DOLLARIZATION, EXCHANGE RATE REGIMES AND GOVERNMENT QUALITY

Adam Honig*
Department of Economics
Amherst College

May 2007

Abstract

The dollarization of the domestic banking system represents a source of vulnerability for emerging market countries, and a debate has emerged over whether the exchange rate regime has an impact on the degree of dollarization. This paper argues that the regime is far less important than the literature has previously claimed. Unofficial dollarization results from a lack of faith in the domestic currency, which ultimately stems from the belief that the government will not follow policies that promote long-run currency stability. Empirical results indicate that improved government quality reduces unofficial dollarization, while the exchange rate regime plays no direct role in promoting dollarization. These results confirm the intuition that there is no easy fix that restores confidence in the domestic currency. They also provide a potential explanation for the steady progression of unofficial dollarization throughout the 1990's in spite of falling inflation rates.

JEL Classification: F33, G21.

Keyword(s): Unofficial dollarization, exchange rate regimes, government quality.

* Correspondence: Adam Honig, Department of Economics, 315 Converse Hall, Amherst College. Amherst, MA 01002-5000. Email, ahonig@amherst.edu. Phone: (413) 542-5032. Fax: (413) 542-2090.

"*What I want is to figure out how we turn Argentina into Australia.*"

Paul Krugman[1]

1. Introduction

Given the susceptibility of emerging markets to financial crises and their devastating consequences, academics and policymakers have made it a priority to develop policies that can prevent such crises in the future. In particular, there is an ongoing debate about the choice of exchange rate regime. Goldstein (1999), for example, has blamed fixed exchange rates for recent financial meltdowns and recommends floating, while others have suggested pegging or even official dollarization as the best path towards stability (Calvo, 1999; Hausmann, et al., 1999). For developed economies, the choice of exchange rate regime should still be analyzed in the context of the traditional optimum currency area literature (Mundell, 1961; McKinnon, 1963). Unfortunately, this decision is more complicated for emerging markets and developing nations, which face a host of additional concerns.

A serious concern that has received much recent attention, although little empirical treatment, is the liability dollarization of the domestic banking system.[2] Unhedged foreign-currency-denominated liabilities are a major source of vulnerability for both firms and banks because large depreciations can lead to significant reductions in net worth (De Nicoló, et al., 2005; Mishkin, 1996). This process can lead to sharp contractions in output, producing a "fear of floating" among emerging markets (Calvo and Reinhart, 2002). It is, therefore, possible that a country that is unable to reduce this risk might choose to peg or officially dollarize even though it would otherwise prefer to float. Clearly, this is a suboptimal outcome. Not surprisingly, economists have begun to analyze the causes of unhedged dollar liabilities, and a debate has emerged over the role played by the exchange rate regime. The moral hazard view stresses that fixed exchange rates discourage hedging of dollar debt (Goldstein, 1999; Burnside, et al.,

[1] International Conference on Exchange Rate Regimes in Emerging Market Economies, 1999.

[2] Following the standard vocabulary, this paper employs the terms "dollar" when referring to any foreign currency and "peso" when referring to any domestic currency.

2001; Mishkin, 1999) because banks and firms believe that the peg protects them from exchange rate risk. On the other hand, exchange rate volatility increases the cost of hedging and so floating regimes may increase the amount of unhedged dollar debt (Eichengreen and Hausman, 1999).

Unfortunately, detailed data on forward contracts necessary to determine the extent to which dollar liabilities are hedged is unavailable. However, the total amount of dollar liabilities should at least be indicative of the total amount of *unhedged* dollar liabilities for two reasons. First, not all forward contracts eliminate foreign exchange risk. If a forward contract is made with other domestic banks or firms who earn revenue in pesos, the country's aggregate net foreign exposure remains unchanged. It is unclear whether domestic redistribution of this risk is stabilizing (Eichengreen and Hausman, 1999). Second, as Eichengreen and Hausman (1999) point out, foreigners are usually unwilling to sell dollars forward in exchange for domestic currency, thereby limiting hedging opportunities. Therefore, the debate over the effect of the exchange rate regime on unhedged dollar liabilities boils down to the effect of the regime on the total amount of dollar liabilities. This debate over the causes of liability dollarization requires empirical resolution and motivates the analysis of this paper.

This paper estimates the effect of the exchange rate regime on a country's exposure to foreign exchange risk by determining the effect of the regime on unofficial dollarization of the domestic banking system. Thus I focus on the domestic component of "Original Sin," that is, the inability to borrow locally in local currency, which has received less attention in the literature. The determinants of domestic dollarization are likely to be different than that of external liability dollarization. For example, a history of high inflation is likely to result in domestic dollarization, but would probably not predict a country's external debt (Reinhart, et al., 2003). Finally, as this paper argues, domestic dollarization may be reversible, as opposed to external liability dollarization that exists irrespective of country heterogeneity because of the "Original Sin" of emerging markets (Eichengreen, et al., 2002).

The empirical evidence indicates that the exchange rate regime does not significantly affect domestic dollarization. Instead, unofficial dollarization results from a lack of confidence in the currency, which ultimately stems from the belief that the government will not follow policies that promote long-run currency stability. A fixed exchange rate does not ensure this stability, and the choice of exchange rate regime is not an easy fix. Using indicators of government quality, I demonstrate empirically that government quality is the key driver of domestic dollarization, implying that improvements in institutions are a requirement for reducing emerging market vulnerability to large depreciations.[3] [4] [5]

I also find that government quality has an effect after controlling for inflation and periods of past high inflation, thought to be key determinants of dollarization. This suggests that government quality has a residual effect on dollarization, above and beyond its effect on dollarization through inflation. Throughout the 1990's, unofficial dollarization progressed steadily despite falling inflation and attempts to limit exchange rate movements. One explanation is a continued lack of faith in underlying government fundamentals, even if policy has been successful in reducing inflation. Specifically, the persistent trend towards dollarization might reflect an approval of current policies but a fear that they may someday be reversed or abandoned.

The rest of the paper is organized as follows. Section 2 presents the empirical methodology. Section 3 discusses the results of the estimation. Section 4 summarizes the findings and draws policy implications.

---

[3] This paper is part of the growing literature on the effect of institutions on macroeconomic outcomes (Acemoglu, et al., 2003; Tommasi, 2002).

[4] Using a different empirical methodology, De Nicoló, et al. (2005) come to similar conclusions.

[5] However, in a recent paper, Eichengreen, et al. (2002) argue that emerging markets are forced to borrow *externally* in one of the major currencies because the currencies of small countries offer little diversification benefits to foreign lenders relative to the additional transactions costs they imply, irrespective of country heterogeneity. If this is true, then improvements in government credibility and reductions in inflation will not reduce the proportion of *external* borrowing that is foreign currency denominated. However, building a reputation for sound monetary and fiscal policy can still reverse domestic dollarization. In addition, building a track record of low inflation will spur the growth of domestic capital markets requiring less foreign borrowing (Jeanne, 2003). Warnock and Burger (2003) find that countries with stronger institutions have larger local currency bond markets.

2. Empirical Methodology

Using annual data on deposit and credit dollarization for 1988-2000, I estimate the following regression:

$$Dollarization_{it} = \beta_0 + \beta_1 ManagedFloating_{it} + \beta_2 Floating_{it} + \beta_3 GovernmentQuality_{it} + \underline{\delta}' RegulatoryControls_{it} + \underline{\gamma}' MacroControls_{it} + \alpha_i + \varepsilon_{it} \quad (2.1)$$ [6] [7]

This regression was performed on up to 66 countries. When the government quality variable is excluded, the sample size increases to 92 countries although the inclusion of the government quality variable does not affect the qualitative effect of the exchange rate regime variables.[8] In order to analyze the effect of the exchange rate regime and government quality, it is crucial to choose the measure of unofficial dollarization that best captures exposure to currency risk. One method of estimating banks' exposure to foreign exchange risk is to determine the extent to which they match dollar deposits of residents with dollar credit to domestic firms. Arteta (2005) attempts to resolve the debate using this approach. He estimates the effect of the exchange rate regime on bank currency mismatch, defined as dollar deposits of residents minus dollar credit provided by banks to the resident private sector. His results suggest that floating exchange rates exacerbate bank currency mismatch in emerging markets. However, matching dollar deposits with dollar loans to domestic firms who earn revenue in domestic currency does not affect the bank's overall risk position.[9] It only replaces foreign exchange risk with dollar loan default risk. In addition, the borrowing firm also faces currency risk if it has to repay in dollars. Therefore, bank currency mismatch does not adequately capture total exposure to currency risk.

[6] The appendix contains details on the database and data sources.

[7] The regression follows Arteta (2005) except that I introduce a different measure of dollarization to more accurately measure exchange rate risk, as discussed below. In addition, I include a variable that proxies for government quality.

[8] The one exception appears in Table 6 under OLS although this difference is due to the smaller sample size associated with the government quality variable, not the inclusion of the government quality variable itself.

[9] I initially assume that all firms earn revenue in pesos.

I therefore consider *total* unofficial dollarization of the domestic banking system, defined as dollar deposits of residents *plus* dollar credit to the resident private sector.[10] [11] Let L^F (L^B) represent dollar liabilities of firms (banks) and A^F (A^B) represent dollar assets of firms (banks). The risk measure is thus $L^F + L^B = A^B + L^B$.[12] Dollar deposits represent an unhedged source of currency risk for banks while dollar credit, which does not hedge the bank's dollar liabilities, is a source of currency risk for firms.

Total dollarization, however, overestimates currency risk since lending in dollars, while not providing a perfect hedge, does limit the loss of banks' net worth when firms can repay at least some of the loan following a depreciation. Incorporating the fact that dollar lending can reduce currency risk for banks, the new risk measure is $L^F + (L^B - \gamma_1 A^B) = A^B + (L^B - \gamma_1 A^B) = (1-\gamma_1)A^B + L^B$. If currency risk for firms caused by dollar loans is exactly offset by a reduction in banks' risk, then $\gamma_1 = 1$ and the risk measure is just L^B or the net dollar liabilities of the banking system. Since this is equivalent to dollar deposits, I also use a measure of deposit dollarization (specifically the ratio of dollar deposits to total bank liabilities) as the dependent variable in the regression. Because dollar loans bankrupt firms for very large depreciations, yielding no benefit to banks, they increase currency risk in net so that $\gamma_1 < 1$. Therefore, L^B represents a lower limit on risk. Thus the best measure of risk is most likely in between L^B and $A^B + L^B$.

If domestic firms, however, earn revenue in dollars, then dollar mismatch is the more appropriate measure of bank risk. This would be the case in a country with a large tradables sector where exporting firms typically earn revenue in dollars. Specifically, firms face no currency mismatch since they borrow in dollars and earn revenue in dollars, while banks only face risk to the extent that they do not match

[10] Due to a lack of data, I cannot account for cash holdings of foreign currency or for the foreign currency deposits of domestic residents and firms held abroad.

[11] This discussion follows Honig (2005).

[12] To capture the importance of dollar credit and dollar deposits in the economy, it would be preferable to scale total unofficial dollarization by total firm liabilities plus total bank liabilities. Due to a lack of data on total firm liabilities, I scale by total bank credit plus total bank liabilities. Dollar mismatch is scaled by bank liabilities.

dollar liabilities with dollar assets. Since in reality some firms earn revenue in dollars and others in pesos, dollar mismatch represents the true lower bound on risk while total dollarization represents the upper bound, with L^B somewhere in between.

Therefore, since the true measure of risk depends on the extent to which firms earn revenue in dollars, I take a linear combination of dollar mismatch and total dollarization where each country's weight depends on the share of exports in GDP. The greater the degree of exporting, the more likely it is that firms earn revenue in dollars and therefore the more appropriate dollar mismatch is as a measure of the unhedged dollar liabilities in the banking system. Although I estimate all measures of dollarization, the weighted dollarization variable is the most accurate measure of the risks posed by domestic dollarization.

Aggregate data on deposit dollarization are available for 92 emerging markets and developing nations going back to 1988 while data on credit dollarization are available for 41. Since countries with data on credit dollarization also have data on deposit dollarization, data on dollar mismatch and total dollarization are limited to countries with data on credit dollarization. Regions covered include Latin America, the Middle East, Eastern Europe, Africa and Asia. Table 1 presents descriptive statistics for the dollarization variables. The median of dollar mismatch is close to zero, indicating that domestic banks tend to match dollar deposits with dollar loans. The reason, as previously discussed, is that making dollar loans to domestic firms does reduce currency risk even if it does not necessarily hedge dollar deposits. In addition, banks are often regulated to limit currency mismatches.

The exchange rate regime classifications are taken from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*, which is based on the reports of monetary authorities. The managed floating dummy indicates managed floats with or without pre-announced ranges or paths for the exchange rate. The floating regime dummy indicates independent floats. The excluded dummy variable

indicates pegged or limited flexibility regimes. I also use the *de jure* classification but make revisions for countries that claim to peg but actually realign frequently (Ghosh, et al., 1997). This did not affect the qualitative results. I also find similar results for both the Levy-Yeyati and Sturzenegger (2000) and Reinhart and Rogoff (2004) *de facto* classifications.[13]

One final issue with the exchange rate regime data is possible regime "contamination" (Arteta, 2005). In particular, if countries that peg implement policies that are inconsistent with maintaining the peg, the public may expect a large depreciation and therefore increase their holdings of dollar assets. In such a case, I would misleadingly attribute the post-collapse increase in dollarization to the floating regime. I therefore exclude the first year following a regime change. As a robustness check, I exclude the second year as well. The qualitative results were not sensitive to this change.

In addition to the exchange rate regime dummies, I include as regressors variables that proxy for government quality. There are a number of reasons to think that government quality affects unofficial dollarization. First, myopic politicians eager to expand short-run output might enact inflationary policy, either through monetary or fiscal policy, that has the long-run effect of reducing confidence in the domestic currency, thereby encouraging unofficial dollarization. In addition, reckless fiscal policy puts pressure on the monetary authorities to monetize the debt, producing high inflation. Since it is reasonable to assume that well run governments are able to control fiscal imbalances, it therefore follows that they restrain inflation and dollarization as well. Finally, poor regulation and supervision of the financial system can result in large losses in bank balance sheets, which make it costly for the monetary authorities to raise interest rates to control inflation (Calvo and Mishkin, 2003). Thus government quality should affect

[13] For the former classification, the only significant differences in results can be attributed to the much smaller sample size associated with the LYS (2000) classification. For the Reinhart and Rogoff (2003) classification, lack of cross-sectional variation in the peg dummy and lack of within variation in all regime dummies is an issue in the regressions that include data on credit dollarization, for which there are far fewer data points.

dollarization through inflation, although perceptions of current government quality may still have significant effects on dollarization regardless of current or past inflation. Specifically, lenders may continue to dollarize their loans despite falling inflation rates if there remains a lack of faith that the government will continue these successful policies.

The composite government quality variable, *GovQual* (range 0-6), is based on several variables from the *International Country Risk Guide*. *Bureaucracy Quality* (range 0-4) measures institutional strength and quality of the bureaucracy as well as autonomy from political pressure. Higher scores also indicate that the bureaucracy has the ability to operate without drastic changes in policy when governments change. A skilled bureaucracy that is resistant to political influence can limit myopic policy. *Corruption* (range 0-6) within the political system measures the extent to which government officials are able to assume positions of power through patronage rather than ability and to which they can be influenced by illegal payments. Unskilled, corrupt politicians are more likely to engage in reckless fiscal policy. Finally, *Law and Order* (range 0-6) assesses the strength and impartiality of the legal system and popular observance of the law. Higher scores also indicate well functioning political institutions, implying that this variable should be able to account for sound policy as well.[14]

For domestic lenders, whether they are domestic depositors lending to domestic banks or domestic banks lending to domestic firms, any factor that increases faith in the domestic currency should,

[14] In addition to analyzing government quality, I examine the effect of central bank independence on unofficial dollarization. There is a large literature on the effect of these variables on inflation, yet the effect on dollarization has not been explored to date. Following de Haan and Kooi (2000) and Sturm and de Haan (2001), *Turnover* is defined as the turnover rate of central bank governors. A higher turnover rate is associated with less central bank independence. I do not report the coefficient of this variable, however, as it was insignificant under numerous specifications. There are a number of possible explanations for this result. A lower turnover rate of central bank governors is not necessarily a sign that the central bank is independent. If governors know that they can be fired by politicians, they may succumb to their pressure, resulting in a low turnover rate. In addition, more independent-minded central bankers are also less likely to accept the job in the first place. Measuring central bank independence based on legal characteristics is problematic as well. As pointed out in Mishkin (2004), what is written down in law may be less important than political culture and history. For example, legally, the government of Canada has the final say in the conduct of monetary policy, but in practice it would be politically unpopular to overrule the central bank.

all else equal (i.e. holding the interest rate spread between local peso and dollar loans constant), decrease the ratio of dollar loans to total loans, whether it be the ratio of dollar deposits to total deposits or the ratio of bank dollar credit to total credit.[15] The reason is that lenders are more willing to lend in domestic currency. For example, the adoption of a credible peg or an improvement in government quality that increases confidence in the peso should lead to reductions in unofficial dollarization, implying a positive coefficient on the floating dummy and a negative coefficient on the government quality variable. Thus the "faith in the currency effect" implies that *if* fixed regimes are credible, domestic lenders would choose a greater degree of unofficial dollarization under floating regimes.

However, the "faith in the currency effect" should elicit a different response from domestic borrowers as opposed to lenders, whether they are domestic banks borrowing from depositors or domestic firms borrowing from banks, as borrowers are more willing to borrow in dollars when they have more faith in the peso. Thus the coefficients of the regime variables are theoretically ambiguous, depending on the relative responses of borrowers and lenders (i.e. the net "faith in the currency effect"), although it seems likely that worsening confidence in the peso should result in a greater proportion of dollar lending. Thus, in order to conclude that the regime does not affect faith in the peso, it is necessary to show that the regime does not affect the proportion of lending in dollars, although this is not sufficient since it is theoretically possible that the responses of lenders and borrowers are off-setting.

Moreover, lending in dollars is not the only response to expected inflation or depreciation. Lenders can also charge higher interest on peso loans.[16] Although interest rate spreads should adjust so that expected returns to lending in dollars and pesos are equal (ignoring risk), it is likely that a change in the outlook for the peso would result, in equilibrium, in both a change in the degree of dollarization and

[15] In equilibrium, of course, interest rate differentials will adjust so that expected returns to lending in dollars and pesos are the same (ignoring risk), an issue which will be discussed shortly.

[16] I included the interest rate differential as a robustness test in the regression explaining dollarization, although this variable should drop out in the reduced form. This variable was insignificant.

the interest rate spread as demand and supply curves adjust. Therefore, in order to conclude that the regime does not matter, it is *also* necessary to show that the regime has an insignificant effect on the interest rate spread between local peso and dollar loans.[17] In other words, I need to show that a change in exchange rate regime does not shift both the demand for loanable funds and the supply of loanable funds curves (where the proportion of dollar lending is on the horizontal axis and the interest rate differential is on the vertical axis), yielding no change in "price" or "quantity."[18] Notice that even if a change in regime produced off-setting effects on the proportion of dollar lending (i.e. demand and supply shift by the same amount), there would still be a change in the interest rate spread, implying that the regime does have an effect. I find empirically, however, that the regime has an insignificant effect on both unofficial dollarization and the interest rate spread. I also find that improvements in government quality lead to lower levels of total unofficial dollarization without much of an effect on interest rates.

Ize and Levy-Yeyati (2003) argue that with strict interest parity, dollarization will be the result of the relative volatilities of the real exchange rate and inflation. The share of dollar lending then becomes the proportion of dollar loans in the minimum variance portfolio (MVP). I therefore include this share as an additional regressor. As De Nicoló, et al. (2005) point out, however, the sample variances and covariances of observed price and exchange rate movements that make up the MVP only partially capture risk. Credibility effects, fears of a collapsing monetary regime or a return to unstable inflation can generate differences between expected and observed volatilities. Both the government quality variable used in this paper (and similar measures used in their paper) as well as the exchange rate regime variables analyzed here are measures of risk in this context. Specifically, the "faith in the currency effect" of the

[17] The difference between the domestic money market interest rate and the U.S. rate is used to proxy for the difference between the domestic currency interest rate and the local foreign currency interest rate, for which data are not generally available.

[18] I do not need to make any assumptions about the relative moments in the demand or supply curves to conclude that the regime does not matter, since all that is necessary is to show that neither shift.

exchange rate regime captures these credibility effects. Again, the exchange rate regime is not found to affect dollarization while government quality does.[19]

Finally, there is still the possibility that although neither demand or supply curves for loanable funds shifts when the regime changes, the regime still affects confidence in the peso but that there are offsetting effects on both demand and supply. In addition to the "faith in the currency effect," there is the possibility that both borrowers and lenders prefer to contract in dollars under fixed regimes because the government will feel responsible for any devaluation and thus bail out the borrowers. For example, suppose there is more concern about the value of the peso under floating regimes. Then for borrowers, the "bailout effect" works in the same direction as the "faith in the currency effect": borrowers prefer to borrow in dollars under fixed regimes, all else equal. The reason is that borrowers, while indifferent between borrowing local currency and borrowing dollars but hedging, would certainly prefer to borrow dollars if they felt there was no need to hedge because of a guaranteed bailout (Broda and Levy-Yeyati, 2000; McKinnon and Pill, 1999).

For lenders, however, the effects would work in opposite directions. Conditional on the firm being able to repay the loan, it is preferable to lend in dollars under floating regimes as opposed to fixed regimes, all else equal, implying a positive coefficient on the floating dummy. However, given that the borrower is unable to repay the loan in the event of a large depreciation, the lender can recover the full value of the loan under a fixed regime assuming there is a bailout. Under a floating regime, the lender can only recover the borrower's revenue, which is less than what the lender is owed. Thus, the net effect of the exchange rate regime on the decision to lend in dollars is ambiguous.

[19] The inclusion of the dollar share of minimum variance portfolio as an explanatory variable does not affect the coefficients of the exchange rate regime variables.

Figure 1 displays the direction of these effects on the demand and supply for loanable funds as we move from a fixed to a floating exchange rate. Because these two effects work in the same direction for *borrowers*, in equilibrium the responses of borrowers and lenders should not offset. Therefore, the fact the regime is insignificant in explaining both the proportion of loans in dollars and the interest rate spread suggests that neither the "faith in the currency effect" nor the "bailout effect" is significant.

Nevertheless, to account for the possibility that the "bailout effect" is off-setting the "faith in the currency effect," I include a dummy indicating whether dollar deposits are insured Demirgüç-Kunt and Detragiache, 2002) to proxy for the probability of a bailout. The original results are robust to the inclusion of this variable, however, so I can conclude that a change in exchange rate regime does not produce a "bailout effect" on the decision to lend in dollars.[20] Therefore, the result that neither the demand nor supply curves shift when the regime changes suggests that the regime does not affect confidence in the peso.

I also include as regressors variables that control for the regulatory and macro environment. For example, there may be restrictions that affect dollar deposits or dollar credit and consequently bank dollar mismatch and total dollarization. I therefore construct two dummy variables based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (Arteta, 2005). They indicate whether a country allows residents' dollar deposit accounts and dollar lending with only minor restrictions as opposed to either severely restricting them or prohibiting them outright.

In addition to the regulatory environment, I also control for a number of macro variables that may affect unofficial dollarization. It can be argued that dollarization is a natural consequence of increased trade and integration as exporters and importers require more foreign currency for their businesses, thus creating a need for dollar accounts. It may also be the case that banks are more willing to extend dollar

[20] I do not include this variable in the main regression because it decreases the sample size considerably.

credit to exporters who earn revenue in dollars because there is less dollar default risk. I therefore include the ratio of trade to GDP as an explanatory variable. Perhaps the most direct cause of unofficial dollarization are periods of high inflation and large depreciations. Consequently, I include inflation and exchange rate depreciation as regressors.[21] Including the latter also controls for valuation effects in the measures of dollarization. To capture hysteresis in the effect of past high inflation and depreciation on current dollarization, I construct a high past inflation variable that is a rolling variable that indicates the number of years that annual inflation exceeded 100% in the previous ten years. Finally, I include a time trend in the base specification to account for the general movement towards dollarization, which may coincide with a movement towards more flexible exchange rate arrangements. In robustness tests I include region and year dummies, the inclusion of which does not affect the main results.

Before discussing the results, the issue of potential endogeneity must be addressed. It is possible that there is feedback from the level of dollarization to the exchange rate regime for a number of reasons. First, a substantial degree of unofficial dollarization contributes to a fear of floating because of the devastating effects of large depreciations, perhaps leading to the adoption of a fixed exchange rate Calvo and Reinhart, 2002). In addition, a high elasticity of substitution between the domestic and foreign currency increases the volatility of the exchange rate and strengthens the case for a fixed exchange rate (Calvo and Végh, 1992; Baliño, et al., 1999).

To address this potential problem, I perform instrumental variables estimation and find that the regime is insignificant.[22] There is a large literature from which to draw instruments on the determinants

[21] In unreported regressions, I vary the use of inflation and depreciation. The coefficients of the exchange rate regime dummies are robust to different combinations of these control variables. For example, due to potential multicollinearity between inflation and depreciation, I exclude the former in certain specifications. In addition, I exclude both inflation and depreciation as the exchange rate regime may have a causal effect on dollarization through these variables. I also exclude the ratio of trade to GDP because the inclusion of this variable might underestimate the effect of the exchange rate regime, assuming there is a causal relationship from the regime to the degree of trade.

[22] Lagging the exchange rate regime variables did not affect the results.

of the exchange rate regime. I use inflation, real GDP growth rates, per capita real GDP, the ratio of central bank foreign exchange reserves to M1, and the growth in domestic credit (Edwards, 1996). The growth rate of GDP measures either the incentive to engage in expansionary exchange rate policy or, conversely, the need for the countries to "tie their own hands." Per capita income captures the fact that more advanced countries have a lower tolerance for inflation and therefore might choose to peg. On the other hand, high income countries might be better at innovating technologies for reducing the costs of inflation, so their inflation aversion might be lower (Campillo and Miron, 1996). The ratio of central bank foreign exchange reserves to M1 reflects the ability of the central bank to maintain a pegged exchange rate. Countries with a higher rate of growth of domestic liquidity will have a lower ability to sustain the peg. I include the ratio of trade to GDP as a measure of the country's openness and therefore the likelihood of adopting a fixed exchange rate (Poirson, 2001). Of course this variable is a regressor so it automatically becomes an instrument. Finally, since smaller countries are more likely to adopt fixed exchange rates, I use real GDP and land area to account for country size.

3. Empirical Results

Tables 2-6 present the results for estimation of the effect of the exchange rate regime on different measures of unofficial dollarization. I present OLS, random effects (RE) and fixed effects (FE) estimation results. The results in each table correspond to equation (2.1). The second set of columns in each table contains the high past inflation variable. Table 2 reports results for the estimation of credit dollarization. Under all estimation procedures, the coefficients of the regime dummies are small and insignificant in explaining the ratio of dollar credit to total credit. The government quality variable, on

the other hand, does tend to be correlated with credit dollarization.[23] *GovQual* has a sizeable and significantly negative effect on credit dollarization. For example, the OLS coefficient on *GovQual* implies that countries at the bottom of the scale have levels of dollar credit/total credit that are 35 percentage points higher than those at the top. This is a sizeable effect.

In general, FE estimation yields smaller and less significant coefficient estimates of *GovQual*. This most likely stems from the fact that although there is some within variation in government quality over time, 90% of all within changes in the government variable are equal to a one standard deviation change. In contrast, there is far more cross-sectional variation with which to measure the effect of government quality. The RE coefficients tend to be smaller than the OLS coefficients as well as they put more weight on the FE estimator. In assessing the effects of government quality, therefore, it is more appropriate to focus on the OLS coefficients. In fact, unreported between estimator coefficients tend to be at least as large and significant as the OLS coefficients in explaining all the various measures of dollarization.

The exchange rate regime also does not have a significant effect on deposit dollarization, as shown in Table 3. As described earlier, deposit dollarization represents a lower bound on currency risk when all firms earn revenue in pesos. Although the OLS coefficients are sometimes positive and significant, the coefficients are small. The RE coefficients are smaller and not significant at the 5% level. Moreover, the Hausman (1978) p-value suggests that both the OLS and RE estimators are inconsistent. The FE estimator, which is consistent, yields small or insignificant coefficient estimates.[24] Moreover, there is sufficient within variation in the regime variables to have confidence in the fixed effects

[23] The standard deviation of these variables is close to one, so a one-unit increase also represents an increase in one standard deviation.

[24] In fact, even when the RE estimator is inconsistent, its inconsistency is small relative to pooled OLS when the variance of the fixed effect is greater than the variance of the random error component, as is the case in this data. Finally, using the Reinhart and Rogoff (2003) classification, the exchange rate regime is insignificant under all procedures.

estimates. Specifically, the managed floating dummy changes value 30 times, and the floating dummy changes value 29 times. Including changes in the excluded pegged dummy, there are a total of 39 regime changes during the sample period. Finally, as with credit dollarization, *GovQual* has a significantly negative effect on deposit dollarization.

Table 4 indicates that the exchange rate regime does not significantly affect dollar mismatch. The independent float variable is insignificant in all specifications, and the results for the managed float variable depend on the estimation procedure, although none of the coefficients are large. This result is consistent with regulations in emerging markets that prevent domestic banks from exhibiting large currency mismatches (Calvo and Mishkin, 2003). In addition, to maintain profitability and satisfy demand for credit, domestic banks lend domestically a large share of their dollar deposits (Honohan and Shi, 2003). In most cases, the government quality variable does not have a consistently significant or sizeable effect on dollar mismatch. The reason is that it tends to reduce both credit dollarization and deposit dollarization so that the net effect on dollar mismatch is small. Although *Govqual* has a negative coefficient under OLS and RE, the reason is that higher government quality reduces deposit dollarization (when I restrict to observations for which I can construct the mismatch variable) more than it reduces credit dollarization so that the net effect is a reduction in dollar mismatch.

In Table 5, the coefficients of the managed floating and independently floating binary variables are small or insignificant in explaining total dollarization. Combined with the insignificant effects on both credit and deposit dollarization, these regressions all support the view that confidence in the domestic currency is not significantly affected by the choice of exchange rate regime. By contrast, *GovQual* is negative and significant in explaining total dollarization under OLS. The RE coefficients are almost significant at the 10% level (the coefficient of *Bureaucracy Quality* is highly significant although not the coefficients of *Law and Order* or *Corruption*). The insignificance of the FE coefficients (and RE

coefficients which put more weight on the FE estimates) is most likely due to the lack of within variation in government quality over time.

While the OLS coefficients of the managed float variable are significant at the 10% level when explaining weighted dollarization in Table 6, the effect is not large. Moreover, the Hausman p-value suggests that both the OLS and RE estimators are inconsistent. FE estimation yields small or insignificant coefficients. Finally, *GovQual* is mostly negative and significant in explaining weighted dollarization.

The results in Tables 2-6 imply that the exchange rate regime is not a significant determinant of domestic dollarization. While it is possible that pegs have contributed to dollarization in some countries whereas floating regimes have led to dollarization in others, yielding no cross-sectional relationship, this point only underscores the fact that the exchange rate regime is not a panacea and does not have a consistent effect on dollarization. In addition, within-country variation in regimes over time does not affect the level of dollarization.

To further establish the robustness of this result, I estimate the effect of the regime on all linear combinations of dollar mismatch and total dollarization where the weight on each variable varies in increments of .05. Therefore, I let the data choose the particular linear combination for which the effect of the regime is greatest. I find that, for all possible linear combinations, the regime is insignificant using the fixed effects and random effects estimators, as well as the GLS estimator suggested by Balestra and Nerlove (1966). OLS almost always yields insignificant coefficients as well. One exception occurs when all weight is put on dollar mismatch, as can be seen in Table 4.

On the other hand, the results indicate that improvements in government quality can be effective in reducing unofficial dollarization.[25] In most cases, the coefficients have the expected negative sign and are never significantly positive.[26] As argued previously, focusing on cross-sectional variation is more appropriate for assessing the effects of government quality as there is little time series variation.[27] These results are robust to regression controls such as inflation. While government quality is correlated with inflation, there remains a residual effect on dollarization. Throughout the 1990's, unofficial dollarization progressed steadily despite falling inflation and attempts to limit exchange rate movements. One explanation is a continued lack of faith in underlying government fundamentals, even if policy has been successful in reducing inflation. Specifically, the persistent trend towards dollarization might reflect an approval of current policies but a fear that they may someday be abandoned.

Including the high past inflation variable, however, tends to reduce the magnitude of the government quality coefficients. This suggests that one of the main channels through which government quality affects dollarization is through high inflation. Assuming, however, that the direction of causality goes from government quality to high inflation, the total effect of government quality is better measured by its coefficient when the high inflation variable is excluded. Still, government quality is significant in most cases even after controlling for past high inflation. In other words, government quality has a residual effect on dollarization above and beyond its effect on dollarization through high inflation. A

[25] The results are robust to including GDP per capita as an explanatory variable. There are also strong effects of government quality when a simple dummy variable separating low quality governments from high quality is used in the regressions.

[26] Of course there is the question of how well these proxy variables actually measure government quality. A simple rating of bureaucratic quality on a scale of 0-4 will most likely not capture subtle differences across governments. However, this inability to perfectly capture government quality suggests that the coefficients actually underestimate the effect that government has on unofficial dollarization. It is also possible that real reductions in dollarization will occur only after government quality has crossed some threshold level. Finally, including industrial countries that have higher levels of government quality but no unofficial dollarization would almost surely yield a much larger coefficient of the government quality variable.

[27] I also estimate the model using averages of these variables taken over the 1980's to reflect long-run structural characteristics that only change gradually over time. Results were similar.

likely explanation is that current levels of dollarization also depend on government quality, which affects perceptions about the *future* value of the currency.

In all of the specifications estimating the different measures of unofficial dollarization, the coefficients of inflation and depreciation are either insignificant or extremely small. This is true regardless of whether inflation and depreciation are included together as regressors or separately. The reason is that even countries with low current rates of inflation can have high levels of dollarization for a number of reasons. First, this can arise from hysteresis in the effects of past high inflation on dollarization today. The high past inflation variable tends to be larger and more significant than current inflation. Second, unofficial dollarization ultimately stems from government fundamentals that do not necessarily have a strong correlation with inflation. For example, inflation rates have fallen in emerging markets throughout the 1990's but unofficial dollarization has progressed, perhaps because of the continued weakness in emerging market governments.

To deal with potential endogeneity of the exchange rate regime, I perform instrumental variables estimation. In Table 7, both regime dummy variables are insignificant in explaining all measures of dollarization. However, the R^2 in the prediction equations for the exchange rate regime dummies is quite low so these results must be interpreted with caution. Thus, instrumental variables estimation more strongly supports the view that the exchange rate regime does not significantly affect dollarization. Moreover, lagging the regime dummies in the original specification to mitigate the endogeneity problem also has no effect.

Finally, Table 8 presents the results when the interest rate spread is the dependent variable. Although the OLS of the floating dummy is positive and significant, it is insignificant under RE and FE. Although the FE coefficient of the managed floating dummy is negative and significant, the floating dummy, which should exhibit a larger difference with the excluded pegged dummy than the managed

floating dummy, is insignificantly different from zero (both are insignificant using the Reinhart Rogoff classification). In addition, the coefficients of the managed floating dummy are insignificant under both OLS and RE.

4. Conclusion

The empirical results in this paper suggest that the exchange rate regime is not an important determinant of unofficial dollarization. The implication is that too much emphasis has been placed on the role that the exchange rate can play in either reducing or exacerbating emerging market vulnerability. Instead, more attention should be paid to the root cause of unofficial dollarization - a lack of faith in the government's ability to enact policies that promote long-run currency stability. This paper demonstrates empirically that improving the institutions of government can lead to a reduction in the degree of dollarization. Thus, although countries cannot erase a history of high inflation, there is still reason for optimism that they can reverse the domestic dollarization process by building a reputation for sound policy and good governance. In other words, emerging markets can achieve redemption from "Original Sin" in the domestic sense. No particular exchange rate regime will accomplish this but rather, as Calvo and Mishkin (2003) put it, "it's the institutions stupid."

The second implication is that unofficial dollarization should not always be treated as an initial condition that should frame the choice of exchange rate regime in emerging markets. For some countries, this may be appropriate (Calvo, 1999), but for many others, unofficial dollarization should be viewed as an endogenous market response to bad policy, an outcome that can and should be reversed.[28] Although they may be forced in the short run to limit exchange rate movements while there are still large unhedged

[28] Forced measures to de-dollarize an economy such as punitive reserve requirements and mandatory holding periods for dollar deposits are almost always met with significant capital flight and declines in bank credit (Reinhart, et al., 2003). Thus de-dollarizing without improving government quality involves significant costs.

dollar liabilities, countries experiencing this problem should choose to fix (or even officially dollarize), as opposed to float, only if they would make the *same* choice without this source of currency risk. If not, they should reverse dollarization so that floating does not involve so much risk. Thus, although the results of this paper indicate that there are no easy fixes and that credibility can only be achieved the hard way, there remains the optimistic conclusion that emerging markets are not helpless in this endeavor.

Acknowledgements

I have greatly benefited from comments from anonymous referees. I wish to thank Frederic Mishkin, who has guided me since the beginning of this research project. I also wish to thank Richard Clarida, Linda Goldberg, Jean Boivin, Mitali Das, Geoffrey Woglom, Steven Rivkin, Francisco Ciocchini and Paulo Barelli for invaluable comments and helpful discussions. Finally, I would like to thank seminar participants at the Columbia University Macro Seminar, Amherst College, Williams College, the Federal Reserve Bank of Kansas City and the Board of Governors International Finance Division.

References

Acemoglu, D., Johnson, S., Robinson, J., 2003. Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth. Journal of Monetary Economics 50 (1), 49-123.

Arteta, C., 2005. Exchange Rate Regimes and Financial Dollarization: Does Flexibility Reduce Currency Mismatches in Bank Intermediation? Topics in Macroeconomics 5 (1), Article 10.

Balestra, P., Nerlove, M., 1966, Pooling Cross Section and Time Series Data in the Estimation of a Dynamic Model: the Demand for Natural Gas. Econometrica 34 (3), 585-612.

Baliño, T., Bennett, A., Borensztein, E., 1999. Monetary Policy in Dollarized Economies. Occasional Paper No. 171, International Monetary Fund.

Broda, C., Levy-Yeyati, E., 2000. Safety Nets and Endogenous Financial Dollarization. mimeo, Universidad Torcuato Di Tella.

Burger, J., Warnock, F., 2003. Diversification, Original Sin, and International Bond Portfolios. International Finance Discussion Papers 755. Washington: Board of Governors of the Federal Reserve System.

Burnside, C., Eichengreen, B., Rebelo, S., 2001. Hedging and Financial Fragility in Fixed Exchange Rate Regimes. European Economic Review 45, 1151-1193.

Calvo, G., Reinhart, C., 2002. Fear of Floating. The Quarterly Journal of Economics 117 (2), 379-408.

Calvo, G., 1999. On Dollarization. www.bsos.umd.edu/econ/ciecalvo.htm.

Calvo, G., Mishkin, F., 2003. The Mirage of Exchange Rate Regimes for Emerging Market Countries. Journal of Economic Perspectives 17 (4), 98-120.

Calvo, G., Végh, C., 1992. Currency Substitution in Developing Countries: An Introduction. Revista de Analisis Economico 3-27.

Campillo, M., Miron, J., 1996. Why Does Inflation Differ Across Countries? NBER Working Paper 5540.

Demirgüç-Kunt, A., Detragiache, E., 2002. Does Deposit Insurance Increase Banking Sector Stability: An Empirical Investigation. Journal of Monetary Economics 49, 1373–1406.

de Haan, J., Kooi, W., 2000. Does Central Bank Independence Really Matter? New Evidence For Developing Countries Using A New Indicator. Journal of Banking and Finance 24, 643-664.

De Nicoló, G., Honohan, P., Ize, A., 2005, Dollarization of the Banking System: Causes and Consequences, Journal of Banking and Finance 29, 1697-1727.
Edwards, S., 1996. The Determinants of the Choice Between Fixed and Flexible Exchange Rates. NBER Working Paper 5756.
Eichengreen, B., Hausmann, R., 1999. Exchange Rates and Financial Fragility. NBER Working Paper 7418.
Eichengreen, B., Hausmann, R., Panizza, U., 2002. Original Sin: The Pain, the Mystery and the Road to Redemption. Paper prepared for the conference Currency and Maturity Matchmaking: Redeeming Debt from Original Sin. Inter-American Development Bank, Washington, D.C., 21-22 November 2002.
Ghosh, A., Gulde, A., Ostry, J., Wolf, H., 1997. Does the Nominal Exchange Rate Regime Matter? NBER Working Paper 5874.
Goldstein, M., 1999. Safeguarding prosperity in a global financial system: The future international financial architecture report of an independent task force. Washington, DC: Institute for International Economics for the Council on Foreign Relations.
Hausman, J., 1978. Specification Tests in Econometrics. Econometrica 46 (6), 1251-1271.
Hausmann, R, Gavin, M., Pages-Serra, C., Estein, E., 1999. Financial Turmoil and the Choice of Exchange Rate Regime. Inter-American Development Bank, mimeo.
Honig, A., 2005. Fear of Floating and Domestic Liability Dollarization. Emerging Markets Review 6 (3), 289-307.
Honohan, P., Shi, A., 2003. Deposit Dollarization and the Financial Sector in Emerging Economies. in J. Hanson, P. Honohan and G. Majnoni, eds. Globalization and National Financial Systems, New York: Oxford University Press.
Ize, A., Levy-Yeyati, E., 2003. Financial Dollarization. Journal of International Economics 59 (2), 323-347.
Jeanne, O., 2003. Why Do Emerging Economies Borrow in Foreign Currency. CEPR Discussion Papers: 4030.
Levy-Yeyati, E., Sturzenneger, F., 2000. Classifying Exchange Rate Regimes: Deeds vs. Words. unpublished manuscript, Universidad Torcuato di Tella.
Mishkin, F., 1999. Lessons from the Asian Crises. Journal of International Money and Finance, Volume 18 (4), 709-723
Mishkin, F., 1996. Understanding Financial Crises: A Developing Country Perspective. in Michael Bruno and Boris Pleskovic, .eds, Annual World Bank Conference on Development Economics World Bank, Washington D.C. 1996, 29-62.
McKinnon, R., 1963. Optimum Currency Areas. American Economic Review 51, 657-665.
McKinnon, R., Pill, H., 1999. Exchange Rate Regimes for Emerging Markets, International Overborrowing and Moral Hazard. Oxford Review of Economic Policy 15, 19-38.
Mundell, R., 1961. A Theory of Optimum Currency Areas. American Economic Review 51, 717-725.
Poirson, H., 2001. How Do Countries Choose Their Exchange Rate Regime? Working Paper WP/0146, International Monetary Fund.
Reinhart, C., Rogoff, K., 2004. The Modern History of Exchange Rate Arrangements: A Reinterpretation? Quarterly Journal of Economics 119 (1), 1-48.
Reinhart, C., Rogoff, K., Savastano, M., 2003. Addicted to Dollars. NBER Working Paper 10015.
Sturm, J., de Haan, J., 2001. Inflation in Developing Countries: Does Central Bank Independence Matter? New Evidence Based on a New Data Set. CCSO Quarterly Journal.
Tommasi, M., 2002. Crisis, Political Institutions, and Policy Reform: It is not the Policy, it is the Polity, Stupid. forthcoming in Annual World Bank Conference on Development Economics, University of San Andres, mimeo.

Figure 1: Effects of Moving from a Fixed to Floating Regime
on the Supply and Demand of Loanable Funds

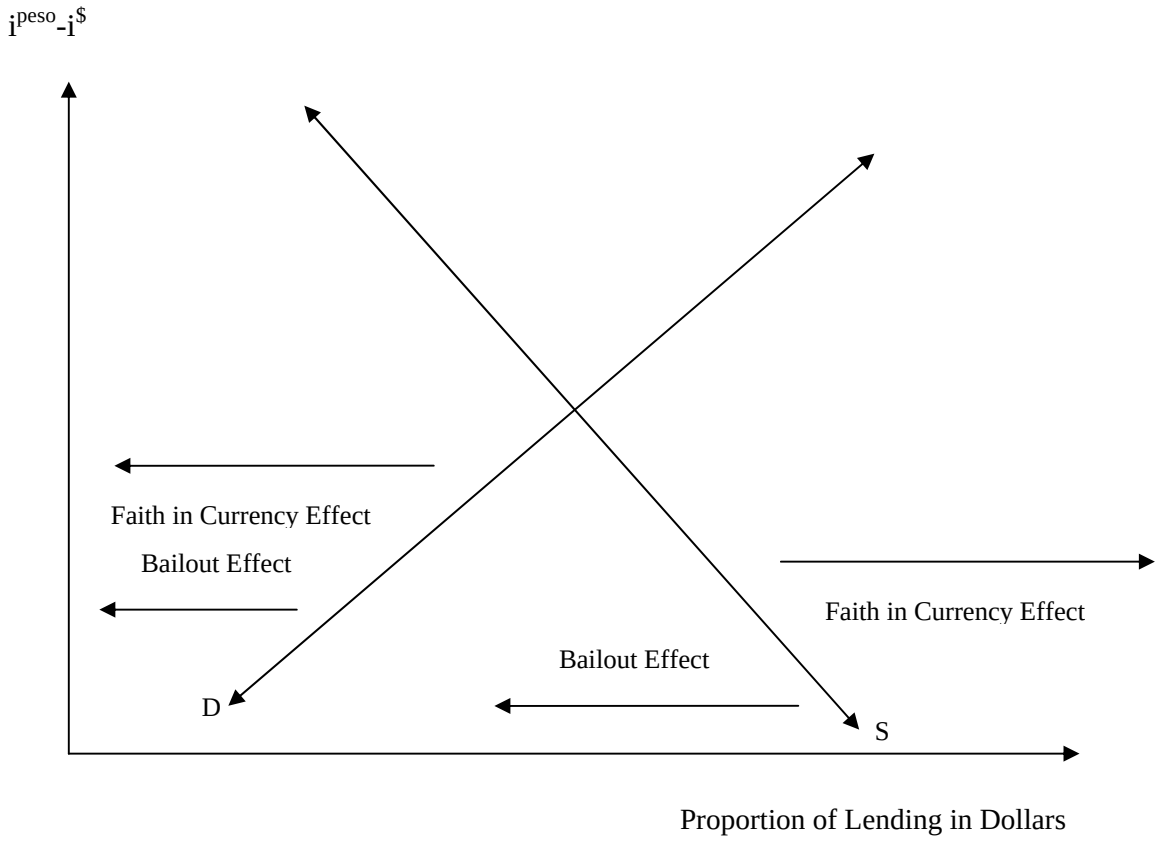

Table 1
Summary statistics

	Obs.	Median	Std. Dev.
Dollar Credit/Total Credit	273	28.9	25.5
Dollar Deposits/Total Deposits	748	25.5	24.2
Dollar Deposits/Total Liabilities	738	16.0	18.6
Dollar Mismatch/Total Liabilities	257	2.5	-20.9
Total Dollarization/Total Credit + Liabilities	257	27.9	20.6
Peg or Limited Flexibility	1052	0.4	0.5
Managed Float	1052	0.3	0.5
Independent Float	1052	0.3	0.5
GovQual	769	3.2	1.0

All ratios expressed in percentage terms.
Mean values of the exchange rate regime dummy variables are presented.

Table 2
Estimation of Credit Dollarization

Dependent Variable: Dollar Credit/Total Credit						
	OLS	RE	FE	OLS	RE	FE
Managed Float	1.47	2.22	1.75	1.62	1.77	1.48
	(5.14)	(3.14)	(3.30)	(4.24)	(3.09)	(3.27)
Independent Float	-6.53	-2.17	-2.61	-1.65	-0.80	-1.44
	(4.69)	(3.16)	(3.48)	(3.96)	(3.15)	(3.49)
GovQual	-7.06	-2.65	-2.24	-4.68	-1.88	-1.68
	(2.44)***	(1.26)**	(1.30)*	(2.18)**	(1.27)	(1.32)
Trade/GDP	-0.14	0.05	0.08	-0.10	0.03	0.06
	(0.09)	(0.06)	(0.07)	(0.08)	(0.06)	(0.07)
FC Loans Allowed	5.92	1.90	0.44	4.35	1.81	0.55
	(4.41)	(3.55)	(3.83)	(4.07)	(3.48)	(3.79)
Inflation	-0.03	-0.05	-0.05	-0.10	-0.04	-0.04
	(0.04)	(0.02)**	(0.02)**	(0.04)**	(0.02)*	(0.02)*
Depreciation	0.08	0.05	0.05	0.08	0.05	0.05
	(0.02)***	(0.01)***	(0.01)***	(0.02)***	(0.01)***	(0.01)***
Dollar Share MVP	0.82	-0.01	-0.03	0.34	-0.03	-0.04
	(0.23)***	(0.15)	(0.15)	(0.25)	(0.15)	(0.15)
Time	1.24	1.32	1.27	0.67	1.63	1.53
	(0.88)	(0.31)***	(0.32)***	(0.86)	(0.33)***	(0.34)***
High Past Inflation				6.32	2.14	1.67
				(1.19)***	(0.79)***	(0.83)**
Constant	56.05	26.35	27.50	44.22	18.94	22.02
	(14.34)***	(7.83)***	(7.02)***	(12.55)***	(8.13)**	(7.46)***
Observations	169	169	169	169	169	169
R^2	0.19		0.39	0.31		0.41
Countries	30	30	30	30	30	30
Hausman p-value		0.90			0.45	

Standard errors in parentheses.
All ratios and growth rates expressed in percentage terms.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3
Estimation of Deposit Dollarization

Dependent Variable: Dollar Deposits/Total Liabilities						
	OLS	RE	FE	OLS	RE	FE
Managed Float	5.98	3.70	2.22	6.38	3.65	2.19
	(2.11)***	(1.97)*	(2.11)	(1.78)***	(1.96)*	(2.12)
Independent Float	2.56	0.30	-1.70	4.76	0.55	-1.70
	(2.21)	(1.87)	(2.05)	(1.95)**	(1.86)	(2.05)
GovQual	-2.62	-2.05	-1.30	-2.00	-1.87	-1.28
	(0.98)***	(0.76)***	(0.79)	(0.81)**	(0.77)**	(0.80)
Trade/GDP	-0.11	0.00	0.06	-0.09	-0.01	0.06
	(0.03)***	(0.03)	(0.04)	(0.03)***	(0.03)	(0.04)
FC Deposits Allowed	13.88	10.46	11.24	11.38	8.97	10.90
	(1.73)***	(3.00)***	(3.92)***	(1.65)***	(2.99)***	(4.02)***
Inflation	0.08	0.02	0.01	0.03	0.02	0.01
	(0.03)***	(0.01)*	(0.01)	(0.03)	(0.01)*	(0.01)
Depreciation	0.01	0.02	0.02	0.00	0.02	0.02
	(0.01)	(0.01)***	(0.01)***	(0.01)	(0.01)**	(0.01)***
Dollar Share MVP	1.00	0.13	0.08	0.51	0.10	0.08
	(0.40)**	(0.15)	(0.15)	(0.28)*	(0.15)	(0.15)
Time	1.86	1.33	1.18	1.35	1.40	1.19
	(0.35)***	(0.17)***	(0.17)***	(0.33)***	(0.17)***	(0.17)***
High Past Inflation				3.88	1.12	0.20
				(0.54)***	(0.44)**	(0.50)
Constant	6.94	8.14	3.63	5.90	6.58	3.39
	(3.66)*	(4.15)**	(4.26)	(3.15)*	(4.13)	(4.30)
Observations	410	410	410	410	410	410
R^2	0.31		0.24	0.41		0.24
Countries	66	66	66	66	66	66
Hausman p-value		0.05			0.00	

Standard errors in parentheses.
All ratios and growth rates expressed in percentage terms.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4
Estimation of Dollar Mismatch

Dependent Variable: Dollar Mismatch/Total Liabilities						
	OLS	RE	FE	OLS	RE	FE
Managed Float	6.12	-0.60	-7.85	6.48	-0.23	-7.67
	(3.30)*	(3.75)	(4.62)*	(3.16)**	(3.76)	(4.59)*
Independent Float	3.24	3.19	-5.23	1.44	3.74	-3.79
	(3.50)	(3.45)	(4.86)	(3.46)	(3.48)	(4.91)
GovQual	-2.37	-2.41	-1.51	-3.10	-2.29	-1.13
	(1.19)**	(1.38)*	(1.53)	(1.08)***	(1.42)	(1.54)
Trade/GDP	-0.03	-0.01	0.14	-0.04	-0.02	0.12
	(0.05)	(0.06)	(0.09)	(0.04)	(0.06)	(0.09)
FC Deposits Allowed	-2.82	-0.56	11.94	-1.40	-1.14	10.67
	(4.01)	(5.45)	(9.59)	(3.91)	(5.28)	(9.57)
FC Loans Allowed	4.52	-0.94	0.95	4.39	-0.94	0.92
	(3.57)	(4.09)	(5.48)	(3.42)	(4.01)	(5.45)
Inflation	0.03	0.02	0.02	0.07	0.02	0.03
	(0.05)	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)
Depreciation	0.00	-0.01	-0.02	0.00	-0.01	-0.02
	(0.03)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)
Dollar Share MVP	-0.20	0.24	0.26	0.06	0.21	0.21
	(0.15)	(0.18)	(0.18)	(0.16)	(0.19)	(0.18)
Time	-0.87	0.07	-0.12	-0.51	0.09	0.10
	(0.59)	(0.36)	(0.38)	(0.62)	(0.37)	(0.40)
High Past Inflation				-2.86	0.40	1.69
				(0.88)***	(0.91)	(1.07)
Constant	16.32	11.11	-5.05	17.92	10.64	-8.83
	(9.63)*	(8.03)	(10.93)	(8.77)**	(8.26)	(11.13)
Observations	157	157	157	157	157	157
R^2	0.13		0.10	0.19		0.12
Countries	29	29	29	29	29	29
Hausman p-value		0.19			0.05	

Standard errors in parentheses.
All ratios and growth rates expressed in percentage terms.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5
Estimation of Total Dollarization

Dependent Variable: Total Dol./(Total Credit + Liabilities)						
	OLS	RE	FE	OLS	RE	FE
Managed Float	4.90	3.32	2.30	4.46	3.29	2.44
	(4.47)	(2.75)	(2.98)	(4.07)	(2.70)	(2.95)
Independent Float	-1.46	-3.25	-4.89	0.77	-2.21	-3.78
	(4.17)	(2.70)	(3.13)	(3.78)	(2.71)	(3.16)
GovQual	-4.59	-1.51	-1.00	-3.69	-1.11	-0.71
	(1.95)**	(0.96)	(0.99)	(1.85)**	(0.96)	(0.99)
Trade/GDP	-0.19	0.03	0.09	-0.17	0.02	0.07
	(0.07)**	(0.05)	(0.06)	(0.07)**	(0.05)	(0.06)
FC Deposits Allowed	20.53	7.56	6.35	18.77	6.50	5.37
	(3.78)***	(5.04)	(6.19)	(3.97)***	(5.00)	(6.14)
FC Loans Allowed	-4.61	2.96	4.02	-4.46	2.90	3.99
	(3.93)	(3.25)	(3.54)	(4.07)	(3.21)	(3.50)
Inflation	-0.02	-0.02	-0.02	-0.07	-0.01	-0.01
	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	(0.02)
Depreciation	0.05	0.02	0.01	0.05	0.01	0.01
	(0.01)***	(0.01)*	(0.01)	(0.01)***	(0.01)	(0.01)
Dollar Share MVP	0.67	0.04	0.03	0.35	-0.01	-0.01
	(0.24)***	(0.12)	(0.12)	(0.27)	(0.12)	(0.12)
Time	1.10	1.09	1.00	0.66	1.26	1.17
	(0.74)	(0.24)***	(0.25)***	(0.75)	(0.25)***	(0.26)***
High Past Inflation				3.54	1.49	1.30
				(1.17)***	(0.66)**	(0.69)*
Constant	35.04	14.90	14.69	33.05	10.98	11.78
	(11.29)***	(7.03)**	(7.05)**	(10.68)***	(7.17)	(7.15)
Observations	157	157	157	157	157	157
R^2	0.31		0.41	0.36		0.43
Countries	29	29	29	29	29	29
Hausman p-value		0.71			0.40	

Standard errors in parentheses.
All ratios and growth rates expressed in percentage terms.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6
Estimation of Weighted Dollarization

Dependent Variable: Weighted Dollarization						
	OLS	RE	FE	OLS	RE	FE
Managed Float	6.20	3.74	1.04	6.05	3.60	1.16
	(3.45)*	(2.60)	(2.85)	(3.41)*	(2.57)	(2.82)
Independent Float	1.42	-0.86	-4.79	2.17	-0.15	-3.80
	(3.19)	(2.50)	(2.99)	(3.21)	(2.52)	(3.02)
GovQual	-3.29	-1.83	-1.03	-2.98	-1.47	-0.77
	(1.70)*	(0.92)**	(0.94)	(1.68)*	(0.93)	(0.95)
Trade/GDP	-0.32	-0.13	-0.03	-0.31	-0.14	-0.04
	(0.05)***	(0.04)***	(0.05)	(0.05)***	(0.04)***	(0.05)
FC Deposits Allowed	16.05	5.82	6.85	15.46	4.98	5.97
	(3.28)***	(4.50)	(5.91)	(3.43)***	(4.51)	(5.87)
FC Loans Allowed	-3.71	1.87	4.30	-3.66	1.86	4.27
	(3.00)	(3.04)	(3.38)	(3.09)	(3.02)	(3.35)
Inflation	-0.02	-0.01	0.00	-0.04	0.00	0.00
	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	(0.02)
Depreciation	0.03	0.00	-0.01	0.03	-0.01	-0.01
	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
Dollar Share MVP	0.50	0.09	0.07	0.39	0.05	0.03
	(0.17)***	(0.11)	(0.11)	(0.19)**	(0.11)	(0.11)
Time	0.29	0.91	0.76	0.14	1.04	0.91
	(0.60)	(0.23)***	(0.24)***	(0.61)	(0.24)***	(0.25)***
High Past Inflation				1.19	1.20	1.17
				(0.90)	(0.63)*	(0.66)*
Constant	40.46	21.42	16.19	39.79	18.01	13.57
	(9.55)***	(6.19)***	(6.73)**	(9.53)***	(6.39)***	(6.83)**
Observations	157	157	157	157	157	157
R^2	0.47		0.30	0.48		0.32
Countries	29	29	29	29	29	29
Hausman p-value		0.08			0.15	

Standard errors in parentheses.
All ratios and growth rates expressed in percentage terms.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7
Instrumental Variables Estimation

Dependent Variable:	Dollar Credit/ Total Credit	Dollar Deposits/ Total Liabilities	Dollar Mismatch/ Total Liabilities	Total Dollarization/ Total Credit + Liab.	Weighted Dollarization
Managed Float	76.02	-13.26	-17.95	41.66	13.14
	(48.99)	(14.46)	(29.99)	(31.43)	(24.34)
Independent Float	35.90	10.10	14.93	30.26	21.87
	(32.00)	(8.93)	(18.98)	(22.16)	(16.24)
Trade/GDP	0.18	-0.08	-0.07	0.04	-0.16
	(0.15)	(0.06)	(0.11)	(0.09)	(0.08)**
FC Deposits Allowed		8.47	-2.44	-7.87	-7.40
		(2.19)***	(8.20)	(9.88)	(7.17)
FC Loans Allowed	15.20		-8.39	10.15	-0.92
	(7.89)*		(7.34)	(7.01)	(5.61)
Inflation	-0.01	0.00	-0.02	-0.02	-0.02
	(0.03)	0.00	(0.02)	(0.02)	(0.01)
Depreciation	0.03	0.02	0.01	0.02	0.01
	(0.02)	(0.00)***	(0.01)	(0.01)	(0.01)
Dollar Share MVP	0.04	0.24	0.29	0.12	0.15
	(0.32)	(0.23)	(0.23)	(0.19)	(0.16)
Time Trend	0.61	1.42	0.58	1.27	1.17
	(0.91)	(0.38)***	(0.60)	(0.48)***	(0.41)***
Constant	-40.07	9.02	14.30	-12.85	16.55
	(33.58)	(8.46)	(20.61)	(19.06)	(15.58)
Observations	200	541	190	190	186
Countries	38	83	37	37	37

Standard errors in parentheses.
All ratios and growth rates expressed in percentage terms.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8
Estimation of the Interest Rate Spread

Dependent Variable: Interest Rate Differential			
	OLS	RE	FE
Managed Float	3.77	-6.69	-19.73
	(5.21)	(5.04)	(7.05)***
Independent Float	11.00	2.93	-9.47
	(5.17)**	(4.98)	(6.95)
GovQual	3.52	3.37	2.58
	(1.18)***	(2.05)	(2.67)
Trade/GDP	-0.06	-0.11	-0.11
	(0.04)	(0.06)*	(0.10)
FC Deposits Allowed	0.12	0.03	9.97
	(4.33)	(5.28)	(13.54)
Inflation	0.37	0.35	0.38
	(0.08)***	(0.03)***	(0.04)***
Depreciation	0.13	0.14	0.17
	(0.06)**	(0.03)***	(0.03)***
Dollar Share MVP	0.66	0.68	0.69
	(1.21)	(0.51)	(0.52)
Time	-1.54	-1.29	-0.88
	(0.49)***	(0.46)***	(0.51)*
Constant	8.10	17.43	18.33
	(7.60)	(9.47)*	(15.18)
Observations	465	465	465
R^2	0.38		0.36
Countries	67	67	67
Hausman p-value		0.11	

Standard errors in parentheses.
All ratios and growth rates expressed in percentage terms.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix A

Below I list the variables and sources used. The data is annual and it covers the period 1988–2000.

Table A1

Variable	Description and Source
Dollarization Variables	
Dollar Credit	Foreign currency credit issued by domestic banks to the resident private sector. Source: IMF Country Reports.
Dollar Deposits	Foreign currency deposits of residents held in domestic banks. Source: IMF Country Reports.
Total Credit	Total credit issued by domestic banks to the resident private sector. Source: IMF Country Reports.
Total Liabilities	Total liabilities of domestic banks. Source: IMF Country Reports.
Foreign Assets	Foreign assets of domestic deposit money banks. Source: IFS.
Foreign Liabilities	Foreign liabilities of domestic deposit money banks. Source: IFS.
Dollarization Regulation Data	
Foreign currency loans allowed	IMF's Annual Report on Exchange Arrangements and Exchange Restrictions.
Foreign currency deposits allowed	IMF's Annual Report on Exchange Arrangements and Exchange Restrictions.
Exchange Rate Regime Variables	
de jure regime	Source: IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions.* I thank Maria Soledad Martinez Peria for providing me with much of this data.
de facto regime	Source: Reinhart and Rogoff (2004)
de facto regime	Levy-Yeyati and Sturzenegger (2000). I thank Federico Sturzenegger for providing me with this data.
frequent parity adjusters	Ghosh, et al. (1997). I thank Holger Wolf for providing me with this data.
Macro Variables	
Trade (% of GDP)	Exports plus Imports divided by GDP. Source: IFS and WDI.
Exports (% of GDP)	Exports divided by GDP. Source: IFS and WDI.
Money Market Interest Rate Differential	Source: IFS.
Real GDP	Source: IFS and WDI.
Real GDP per capita	Source: IFS and WDI.
Growth in Real GDP	Annual percentage change of real gross domestic product. Source: WDI.
Central bank foreign exchange reserves (% of M1)	Central bank foreign exchange reserves as percent of M1. Source: IFS.
Growth in Domestic Credit %	Annual percentage change in domestic credit. Source: IFS.
Inflation %	Annual percentage change in Consumer price index. Source: IFS and WDI.
Depreciation %	Annual percentage change in exchange rate. Source: IFS and WDI.
Land Area	Source: WDI.
Foreign currency deposits covered by Deposit Insurance	Demirgüç-Kunt, A., and E. Detragiache (2002). I thank Asli Demirgüç-Kunt for providing me with this data.
Government Quality Variables	
Bureaucracy Quality	Bureaucratic Quality, scale of 0-4. Source: International Country Risk Guide, published by The PRS group.

Corruption	Corruption in Government, scale of 0-6. Source: International Country Risk Guide, published by The PRS group.
Law and Order	Measures law and order tradition, scale of 0-6. Source: International Country Risk Guide, published by The PRS group.
Term of central bank governors	de Haan and Kooi (2000), Sturm and de Haan (2001). I thank Jan-Egbert Sturm for providing me with this data.

Table A2
Deposit and credit dollarization data availability

Country	Deposits	Credit	Country	Deposits	Credit	Country	Deposits	Credit
Albania	90-00	98-99	Guinea-Bissau	90-96		Romania	92-00	93-00
Angola	92-99		Haiti	94-99	94-99	Russian Federation	92-00	92-00
Antigua & Barbuda	90-98		Honduras	89-98		Rwanda	91-99	
Argentina	92-00		Hungary	92-99	94-99	Sao Tome & Principe	94-00	
Armenia	93-00		Indonesia	90-99	93-99	Serbia	99-00	99-00
Azerbaijan	92-97	93-94	Israel	90-99	91-99	Slovak Republic	92-00	92-00
Bahamas	90-00	90-00	Jamaica	91-99	92-99	Slovenia	91-99	
Belarus	93-99	93-95	Jordan	90-96		South Africa	94-99	94-99
Belize	90-00		Kazakhstan	94-99	95-99	St. Kitts & Nevis	89-99	
Bolivia	92-00	92-00	Korea	94-98		St. Lucia	91-98	
Bosnia & Herz.	94-00		Kuwait	95-00		St. Vincent & Gren.	89-99	
Botswana	93-98		Kyrgyz Republic	93-99	96-99	Sudan	89-00	
Bulgaria	90-00	90-00	Lao P.D.R.	92-98		Tajikistan	93-00	
Cambodia	93-00		Latvia	93-00	93-00	Tanzania	94-00	
Cape Verde	88-98		Lithuania	93-00		Thailand	90-00	
Congo, Dem. Rpb.	96-99		Macedonia	95-99	95-99	Trinidad & Tobago	93-00	
Costa Rica	91-97		Madagascar	93-00	98	Tunisia	91, 94-99	
Croatia	91-00	91-94	Malawi	94-00		Turkey	89-98	90-98
Cyprus	89-94		Mexico	92-00	92-00	Turkmenistan	93-97	93-97
Czech Republic	92-00	92-00	Moldova	93-00		Uganda	92-98	
Djibouti	92-98	92-97	Mongolia	91-99	91-94	Ukraine	94-00	94-00
Dominica	89-00		Mozambique	91-00	97-00	United Arab Emirates	93-97	
Ecuador	92-98		Myanmar	89-99		Uruguay	89-98	89-98
El Salvador	91-98		Nepal	93-99		Uzbekistan	92-99	97-99
Eritrea	97-99		Nicaragua	90-99		Vanuatu	89-99	89-99
Estonia	92-00	94-00	Pakistan	90-99		Venezuela	90-98	
Gambia		95-00	Papua New Guinea	90-99		Vietnam	89-00	94-99
Georgia	94-00	94-00	Paraguay	89-00	89-00	Yemen	94-99	94-99
Ghana	93-00	94-00	Peru	92-00	92-00	Zambia	94-98	
Grenada	90-00		Philippines	90-98		Zimbabwe	93-94, 97-00	
Guinea	91-00		Poland	93-00				