Dollars, Debt, and International Financial Institutions: Dedollarizing Multilateral Lending

Eduardo Levy Yeyati

Financial dollarization is increasingly seen as a concern because of its tendency to contribute to financial crises and output volatility. As a result the debate on financial dollarization has shifted in favor of a more proactive stance on dedollarization. While often neglected, lending from international financial institutions is an important source of financial dollarization in emerging economies and must be considered in any dedollarization strategy. This article revisits old and new arguments in favor of international financial institution lending in the local currency and argues that any such initiative should rely, at least initially, on demand from residents seeking stable returns in units of the local consumption basket but who are reluctant to take on sovereign risk. Superior enforcement capacity enables international financial institutions to intermediate these savings, currently invested in dollarized foreign assets, back into the local economy. The international financial institutions can offer investment-grade local currency bonds and use the proceeds to dedollarize their own lending to noninvestment-grade countries, thereby reducing financial dollarization and fostering the development of local currency markets. JEL codes: F34, F41, H63, G11.

Financial dollarization, defined as the holding by residents of foreign currency–denominated financial assets and liabilities, has moved to the forefront of the policy debate in many emerging market economies due to concerns about the impact of the associated currency mismatch on output volatility and financial fragility.[1] As a result, the central issue of the financial dollarization debate has moved from a generally passive stance aimed at minimizing the

1. Many of these concerns have been validated by recent empirical work. See, for example, Berganza and García Herrero (2004); Calvo, Izquierdo, and Mejia (2004); De Nicoló, Honohan, and Ize (forthcoming); Frankel (forthcoming) and Levy Yeyati (2006).

negative implications to a more proactive one aimed at offsetting the incentives that favor dollarization while developing local currency substitutes.[2]

One of the most important sources of financial dollarization in emerging market economies and developing economies is lending by international financial institutions, denominated in hard currency (or a basket of currencies). The convenience of dedollarizing international financial institution lending has been highlighted in recent proposals (see, for example, Eichengreen and Hausmann 2004), but for various reasons these ideas have been received with skepticism or indifference.

This article discusses old and new theoretical and empirical arguments in favor of international financial institution lending in local currencies. In contrast to proposals that stress potential demand from nonresidents seeking a currency-diversified portfolio, this article argues that international financial institution lending should rely, at least initially, on demand from residents in search of local currency assets to minimize the volatility of returns measured in the local consumption basket but reluctant to take on sovereign risk.

Saving in the local currency faces two fundamental obstacles in developing countries: high nominal volatility (unpredictable inflation due to nominal shocks or attempts to dilute the real value of local currency liabilities through inflation) and high credit risk (a high probability of default, including through violation of the terms and conditions of both public and private contracts under local jurisdiction or the imposition of confiscatory taxes on savings).

The first obstacle can be mitigated through indexation, typically to the local consumer price index (CPI). The second obstacle is more difficult to overcome. Country risk encompasses not only the possibility of default but also a number of sovereign actions that erode creditor rights, including alterations of the indexation methodology. This risk induces residents to relocate their savings to countries where property rights are better protected. Thus, even in the absence of nominal instability (or despite the mitigating presence of indexation), residents may end up dollarizing their savings simply because of the lack of local currency assets free of country-specific credit risk. Under these conditions there is potential demand for investment-grade securities in local currency that cannot be satisfied by noninvestment-grade countries.

It is easy to see how moving savings abroad can deepen financial dollarization. As a large part of the domestic pool of savings moves abroad, the country is forced to rely on foreign, particularly multilateral, credit.[3] International financial institutions can make up at least partially for the lack of domestic

---

2.   In this context dedollarization is understood as a voluntary process, as opposed to a compulsory currency conversion. Following the standard dollarization literature, dollar and foreign currency, and peso and local currency are used here interchangeably.

3.   De la Torre and Schmukler (2004) discuss offshoring as a mechanism for coping with country-specific risk. If offshoring could successfully protect against country risk, foreign borrowing could readily substitute for the decline in domestic funds. However, the extent to which offshore claims are less exposed than onshore assets to country-specific risk is not obvious, as witnessed in the recent Argentine default.

funds through their ability to enforce an implicit preferred creditor status that reduces their exposure to sovereign risk and enables them to collect funds and issue loans at close to risk-free rates to countries facing high country-risk premiums. Thus, international financial institutions are able to mitigate the agency problem underlying the high cost of capital in emerging market economies, playing a risk-transformation role.

This makes international financial institutions natural candidates to launch investment-grade local currency markets. By issuing debt in emerging market currencies to fund local currency loans, they could dedollarize an important portion of the country's external liabilities while keeping a balanced currency position, in the process providing the needed liquidity to start up these missing markets. Note that this strategy requires dedollarization of outstanding loans rather than additional international financial institution lending (which could ultimately weaken the capacity of international financial institutions to enforce their preferred creditor status).[4]

The main deterrent has been the untested conjecture that the representative international investor would not be attracted by local currency assets. However, the minimum liquidity needed to launch markets for investment-grade local currency securities can be obtained from latent demand for these securities from the country's residents.

The financial dollarization literature distingushes, both analytically and empirically, between resident and nonresident potential demand for local currency assets. Analytically, local currency instruments will look relatively more attractive to risk-averse local savers and borrowers, because they mirror their stream of future consumption and income more closely.[5] This "home currency bias" is consistent with the evidence that shows that past debt dedollarization processes were driven largely by a deepening of the domestic markets based on local demand.[6]

---

4. IIt follows that the credit risk exposure of the international financial institution should remain constant or may even decline to the extent that the default probability depends on the currency mismatch.

5. This distinction was originally made by Thomas (1985) in a two-country model and more recently by Ize and Levy Yeyati (2003).

6. Bordo, Meissner, and Redish (2002, p. 18), when analyzing the evolution of debt denomination in four British Dominions (Australia, Canada, New Zealand, and South Africa), highlight that "the onset of World War I essentially closed the London capital market, and the response was similar in all four dominions. The gold convertibility of the domestic currency was suspended (and not resumed until 1925), and governments raised funds domestically, essentially creating a domestic bond market . . . . Foreign issues relative to domestic issues (at least for sovereign debt) would never regain their earlier dominance." Similarly, Claessens, Klingebiel, and Shmukler (2003) find that the dollarization ratio of (domestic plus external) government bonds is negatively related to the size of domestic financial markets. See also Martínez and Werner (2002) for the development of local currency markets in Mexico, Herrera and Valdez (forthcoming) for Chile, and Caballero, Cowan, and Kearns (2005) for Australia. Note that this evidence does not imply that there is necessarily any pent-up demand for peso assets; rather, it indicates that, if that demand exists at all, it will likely come from resident investors.

The case of pension funds is illuminating. By acquiring a credit risk–free asset denominated in CPI units, fund managers would fulfill their role by ensuring a stable stream of retirement benefits while avoiding the risk of confiscation. However, to diversify credit risk, pension funds typically invest a fraction of their portfolio in dollarized foreign assets. As a result, while the government of the emerging market economy borrows in dollars from international financial institutions, a share of residents' retirement savings is invested abroad in dollarized investment-grade paper (such as that issued by international financial institutions to fund their own lending). The international financial institutions may then intermediate these funds by selling to pension funds the bonds that finance the country loans. This intermediation could be done in CPI units to the benefit of both parties involved. The article makes the case for a similar type of arrangement as a natural first step to dedollarizing the external debt of developing countries.

I. DEFINITIONS, IMPLICATIONS, AND MEASUREMENT

There is still disagreement on the proper definition and measurement of financial dollarization (Eichengreen, Hausmann, and Panizza 2003; Goldstein and Turner 2003). While the literature has emphasized the country's foreign currency position relative to nonresidents (typically measured by its foreign currency–denominated external debt),[7] the aggregation argument underlying this distinction (that the currency exposure of resident creditors and debtors should cancel out) ignores important aggregate effects. Even if a financially dollarized economy is currency balanced as a whole, it will likely be imbalanced at a micro level, leading to capital flight, bank runs, and massive bankruptcies at the time of a real exchange rate adjustment, with important real consequences. Hence, the significant effects of *domestic* financial dollarization found in the literature.

With that in mind, this article looks at both domestic and external sources of financial dollarization. Domestic dollarization is captured by domestic dollar deposits, which, given the standard prudential limits on banks' net currency position, provide a good proxy for the volume of domestic dollar loans. External dollarization is represented by private external loans and holdings of external bonded debt and by multilateral lending, broken down by International Monetary Fund (IMF) and non-IMF loans.[8] Finally, liability dollarization is computed as the ratio of dollar liabilities to total liabilities, where domestic dollar loans are proxied by domestic dollar deposits, and domestic

---

7. This focus on external debt implicitly presumes a link between bondholders' residence and debt jurisdiction that is imperfect at best.

8. This distinction is important for two reasons. First, one key ingredient of the proposal discussed here is that to avoid a currency mismatch while dedollarizing lending, an international financial institution needs to fund itself in the same exotic currency in which it intends to lend. This option is unavailable to the IMF, which unlike multilateral banks, does not fund itself in the capital market. Second, in contrast to the long-term financing of investment projects by multilateral banks, the IMF's short-term liquidity assistance can hardly be seen as a partial substitute for domestic loanable funds.

loans are proxied by domestic deposits. These values are presented for a balanced sample of countries in table 1. Official financial dollarization (ratio of non-IMF international financial institution lending to GDP) levels are comparable to those of external loans and higher than those associated with domestic dollarization and external bonded debt (the focus of much of the empirical financial dollarization literature). Based on median values, official financial dollarization accounts for more than a fourth of total external dollarization and a fifth of total dollarization. These numbers indicate that a strategy aimed at reducing financial dollarization cannot ignore the role of international financial institutions.

II. Offshoring and Financial Dollarization

One aspect often overlooked in the financial dollarization literature is the interaction between country-risk and the degree of dollarization for noninvestment-grade economies. If country-risk drives domestic savings abroad where no local currency assets are available, other things being equal, higher country risk would be associated with higher total dollarization ratios (inclusive of offshore deposits), leading to a smaller volume of local currency loanable funds. In turn, this deficit would be partially compensated for by a greater dependence on foreign dollar borrowing (to the extent that it insulates investors from country risk better than domestic assets do) and, ultimately, on international financial institution lending. This section presents a stylized analytical illustration of this intuition and tests its empirical implications in the data.

An Analytical Example

The links between country risk, offshoring, and dollarization can be illustrated by a simple extension of Ize and Levy Yeyati's (2003) portfolio model.

Consider the following scenario. A continuum of measure A of risk-averse resident investors endowed with a unit of cash can invest in four alternative assets: peso and dollar debt issued in a noninvestment-grade emerging market economy (the home economy) and peso and dollar debt issued in an investment-grade developed economy (the foreign economy). Denote the portfolio shares by x^{HP}, x^{HD}, x^{FP}, and x^{FD} where the first superscript denotes the place of issuance (home or foreign country) and the second the denomination (pesos or dollars).

Real returns as measured by the resident investor are given by:

(1)
$$r^{HP} = E(r^{HP}) - \mu_\pi - \mu_c$$
$$r^{HD} = E(r^{HD}) + \mu_s - \mu_c$$
$$r^{FD} = E(r^{FD}) + \mu_s$$
$$r^{FP} = E(r^{FP}) - \mu_\pi$$

TABLE 1. Sources of Financial Dollarization for a Balanced Sample of Nonindustrial Economical (Percent of GDP)

	Domestic dollar deposits (a)	External loans (b)	Dollar-bonded external debt (c)	International financial institution lending, excluding IMF (d)	IMF lending (e)	Total external (b) + (c) + (d) + (e)	Total
1996							
Mean	0.0825	0.1427	0.0406	0.2238	0.0130	0.4201	0.5027
Median	0.0625	0.1297	0.0272	0.0872	0.0055	0.3323	0.4326
Minimum	0	0.0271	0.0014	0	0	0.09118	0.1185
Maximum	0.3390	0.5295	0.2937	2.4379	0.0591	2.6977	2.9492
Number of observations	30	30	30	30	30	30	30
2001							
Mean	0.1197	0.1286	0.0908	0.1838	0.0183	0.4214	0.5411
Median	0.0823	0.1207	0.0583	0.0964	0.0028	0.3479	0.4422
Minimum	0.0003	0.0359	0.0019	0.0011	0	0.1783	0.1814
Maximum	0.5101	0.2484	0.3251	1.973382	0.0987	2.2831	2.7932
Number of observations	30	30	30	30	30	30	30

Note: Countries in the sample: Argentina, Bulgaria, Chile, Costa Rica, Czech Republic, Dominican Republic, Egypt, Estonia, Guatemala, Croatia, Hungary, Indonesia, Jamaica, Kazakhstan, Lithuania, Latvia, Moldova, Mexico, Malaysia, Nicaragua, Peru, Philippines, Poland, Romania, Slovak Republic, Thailand, Turkey, Uruguay, Venezuela, and South Africa.

Source: Author's analysis based on data sources discussed in the text.

where $E(r^j)$ denotes the expected real return on the assets, and μ_π, μ_s, and μ_c are zero-mean disturbances to the local inflation rate π, the real (peso–dollar) exchange rate s, and the home country's credit risk (or country risk) c, assumed to be distributed with variance–covariance matrix $[S_{xy}]$, with $S_{cs} = S_{c\pi} = 0$.[9]

Assume further that investors maximize risk-adjusted real return:

$$(2) \qquad \max_{x^j} U = E(r) - \frac{c}{2} \text{Var}(r)$$

subject to the no-short sales condition $x^j \geq 0$, where $r = \sum_j x^j r^j$.

Any solution to the portfolio problem can be characterized by the following dollarization and offshoring ratios:[10]

$$(3) \qquad \lambda \equiv x^{HD} + x^{FD} = \lambda_u - \frac{1}{cV} E(r^{HP} - r^{HD})$$

and

$$(4) \qquad \gamma \equiv x^{FD} + x^{FP} = 1 - \frac{1}{cS_{cc}} E(r^{HD} - r^{FD})$$

where

$$(5) \qquad V \equiv \text{Var}(r^{HP} - r^{HD}) = S_{\pi\pi} + S_{ss} + S_{\pi s}$$

and

$$(6) \qquad \lambda_u = \frac{(S_{\pi\pi} + S_{\pi s})}{V}$$

is the dollarization share in the absence of real return differentials, or the underlying dollarization ratio.

In turn, the demand for funds is characterized by a continuum of measure L of local borrowers, assumed to be risk-neutral for simplicity (the assumption can be relaxed without altering the qualitative results, as in Ize and Levy Yeyati 2003), with the option to invest in a production technology with known

9. The qualitative results are not driven by these simplifying assumptions. The derivation of the analytical solutions (reported in the supplemental appendix) presents the solution for the case in which country and real exchange rate risk are not independent. Similarly, the results still carry through if inflation and country risk are partially correlated. A good reference is provided by the correlation between country risk (the sovereign bond spread over a risk-free bond of similar duration) and the rates of inflation and real devaluation. For the sample used in the tests and based on monthly data, these correlations are 0.15 and 0.03, respectively.

10. A derivation of the solution is included in the supplemental appendix.

real returns. This investment can be financed from four sources: domestic peso and dollar debt and external peso and dollar debt (where the share of external debt in the liability portfolio is denoted by x^*).

External debt can be contracted either with private lenders or with the international financial institutions. Under the assumption that country risk is mitigated by foreign borrowing or by the international financial institutions' preferred creditor status, foreign funds would be cheaper than domestic funds, and in equilibrium there would be no domestic borrowing (and therefore no domestic intermediation of funds). More realistically, credit risk associated with foreign borrowing would increase with the outstanding stock of external debt, and this should be reflected in borrowing costs. For the current exercise it suffices to assume that foreign borrowing costs command a premium $\phi(X)$ on the international rate, with $\phi'(X) > 0$, where $X = x^*L$. Then, assuming away intermediation costs, interest rate arbitrage implies that

$$(7) \qquad E(r^{HP}) = E(r^{HD}) = E(r^{FP}) + \phi = E(r^{FD}) + \phi$$

which, substituted into equations (3) and (4), implies that $\lambda = \lambda_u$, and $\gamma = 1 - \phi/cS_{cc}$.

This solution characterizes a continuum of portfolios that maximize the investors' utility. While the availability of external peso assets has no impact on the dollarization ratio if $\gamma < \lambda_u$, it does if $\gamma \geq \lambda_u$, where external assets in excess of the desired stock of dollar assets should be denominated in pesos (that is, $x^{FP} \geq \gamma - \lambda_u$). Therefore, if external peso assets were not available, dollarization would be driven entirely by the deposit offshoring ratio (the ratio of resident deposits held abroad to total resident deposits), because in this case the deposit offshoring ratio could never exceed the deposit dollarization ratio.

More generally, it can be shown that the new dollarization ratio (identified by the lower bar) is given by:[11]

$$(8) \qquad \gamma = \underline{\gamma} = \frac{(S_{\pi\pi} + S_{\pi s} + S_{cc})}{V + S_{cc}} - \frac{1}{c} \times \frac{\phi}{V + S_{cc}} = \underline{\lambda} > \lambda,$$

where the difference $\lambda - \lambda_u$, increasing in country risk, is due to the absence of investment-grade peso assets: capital flight translates directly into an increase in the dollarization ratio.

This analysis can be readily extended to the case of CPI-indexed domestic assets. Perfect indexation could be expressed as $\mu_\pi = 0$. Therefore, if domestic peso assets were indexed to the local CPI, the dollarization ratio from equation 8 would equal $S_{cc}/S_{cc} + S_{ss}$, and would be driven entirely by country risk.

---

11. Note that this is also the dollarization ratio that would be obtained should local dollar deposits be banned, leaving the placement of assests abroad as the only option to dollarize savings.

In other words country risk sets a floor to the extent to which a noninvestment-grade country can reduce financial dollarization through monetary policy (reducing inflation volatility and the exchange rate pass-through) or CPI indexation.

How does the placement of domestic savings abroad affect the currency composition of resident liabilities? To answer this question, note that the domestic balance of funds requires that

$$(9) \qquad\qquad (1 - x^*)L = (1 - \gamma)A$$

and, for the peso market,

$$(10) \qquad\qquad (1 - \lambda^B)L = (1 - \lambda)A$$

where λ^B denotes the borrower's dollarization ratio.

If the offshoring ratio were not binding, an increase in country risk would not alter the degree of dollarization of domestic savings and, in turn, the amount of peso funds available, as the resulting decline in the domestic supply of pesos would be perfectly offset by an increase in the supply of pesos abroad.

However, when the offshoring ratio is binding, the supply of peso funds is automatically determined by the offshoring ratio γ, since equations (9) and (10) yield:

$$(11) \qquad\qquad (1 - \lambda^B)L = (1 - \gamma)A = (1 - x^*)L$$

or $\lambda^B = x^*$. In this case, the borrower effectively has two options: domestic peso loans (limited by the domestic supply of funds) and dollarized foreign borrowing. As country risk mounts, the cost of domestic peso loans relative to dollarized foreign borrowing increases, raising the offshoring ratio (and, as a result, the liability dollarization ratio) to the point at which foreign and domestic borrowing costs are again equalized.[12]

It can be seen that the presence of country-risk-free offshore assets restores condition (10), as the borrower's financing needs can now be met by borrowing pesos abroad (at the peso risk-free rate plus the transaction cost, ϕ), decoupling the choice of currency and location. In particular, increases in x as a result of higher country risk need no longer have an impact on λ^B.[13]

In sum, high country risk is associated with a high offshoring ratio and, if the ratio is sufficiently high, with a smaller supply of peso-loanable funds.

12. It can be readily seen that $\lambda^B = 1 - (1 - \gamma)$ (A/L), so that $\partial\gamma/\partial S_{cc} > 0$ implies that $\partial\lambda^B/\partial S_{cc} > 0$.

13. The model implicitly assumes constant investment returns, to focus on the currency choice. Note, however, that under diminishing marginal returns an increase in country risk would raise borrowing costs and reduce aggregate investment without altering the qualitative results in terms of currency composition.

To the extent that foreign borrowing is relatively immune to country risk, higher country risk would lead to a larger share of foreign borrowing and, in the absence of risk-free peso assets, higher liability dollarization ratios.

Are Nonresidents Different?

An argument made repeatedly in the literature is that hedging considerations indicate that resident investors are likely to exhibit smaller dollarization ratios than nonresident investors (see Thomas 1985 for an early reference). The previous example helps illustrate the point.

First, note that using $\mu_s \approx \mu_e - \mu_\pi$, where μ_e denotes nominal exchange rate shocks, underlying dollarization simplifies to

$$(12) \qquad \lambda_u = \frac{S_{\pi e}}{S_{ee}}$$

the coefficient of a simple regression of the inflation rate on the nominal exchange rate, that is, a crude measure of the exchange rate pass-through.

Starting from equation (12), and exploiting the symmetry of this setup, it is easy to verify that in a stylized two-country world the degree of underlying "pesoification" (that is, the share of foreign currency assets over total assets) of foreign residents would be equal to

$$(13) \qquad \lambda_u^* = \frac{S_{\pi^* e^*}}{S_{e^* e^*}}$$

where e^* denotes the dollar–peso exchange rate, and π^* the rate of inflation in the foreign country.

For any pair of countries with comparable pass-through coefficients it follows that any coefficient below 50 percent would imply that the demand for local currency assets from residents should exceed that from nonresidents—an asymmetry that deepens when inflation volatility (and the pass-through coefficient) declines and, by extension, when the peso assets are indexed to the local inflation rate.

The example oversimplifies the portfolio choice of the representative resident and nonresident investors. In particular, it ignores cross-border transaction costs and differences in the liquidity services provided by financial assets at home and abroad, which in practice introduce an important source of investor heterogeneity. This helps explain why in practice fully dollarized investment portfolios (where the condition $\gamma > \lambda_u$ binds) can coexist with a stock of domestic dollar deposits (owned by small investors that face proportionally large transaction costs, or by large investors for liquidity purposes).

However, the exercise provides a valid intuition regarding two points that are critically important for assessing the role of international financial

institutions in the development of local currency markets: the impact that country risk may have (through the shifting of domestic savings abroad) on financial dollarization in noninvestment-grade countries, and the home currency bias that makes local currency assets more appealing to resident investors than to foreigners, particularly in countries with stable inflation.

Offshoring and Dollarization in the Data

Thus, in the absence of risk-free instruments in emerging market economy (exotic) currencies, noninvestment-grade countries may see a substantial portion of their domestic savings dollarized simply as a result of capital flight to safer investments abroad. This capital flight, inasmuch as it reduces the volume of domestic loanable funds, increases both financing costs and the country's dependence on external finance, to the extent that external finance is perceived as less exposed to country-specific credit risk. In particular, if external finance offers only partial protection against country risk, one would expect limited access to domestic finance to make noninvestment-grade countries more dependent on international financial institution lending. This section explores whether these intuitions are consistent with the empirical evidence.

This is done by distinguishing between the domestic dollarization (ratio of domestic dollar deposits to total domestic deposits) and deposit dollarization, λ_u, (the ratio of dollar deposits to total resident deposits at home and abroad). The second variable, while less frequently used in the literature, is a more accurate measure of the degree of dollarization of residents' portfolios as depicted in the analytical example and more clearly reflects both underlying dollarization and the deposit offshoring ratio. The domestic supply of loanable funds is proxied by the ratio of domestic deposits to GDP.[14] Two sources of external dollarization are examined, nonofficial lending (external loans plus external bonded debt) and official lending (which distinguishes between IMF and non-IMF lending). Liability dollarization is computed as the ratio of total foreign currency liabilities to total liabilities, where the currency composition of domestic loans is proxied by that of domestic deposits. Finally, country risk is measured as the stripped spread between sovereign debt and comparable U.S. Treasuries, as captured by J.P. Morgan's EMBI Global.[15]

A correlation matrix of period averages for the links between country risk, location and currency composition of resident savings, and the sources of external dollarization shows an association of country risk with a smaller volume of domestic funds and a higher deposit offshoring ratio, on the one hand, and a high and positive correlation between the offshoring ratio and deposit

---

14. Domestic deposits are used instead of M2 or domestic credit to be consistent with the way the deposit offshoring ratio is computed. However, all three variables are highly correlated and yield virtually identical results.

15. For methodogical issues concerning the EMBI Global, see J.P. Morgan (1999).

dollarization (and in turn between deposit dollarization and country risk), on the other (table 2). Both findings are consistent with the implications of the previous model.

Regarding the sources of liability dollarization, there is no clear link between country risk and nonofficial external finance, suggesting that while external debt may provide some protection against country risk (hence, the weaker negative link between these two variables), it does not offset the decline in domestic funds. This decline is ultimately compensated for by a larger dependence on international financial institution lending, as reflected in a larger ratio to GDP as well as in a larger ratio of international financial institution to total external credit.

More detailed exploration shows that high-risk countries are associated with smaller domestic deposits (table 3, columns 1–3) and higher deposit offshoring ratios (columns 4–6). This remains true even after controlling for domestic dollarization and for restrictions on dollar deposits that may bias residents toward holding dollar assets abroad if capital flight were motivated by currency risk. (Interestingly, restrictions appear to be positively related to domestic deposits and negatively related to the deposit offshoring ratio.)

Thus, country risk contributes to a weak demand for peso assets in noninvestment-grade countries in addition to the underlying dollarization channel identified by the portfolio approach. Indeed, country risk appears to affect deposit dollarization mainly through its effect on the offshoring ratio. As column 7 shows, even after controlling for underlying dollarization, the additional effect of country risk on the share of dollar deposits is similar to the effect on external deposits (which, measured at a country risk mean of 575 basis points yields a sizable increase of about 10 percent). This effect virtually vanishes, however, after controlling for the deposit offshoring ratio, which is reflected almost one to one in the deposit dollarization ratio (column 8).[16] The link between the deposit dollarization ratio and the deposit offshoring ratio also holds for the larger sample obtained by dropping the country-risk index (column 9) and in a dynamic setting with country-fixed effects (columns 10 and 11).[17]

A partial regression plot from a regression of *excess* deposit dollarization (measured as the difference between the observed and the underlying dollarization ratios) on the offshoring ratio (including per capita GDP as a proxy for development and institutional quality) provides another illustration of the

16. Underlying dollarization is computed here directly from equation (6), based on monthly inflation and real exchange rate data. Note that the fact that observed dollarization depends on both underlying dollarization and offshoring follows directly from the model, once differential cross-border transaction costs for individual savers are allowed for. See the supplemental appendix for a derivation.

17. To control for the possible incidence of common macroeconomic variables omitted in the specification, the cross-section regressions were rerun including per capita GDP as a proxy for time-invariant institutional and development factors and the panel regressions of columns 10 and 11 adding the inflation and the real growth rates. The results, which remain virtually unchanged, are reported in the supplemental appendix.

TABLE 2. Correlation Matrix for Measures of Financial Dollarization in emerging Market Economies (Period Averages)

	Domestic deposits	Deposit offshoring ratio	Deposit dollarization ratio	Dollar external liabilities, excluding international financial institutions	International financial institution lending, excluding IMF	IMF lending	International financial institution lending / total external liabilities
Deposit offshoring ratio	−0.5429 (0.0023)						
Number of observations	29						
Deposit dollarization ratio	−0.4163 (0.0540)	0.6803 (0.0005)					
Number of observations	22	22					
Dollar external liabilities, excluding international financial institutions	0.4209 (0.0455)	−0.2224 (0.3076)	−0.1390 (0.5588)				
Number of observations	23	23	20				
International financial institution lending, excluding IMF	−0.2383 (0.2313)	0.2876 (0.1542)	0.2052 (0.3722)	−0.4280 (0.0469)			
Number of observations	27	26	21	22			
IMF lending	−0.2714 (0.1709)	0.1522 (0.4578)	0.2676 (0.2408)	−0.1778 (0.4285)	0.2520 (0.2048)		
Number of observations	27	26	21	22	27		
International financial institution lending / total external liabilities	−0.1246 (0.5357)	0.1128 (0.5832)	0.1667 (0.4703)	−0.5470 (0.0084)	0.7935 (0.0000)	0.1307 (0.5159)	
Number of observations	27	26	21	22	27	27	
Country risk	−0.5646 (0.0012)	0.5005 (0.0057)	0.5047 (0.0166)	−0.1886 (0.3774)	0.5633 (0.0022)	0.5073 (0.0069)	0.3652 (0.0610)
Number of observations	30	29	22	24	27	27	27

Note: Numbers in parentheses are significance levels. Averages are computed based on observations for which the country risk index is available. Domestic deposits, dollar external liabilities, and international financial institution and IMF lending are computed as a ratio of GDP.

Source: Author's analysis based on data sources discussed in the text.

TABLE 3. Country Risk, Deposit Offshoring Ratio and Deposit Dollarization in Emerging Market Economies

|	Domestic deposits as share of GDP Ordinary least squares (period averages)			Deposit offshoring ratio Ordinary least squares (period averages)			Deposit dollarization ratio				
							Ordinary least squares (period averages)			Fixed effects (annual data)[a]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Country risk	−0.030* (0.007)	−0.039* (0.008)	−0.031* (0.007)	0.015* (0.004)	0.016*** (0.008)	0.013*** (0.007)	0.018*** (0.009)	0.005 (0.004)		0.004** (0.002)	
Domestic deposit dollarization ratio		0.089 (0.164)			0.033 (0.128)						
Restrictions			0.045 (0.047)			−0.031*** (0.016)					
Underlying dollarization ratio							0.426* (0.089)	0.390* (0.062)	0.265* (0.050)		
Deposit offshoring ratio								0.815* (0.158)	0.818* (0.100)	0.852* (0.118)	0.701* (0.034)
Constant	0.560* (0.069)	0.588* (0.092)	0.521* (0.072)	0.216* (0.029)	0.210* (0.047)	0.254* (0.046)	0.261* (0.054)	0.093 (0.056)	0.179* (0.043)	0.222* (0.036)	0.290* (0.023)
Number of observations	30	23	24	29	22	22	21	21	78	107	584
R-squared	0.32	0.39	0.35	0.25	0.25	0.31	0.68	0.86	0.62	0.99	0.98

*Significant at the 1 percent level; **significant at the 5 percent level; ***significant at the 10 percent level.

Note: Numbers in parentheses are robust standard errors.

[a]Regressions include year dummy variables.

Source: Author's analysis based on data sources discussed in the text.

FIGURE 1. Deposit Offshoring Ratio and Excess Deposit Dollarization (partial regression plot)

Coefficient = 0.64200696, (robust) se = 0.07970967, t = 8.05
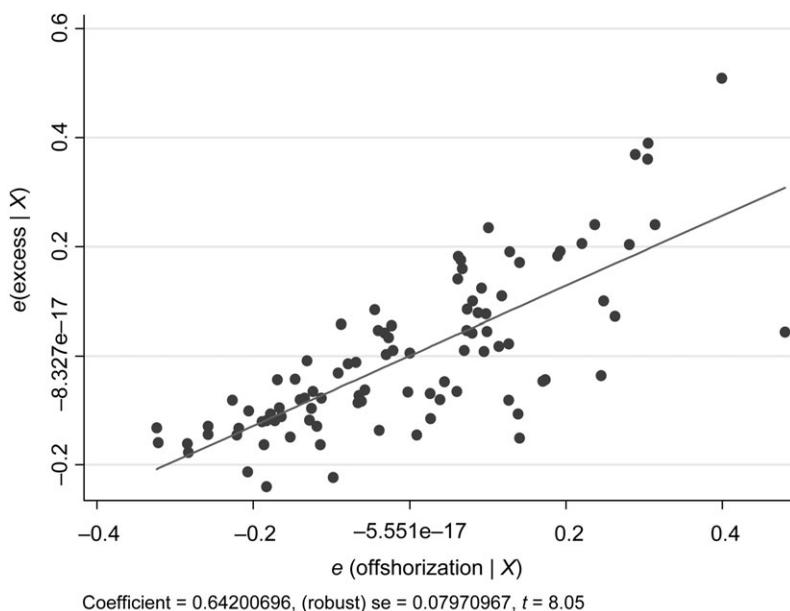
Note: Excess dollarization is measured as the difference between actual and underlying deposit dollarization.
Source: Author's analysis based on data sources discussed in the text.

influence of the deposit offshoring ratio on the deposit dollarization ratio (figure 1). The correlation is highly significant and is not driven by a few outliers.

The deposit offshoring ratio is also associated with greater dependence on international financial institution lending, both at different points in time and over time for IMF and non-IMF lending (table 4). The offshoring ratio is associated with a shortage of loanable funds rather than an excess supply of them (as would be the case in middle-income countries like Chile and most high-income countries where outflows are typically associated with a scarcity of investment options and low returns). In contrast, no significant link is found between the deposit offshoring ratio and other sources of external credit (table 5, columns 1 and 2) or total external long-term liabilities, used as a proxy for foreign currency external debt (columns 3 and 4).[18] This suggests that if a foreign jurisdiction provides better protection against credit risk as is sometimes speculated, this benign effect is not enough to make up for the

18. Data on total external long-term liabilities are available from the World Bank's Global Development Finance for a larger sample and a longer period. The implicit assumption that all external debt issued by nonindustrial countries is denominated in foreign currency seems to be a reasonable approximation of reality.

TABLE 4. Deposit Offshoring ratio and Lending by International financial Institutions, Emerging Market Economies

	Non-IMF lending as share of GDP				IMF lending as share of GDP			
	Ordinary least squares (averages)		Fixed effects (annual data)		Ordinary least squares (averages)		Fixed effects (annual data)	
	(1)[a]	(2)	(3)	(4)	(5)[a]	(6)	(7)	(8)
Deposit offshoring ratio	0.678*	1.221***	0.376***	0.235**	0.025	0.083***	0.030***	0.086**
	(0.349)	(0.306)	(0.079)	(0.094)	(0.026)	(0.023)	(0.008)	(0.041)
Country risk				0.008***				0.001
				(0.002)				(0.001)
Constant	−0.004	0.078	0.387***	0.082***	0.009	−0.001	0.018***	−0.013
	(0.096)	(0.095)	(0.033)	(0.029)	(0.008)	(0.007)	(0.003)	(0.016)
Number of observations	25	120	815	125	26	120	816	125
R-squared	0.19	0.09	0.97	0.98	0.02	0.09	0.93	0.82

*Significant at the 10 percent level; **significant at the 1 percent level; ***significant at the 5 percent level.

Note: Numbers in parentheses are robust standard errors.

[a]Includes only observations for which the country risk index is available.

Source: Author's analysis based on data sources discussed in the text.

TABLE 5. Offshoring and Liability Dollarization in Emerging Market Economics

	Dollar external liabilities as share of GDP, excluding international financial institutions		Total external liabilities as share of GDP, excluding international financial institutions		Liability dollarization ratio, excluding IMF		Liability dollarization ratio	
	Ordinary least squares (averages)	Fixed effects (annual)	Ordinary least squares (averages)	Fixed effects (annual)	Ordinary least squares (averages)		Ordinary least squares (averages)	
	(1)	(2)	(3)	(4)	(5)	(6)[a]	(7)	(8)[a]
Deposit offshoring ratio	−0.194	0.209	−0.034	0.080*	0.547**	0.564**	0.558**	0.561***
	(0.184)	(0.136)	(0.075)	(0.036)	(0.213)	(0.132)	(0.213)	(0.111)
Constant	0.278***	0.109**	0.141***	0.082***	0.462***	0.515***	0.465***	0.521***
	(0.064)	(0.054)		(0.015)	(0.074)	(0.054)	(0.074)	(0.046)
Number of observations	23	301	120	815	38	88	38	88
R-squared	0.05	0.80	0.00	0.84	0.18	0.23	0.18	0.23

*Significant at the 5 percent level; **significant at the 1 percent level; ***significant at the 10 percent level.

Note: Numbers in parentheses are robust standard errors.

[a]Uses total long-term external debt as a proxy for dollar long-term external debt.

Source: Author's analysis based on data sources discussed in the text.

deficit in domestic funds when sovereign risk is driving capital abroad. Finally, liability dollarization is positively correlated with deposit offshoring (columns 5–8), a reflection of the higher dependence on international financial institution lending revealed by the previous results.

In sum, the evidence is consistent with the hypothesis that, in the absence of risk-free instruments in exotic currencies, noninvestment-grade countries may see a substantial portion of their domestic savings dollarized simply as a result of the flight of capital to safer investments abroad. In turn, this capital flight, inasmuch as it reduces the volume of domestic loanable funds, increases the country's dependence on dollarized international financial institution lending (better equipped to cope with country risk than international investors), shifting the currency liability composition towards the foreign currency as a consequence.

III. Financial Dedollarization and the International Financial Institutions

As the previous discussion highlights, in noninvestment-grade countries international financial institutions tend to substitute for domestic sources of finance. Crucially, the role of international financial institutions in this context does not necessarily entail, as sometimes argued, a significant subsidy to emerging market economies. Indeed, a key characteristic of international financial institutions is that, unlike private investors, they experience a surprisingly good repayment record.[19] Thus, international financial institutions can be seen as contributing to a "sovereign risk transformation," matching the supply of private funds in search of investment-grade securities and the demand for funds by noninvestment-grade economies, exploiting their superior enforcement capabilities to channel these funds into virtually risk-free lending.

It is only natural, then, to use this advantage to foster the supply of local currency funds that are lost due to sovereign risk considerations. As noted, this would not require the extension of additional lending by the international financial institutions, but rather the issuance of investment-grade paper, to meet the demand for risk-free local currency securities, and use of the proceeds to convert part of the outstanding stock of international financial institution loans to keep a balanced currency position.

This section reviews the facilities offered by international financial institutions to hedge their clients' currency exposure and proposes a scheme to dedollarize international financial institution lending to meet the demand for investment-grade local currency securities by residents. It addresses the main criticisms leveled against both old and new initiatives of this type.

---

19. Recent work has revealed that the subsidy component in IMF nonconcessional lending to emerging economies is virtually nill (Jeanne and Zettelmeyer 2001)—a result that would also apply to other international financial institutions with preferred creditor status.

What's on the Menu?

The supply of hedging instruments available from international financial institutions is still rather limited. The World Bank, for example, offers the option of converting outstanding loan obligations (or of requesting a swap of its foreign currency obligations) into local currency. Since World Bank loans are funded in foreign currency, the transaction requires that the World Bank arrange a local-foreign currency swap with another financial institution to transfer the currency exposure.[20] These local currency products are not without benefits, particularly for noninvestment-grade clients that would otherwise be unable to access currency swaps directly in capital markets. However, they are typically limited in volume, shorter than the loan they are intended to hedge, and granted on a case-by-case basis subject to the existence of a liquid swap market.[21]

Their greatest shortcoming, however, is that rather than expanding the pool of local currency funds, these local currency products tap into existing swap markets. Thus, while they may benefit local borrowers through reduced transaction costs, they are also likely to crowd out the available supply of hedging instruments. At any rate, possibly because of their limited benefits, these relatively new products have not been in high demand.[22]

The World Bank has also launched a few issues in investment-grade exotic currencies.[23] The modality is not uniform. For example, in February 2000, three-year euronote in Mexican pesos was issued abroad and was placed largely among U.S. investors on the back of strong external demand shortly after rating agencies announced that they were considering an upgrade of Mexico's debt to investment grade. By contrast, in May 2000, Chilean CPI-indexed peso five-year euronote was distributed mainly among domestic institutional investors, who purchased about 75 percent of the issue.

While these issues may have positive spillovers for the development of local currency markets, they contribute little to a dedollarization agenda, as the risk-transformation role is less valuable for economies that already enjoy investment-grade status. The previous analysis suggests that the best use of the international financial institutions' advantage entails external issues (to minimize the crowding out of available domestic funds) in noninvestment-grade countries that are unable to attract domestic investors in search of low-risk assets.

---

20. For details, see the brochure on local currency financial products posted on www.worldbank.org/fps/hedging.htm. Currency swaps are also offered by the IDB.

21. The emerging market economies that satisfied this condition by end-2003 according to the World Bank were Brazil, Chile, Colombia, the Czech Republic, Hungary, India, Indonesia, Republic of Korea, Mexico, Malaysia, Philippines, Poland, the Slovak Republic, South Africa, and Thailand. Of these, only Colombia, India, Indonesia, and Philippines are noninvestment-grade countries.

22. As of April 2004, only three countries had signed the Master Derivatives Agreement required by the World Bank to request a currency swap.

23. A list of recent World Bank issues can be found in www.worldbank.org/debtsecurities/recent_issues.htm.

A move in this direction was the March 2004 Colombian CPI-indexed bond, issued and placed domestically by the World Bank with domestic institutional investors. While it still has the potential to crowd out existing (captive) demand for peso assets, the bond was nonetheless welcomed by the government as a way to satisfy demand from the growing private pension system for long-term risk-free assets in the local currency instead of abroad. Closer to the scheme proposed here was the May 11, 2004, eurobond in Brazilian reais issued by the Inter-American Development Bank (IDB) that included restrictions on domestic sales to avoid crowding out domestic resources.

While these issues reflect a welcome shift in the funding strategies of some international financial institutions, they have been motivated by the search for lower funding costs. Indeed, the proceeds have been immediately swapped into dollars rather than being used to convert outstanding loans into the same exotic currencies. Thus, despite the merits, their effective impact in terms of dedollarizing the liabilities of emerging economies has been virtually nill.

What Has Been Proposed?

Most of the discussion about what type of peso instrument to substitute for the current dollar assets has centered on CPI indexation, an avenue that proved successful in containing and undoing financial dollarization in Chile and Israel. While the local CPI is the most obvious candidate index for domestic residents, several alternatives have been proposed when the aim is to attract foreign investors. Of these, two stand out: a GDP index (see Borensztein and Mauro 2004) and a commodity index (see Caballero and Panageas 2003 on copper-indexed debt in Chile).

While the existence of derivative markets makes commodities easier to price and hedge, their use is limited to commodity exporters and by the correlation of commodity exports with the country's income. Moreover, as with the currency swap discussed above, it is not clear how indexation improves on a short hedge purchased directly by the issuer in the derivatives markets. And while GDP indexation may be more suitable for smoothing out countercyclical variations in debt-to-GDP ratios and borrowing costs, it is difficult to see how GDP risk can be stripped and hedged by potential investors, particularly in the absence of a market for GDP indexes.[24]

Similar caveats apply in principle to CPI-indexation as a way of luring nonresident investors. Eichengreen and Hausmann (2004) stress the attractiveness of a basket of CPI-indexed exotic currencies for nonresidents and propose that international financial institutions issue debt in these currencies to fund their own lending to emerging market economies and provide the needed startup liquidity. This requires matching not only demand and supply in each currency but also across currencies to allow for the needed diversification strategy, a not insubstantial coordination effort. Furthermore, while speculative nonresident

24. This may explain why the GDP-indexed clause attached to the bond offered by Argentina in the 2005 debt exchange was significantly underpriced by the market.

demand for specific currencies perceived as undervalued is not unlikely (as the IDB issue in Brazilian reais attests), interest from long-run international investors seeking a diversified portfolio with stable returns is more difficult to envisage.

International Financial Institutions and Intermediation of Resident Savings

Once the focus shifts from foreign investors to demand from residents, there are important advantages to using CPI indexation. It can be measured frequently (improving the accuracy of the indexation) by an autonomous agency (ensuring that the index is free from government manipulation). More importantly, unlike other indexes, there is a natural demand for the CPI arising from the hedging properties highlighted above. That makes it the obvious choice to jumpstart the dedollarization process with the help of an investment-grade issuer (international financial institutions) that decouples sovereign and currency risk to attract domestic investors seeking stable real returns at a reasonable level of credit risk.[25]

Resorting directly to the domestic market, however, may have economic (and political) drawbacks, as it crowds out other local currency funds by inducing a shift from high-risk government and corporate debt to investment-grade international financial institution paper. While the new issue may extend the domestic market for local currency securities by bringing in investors previously reluctant to assume country risk, it is likely to increase the cost of funds domestically, inducing the government to borrow abroad, resulting in only minor changes in the overall composition of government liabilities. Thus, to maximize the beneficial composition effect, the new debt should be issued in international markets.

Both the literature and recent experience point to institutional investors as the natural target of these issues. Consider, for example, the case of pension funds. By acquiring a credit-risk-free asset denominated in units of the consumption basket, they fulfill their role as guarantors of a stable stream of real income after retirement, while avoiding country-specific credit risk. Pension funds are typically allowed to invest a share of their portfolio in investment-grade foreign assets, a share that has been growing since the Argentine debacle sounded the alarm on excessive exposure to sovereign risk. Thus, while the government borrows from international financial institutions, a share of residents' retirement savings is being invested abroad in triple A paper such as that issued by international financial institutions to fund their loans. The international financial institutions can readily channel these funds back into the domestic economy by selling CPI-indexed bonds to the pension funds to finance loans denominated in the same index. This demand for long-dated investment-grade local currency

25. Risk decoupling is at the heart of the Eichengreen and Hausmann (2004) proposal as well. However, currency risk is tolerated to the extent that it can be diversified away in a basket of exotic currencies. In the version proposed here CPI indexation eliminates currency risk from the resident's standpoint, so that no currency diversification is required.

paper from institutional investors could reach high levels as pension fund stocks accumulate (see table S2 in the supplemetal appendix).

An alternative approach is the use of international financial institution guarantees of local currency debt to reduce the credit risk of noninvestment-grade issues in exotic currencies. Halfway between a risk-free international financial institution bond and a risky emerging market economy paper, this combination (if guarantees are capped in dollars) would entail similar risks for the international financial institutions as those associated with existing guarantees of dollar bonds.[26]

As noted, a few successful international financial institution issues in exotic currencies have already revealed the existence of demand for these securities. That makes the redollarization of their proceeds particularly puzzling and at odds with the concerns about financial dollarization repeatedly expressed by international financial institution officials and publications (see, for example, IDB 2006). Considering the high exposure of these institutions with many of their clients, it is easy to see how instead of the swap with a third financial institution that followed bond issuance, they could have dealt directly with the client, partially dedollarizing outstanding obligations. While the cash flows of the bond and loan would typically differ, swap markets provide sufficient flexibility to match both schedules with little, if any, additional transaction costs. The settlement currency of both streams of cash flows would be immaterial in this case. Even if the currency of the original loan is preserved, this obligation would be indexed to the local currency (or the local CPI), eliminating any currency exposure—an argument also valid for new lending. And for the same reason there is no obvious rationale for limiting the currency conversion to the local expenditure component of the loan (as is currently the case for existing local currency products). An appropriate hedging strategy would need to match the currency composition of liabilities with that of future *earnings* (as opposed to past expenses).

In October 2005 the Asian Development Bank launched a Philippine bullet peso bond in the Philippine capital market. The issue was oversubscribed and broadly placed among resident institutional investors including banks, insurance companies, fund management companies, and trust departments. The proceeds of the bond issue will be used for a peso-denominated loan to Balikatan Housing Inc. (BHI), a special-purpose vehicle jointly owned by the National Home Mortgage Finance Corporation of the Philippines and Deutsche Bank. In sum, there seems to be no obvious obstacle to onlending the funds obtained from local currency issues to emerging market economy clients.

Addressing the Skeptics

Besides the mixed reviews from market participants, the proposals to dedollarize international financial institution lending have faced internal criticism.

---

26. In this vein the IDB has recently approved a policy change to enhance its partial credit guarantees for Latin American and Caribbean debt issuers.

This article briefly discusses two of them, as summarized by Rajan (2004).[27] First, he points out that a portfolio approach to financial dollarization should take into account the correlation between financial returns and nonfinancial income. More precisely, to the extent that economic activity (and, as a result, real nonfinancial income) is negatively correlated with the nominal exchange rate, local savers would demand lower returns on dollar assets that are used as a hedge against economic downturns. In principle, however, this effect would be offset by the mirror impact that exchange rate procyclicality has on the borrower: because real earnings decline just when the burden of dollar debt increases in real terms, local debtors would be willing to pay the higher returns demanded on peso assets to hedge their own income stream. Ultimately, the net effect of introducing nonfinancial income into the picture is not straightforward.

The second argument is more relevant to the discussion here. Under myopic behavior, emerging market economy borrowers would be expected to exploit the lower dollar borrowing costs in good times, disregarding the contingent cost of the associated exposure—likely to be borne by others.[28] Note that while the peso interest rate charged by international financial institutions would be below that demanded by private lenders (because of the lower credit risk), the conversion of outstanding international financial institution loans to the local currency would not save debtors the currency risk premium that induced dollarization in the first place. In other words if financial dollarization were the result of asymmetric risk pricing, rather than lack of investment-grade local currency assets as argued here, opportunistic debtors would turn down the offer to insure against future balance sheet effects at a fair price. If so, the proposed dedollarization strategy, rather than suffering from lack of investor interest, might be condemned by the indifference of the very debtors that it is intended to relieve.

This moral hazard argument looks rather less persuasive in light of recent dedollarization efforts in emerging market economies.[29] Moreover, the

27. A third, more general argument concerns the fear of de-indexation (that is, the forcible conversion of indexed assets to nominal ones) that may inhibit the development of the market for CPI-indexed assets. Although CPI indexation is far from a necessary condition for dedollarization, it has played an important role in most recent attempts to issue local currency debt at reasonably long maturities. However, unilateral de-indexation would affect the international financial institution loan, but not the bond (which would still be indexed). Indeed, de-indexation would amount to defaulting on an international financial institution—an unlikely outcome.

28. Variations on this argument have been examined in the literature in relation to market imperfections such as implicit guarantees (Burnside, Eichenbaum, and Rebelo 2001) and currency-blind regulation (Broda and Levy Yeyati 2006) that are conducive to excessive dollarization.

29. Some examples include the gradual dedollarization of public debt in post-tequila crisis Mexico and, more recently, in Brazil; the introduction of local currency assets in Peru and CPI-indexed assets in Uruguay, along with a revision of the prudential framework on dollar intermediation; and the imposition of quantitative restrictions on the on-lending of onshore dollar deposits in Argentina after the demise of the currency board.

successful international placement of local currency sovereign bonds by noninvestment-grade countries at long maturities (such as the recent "Brazil 2016") appears to confirm the view that the inability to issue local currency debt in international markets (the so-called "original sin") may have reflected the sovereign's unwillingness to pay the needed currency premium—an attitude that has been fading as the premium declines and awareness of the perils of dollarization increases.

Nonetheless, taking the moral hazard argument at face value, one can only conclude that, if the international financial institutions have correctly internalized the welfare of the country, it would be in their best interest to undo this imperfection by changing the terms on which they offer dollar lending (more generally, by including dedollarization in their standard set of conditionalities) rather than by supplying misleadingly cheap dollar loans that perpetuate this perverse cycle. Ultimately, agency problems provide yet another reason for international financial institutions to adopt a more proactive stance. The IMF's new focus on currency mismatches as prudential indicators represents a move in this direction.

IV. Concluding Remarks

This article has tried to convey a simple message: to the extent that country risk induces financial dollarization through the placement of domestic savings abroad, international financial institutions can exploit their superior enforcement ability to intermediate these savings back into the domestic economy, undoing financial dollarization. For international financial institutions this would not require expanding credit, transferring resources, or incurring currency risk. Rather, it would involve issuing local currency bonds and using the proceeds to gradually convert current loans into (or refinance maturing loans in) the local currency. This initiative represents a feasible starting point for the much needed development of local currency markets, not a final solution to the dollarization problem. While successful issues of international financial institution debt in exotic currencies are an encouraging first step, a coordinated effort is still needed to convince governments and the international financial institutions of the benefits of using the proceeds to dedollarize multilateral lending.

The scheme described above is not a sufficient condition for reducing financial dollarization in emerging market economies. Needless to say, the demand for local currency assets (and, more generally, the achievement of financial stability) would be contingent on the consistent implementation of responsible economic policies. However, while following good policies is by definition good advice, doing so is not always sufficient for collecting the full reward. It is here that the international financial institutions can make a contribution.

<div style="text-align: center">

APPENDIX

Variable sources and definitions

</div>

- Onshore dollar (peso) deposits: Foreign (local) currency deposits with domestic banks. *Source:* Levy Yeyati (2006).

- Onshore deposits: Onshore dollar deposits + onshore peso deposits.

- Offshore deposits: Cross-border deposits by residents with banks domiciled in Bank for International Settlements reporting countries. *Source*: Bank for International Settlements.

- Total deposits: Offshore deposits + onshore deposits.

- Deposit offshoring ratio: Offshore deposits/total deposits.

- Deposit dollarization ratio: (Onshore dollar deposits + offshore deposits)/total deposits.

- Onshore deposit dollarization ratio: Onshore dollar deposits/onshore deposits.

- External loans: Cross-border loans to residents from banks domiciled in Bank for International Settlements reporting countries. *Source:* Bank for International Settlements.

- Dollar-bonded external debt: Private and public external bonds denominated in foreign currency; stocks outstanding. *Source:* Bank for International Settlements.

- Peso-bonded external debt: Private and public external bonds denominated in local currency; stocks outstanding. *Source*: Bank for International Settlements.

- International financial institution lending: Long-term debt with official creditors. Public and publicly guaranteed debt from official creditors includes loans from international organizations (multilateral loans) and loans from governments (bilateral loans). *Unit*: millions of U.S. dollars. *Source*: World Bank (2003).

- IMF lending: Use of IMF credit. Denotes repurchase obligations to the IMF with respect to all uses of IMF resources, excluding those resulting from drawings in the reserve tranche. *Source*: World Bank (2003).

- Dollar external liabilities: External loans + dollar-bonded external debt + International financial institution lending.

- Total external debt: Includes public and publicly guaranteed long-term debt, private nonguaranteed long-term debt, use of IMF credit, and estimated short-term debt outstanding. *Source*: World Bank (2003).

- Short-term external debt: Debt with an original maturity of one year or less. *Source*: World Bank (2003).

- Total long-term external debt: Total external debt – short-term external debt. Used in some tests as an alternative measure of dollar external liabilities. *Source:* World Bank (2003).

- Liability dollarization ratio: (Dollar external liabilities + dollar domestic deposits)/(dollar external liabilities + peso-bonded debt + domestic deposits). The currency composition of deposits is used to proxy the currency composition of domestic loans.

- Country risk: J.P. Morgan Bond EMBI Global index. Included in the EMBI Global are U.S. dollar–denominated Brady bonds, eurobonds, traded loans, and local market debt instruments issued by sovereign and quasi-sovereign entities. *Source:* J.P. Morgan.

- Restrictions: Index of restrictiveness of rules on resident holdings of foreign currency deposits onshore as of beginning of 2001. *Source*: Levy Yeyati (2006) based on IMF (2001), following the methodology proposed by De Nicoló, Honohan, and Ize (forthcoming).

- Underlying dollarization ratio: $[\mathrm{Var}(\pi) - \mathrm{Cov}(\pi, s)] / [\mathrm{Var}(\pi) + \mathrm{Var}(s) - 2\mathrm{Cov}(\pi, s)]$, where π and s are the monthly inflation and real devaluation rates. *Source:* IMF, various years, *International Financial Statistics*.

REFERENCES

Berganza, J. C., and A. Garcí Herrero. 2004. "What Makes Balance Sheet Effects Detrimental for the Country Risk Premium?" Bank of Spain, Madrid.

Bordo, M., C. Meissner, and A. Redish. 2002. "How "Original Sin" Was Overcome: The Evolution of External Debt Denominated in Domestic Currencies in the United States the British Dominions 1800–2000." NBER Working Paper 9841. Cambridge, Mass.: National Bureau of Economic Research.

Borensztein, E., and P. Mauro. 2004. "The Case for GDP-Indexed Bonds." *Economic Policy* 19(38): 165–216.

Broda, C., and E. Levy Yeyati. 2006. "Endogenous Deposit Dollarization." *Journal of Money, Credit, and Banking* 38(4):963–88.

Burnside, C., M. Eichenbaum, and S. Rebelo. 2001. "Hedging and Financial Fragility in Fixed Exchange Rate Regimes." *European Economic Review* 45(7):1151–93.

Caballero, R., and S. Panageas. 2003. "Hedging Sudden Stops and Precautionary Recessions: A Quantitative Framework." NBER Working Paper 9778. Cambridge, Mass.: National Bureau of Economic Research.

Caballero, R., K. Cowan, and J. Kearns. 2005. "Fear of Sudden Stops: Lessons from Australia and Chile." *The Journal of Policy Reform* 8(4):313–54.

Calvo, G., A. Izquierdo, and L. F. Mejía. 2004. "On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects." Inter-American Development Bank, Washington, D.C.

Claessens, S., D. Klingebiel, and S. Schmukler. 2003. "Government Bonds in Domestic and Foreign Currency: The Role of Macroeconomics and Institutional Factors." World Bank, Washington, D.C.

De la Torre, A., and S. Schmukler. 2004. "Coping with Risk through Mismatches: Domestic and International Financial Contracts for Emerging Economies." *International Finance* 7(3):349–90.

De Nicoló, G., P. Honohan, and A. Ize. (Forthcoming). "Dollarization of the Banking System: Good or Bad?" *Journal of Banking and Finance*.

Eichengreen, B., and R. Hausmann. 2004. "Original Sin: The Road to Redemption." In B. Eichengreen, and R. Hausmann eds., *Other People's Money: Debt Denomination and Financial Instability in Emerging-Market Economies*. Chicago: University of Chicago Press.

Eichengreen, B., R. Hausmann, and U. Panizza. 2003. "Currency Mismatches, Debt Intolerance and Original Sin: Why They Are Not the Same and Why It Matters." NBER Working Paper 10036. Cambridge, Mass.: National Bureau of Economic Research.

Frankel, J. (Forthcoming). "Contractionary Currency Crashes in Developing Countries." *IMF Staff Papers*.

Goldstein, M., and P. Turner. 2003. *Controlling for Currency Mismatches in Emerging Economies*. Washington, D.C.: Peterson Institute for International Economics.

Herrera, L. O., and R. Valdez. (Forthcoming). "Dedollarization, Indexation and Nominalization: The Chilean Experience." *Journal of Policy Reform*.

IDB (Inter-American Development Bank). 2006. *Living with Debt: How to Limit the Risk of Sovereign Finance*. Cambridge, Mass.: Harvard University Press.

IMF (International Monetary Fund). 2001. Annual Report on Exchange Arrangements and Exchange Restrictions. Washington, D.C.

Various years. *International Financial Statistics*. Washington, D.C.

Ize, A., and E. Levy Yeyati. 2003. "Financial Dollarization." *Journal of International Economics* 59(2):323–47.

Jeanne, O., and J. Zettelmeyer. 2001. "International Bailouts, Moral Hazard, and Conditionality." *Economic Policy* 16(33):409–32.

Levy Yeyati, E. 2006. "Financial Dollarization: Evaluating the Consequences." *Economic Policy* 21(45):61–118.

Morgan, J. P. 1999. "Introducing the J. P. Morgan Emerging Markets Bond Index Global (EMBI Global)." August 3, 1999, J. P. Morgan Securities Inc.

Martínez, L., and A. Werner. 2002. "Capital Markets in Mexico: Recent Developments and Future Challenges." Central Bank of Mexico, Federal District of Mexico, Mexico City.

Rajan, R. 2004. "How Useful Are Clever Solutions?" *Finance & Development* 41(1 March):56–57.

Thomas, L. R. 1985. "Portfolio Theory and Currency Substitution." *Journal of Money, Credit, and Banking* 17(3):347–57.

World Bank. 2003. *Global Development Finance 2003*. Washington, D.C.