debtors in a financially dollarized country amplifying the effect of the cycle on the debtor's capacity to pay.<sup>7</sup>

The vast body of analytical literature on financial dollarization and currency mismatches spurred by the recent episodes of financial distress contrasts with the scarcity of empirical work to support or refute the concerns previously discussed.<sup>8</sup> To contribute to fill this gap, this paper exploits a comprehensive database on alternative sources of financial dollarization to examine its impact on monetary stability, financial fragility and economic performance.

The definition and measurement of financial dollarization used in this paper already entails taking sides on an issue that is certainly far from settled issue, as witnesses the discussion in Eichengreen et al. (2003), and Goldstein (2003). In particular, part of the literature on currency mismatches have focused on the country's foreign currency indebtedness vis a vis non-residents, in the view that foreign assets and liabilities held domestically should cancel each other out, with no impact on economic performance. This focus, however, suffers from at least two important shortcomings. First, markets and holder residence tend to overlap, making the

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<sup>4</sup> See, among others, Krugman (1999), Aghion et al. (2000) and Céspedes et al. (2002). De la Torre et al. discuss the crucial role played by impending balance sheet effects in the recent Argentine crisis.

<sup>5</sup> This argument has been proposed by Calvo and Reinhart (2002), among others, to account for "fear of floating," that is, the tendency to avoid substantial exchange rate volatility through foreign exchange intervention under formally floating exchange rate regimes. In line with this hypothesis, Levy Yeyati and Sturzenegger (2003) find that financially dollarized countries tend to adopt de facto a more rigid exchange rate regime. It has to be noted, however, that if prices are nominally flexible, the real exchange rate adjustment to external shocks should materialize through deflation over a longer period of time, to the same qualitative effect. Empirical evidence on a deflationary adjustment under a peg is presented in Galiani et al. (2003).

<sup>6</sup> See Burnside et al. (2001). Indeed, this implicit guarantee has been at least partially validated in many recent crises (Mexico 1994 and Brazil 1998). Certainly, the forcible pesification of debts in Argentina after the collapse of the currency board agreement was an extreme case in which these beliefs were ex-post fully confirmed.

<sup>7</sup> By contrast, in non-dollarized economies, the adjustment to a more depreciated equilibrium RER that comes through nominal depreciation typically improves (via debt dilution) the debtor's capacity to pay relative.

<sup>8</sup> Exceptions include De Nicoló et al. (2003), Arteta (2002), and Calvo et al. (2003).

distinction between residents and foreigners almost impossible to trace given the available data, particularly for those developing economies for which financial dollarization represents a potential concern.

More importantly, even if the required data were available, the aggregation argument does not tend to materialize in practice. While a financially dollarized economy may be currency-balanced as a whole, it will likely be imbalanced at a micro level, as resident holders of financial assets typically differ from foreign currency debtors. In turn, at the time of a real exchange rate adjustment, individual mismatches, rather than netting out, tend to lead to capital flight, bank runs, massive bankruptcies and endless litigation even in the absence of net external position vis a vis non residents.<sup>9</sup>

Finally, there is mounting evidence that the overall degree of financial dollarization may be influenced by a home currency bias by which the currency composition of residents and non-residents differs, with the former more prone to invest in local currency assets than the latter.<sup>10</sup> As a result, it suggests that the overall currency mismatch, to the extent that it is correlated with the dependence on foreign borrowing, is associated with the inability to induce residents to hold local currency assets. The definition of financial dollarization used here explicitly embraces this home bias view.<sup>11</sup>

The route map of the paper is the following. Section II addresses the measurement problem, and presents an overview of levels and trends of alternative measures of FD in recent years. Section III reports the empirical tests of the consequences of financial dollarization. Finally, Section IV summarizes the main policy implications and concludes.

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<sup>9</sup> Indeed, even in those cases in which individual debtors are currency hedged, it is easy to conceive the case in which they file for bankruptcy after diverting their foreign currency assets right before the currency collapse. Following standard conventions, by external I refer to an obligation issued under international (as opposed to domestic) Law. Thus, debt issued under New York Law would be domestic if the issuer is a U.S. resident and external otherwise, irrespective of the nationality of the holder.

<sup>10</sup> The point is made analytically Thomas (1983) and Ize and Levy Yeyati (2003). Bordo et al. (2002) discusses it from a historical perspective. In a related paper, Claessens et al. (2003) find that the dollarization ratio of (internal plus external) government bonds is negatively related with the size of the domestic financial market.

<sup>11</sup> This contrasts with the related literature on “original sin,” which denotes the inability to borrow in domestic currency *internationally* (see Eichengreen et al., 2003, and references therein). It has to be noted, though, that there is no prima facie evidence supporting the view that original sin reflects inability to issue local currency bonds (as opposed to unwillingness to incur the cost of a high currency premia).

## II. FD in the data

Measurement is certainly a non-trivial aspect in the financial dollarization debate, at least for two reasons. Firstly, the particular issue under study would tend to favor one particular aspect of dollarization (and, in turn, one particular measure) over the others. Thus, while the impact of financial dollarization on monetary stability requires a good measure of the dollar share of residents' savings (for example, the deposit dollarization ratio), the influence of dollarization on financial fragility and crisis propensity calls for a measure of the liability dollarization ratio of domestic financial institutions. Finally, the impact on output volatility and growth, inasmuch as it is related to the real exchange rate exposure of the economy as a whole, is more likely to depend on total (internal and external, private and public) dollar indebtedness.

Secondly, the choice of a measure depends crucially on data availability, in terms of both country and period coverage. A substantial amount of data is already available on the currency composition of domestic deposits, and the latter can be used as a reasonable proxy for domestic loan dollarization, as they often mirror each other due to the presence of prudential limits on banks' foreign exchange positions (Figure 1). The same is valid for dollarized official credit and, to varying degrees, to cross-border deposits and loans (possibly biased downward due to underreporting) and external bonded debt. On the other extreme, data on the dollar share of domestic debt is rather difficult to produce.<sup>12</sup>

In light of the aforementioned constraints, and in order to maximize sample size, in the following empirical exercises I will focus primarily on the onshore deposit dollarization ratio as the main dollarization measure. The deposit dollarization series used here is constructed by assembling data reported in De Nicoló et al. (2003), Arteta (2002), Baliño et al. (1998), various central bank bulletins and IMF Article IV Staff Reports. As a result, the final series covers over 1524 observations for 122 developed and developing countries over the period 1975-2002.<sup>13</sup>

Table 1.a provides a quick glance at the order of magnitude of the deposit dollarization levels and trends. As the table indicates, the average dollar share of domestic deposits increased from 20% in 1990 to 30% in 2001. Comparable trends are

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<sup>12</sup> Reinhart et al. (2003) construct a dollarization index based on the dollarization ratios of domestic deposits, external debt and domestic public debt. However, as they state in the appendix, available data on the latter covers only 24 countries. Classens et al. (2003), computing the dollarization of government debt from BIS sources, assume that all domestic debt is denominated in local currency (with the exception of Argentina for which they have an alternative source) abstracting from the fact that governments in many financially dollarized countries issue domestic dollar (or dollar-linked) debt.

<sup>13</sup> Data reported in those sources has been checked for consistency and, in many cases, revised accordingly. For testing purposes, I exclude de jure dollarized economies, in line with the view that micro mismatches are as important, if not more important than aggregate mismatches. Table A1 in the Appendix presents a list of countries and periods covered. A list of variable definitions and sources is presented in Table A2. For ease of comparison, Table 1 was prepared over a consistent sample of countries for which GDP and inflation data are available for the whole period.

apparent for transition and Latin American economies where financial dollarization has been particularly pervasive.<sup>14</sup> As has been already well documented in the literature, deposit dollarization in emerging economies grew or remained relatively stable in most developing countries despite a marked decline in inflation rates across the board during the last decade.

Table 1.b. illustrates the relative importance of deposit dollarization, normalized by the country's GDP as a way of capturing the associated currency exposure, by comparing it with other alternative sources of financial dollarization: i) official (bilateral and multilateral) lending, ii) cross-border bank loans to local residents, and iii) external (private and public) bonded debt.<sup>15</sup> The sample includes developing countries for which data on all sources are available, and excludes offshore financial centers, where financial dollarization is typically large and of a different nature than the one studied here.

As noted, the use of onshore deposit dollarization is a natural way to test the impact on monetary policy and, to the extent that it proxies onshore loan dollarization, to assess the consequences in terms of financial fragility. However, alternative measures of financial dollarization will be used as a robustness check in those cases in which that are likely to play a crucial role.

### **III. Evaluating the consequences**

#### ***Dollarization and monetary policy***

The earlier literature stressed the fact that dollarization, by reducing the costs of switching to the foreign currency to avoid the effects of inflation, may increase the volatility of money demand impinging in the capacity of the central bank to conduct monetary policy. While this concern was rooted in the view of dollarization as a currency substitution phenomenon, a similar argument could be made regarding the dollarization of domestic savings. Specifically, as the flight to readily available foreign-currency assets becomes less costly, the demand for reserve money should be more sensitive to monetary expansions in a dollarized economy. On the positive side, financial dollarization may reduce the temptation to inflate and be conducive, *ceteris*

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<sup>14</sup> Dollarization ratios in transition economies are computed over a shorter period. As a result of the associated real exchange rate appreciation that followed price liberalization in these countries, initial ratios may overstate the long run dollarization levels. On the impact of the real exchange rate variations on dollarization ratios, see Baliño et al. (1999).

<sup>15</sup> The data is from the Bank of International Settlements, with exception of official credit, sourced from the World Bank's GDF. While no information on the currency of denomination of cross-border deposits and loans is provided, it is reasonable to assume, as I do here, that in the case of developing economies they are foreign denominated. Appendix B presents tables with country and period coverage for all dollarization series. Appendix C reports a list of variable definition and sources used in the paper.

paribus, to lower inflation expectations, as it increases the perceived cost of monetary expansions both in terms of inflation and due to balance sheet concerns.

To address these hypotheses, I test a simple specification based on the log linearization of a standard money demand equation. Specifically, I regress the log difference of the consumer price on the log differences in broad money (M2) and real GDP, and the change in the nominal interest rate, plus three regional dummies corresponding to Latin American (*latam*), sub-Saharan African (*safrica*) and transition economies (*trans*), and year dummies.<sup>16</sup> To this I add the deposit dollarization ratio and its interaction with money growth. If financial dollarization induce lower inflation expectations, the total effect of deposit dollarization should be negative. In turn, a greater sensitivity of inflation to money growth should be captured by a positive interaction coefficient.

Overall, the results in Table 3 confirm our priors, indicating that dollarization has a beneficial short-run effect on inflation through a sobering effect on expectations, at the expense of a greater sensitivity of inflation to changes in the monetary aggregate. The first columns presents the baseline specification, controlling for country-specific effects. The coefficients display the correct sign (positive for money growth and interest rates, negative for output growth). Column (2) shows an OLS regression on the average dollarization ratio and its interaction with money.<sup>17</sup> The dollarization coefficient has the expected negative sign (more dollarization leading to less inflation), although it is not significant. On the other hand, the interaction reveals that onshore dollarization raises significantly the elasticity of inflation with respect to money growth. As an indicative example, a 100% deposit dollarization level implies that the coefficient on money creation nearly doubles. Comparable results are obtained using country-specific effects (column 3). The coefficient on deposit dollarization becomes significant when we replicate the previous two regressions using the current dollarization ratio instead of its average (columns 4 and 5). Reassuringly, the rest of the coefficients are virtually unchanged.

The implications of these two offsetting effects (namely, a lower inflation bias countervailing a higher inflation sensitivity) for long-run inflation rate are not straightforward. To address this question, we run a cross-section regression of average inflation on the average GDP and money growth rates and the average dollarization level (column 6). The coefficient shows up positive but not significant. A positive link between dollarization and inflation, however, presents obvious endogeneity concerns (as higher inflation may lead to higher deposit dollarization). To mitigate this problems, we instrument dollarization using an index of the degree of restrictions to onshore dollarization, in place as of 2000 (*restrictions*), constructed following De

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<sup>16</sup> The inclusion of additional variables such as openness, government consumption or exchange rate regimes yield similar results at the cost of a loss of observations, and are thus omitted. Results are available upon request.

<sup>17</sup> Regional dummies are also introduced and display the expected positive sign.

Nicoló et al. (2003).<sup>18</sup> The results show a positive and significant association between dollarization and inflation, suggesting that the short-run effect in terms of inflation expectations is ultimately offset by the incidence of a more sensitive inflation response.

### ***Dollarization and financial fragility***

Perhaps the concern more frequently emphasized in relation to financial dollarization is its deleterious impact on financial fragility. Recent work have reported some supporting evidence. On the one hand, De Nicoló et al. (2003) find that dollarized banking sectors exhibit higher risk profiles (as measured by the Z-index, a proxy of distance to default)<sup>19</sup> and deposit volatility (in line with the greater volatility of money demand revealed in the previous section). Calvo et al. (2003), in related work, document that the propensity to suffer sudden stops in capital inflows (possibly an important trigger of financial crises) increases with the degree of financial dollarization (defined as BIS reporting banks' local asset positions in foreign currency as a share of GDP).

Closer to the focus of this paper, Domac and Martínez Pería (2000) find the foreign liabilities to assets ratio of local banks to be positively correlated with the probability of a systemic banking crisis. This is at odds, however, with Arteta (2003), who find, for a somewhat smaller sample, little evidence that onshore financial dollarization raises the probability of facing a banking crisis. Thus, it appears that one the main themes of the financial dollarization debate, namely its presumed incidence on financial fragility and crisis propensity due to the presence of balance sheet effects, it still to be validated by the evidence.

I revisit this issue by modeling the probability of facing a banking crisis as a function of standard crisis determinants (lagged to limit potential endogeneity problems), the change in the nominal exchange rate in the previous period, and two financial dollarization measures: a deposit dollarization dummy (which equals 1 whenever the deposit dollarization ratio for the previous year exceeds 10%), and the ratio between local banks' foreign currency liabilities and assets, to capture non-deposit liability dollarization of local banks.

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<sup>18</sup> While the index of restrictions corresponds to the year 2000, it can be reasonably assumed that the degree of restrictiveness in individual countries is relatively constant over time. Indeed, the index exhibits a high and statistically significant correlation with annual dollarization ratios in different years. On the other hand, it is not correlated with inflation in any of the specifications in the table. The index, based on the IMF's AREAER, is reported in Appendix B. See De Nicoló et al. (2003) for a description.

<sup>19</sup> More precisely, the index measures the probability that a loss (negative ROA) exceeds the bank's equity capital ( $EQ$ ) or

$$P(ROA \leq -\frac{EQ}{A}) \leq \frac{\sigma_{ROA}^2}{\left(\mu_{ROA} + \frac{EQ}{A}\right)^2} \equiv \frac{1}{Z^2}$$

Thus, a smaller Z would indicate a larger risk exposure.



Specifically, I use as dependent variable a dummy that equals one for the first period of the crisis, and zero in non-crisis periods. Crisis periods following the first one are dropped from the sample to abstract from any impact that the crisis may have on the explanatory variables. In turn, the set of standard controls comprises the inflation rate, changes in the terms of trade, the real interest rate, the real GDP growth rate, and the ratios of M2 to international reserves, private credit to GDP, liquid to total assets, and capital flows to GDP. In addition, I add the real GDP per capita as a broad control for institutional quality. Finally, to test whether financial dollarization increases the propensity of a crisis for a given exchange rate adjustment, some regressions include the interaction of the change in the exchange rate with the financial dollarization measures.

The results are reported in Table 5. The first column includes only the standard regressors. All display the expected sign although only a few are statistically significant at conventional levels, possibly due to multicollinearity problems. Column 2 introduces the change in the exchange rate and the dollarization variables, which show a positive and, in the case of the latter, significant effect on crisis propensity. Finally, column 3 adds the interaction terms. As can be seen, both interactions are positive and significant, indicating that onshore dollarization increases the incidence of exchange rate changes in the probability of suffering a banking crisis. The total effect of each dollarization measure, positive and significant as expected, are reported at the bottom.

As the table shows, the number of observations is reduced substantially when all regressors are included. To check whether the results are sensitive to the small sample covered in columns 2 and 3, columns 4 and 5 simply replicate these tests using a subsample of the set of standard controls. The qualitative results are not altered. Interestingly, in both cases, the total effect of an exchange rate change is not significant once the dollarization variables are included, suggesting that an exchange rate shock appears to have a negative impact only through its balance sheet effect.<sup>20</sup>

The previous results substantiate the concern linking financial dollarization with financial fragility through the balance sheet channel. Dollarization advocates, however, has often stressed that this undesired consequence should be weighted against the beneficial effects of onshore dollarization on local intermediation, in countries where financial markets would otherwise be insufficiently developed due to a weak currency problem. A final answer to the question about whether financial dollarization helps develop domestic markets in weak currency economies remains elusive, as empirical testing is mined by the scarcity of data and the difficulty to

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<sup>20</sup> In fact, its sign turns negative, suggesting that banking sectors in non-dollarized economies actually may benefit from an exchange rate adjustment, possibly due to its positive impact on the real economy. Unfortunately, the coefficients are not significant and more testing is needed to assess whether this positive effect is actually in place.

control for all relevant factors that may influence both currency denomination and financial development.

However, a recent study by De Nicoló et al. (2003) provides some valuable preliminary insights. By regressing financial depth (measured as the M2 to GDP ratio) on the deposit dollarization ratio plus a number of additional controls, they find that dollarization is not associated per se with deeper markets, except in high inflation countries where it appears to have a countervailing effect.<sup>21</sup> In addition, it shows that the imposition of restrictions on onshore dollarization has no effect on the degree of financial depth, which suggest that the desintermediation effects of limiting dollarization de jure may have been overstated in the debate.

A cursory look at the data seems to reveal a *negative* dollarization-financial depth link, as shown in Figure 2, where I plotted average M2-to-GDP and dollarization ratios. Offshore centers are singled out in the figure by a square marker. As can be seen, three of them are clear outliers relative to what appears to be a significant negative association. Once offshore centers are excluded from the sample, a simple regression of financial depth on deposit dollarization yields a significant and negative correlation.

In sum, while concerns related to financial fragility seem to be supported by the evidence, there seems to be little empirical ground for the foregone conclusion that dollarized countries are compensated with the benefit of more liquid domestic financial markets.

### ***Dollarization and growth***

Although the final test of the net effect of financial dollarization lies in its implication for growth and output volatility, there are surprisingly few empirical studies that systematically addresses this issue.<sup>22</sup> Regarding output volatility, the increased real exchange exposure typically associated with dollarization would indicate that dollarized countries are likely to exhibit greater output variability. Moreover, one could argue that, because they are known to be more sensitive to currency fluctuations, dollarized countries are bound to be the subject of speculative attacks, endogenizing to some extent the distribution of external shocks.<sup>23</sup>

Less straightforward is the case for long-run growth. While output volatility may have adverse consequences for growth (Ramsey and Ramsey, 1995),

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<sup>21</sup> Similar results are based using the present database.

<sup>22</sup> The only exception is, perhaps, Reinhart et al. (2003) where they compare average growth performance as a function of different measures of dollarization, with mixed results.

<sup>23</sup> This hypothesis can be thought of an extension Calvo's (1999) claim that pegs are likely to suffer more volatile external shocks due to speculative attacks, to the case of a dollarized economy where the government is expected to mitigate the depreciation of the local currency at the cost of a loss of reserves.

dollarization, by deepening financial markets, may fuel investment offsetting the previous effect. However, as we have seen, the alleged financial impact does not show in the data, tilting the balance against dollarization.

A cursory look at the data yields interesting preliminary insights. Table 7a reports the means test of the two variables of interest (growth and growth volatility) for high a low dollarization countries, defined as those with average dollar ratios above or below the sample median. As can be seen, the latter display significantly faster and more stable growth than the former. Similar conclusions can be drawn from the correlations in Table 7b. Thus, a bird's eye look at the data appears to indicate that dollarization does have negative implications for growth.

This is consistent with the results of the cross-section regressions of Tables 7c-d. The first table reports growth regressions of average growth on the average dollarization ratio and standard controls such as initial per capita GDP, initial human capital (proxied by the ration of secondary school enrollment at the beginning of the period, *sec*), plus the averages of the investment-to-GDP ratio, the population growth, and regional dummies. The table indicates that dollarization is negatively associated with growth, and significantly so when offshore economies are excluded. Instrumenting dollarization with restrictions reinforces the results. The results concerning output volatility are even more robust (Table 7d). Dollarization is significantly related with volatility, even after controlling for terms of trade and nominal exchange rate volatility (column 4) and excluding offshore financial centers (column 5).

The literature on the real consequences of financial dollarization has emphasized the incidence of the aggregate currency mismatch, focusing on external foreign currency liabilities. While this does not deny the relevance of onshore dollarization as a source of financial distress, offshore dollarization certainly played a role in recent financial crises and helps explain the deleterious effects of exchange rate adjustments on economies where onshore dollarization is virtually null. More generally, we would expect to observe a negative link between measures of offshore dollarization and output volatility, particularly in developing economies. This link is explored in the last three columns in Table 7, where we replicate the previous tests using the ratio of foreign bonded debt (private and public) over GDP as a proxy for the external mismatch. As can be seen, output volatility appears to be positively and significantly correlated with the level of foreign currency bonded debt for non-industrial economies (but not for industrial ones), even after controlling for nominal instability over the period (proxied by average inflation) and the degree of openness.<sup>24</sup>

These findings suggest that dollarization (both domestic and external) may have a detrimental effect on the real economy. While a more careful exploration of these links that takes into account potential simultaneity problems is warranted, this

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preliminary exploration support the view that, for a dollarized developing economy, the growth path is likely to be slower and choppier than for the rest.

#### **IV. Final remarks**

The previous section showed that financially dollarized economies tend to display a greater sensitivity of domestic prices to money creation and higher inflation rates (contradicting the view of dollarization as a self-disciplining device), a greater propensity to suffer systemic banking crises, and slower and more volatile output growth, without any visible gain in terms of financial depth. In sum, the evidence confirmed some of the concerns typically associated with financial dollarization, and cast doubt on certain arguments that have been used in its favor.

Overall, these findings provide a case for promoting dedollarization as an active policy. Both the previous evidence and the lessons from past and current dedollarization experiences suggest that any such strategy should entail a two-way approach.<sup>25</sup> On the one hand, short of a quantitative limit on onshore dollar intermediation (as is the case in many developed and emerging economies), prudential regulation should be revised to address ex-ante the factors that favor the use of the dollar, as is gradually being done, rather belatedly, by some financially dollarized economies such as Argentina and Uruguay after recent systemic financial crises.<sup>26</sup> On the other, *pari passu* with this revisions, peso instruments should be introduced and promoted to limit the impact of more stringent regulation in terms of domestic financial intermediation, either through the use of indexation as in Chile or more naturally through the development of local currency markets for government debt as a substitute for foreign currency-denominated external obligations, as has been done, for example, in Mexico after the Tequila crisis.

Needless to say, any successful dedollarization strategy should be accompanied by sound and credible monetary and fiscal policies. However, as witness the Argentine convertibility, the Uruguayan crawling peg or the Peruvian managed float, sound monetary policies are necessary but may not be sufficient. A proactive agenda with specific measures aimed at mitigating the presence of externalities and enhancing the attractiveness of local currency assets may be needed to complement conducive macro policies. Ultimately, the economic implications of financial dollarization appear to justify the effort.

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<sup>25</sup> See Levy Yeyati (2003) for a detailed discussion along these lines.

<sup>26</sup> Measures along these lines include, for example, equalizing the local currency coverage of deposit insurance across currencies or factoring in the currency exposure of debtors in the computation of provisions and risk-based capital requirements.

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Table 1a. Deposit Dollarization and Inflation

		Dollarization	Inflation	Latam		Transition	
				Dollarization	Inflation	Dollarization	Inflation
1990	mean	20.5	45.4	21.1	71.0	35.8*	30.5*
	<i>median</i>	<i>15.6</i>	<i>15.0</i>	<i>13.3</i>	<i>17.4</i>	<i>30.0</i>	<i>24.8</i>
Obs.		45	45	21	21	12	12
2001	mean	30.4	8.9	28.9	5.0	47.7	7.2
	<i>median</i>	<i>20.1</i>	<i>4.0</i>	<i>18.9</i>	<i>4.0</i>	<i>48.0</i>	<i>7.1</i>
Obs.		71	71	22	22	15	15

\*For transition economies we use 1995 data.

Table 1b. Dollar liabilities over GDP: Alternative Sources  
(non-industrial countries excluding offshore financial centers)

		Domestic deposits	Cross-border loans	External bonded debt	Official long-term debt	Total*
1995	mean	6.98	14.55	3.74	16.51	41.80
	<i>median</i>	<i>5.56</i>	<i>11.39</i>	<i>1.79</i>	<i>11.81</i>	<i>39.82</i>
Obs.		26	26	26	26	26
min		0	2.46	0.16	0	11.97
max		25.53	53.81	35.02	75.80	111.42
2000	mean	9.93	12.62	8.28	13.051	43.88
	<i>median</i>	<i>8.41</i>	<i>10.90</i>	<i>6.44</i>	<i>11.11</i>	<i>41.31</i>
Obs.		29	29	29	29	29
min		0.01	2.72	0.57	0	17.26
max		37.61	25.44	25.75	41.56	80.64

\* Sum of the GDP ratios of dollarization of domestic deposits, cross border loans, external bonded debt, and official credit.

Note: Excludes outliers: Guyana, Nicaragua and Sao Tome & Principe.

Table 2. Dollarization and Inflation  
Dependent Variable:  $\Delta p$

	FE	OLS	FE	OLS	FE	Avg	Avg(i)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta m$	0.841*** (0.065)	0.676*** (0.087)	0.515*** (0.119)	0.703*** (0.132)	0.579*** (0.150)		
$\Delta \text{lgdp}$	-0.448*** (0.114)	-0.698*** (0.129)	-0.597*** (0.132)	-0.627*** (0.199)	-0.502** (0.202)		
$\Delta \text{intrate}$	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)		
latam	0.000 (0.000)	0.025* (0.013)		0.015 (0.013)		0.021 (0.016)	0.025 (0.019)
safrica	0.000 (0.000)	0.045*** (0.011)		0.046* (0.027)		0.054** (0.024)	0.057** (0.025)
transition	0.000 (0.000)	0.075*** (0.022)		0.060** (0.023)		0.076 (0.054)	0.056 (0.057)
dollar_avg		-0.086 (0.052)				0.081 (0.079)	0.190** (0.094)
$\Delta m\_dollar\_avg$		0.599*** (0.202)	0.899*** (0.282)				
dollar				-0.161** (0.076)	-0.566*** (0.181)		
$\Delta m\_dollar$				0.683** (0.326)	0.938** (0.380)		
$\Delta m\_avg$						0.947*** (0.090)	0.899*** (0.102)
$\Delta \text{lgdp\_avg}$						-1.431** (0.673)	-1.526** (0.690)
constant	-0.040** (0.016)	-0.036** (0.017)	-0.019 (0.019)	-0.025 (0.063)	0.055 (0.092)	-0.018 (0.030)	-0.027 (0.031)
Observations	2987	2056	2056	1076	1076	105	103
R-squared	0.81	0.80	0.83	0.85	0.87	0.83	0.83

Standard errors robust to heteroskedasticity and, in fixed-effect specifications, to clustering by country-specific observations, in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

(i) Instruments:  $\Delta m\_avg$ ,  $\Delta \text{lgdp\_avg}$ ,  $\Delta \text{intrate\_avg}$ , latam, safrica, transition and restrictions.

### Selected Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
dlepi	2056	0.167	0.357	-0.103	5.475
dollar_avg	2056	0.173	0.180	0.001	0.915
d1m2_dollar_avg	2056	0.052	0.156	-0.514	2.591
dollar	1076	0.215	0.226	0.000	0.941
d1m2_dollar	1076	0.070	0.190	-0.406	2.538



Table 3. Dollarization and financial fragility  
Dependent variable: First crisis year dummy

	Logit (1)	Logit (2)	Logit (3)	Logit (4)	Logit (5)
$\Delta p$	0.553*** (0.201)	-0.841 (0.716)	-1.673 (1.089)		
$\Delta tt$	-0.000 (0.008)	0.011 (0.012)	0.013 (0.012)		
real interest rate	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)		
M2/reserves	-0.010 (0.008)	-0.004 (0.011)	-0.005 (0.011)		
privcred/gdp	0.027 (0.657)	-0.597 (1.142)	-0.802 (1.168)		
cash/assets	-0.530 (0.692)	-0.568 (0.963)	-0.588 (0.884)		
capital flows/gdp	-1.114 (1.017)	-1.062 (1.422)	-1.651 (1.429)		
real gdp growth	-0.014 (0.019)	-0.000 (0.033)	-0.006 (0.033)	-0.041* (0.024)	-0.047* (0.025)
real per capita gdp	0.000** (0.000)	0.000* (0.000)	0.000** (0.000)	0.000*** (0.000)	0.000*** (0.000)
$\Delta er$		1.113 (0.679)	-0.895 (1.326)	0.489*** (0.184)	-1.309 (1.004)
FL/FA		0.000*** (0.000)	0.005** (0.003)	0.000*** (0.000)	0.004** (0.002)
dollar_10		0.852** (0.369)	0.683* (0.411)	0.881*** (0.340)	0.787** (0.357)
FL/FA * $\Delta er$			0.106** (0.051)		0.075** (0.034)
dollar_10 * $\Delta er$			2.351** (1.196)		1.653* (0.980)
constant	-2.696*** (0.356)	-2.921*** (0.551)	-2.606*** (0.544)	-3.624*** (0.310)	-3.523*** (0.325)
Observations	1429	535	535	1041	1041
$\Delta er + FL/FA * \Delta er + dollar\_10 * \Delta er$ (p-value)			1.660 (0.175)		0.880 (0.326)
dollar_10 + dollar_10 * $\Delta er$ (p-value)			1.099*** (0.005)		1.030*** (0.004)
FL/FA + FL/FA * $\Delta er$ (p-value)			0.024** (0.039)		0.015** (0.024)

Notes: All regressors lagged one period. The crisis dummy equals one for the first year of a banking crisis. Subsequent crisis years dropped from the sample. dollar\_10 equals one if onshore deposit dollarization ratio exceeds 10%. Robust standard errors in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

### Selected Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
$\Delta er$	535	.177011	.4827931	-.1407392	5.15798
LF/LA	535	25.56345	401.1965	.0072505	8086.207
dollar_10	535	.4785047	.5000053	0	1

Table 4a. Dollarization and growth: Mean tests

	Low dollarization <i>(std dev.)</i>	High dollarization <i>(std dev.)</i>	Means-tests <i>(p-value)</i>
Mean ( $\Delta$ gdp_avg)	0.035 <i>(0.015)</i>	0.026 <i>(0.019)</i>	-0.010 <i>(0.000)</i>
Mean ( $\Delta$ gdp_sd)	0.042 <i>(0.023)</i>	0.065 <i>(0.043)</i>	0.023 <i>(0.000)</i>
Number of countries	64	60	

Note: Low (high) dollarization countries are those with average dollarization ratios below (above) the sample median (median = 20%).

Table 4b. Dollarization and growth: Correlations

	$\Delta$ gdp_avg <i>(p-value)</i>	$\Delta$ gdp_sd
dollar_avg	-0.2700 <i>(0.0024)</i>	0.3814 <i>(0.0000)</i>
$\Delta$ gdp_sd	-0.2276 <i>(0.0026)</i>	

Note: The sample includes 124 countries.

Table 5. Growth regressions  
Dependent Variable:  $\Delta$ gdp\_avg

	OLS	OLS	OLS	OLS	IV (i)	IV (i)
				exc. offshore		exc. offshore
	(1)	(2)	(3)	(4)	(5)	(6)
Initial gdppc	-0.004** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)
sec	0.009 (0.008)	0.014* (0.008)	0.001 (0.011)	0.003 (0.011)	0.010 (0.015)	0.012 (0.016)
dollar_avg	-0.014 (0.011)	-0.022* (0.011)	-0.015 (0.010)	-0.021** (0.010)	-0.054*** (0.018)	-0.064*** (0.020)
ingvdp_avg		0.201*** (0.040)	0.170*** (0.039)	0.162*** (0.039)	0.169*** (0.044)	0.157*** (0.046)
popg_avg		0.380*** (0.120)	0.300** (0.130)	0.326** (0.129)	0.514*** (0.180)	0.543*** (0.186)
latam			-0.009** (0.004)	-0.008* (0.004)	-0.004 (0.006)	-0.002 (0.006)
transition			-0.013*** (0.005)	-0.011** (0.004)	-0.006 (0.007)	-0.003 (0.007)
safrica			-0.015** (0.006)	-0.014** (0.006)	-0.011 (0.007)	-0.009 (0.007)
constant	0.036*** (0.004)	-0.014 (0.009)	0.005 (0.010)	0.005 (0.010)	0.002 (0.011)	0.003 (0.011)
Observations	77	67	67	65	65	63
R-squared	0.09	0.53	0.60	0.59	0.48	0.47

Robust standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

(i) Instruments: gdppc74, sec, ingvdp\_avg, popg\_avg, latam, transition, safrica, and restrictions.

### Selected Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
$\Delta$ gdp_avg	77	0.033	0.017	-0.017	0.081
Initial gdppc	77	1.260	1.648	0.019	9.828
dollar_avg	77	0.173	0.167	0.001	0.756
ingvdp_avg	67	0.213	0.050	0.097	0.316
popg_avg	67	0.020	0.014	-0.000	0.087

Table 6. Output volatility regressions  
Dependent Variable:  $\Delta\text{gdp\_sd}$

	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
					exc. offshore		non-industrials	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dollar_avg	0.066*** (0.021)	0.026** (0.011)	0.024** (0.011)	0.020** (0.010)	0.020* (0.011)			
Initial gdppc		0.009** (0.004)	0.010** (0.005)	0.007** (0.003)	0.007*** (0.003)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
sec		-0.063*** (0.016)	-0.065*** (0.017)	-0.029** (0.015)	-0.035** (0.014)	-0.031** (0.014)	-0.041 (0.026)	-0.042 (0.035)
latam			-0.001 (0.005)	-0.007 (0.006)	-0.010** (0.005)	0.000 (0.006)	-0.003 (0.006)	-0.013 (0.008)
transition			0.018** (0.008)	0.011** (0.005)	0.013*** (0.005)	0.023* (0.013)	0.000 (0.000)	0.000 (0.000)
safrica			-0.002 (0.007)	-0.002 (0.007)	-0.005 (0.007)	-0.008 (0.010)	-0.002 (0.016)	-0.011 (0.014)
$\Delta\text{tt\_sd}$				0.002*** (0.000)	0.002*** (0.000)	0.001 (0.000)	0.001* (0.000)	0.001 (0.000)
$\Delta\text{er\_sd}$				-0.001 (0.004)	0.000 (0.003)	-0.005 (0.010)	-0.005 (0.005)	-0.016 (0.011)
doll_bondebt_avg						0.003 (0.013)	0.257*** (0.091)	0.228** (0.098)
inflation_avg								0.761 (0.471)
Openness (nitial)								-0.005 (0.016)
constant	0.038*** (0.004)	0.055*** (0.005)	0.054*** (0.006)	0.022** (0.010)	0.023** (0.010)	0.038*** (0.009)	0.031** (0.014)	0.035* (0.018)
Observations	124	77	77	73	70	61	36	27
R-squared	0.15	0.36	0.37	0.59	0.63	0.27	0.28	0.51

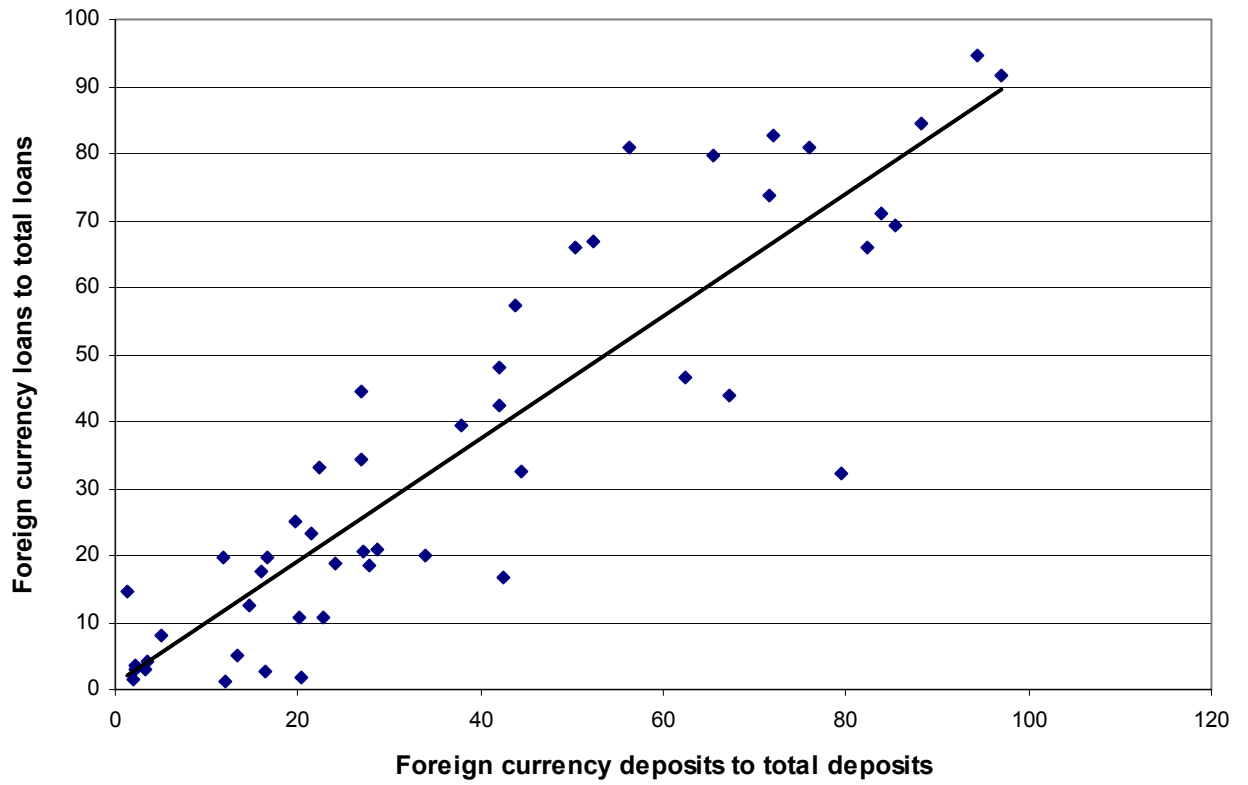
Robust standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

### Selected Summary Statistics

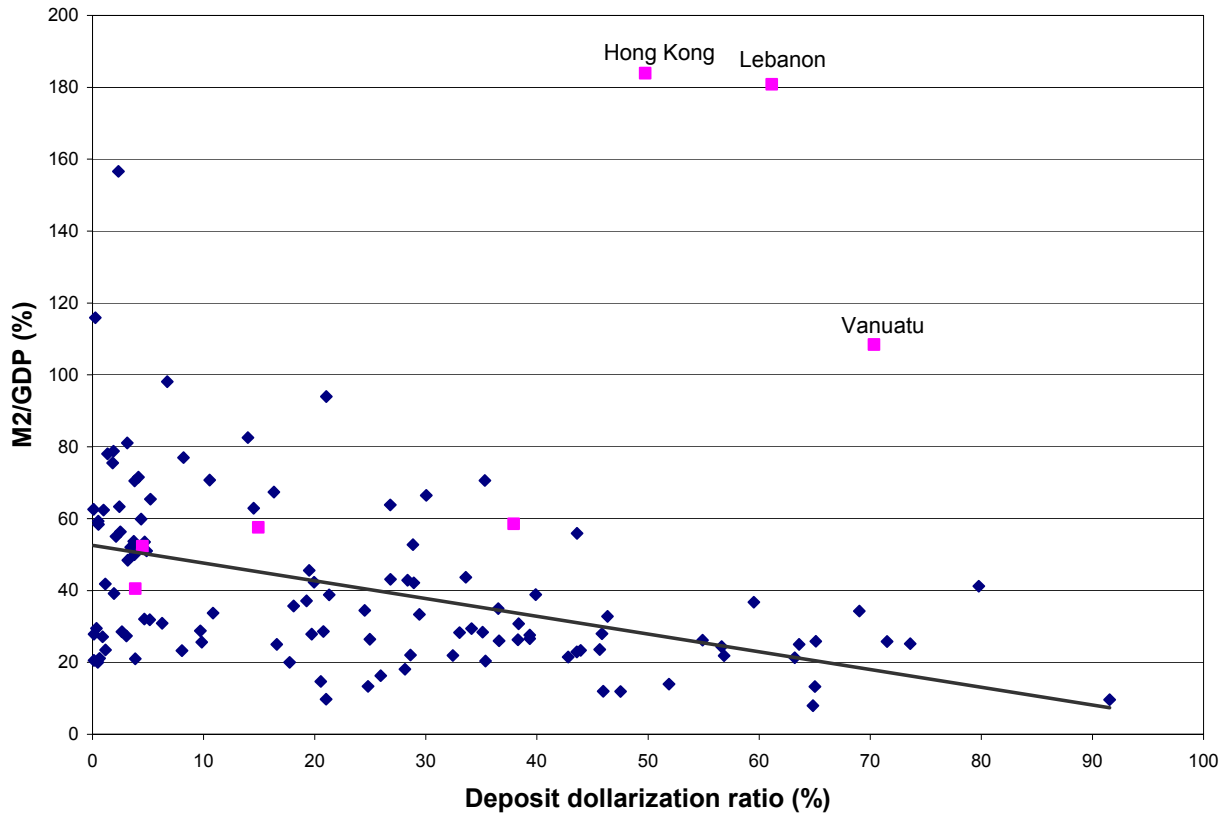
Variable	Obs	Mean	Std. Dev.	Min	Max
$\Delta\text{gdp\_sd}$	124	0.053	0.036	0.015	0.264
dollar_avg	124	0.234	0.209	0.001	0.915
Initial gdppc	77	1.291	1.682	0.019	9.828
sec	77	0.412	0.272	0.010	0.910
doll_bondebt_avg	61	0.120	0.188	0.000	1.260

Figure 1. Deposit and loan dollarization



Note: Foreign currency loans sourced from De Nicoló et al. (2003) and Arteta (2002).

Figure 2. Financial dollarization and financial depth  
(average ratios)



Notes: Square markers represent offshore countries. The trendline represents the locus of the fitted values of a simple regression of the average M2-to-GDP ratio on the average deposit dollarization ratio, excluding offshore observations. The regression coefficient is -0.005 with a t-statistic of -5.27.

## Appendix

Table A1. Variable definitions and sources

Variable	Definitions (sources)
$\Delta p$	Logarithmic difference of the CPI. (IMF's World Economic Outlook [WEO])
$\Delta e$	Logarithmic difference of the nominal exchange rate (IMF's World Economic Outlook [WEO]).
restrictions	Index of restrictiveness of rules on resident holdings of foreign currency deposits onshore, revised and expanded from De Nicoló et al. (2003), using their methodology.
sec	School enrollment, secondary (% gross) (IBRD's World Development Indicators [WDI]).
$\Delta m$	Logarithmic difference of M2 (IFS).
$\Delta gdp$	Logarithmic difference of real GDP (IFS).
crisis	Dummy variable equal to one for the first crisis year (Caprio and Klingebiel, 2003).
real gdp growth	Percent variation of GDP in local currency at constant prices (WDI).
real per capita gdp	GDP per capita, constant prices in local currency (WEO).
M2 / GDP	Ratio of M2 over GDP (IFS).
M2 / reserves	Ratio of M2 over international reserves (IFS).
Cash/assets	Reserves of deposit money banks over assets of deposit money banks (IFS)
privcred/GDP	Bank credit to the resident private sector over GDP (IFS)
gdppc_us	GDP per capita denominated in US dollars (WEO).
intrate	Nominal interest rate (IFS).
dollar openness	Dollar deposits over total deposits in local deposit money banks (various sources). (Export + Import) / GDP (IFS).
$\Delta t$	Logarithmic difference of terms of trade (WDI: exports as a capacity to import (constant LCU)).
private credit/gdp	Credit growth/GDP (IFS).
cash / assets	Reserves of deposit money banks / assets of deposits money (IFS).
FL/FA	Deposit money banks' foreign liabilities over foreign assets (IFS).
capital flows/gdp	Capital account + financial account + net errors and omissions (IFS).
latam	Dummy variable for Latin American countries.
transition	Dummy variable for transition countries.
safrica	Dummy variable for Sub-Saharan African countries.
offshore	Dummy variable for offshore centers (BIS).

Notes:  $x_{avg}$  and  $x_{sd}$  denote the mean and standard deviation of  $x$  over the period covered.  $x_{-1}$  denotes the value of the variable  $x$  lagged one period.

Table A2. Onshore deposit dollarization data: Countries and periods covered

Country	Dollariz.	Country	Dollariz.	Country	Dollariz.	Country	Dollariz.
Albania	1992-2001	Ecuador*	1990-2001	Lebanon	1993-2001	Sierra Leone	1993-1999
Angola	1995-2001	Egypt	1980-2001	Lithuania**	1993-2001	Slovak Republic**	1991-2001
Antigua and Barbuda*	1979-2001	El Salvador*	1982-2001	Macedonia, FYR**	1997-2001	Slovenia**	1991-2001
Argentina*	1986-2001	Estonia**	1991-2001	Malawi	1994-2001	South Africa	1991-2001
Armenia**	1992-2001	Ethiopia	1998-1999	Malaysia	1996-2001	Spain	1996-2001
Austria	1997-2001	Finland	1996-1999	Maldives	1981-1999	St. Kitts and Nevis*	1979-2001
Azerbaijan**	1992-2001	Georgia**	1992-2001	Malta	1975-1984	St. Lucia*	1979-1999
Bahamas, The	1975-2001	Ghana	1995-2000	Mauritius	1992-1999	St. Vincent & Grens.*	1979-2001
Bangladesh	1987-2001	Greece	1990-2001	Mexico*	1991-2001	Sudan	1992-1998
Bahrain	1984-1997	Grenada*	1979-1999	Moldova**	1994-2001	Suriname*	1975
Barbados*	1975-2001	Guatemala*	1995-2001	Mongolia**	1992-2001	Sweden	1994-2001
Belarus**	1992-2001	Guinea	1989-2001	Mozambique	1991-2001	Switzerland	1998-2001
Belize	1976-2001	Guinea-Bissau	1990-1996	Myanmar	1991-1999	Syrian Arab Republic	1975-1998
Bhutan	1993-2001	Haiti*	1994-2001	Netherlands	1990-2001	Tajikistan*	1996-2000
Bolivia*	1975-2001	Honduras*	1990-2001	Netherlands Antilles*	1975-2001	Tanzania	1993-2001
Bosnia and Herzeg.**	1996-2001	Hong Kong	1991-2001	New Zealand	1990-2001	Thailand	1982-2001
Bulgaria**	1991-2001	Hungary**	1989-2001	Nicaragua*	1990-2001	Trinidad and Tobago	1993-2001
Cape Verde	1995-1999	Iceland	1978-1999	Nigeria	1994-2001	Turkey	1986-2001
Cambodia	1993-2001	Indonesia	1992-2001	Norway	1996-2000	Turkmenistan**	1993-2000
Chile*	1976-2001	Israel	1981-2001	Oman	1975-1999	Tonga	1994-1999
China,P.R.: Mainland	1998-2001	Italy	1996-2000	Pakistan	1990-1998	Uzbekistan	1997-1999
Colombia*	1990-1999	Jamaica*	1992-2001	Papua New Guinea	1976-1999	Uganda	1992-2000
Comoros	1998-2001	Japan	1996-2001	Paraguay*	1988-2001	Ukraine**	1992-2001
Congo, Dem. Rep.	1975-2001	Jordan	1990-1999	Peru*	1975-2001	United Arab Emirates	1981-2001
Costa Rica*	1990-2001	Kazakhstan**	1998-2001	Philippines	1982-2001	United Kingdom	1990-2001
Croatia**	1993-2001	Kenya	1995-2001	Poland**	1985-2001	Uruguay*	1981-2001
Czech Republic**	1993-2001	Korea	1990-2001	Qatar	1993-1999	Vanuatu	1981-1999
Cyprus	1991-1999	Kuwait	1981-1999	Romania**	1990-2001	Venezuela*	1994-2001
Denmark	1991-2001	Kyrgyz Republic**	1995-2001	Russia**	1993-2001	Vietnam	1992-2001
Dominica*	1988-2001	Lao People's Dem. Rep.	1989-2001	Sao Tome & Principe	1995-2001	Yemen	1990-2001
Dominican Republic	1996-2001	Latvia**	1992-2001	Saudi Arabia	1975-2001	Zambia	1994-2001
						Zimbabwe	1993-1999

Note: (\*) denotes Latin American countries and (\*\*) denotes Transition countries.



Table A3. Cross-border loans: Countries and periods covered

Country	Period covered	Country	Period covered	Country	Period covered
Afghanistan	1995-2000	Ghana	1995-2002	Nigeria	1995-2002
Albania**	1995-2002	Greece	1995-2002	Norway	1995-2002
Algeria	1995-2002	Grenada*	1995-2002	Oman	1995-2002
Angola	1995-2002	Guatemala*	1995-2002	Pakistan	1995-2002
Argentina*	1995-2002	Guinea	1995-2002	Panama*	1995-2002
Aruba*	1995-2002	Guinea-Bissau	1995-2002	Papua New Guinea	1995-2002
Armenia**	1995-2002	Guyana*	1995-2002	Paraguay*	1995-2002
Australia	1995-2002	Haiti*	1995-2002	Peru*	1995-2002
Austria	1995-2002	Honduras*	1995-2002	Philippines	1995-2002
Azerbaijan**	1995-2002	Hong Kong	1995-2002	Poland**	1995-2002
Bahamas, The*	1995-2002	Hungary**	1995-2002	Portugal	1995-2002
Bahrain	1995-2002	Iceland	1995-2002	Qatar	1995-2002
Bangladesh	1995-2002	India	1995-2002	Romania**	1995-2002
Barbados*	1995-2002	Indonesia	1995-2002	Russia**	1995-2002
Belarus**	1995-2002	Iran, I.R. of	1995-2002	Rwanda	1995-2002
Belize*	1995-2002	Iraq	1995-2000	Saudi Arabia	1995-2002
Benin	1995-2002	Ireland	1995-2002	Sao Tome & Principe	1995-2002
Bhutan	1995-2002	Israel	1995-2002	Senegal	1995-2002
Bolivia*	1995-2002	Italy	1995-2002	Seychelles	1995-2002
Bosnia and Herzegovina**	1995-2002	Jamaica*	1995-2002	Sierra Leone	1995-2002
Botswana	1995-2002	Japan	1995-2002	Singapore	1995-2002
Brazil*	1995-2002	Jordan	1995-2002	Slovak Republic**	1995-2002
Bulgaria**	1995-2002	Kazakhstan**	1995-2002	Solomon Islands	1995-2002
Burkina Faso	1995-2002	Kenya	1995-2002	Somalia	1995-2002
Burundi	1995-2002	Kiribati	1995-2002	South Africa	1995-2002
Cambodia	1995-2002	Kuwait	1995-2002	Spain	1995-2002
Cameroon	1995-2002	Kyrgyz Republic**	1995-2002	Sri Lanka	1995-2002
Cape Verde	1995-2002	Lao People's Dem. Rep	1995-2002	St. Lucia*	1995-2002
Central African Republic	1995-2002	Latvia**	1995-2002	St. Vincent & Grens.*	1995-2002
Chad	1995-2002	Lebanon	1995-2002	Sudan	1995-2002
Chile*	1995-2002	Lesotho	1995-2002	Swaziland	1995-2002
China: Mainland	1995-2002	Liberia	1995-2002	Sweden	1995-2002
Colombia*	1995-2002	Libya	1995-2002	Switzerland	1995-2002
Comoros	1995-2002	Lithuania**	1995-2002	Syrian Arab Republic	1995-2002
Congo, Dem. Rep.	1995-2002	Luxembourg	1995-2002	Tajikistan**	1995-2002
Congo, Republic of	1995-2002	Macedonia, FYR**	1995-2002	Tanzania	1995-2002
Costa Rica*	1995-2002	Madagascar	1995-2002	Thailand	1995-2002
Cote D'Ivoire	1995-2002	Malawi	1995-2002	Togo	1995-2002
Croatia**	1995-2002	Malaysia	1995-2002	Tonga	1995-2002
Cyprus	1995-2002	Maldives	1995-2002	Trinidad & Tobago*	1995-2002
Czech Republic**	1995-2002	Mali	1995-2002	Tunisia	1995-2002
Djibouti	1995-2002	Malta	1995-2002	Turkey	1995-2002
Dominica*	1995-2002	Mauritania	1995-2002	Turkmenistán**	1995-2002
Dominican Republic*	1995-2002	Mauritius	1995-2002	Uganda	1995-2002
Ecuador*	1995-2002	Mexico*	1995-2002	Ukraine**	1995-2002
Egypt	1995-2002	Moldova**	1995-2002	United Arab Emirates	1995-2002
El Salvador*	1995-2002	Mongolia**	1995-2002	United Kingdom	1995-2002
Equatorial Guinea	1995-2002	Morocco	1995-2002	United States	1995-2002
Estonia**	1995-2002	Mozambique	1995-2002	Uruguay*	1995-2002
Ethiopia	1995-2002	Myanmar	1995-2002	Uzbekistán**	1995-2002
Fiji	1995-2002	Namibia	1995-2002	Vanuatu	1995-2002
Finland	1995-2002	Nepal	1995-2002	Venezuela*	1995-2002
France	1995-2002	Netherlands	1995-2002	Vietnam	1995-2002
Gabon	1995-2002	Netherlands Antilles	1995-2002	Yemen	1995-2002
Gambia, The	1995-2002	New Zealand	1995-2002	Zambia	1995-2002
Georgia**	1995-2002	Nicaragua*	1995-2002	Zimbabwe	1995-2002
Germany	1995-2002	Niger	1995-2002		

Note: (\*) denotes Latin American countries and (\*\*) denotes Transition countries. Source: BIS.

Table A4. External debt data: Countries and periods covered

Country	Period covered	Country	Period covered
Algeria	1993-1994	Korea	1993-2001
Argentina*	1993-2001	Latvia**	1997-2001
Aruba (1)	1994-2001	Lebanon	1995-2001
Australia	1993-2001	Liberia (1)	1997-2000
Austria	1993-2001	Lithuania**	1995-2001
Bahrain	1993-2001	Luxembourg	1993-2001
Barbados*	1993-2000	Malaysia	1993-2001
Belgium	1993-2001	Malta	1994-2001
Bolivia*	1994	Mauritius	1995-2001
Brazil*	1993-2001	México*	1993-2001
Bulgaria**	1993-2001	Moldova**	1997-2001
Canada	1993-2001	Morocco	1993-2001
Chile*	1993-2001	Netherlands	1993-2001
China: Mainland	1990-2001	Netherlands Ant.*	1993-2001
China:Hong Kong	1993-2001	New Zealand	1993-2001
Colombia*	1993-2001	Nicaragua*	1993-2001
Costa Rica*	1993-2001	Norway	1993-2001
Croatia**	1997-2001	Oman	1993-2001
Cyprus	1993-2001	Pakistan	1993-2001
Czech Republic**	1993-2001	Panama*	1993-2001
Denmark	1993-2001	Papua New Guinea	1994-1999
Dominican Rep.*	1997-2001	Peru*	1994-2001
Ecuador*	1993-2001	Philippines	1993-2001
Egypt	2001	Poland**	1994-2001
Estonia**	1996-2001	Portugal	1993-2001
Finland	1993-2001	Qatar	1996-2001
France	1993-2001	Romania**	1993-2001
Germany	1993-2001	Russia**	1993-2001
Greece	1993-2001	Singapore	1993-2001
Guatemala*	1993-2001	Slovak Republic**	1994-2001
Haiti*	1993-1994	Slovenia**	1997-2001
Hungary**	1993-2001	South Africa	1993-2001
Iceland	1993-2001	Spain	1993-2001
India	1993-2001	Sri Lanka	1997-2001
Indonesia	1993-2001	Sweden	1993-2001
Ireland	1993-2001	Switzerland	1993-2001
Israel	1993-2001	Thailand	1993-2001
Italy	1993-2001	Tunisia	1993-2001
Jamaica*	1996-2001	Turkey	1993-2001
Japan	1993-2001	United Kingdom	1993-2001
Jordan	1993-2001	United States	1993-2001
Kazakhstan**	1996-2001	Uruguay*	1993-2001
Kenya	1997	Venezuela*	1993-2001
		Zimbabwe	1994

Notes: (\*) denotes Latin American countries and (\*\*) denotes Transition countries.

(1) Countries without GDP data, thus not included in the sample.

Source: BIS.

Table A5. Long-term debt with official creditors: Countries and periods covered

Country	Period covered	Country	Period covered	Country	Period covered
Albania**	1990-2000	Guinea-Bissau	1970-2000	Sao Tome & Principe	1971-2000
Algeria	1970-2000	Guyana*	1970-2000	Senegal	1970-2000
Angola	1981-2000	Haiti*	1970-2000	Seychelles	1971-2000
Argentina*	1970-2000	Honduras*	1970-2000	Sierra Leone	1970-2000
Armenia**	1993-2000	Hungary**	1971-2000	Slovak Republic**	1981-2000
Azerbaijan**	1993-2000	India	1970-2000	Solomon Islands	1971-2000
Bangladesh	1971-2000	Indonesia	1970-2000	Somalia	1970-2000
Belarus**	1993-2000	Iran, I.R. of	1971-2000	South Africa	1994-2000
Belize*	1970-2000	Jamaica*	1970-2000	Sri Lanka	1970-2000
Benin	1970-2000	Jordan	1970-2000	St. Kitts and Nevis*	1981-2000
Bhutan	1981-2000	Kazakhstan**	1992-2000	St. Lucia*	1970-2000
Bolivia*	1970-2000	Kenya	1970-2000	St. Vincent & Grens.*	1970-2000
Bosnia and Herzegovina**	1999-2000	Korea	1970-2000	Sudan	1970-2000
Botswana	1970-2000	Kyrgyz Republic**	1970-2000	Swaziland	1970-2000
Brazil*	1970-2000	Lao People's Dem. Rep	1970-2000	Syrian Arab Republic	1970-2000
Bulgaria**	1981-2000	Latvia**	1992-2000	Tajikistan**	1992-2000
Burkina Faso	1970-2000	Lebanon	1970-2000	Tanzania	1970-2000
Burundi	1970-2000	Lesotho	1970-2000	Thailand	1970-2000
Cambodia	1981-2000	Liberia	1970-2000	Togo	1970-2000
Cameroon	1970-2000	Lithuania**	1992-2000	Tonga	1981-2000
Cape Verde	1981-2000	Macedonia, FYR**	1993-2000	Trinidad & Tobago*	1970-2000
Central African Republic	1970-2000	Madagascar	1970-2000	Tunisia	1970-2000
Chad	1970-2000	Malawi	1970-2000	Turkey	1970-2000
Chile*	1970-2000	Malaysia	1970-2000	Turkmenistán**	1993-2000
China: Mainland	1981-2000	Maldives	1971-2000	Uganda	1970-2000
Colombia*	1970-2000	Mali	1970-2000	Ukraine**	1992-2000
Comoros	1970-2000	Mauritania	1970-2000	Uruguay*	1970-2000
Congo, Dem. Rep.	1970-2000	Mauritius	1970-2000	Uzbekistán**	1992-2000
Congo, Republic of	1970-2000	Mexico*	1970-2000	Vanuatu	1971-2000
Costa Rica*	1970-2000	Moldova**	1992-2000	Venezuela*	1970-2000
Cote D'Ivoire	1970-2000	Mongolia**	1993-2000	Vietnam	1981-2000
Croatia**	1993-2000	Morocco	1970-2000	Yemen	1971-2000
Czech Republic**	1981-2000	Mozambique	1981-2000	Zambia	1970-2000
Djibouti	1970-2000	Myanmar	1970-2000	Zimbabwe	1970-2000
Dominica*	1981-2000	Nepal	1970-2000		
Dominican Republic*	1970-2000	Nicaragua*	1970-2000		
Ecuador*	1970-2000	Niger	1970-2000		
Egypt	1970-2000	Nigeria	1970-2000		
El Salvador*	1970-2000	Oman	1971-2000		
Equatorial Guinea	1970-2000	Pakistan	1970-2000		
Estonia**	1992-2000	Panama*	1970-2000		
Ethiopia	1970-2000	Papua New Guinea	1970-2000		
Fiji	1970-2000	Paraguay*	1970-2000		
Gabon	1970-2000	Peru*	1970-2000		
Gambia, The	1970-2000	Philippines	1970-2000		
Georgia**	1992-2000	Poland**	1981-2000		
Ghana	1970-2000	Romania**	1970-2000		
Grenada*	1970-2000	Russia**	1981-2000		
Guatemala*	1970-2000	Rwanda	1970-2000		
Guinea	1970-2000	Samoa	1970-2000		

Note: (\*) denotes Latin American countries and (\*\*) denotes Transition countries. Source: *Global Development Finance*.

Table A6. Index of restrictions on holdings of foreign currency deposits by residents (as of beginning of 2000)

Country	Restrictions	Firms	Households	Prior approval	Country	Restrictions	Firms	Households	Prior approval
Albania	0	.	.	.	Ghana	0	.	.	.
Angola	0	.	.	.	Greece	0	.	.	.
Antigua and Barb.	2	1	.	1	Grenada	2	1	1	.
Argentina	0	.	.	.	Guatemala	5	2	2	1
Armenia	0	.	.	.	Guinea	0	.	.	.
Austria	0	.	.	.	Guinea-Bissau	1	.	.	1
Azerbaijan	0	.	.	.	Haiti	1	1	.	.
Bahamas, The	1	.	.	1	Honduras	0	.	.	.
Bahrain	0	.	.	.	Hungary	1	1	.	.
Bangladesh	3	1	1	1	Iceland	0	.	.	.
Barbados	3	1	1	1	Indonesia	0	.	.	.
Belarus	0	.	.	.	Israel	0	.	.	.
Belice	1	.	.	1	Italy	0	.	.	.
Bhutan	5	2	2	1	Jamaica	0	.	.	.
Bolivia	0	.	.	.	Japan	0	.	.	.
Bosnia and Herzeg.	0	.	.	.	Jordan	0	.	.	.
Brazil	2	1	1	.	Kazakhstan	0	.	.	.
Bulgaria	0	.	.	.	Kenya	0	.	.	.
Cambodia	0	.	.	.	Korea	0	.	.	.
Cape Verde	1	.	.	1	Kuwait	0	.	.	.
Chile	0	.	.	.	Kyrgyz Republic	0	.	.	.
China: Mainland	2	1	.	1	Lao People's Dem.	0	.	.	.
China: Hong Kong	0	.	.	.	Latvia	0	.	.	.
Colombia	3	1	2	.	Lebanon	0	.	.	.
Comoros	1	.	.	1	Lithuania	0	.	.	.
Congo, Dem. Rep.	0	.	.	.	Macedonia, FYR	0	.	.	.
Costa Rica	0	.	.	.	Malawi	2	1	1	.
Croatia	0	.	.	.	Malaysia	3	.	2	1
Cyprus	3	1	1	1	Maldives	0	.	.	.
Czech Republic	0	.	.	.	Malta	3	1	1	1
Denmark	0	.	.	.	Mauritius	0	.	.	.
Dominica	4	1	2	1	México	2	1	1	.
Ecuador	0	.	.	.	Moldova	0	.	.	.
Egypt	0	.	.	.	Mongolia	0	.	.	.
El Salvador	0	.	.	.	Mozambique	0	.	.	.
Estonia	0	.	.	.	Myanmar	3	1	1	1
Etiopia	4	1	2	1	Netherlands	0	.	.	.
Finland	0	.	.	.	Netherlands Antilles	0	.	.	.
Georgia	0	.	.	.	New Zealand	0	.	.	.

Table A6. Index of restrictions on holdings of foreign currency deposits by residents (as of beginning of 2000)  
(cont.)

Country	Index	Firms	House-holds	Prior-approval	Country	Index	Firms	House-holds	Prior-approval
Nicaragua	0	.	.	.	Suriname	0	.	.	.
Nigeria	1	.	.	1	Sweden	0	.	.	.
Norway	0	.	.	.	Switzerland	0	.	.	.
Oman	0	.	.	.	Syrian Arab Rep.	0	.	.	.
Papua New Guinea	1	1	.	.	Tajikistan	0	.	.	.
Paraguay	0	.	.	.	Tanzania	0	.	.	.
Peru	0	.	.	.	Thailand	4	1	2	1
Philippines	0	.	.	.	Tonga	4	2	2	.
Poland	0	.	.	.	Trinidad & Tobago	0	.	.	.
Qatar	0	.	.	.	Turkey	0	.	.	.
Romania	0	.	.	.	Turkmenistán	3	1	1	1
Russia	0	.	.	.	Uganda	0	.	.	.
Rwanda	3	1	1	1	Ukraine	1	.	.	1
Sao Tome & Princ.	0	.	.	.	United Arab E.	0	.	.	.
Saudi Arabia	0	.	.	.	United Kingdom	0	.	.	.
Sierra Leone	0	.	.	.	Uruguay	0	.	.	.
Slovak Republic	1	.	.	1	Uzbekistán	0	.	.	.
Slovenia	0	.	.	.	Vanuatu	0	.	.	.
South Africa	0	.	.	.	Venezuela	0	.	.	.
Spain	0	.	.	.	Vietnam	2	1	1	.
St. Kitts and Nevis	3	1	1	1	Yemen	0	.	.	.
St. Lucia	0	.	.	.	Zambia	0	.	.	.
St. Vincent & G.	0	.	.	.	Zimbabwe	0	.	.	.
Sudan	0	.	.	.					

Source: IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions 2001*, based on De Nicoló et al. (2003).  
Firms and Households equal 1 if only documented proceeds of exports or remittances can be lodged to the account;  
2 if accounts are not permitted or are limited to a very narrow category of holder. Prior approval equals 1 if required.  
*Restrictions* is computed as the sum of the remaining three columns.