

## Addressing Private Sector Currency Mismatches in Emerging Europe

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### Abstract

This paper (1) provides a survey of the theoretical and empirical literature on the dollarisation of corporate and household liabilities; (2) presents some evidence on the causes of FX lending specifically in transition economies; and (3) proposes a set of criteria to help decide on the right policy response based on country characteristics. Depending on the state of macroeconomic institutions and policy credibility, regulation could be a useful element in the policy response to liability dollarisation in some countries, but counterproductive in others. Countries with low policy credibility should focus on improving their macroeconomic frameworks. Countries in which near-term prospects of Euro adoption preclude the development of local currency markets need to rely primarily on regulation. Between these poles, there is a large group of countries where regulation could play a role, but only if embedded in a broader policy response which also improves macroeconomic policy frameworks and the laws and institutions underpinning money and bond markets. Regulatory responses to the currency mismatch problem need to be consistent across jurisdictions and mindful of their costs, particularly in the context of a fledgling recovery.

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## Introduction

The 2008-09 financial crisis has highlighted the problems associated with currency mismatches in the balance sheets of emerging market borrowers, particularly in Emerging Europe. Currency mismatches aggravated the crises in countries with large currency depreciations such as Hungary and Ukraine, and complicated the crisis response and induced highly contractionary macroeconomic policies in countries that defended their pegs, such as Latvia. As a result, the question of how these economies can better manage their foreign exchange risk or even “de-dollarise” is receiving much attention in the ongoing policy debate.<sup>2</sup> For example, in Hungary the National Bank has proposed to limit foreign exchange borrowing by requiring higher income and/or lower loan-to-value ratios for consumer and mortgage loans denominated in foreign exchange. In Kazakhstan, the authorities already limit forex exposures through a variety of prudential measures (for example higher provisioning for new forex loans for unhedged borrowers), and outright prohibition of lending in foreign exchange to unhedged borrowers is under discussion. The European Commission has contemplated introducing EU-wide higher regulatory requirements on unhedged forex borrowers via macro-prudential and capital requirements, although these are unlikely to be introduced any time soon.

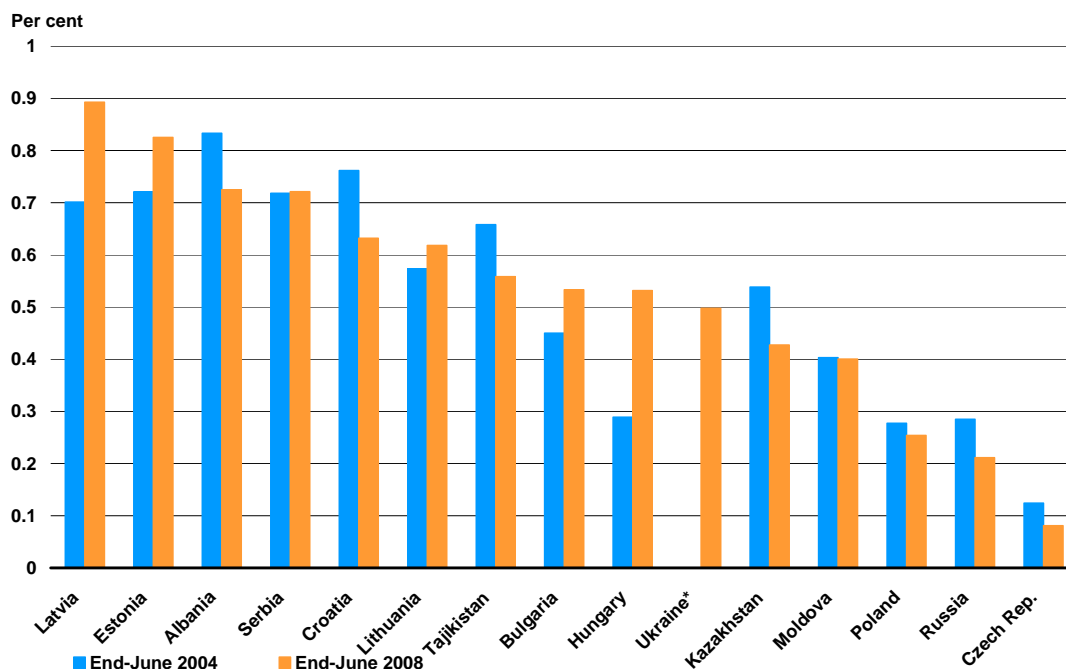
Many of these policy ideas rest on an implicit assumption, namely, that foreign currency (FX) lending in the transition region is mostly a manifestation of the capital inflow and credit boom that preceded the crisis. As such, it is implicitly viewed as driven by similar forces as the financial boom more generally, namely, a subordination of fear (of the consequences of currency devaluation) to greed (much cheaper borrowing terms on the side of borrowers, and the desire to push out loans on the side of lenders). If this assumption were true, it would have a straightforward policy implication: namely, to limit such imprudent behaviour with regulatory means.

This paper finds some evidence that foreign financing was indeed a contributing factor to the FX lending boom, and concludes that regulation does have a role to play in addressing the FX mismatch problem. However, even a cursory look at the data dispels the idea that financial dollarisation in emerging Europe is mainly or even primarily a boom phenomenon, and hence that it may have a simple cure based on national regulation. FX lending has been a longstanding characteristic in the transition region (see Sahay and Végh, 1996, for an analysis of the genesis of dollarisation in the transition region in the early 1990s). While it has increased sharply in some countries during the recent boom years – most notably, in Hungary – it declined in others, including Russia and Kazakhstan (Figure 1).

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<sup>2</sup> Following the literature, we use the term “financial dollarisation”, “loan dollarisation” and “liability dollarisation” to denote the use of foreign currency in the financial system, and especially in bank lending to households, regardless of whether the currency used is the U.S. dollar, the Euro, or other currencies. A better term for most of the countries covered in this paper would be “financial euroisation”. On another note of terminology, this paper uses the terms “emerging Europe” and “transition countries” interchangeably; even some of the analysis includes Central Asian transition countries.

**Figure 1. Foreign currency lending as share of total lending, 2004 and 2008**  
(in percent of total lending, end of year)



Note: In the cases of Croatia, FYR Macedonia and Serbia, includes estimated share of exchange rate indexed local currency lending (assumed to be 74 per cent in 2004 and 61 per cent in 2008 in Croatia; 43 per cent in FYR Macedonia; and 57 per cent in 2005 and 70 per cent in Serbia)  
Source: CEIC.

\* No comparable data available for Ukraine for 2004.

To put the search for policy solutions on a sounder footing, it is important gain a better understanding of what has driven FX lending in the first place in emerging Europe, and why some emerging market regions have managed to de-dollarise while this has so far proven elusive in many transition countries. To achieve this, the first half of this note consists of a survey of the economic literature on financial dollarisation, which has grown considerably in size and quality in recent years. It next presents some evidence on the question whether factors related to the capital inflow boom – and the European model of financial integration more generally – have contributed to loan dollarisation in transition economies. Finally, it draws policy implications, building on this evidence, and de-dollarisation experiences elsewhere (particular in Latin America).

The main result of the paper is that financial dollarisation in emerging Europe has a range of causes, ranging from weak institutions and lack of monetary policy credibility (particularly in less advanced transition countries), to implicit guarantees associated with expectations of Euro adoption, foreign funding of banking systems, and lack of local currency market infrastructure. Because these causes do not apply to all countries in the region with equal force, and because of links between them, the right policy response will depend on country circumstances. For the purposes of making broad recommendations, three groups of countries are distinguished, based on the state of macroeconomic frameworks and institutions, and on the presence of

commitments to maintain hard pegs ahead of Euro membership. Depending on these characteristics, the policy response will need to focus primarily on regulation; on improving macroeconomic institutions and policy credibility; or on a combination of both, with the primary objective (backed by additional supporting measures at the micro level) to develop local currency money and bond markets.

This leaves two main tasks. First, correctly diagnosing countries. In particular, in countries which lack credible macroeconomic frameworks and institutions, attempts to develop local currency markets are unlikely to be successful, and regulatory solutions may well be counterproductive, as denominating financial contracts in FX could be an optimal response (individually and socially) to an environment of high macroeconomic, institutional, and political risks. Second, developing a regulatory approach to FX lending that is both effective – in particular, avoiding problems of cross-border regulatory arbitrage, which can easily arise in financially integrated Europe – and avoids large costs on financial development and access to credit. The paper has something to say on both of these questions, but much more remains to be done.

### **Theory: A Nontechnical Survey**

A proximate answer to the question of why so much developing country lending is in FX, which has been emphasized by market practitioners and academics alike (Eichengreen and Hausmann, 1999; Eichengreen, Hausmann, and Panizza, 2005) points to incomplete markets, in particular, to the lack of markets for local currency debt at longer maturities. By itself, however, this answer is not fully satisfactory, for two reasons. First, it leaves questions on why these markets have not developed, or why they have developed in some countries but not in others of similar size and per capita income. Second, while the lack of local currency debt markets may explain why firms are pushed to borrow in foreign currency, they do not explain why a firm would not want a long-term local currency loan even when it is offered – a situation that an emerging market lender such as the EBRD often encounters when it attempts to lend in local currency.

To fully address the puzzle of why borrowing in FX is the prevalent form of financing in many emerging market countries, one needs to explain why many borrowers seem to prefer FX loans even when they have a choice. The superficial answer is that the real interest rate of FX denominated loans compared to local currency denominated loans is usually much lower. But this answer is clearly insufficient. Higher local interest rates compared to foreign interest rates in emerging market countries typically reflect exchange rate risk. Hence, what we need to understand is why borrowers prefer the FX loans even though it comes bundled with higher currency risk.

As a matter of logic, the answer could fall in two categories. One possibility is that although there is FX risk, it is over priced in the sense that the differential between local and FX borrowing rates is more than the expected rate of devaluation. Alternatively, it could be that the risk is in fact fairly priced. In this case, the answer needs to focus on the puzzle of why borrowers nonetheless prefer to pay the lower borrowing rate and take the FX risk.

From the perspective of mainstream economics, there is a problem with the first line of argument: it involves assuming that uncovered interest parity – a mainstay in international economics – is not only violated (as an empirical matter, it often is) but is systematically violated in one direction. This is an invitation for arbitrage. If FX rates are systematically cheap relative to FX risk, then there should be so much FX borrowing that the imbalance disappears. For this reason, it is worth asking first how far we can get in explaining bias toward FX borrowing without assuming systematic under pricing of FX risk (we return to the under pricing idea at the end of this section).

This is in fact the approach that most of the literature has taken. For the sake of drawing policy implications, the answers can be grouped in three categories: stories that imply that (unhedged) FX borrowing is both individually and socially suboptimal; stories in which it is individually optimal but socially suboptimal; and stories that in which FX borrowing is optimal both individually and socially.

First, borrowers could prefer the cheaper FX loan because they ignore, underestimate or excessively discount the FX risk that is involved. Strictly speaking, this means that borrowers behave irrationally – an unpopular assumption in economics, particularly when it involves many individuals that act independently, and when the allegedly irrational phenomenon persists over time. However, some systematic deviations from rationality which have been well documented in a recent literature on behavioural economics, could help explain the phenomenon at hand. Consumers often tend to resolve trade-offs between current and future consumption in a way that frontloads consumption too compared to what they would want to do if it could commit to a particular intertemporal path. This type of behaviour could arguably explain why consumers (or small enterprises) favour a form of lending that allows higher consumption today, albeit at a cost (or risk) in the future. Consumers may realize the risks involve, but nonetheless choose to borrow in foreign currency today with the intention of hedging or switching to local currency funding soon in the future. But because the future always becomes present, that moment never arrives.

Second, foreign currency borrowing could be excessive from a social perspective but fully rational from an individual perspective as a result of distortions such as borrower moral hazard or externalities.

- *Moral hazard* on the side of the borrower became popular as an explanation for loan dollarisation following the Asian crisis, in which implicit guarantees to borrowers and investors were widely believed to have played a role (McKinnon and Pill, 1999, Corsetti, Pesenti and Roubini, 1999). In this story, the borrower understands the higher risks of FX borrowing, but reckons that he or she will not be forced to repay in full in the event of a depreciation related insolvency. This could be because of limited liability (Brown, Ongena, and Yeşin, 2008); or because of the existence (or expectation) of state support in the event of a devaluation (Dooley, 2000; Burnside, Eichenbaum and Rebelo, 2001; Schneider and Tornell, 2004).
- *Externalities* could be a cause of excessive FX borrowing if foreign currency exposures of individuals aggravate the depth of a crisis, and this effect is not taken into account when individuals choose their level and denomination of borrowing (as each individual has a negligible impact). In effect, this creates

a collective action problem that gives rise to excessive FX borrowing (Korinek, 2009). If borrowers (or lenders) made the decision collectively, they would internalize the risks of FX borrowing and choose a lower level, but since decisions are decentralized, this is not the case.

Third, borrowing in foreign-currency (or alternatively, in inflation indexed debt) could be optimal— even from purely risk-minimizing perspective – in an environment of high and variable inflation (Ize and Parrado, 2002; Jeanne, 2003).<sup>3</sup> There is a widely held presumption that it is safer for unhedged borrowers whose revenue streams are in local currency to also borrow in local currency. However, this presumption may be incorrect because it ignores the fact that the borrower commits to a *nominal* repayment in future, while the prices of the goods that make up the firm’s income stream (or the wages of a household) are subject to change. Hence, borrowing in local currency does not eliminate the mismatch problem: it replaces a currency mismatch by the mismatch between real and nominal units.

In a stable inflation environment, this mismatch does not matter. With volatile inflation, however, committing to a nominal repayment amount in local currency over the period of several years may be as risky, or indeed riskier, as committing to the equivalent (at the time of borrowing) foreign currency amount. If inflation turns out to be lower than expected, it could leave the borrower saddled with unsustainable high debt (particularly if lower than expected inflation goes along with an adverse real shock, as will often be the case). The safest form of financing in this case would normally be inflation-indexed debt, but that in turn may not be feasible if low monetary credibility reflects broader institutional deficiencies, which raise doubts about the timeliness and accuracy of inflation measurement, and concerns that measurements may be manipulated (Rajan and Tokatlidis, 2005). As a result, the safest strategy available may be to borrow in foreign currency.

Although the economic literature emphasizes inflation volatility as the principal cause of risk involved with writing financial contracts in local currency, the underlying idea is more general. From a borrower’s perspective, the choice of FX versus local currency denomination involves trading off currency and real interest rate risk. One reason why real interest rates could be volatile is inflation risk. But another reason (when local currency loans involve floating interest rates that move in response to expected inflation) could be volatile interest rates in response to liquidity squeezes, unpredictable policy moves, or political instability. Laurent and Lehmann (2006) emphasize this as one reason why EBRD clients, even where currency risk was fully understood, often preferred FX funding,

The link between low policy or institutional credibility and FX borrowing emphasized in this literature represents a broader theme that runs through both corporate finance and modern international finance: “dangerous” forms of finance, such as FX borrowing or short-term borrowing, could reflect of a deep policy or institutional deficiency – such as weak contract enforcement, or an inability to commit to investor-friendly policies. In such circumstances, dangerous finance can be welfare improving, for two reasons.

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<sup>3</sup> This approach is close in motivation and philosophy to the portfolio approach to *deposit* dollarisation, which concludes that the optimal currency composition of the portfolio of a domestic saver will depend on the trade-off between inflation and real exchange rate volatility (Ize and Levy-Yeyati, 2003).

- Dangerous financial contracts tend to be simple and hard to renegotiate. They do not involve a lot of risk sharing: it is this very fact that makes them potentially dangerous (think of simple debt as opposed to equity, or FX debt rather than CPI indexed debt). By the same token, however, they can “work” even in underdeveloped and weak institutional settings, and are much less exposed to tampering by governments. For example, unlike equity, simple debt does not require well-developed accounting standards or corporate governance in order to exist. By the same token, FX debt can thrive even in an environment in which poor economic institutions prevent the development of other debt forms (Rajan and Tokatlidis, 2005).
- Dangerous finance can ameliorate some of the underlying problems (in particular, government moral hazard and its counterpart, lack of institutional commitment) by acting as a disciplining device. Dangerous debt structures such as short term or foreign currency debt not only protect investors from the consequences of borrowing country government misbehaviour, but they also raise the stakes for those countries, precisely *because* they potentially give rise to deep crises and hence reward behaviour that prevents such crises (Jeanne, 2000; Tirole, 2003; Jeanne, 2009). An inefficiency arises from the fact that the same crises could be triggered by bad luck rather than bad policies. Nonetheless, the net ex ante welfare effect of dangerous debt is generally positive in these circumstances: “dangerous forms of debt are also ‘policy resistant’; they make the government more accountable, ultimately to the benefit of the country” (Tirole, 2003).

The three categories of stories summarized above have vastly different implications for public policy. If FX bias is caused by borrowers who are either ill-informed or have a tendency to procrastinate, then the problem could be solved either through education, or by offering low-risk instruments that are costly to refinance, and hence commit borrowers to prudent behaviour (many real life loans have that feature, which makes procrastination a somewhat unconvincing explanation of FX bias). If FX bias results from externalities or simply irrational behaviour, the answer lies in regulation (for example, imposing an unremunerated reserve requirement on FX bank assets which would make FX borrowing just expensive enough to align its individual cost with its social costs). Finally, if the cause of FX bias are weak is lack of credible macroeconomic policies or institutions, then the only way to address the bias is to address these institutional weaknesses directly. In particular, making FX borrowing more expensive or prohibiting FX borrowing by unhedged borrowers will not help: rather than encouraging more LC borrowing, it will simply lead to less overall borrowing, and it may aggravate some of the underlying institutional problems by taking away a disciplining device.

As mentioned at the beginning of this section, all the theories we have reviewed so far “work” under the assumption that FX risks is fairly priced. Recently, however, an alternative approach has gained popularity which argues that banks under price FX relative to LC loans in order to match the currency structure of their assets with that of their liabilities (Basso, Calvo-Gonzales, and Jurgilas, 2007, Luca and Petrova, 2008). Of course, this idea works only if bank liabilities themselves biased toward FX. There could be two reasons.

- FX deposits. If this is the case, the “puzzle” is merely pushed back one step, as FX bias of deposits would itself require explanation. This leads to a literature on deposit dollarisation which argues largely along similar lines as the theories were discussed above (essentially, invoking optimal portfolio choice of depositors in light of high CPI volatility compared to real exchange rate volatility; lack of macroeconomic credibility, and moral hazard or similar distortions).
- Foreign currency funding from abroad. This could take the form of subsidiary borrowing from foreign parent banks (i.e. in essence drawing on parent bank deposits) or wholesale borrowing of domestic banks. In this view, financial openness, and particularly foreign bank entry (if foreign subsidiaries have cheaper access to foreign funding than domestic banks) could be a driving force behind the FX bias in borrowing. Note, that as long as not other distortions are assumed, this could be efficient. In combination with some of the other distortions described, however – limited rationality, moral hazard, externalities, lack of government commitment etc. – this channel will reinforce whatever welfare implications resulted from the initial distortion.

## Evidence

There is a recent, but by now quite substantial, empirical literature on the determinants of financial dollarisation. A number of papers analyze the Latin American experience during the 1990s and the beginning of this decade (Martinez and Werner, 2002; Barajas and Morales 2003; Gelos, 2003; Rossi, 2004; Cowan, Hansen and Herrera, 2005; Kamil, 2008). Others study the correlates of liability and sometimes deposit dollarisation in a broad international cross-section of countries (De Nicoló, Honohan, and Ize 2003; Rajan and Tokatlidis 2004; Jeanne, 2003; Levy Yeyati 2006; Guscina 2008). Finally, there is a small recent literature specifically on financial dollarisation in transition economies (Luca and Petrova, 2008; Basso, Calvo-Gonzales and Jurgilas, 2007; Brown, Ongena and Yeşin, 2008; and Rosenberg and Tirpák, 2008). Most of these papers use aggregate data (typically, with the share of foreign currency bank credit in total domestic bank loans to the private nonfinancial sector as the main variable of interest) but a growing number are based on firm data.<sup>4</sup>

For the most part, these papers are not set up to discriminate between the main views on financial dollarisation that we summarized in the previous section. This said, a few facts emerge from these papers that provide backing to some of the theories. We briefly summarize them as follows.

First, there is consistent support for the view that macroeconomic policy credibility, and perhaps institutional quality more broadly, is a determinant of both loan and deposit dollarisation. Inflation volatility tends to be associated with higher levels of FX borrowing. Proxies for institutional quality matter either in addition or as alternative proxies for instability. In De Nicoló et al’s regressions, inflation history loses significance once proxies for the quality of broad political institutions and governance indicators are included. Rajan and Tokatlidis (2004) show that

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<sup>4</sup> Martinez and Werner, 2002; Allayannis, Brown, and Klapper, 2003; Rossi, 2004; Cowan, Hansen and Herrera, 2005; Kamil, 2008; and Brown, Ongena and Yeşin, 2008.



dollarisation is robustly related to the sensitivity of the inflation tax reacts to growth shocks: dollarisation thrives in environments in which economic fluctuations lead to macro instability. In Guscina (2008), political instability is related to higher shares of FX debt. Brown, Ongena and Yeşin, 2008, using data from the 2005 EBRD-World Bank Business Environment and Enterprise Performance survey (BEEPS), find a strong effect of firm security payments on their propensity to borrow in FX.

Second, the interest rate differential is a reliable predictor of loan dollarisation, particularly in the cross-section (though Rosenberg and Tirpák, 2008, also show some evidence for longitudinal effects). This effect is found both for Latin America (Barajas and Morales, 2003) and particularly for transition economies (Brown et al. 2008, Basso et al 2007, and Rosenberg and Tirpák, 2008).

Third, there is strong evidence that floating exchange rates reduce dollarisation. This appears to be true both for floating exchange rate *regimes* (Kamil, 2008) and measures of exchange rate volatility. The strongest evidence in this regard comes from Latin America, but Brown et al. also find this effect in their study of firm borrowing based on the BEEPS.

Fourth, financial development (typically proxied by credit/GDP or M2/GDP) tends to be *positively* related to loan dollarisation within developing country samples (Barajas and Morales, 2003; Basso, Calvo-Gonzales and Jurgilas, 2007). This runs counter to the view that lack of financial development is intrinsic to the dollarisation phenomenon (Caballero and Krishnamurty, 2003).

Fifth, virtually all papers that use transition economy data agree that foreign funding of bank credit is a contributing factor to dollarisation (the literature on Latin America does not emphasize this effect). There is disagreement, however, on whether foreign banks are the culprit or not. In the firm-level regressions of Brown et al (2008) foreign bank presence appears to contribute to dollarisation, although the effect is not always robust. Basso et al. show that the share of foreign liabilities of the banking system is a very strong predictor of loan dollarisation, and interpret this effect as reflecting the presence of foreign bank subsidiaries. However, Rosenberg and Tirpák show that once the loan-to-deposit ratio is controlled for (their measure of foreign funding) the share of foreign banks in the assets of the banking system no longer predicts dollarisation. In other words, what appears to matter is foreign funding; not foreign banks *per se*.

Sixth, regulation appears to have some effects, but the literature is lukewarm on its overall importance. Many papers ignore regulation altogether. The two main exceptions are Luca and Petrova (2008), and Rosenberg and Tirpák (2008). Both papers focus on transition economies.

- Luca and Petrova look at (1) measures of liberalization of foreign currency lending and deposits; and (2) a measure of bank hedging opportunities (forward market liberalization). Only the latter seems to have an effect: a deep forward foreign exchange market lowers the level of loan dollarisation for a given level of deposit dollarisation (the interpretation is that banks need not lend in dollars to stay matched but can instead cover their exposure in the forward market).

- Rosenberg and Tirpák define a “FX restriction index” based on measures that authorities could take to limit FX liabilities: requiring banks to monitor FX asset risk; requiring banks to disclose FX risk to borrowers; imposing eligibility criteria on FX customers; requiring banks to provision or hold higher reserves as a function of indirect FX exposures; and introducing ceiling on FX exposures. The FX restriction index has a significant impact on loan dollarisation in their model, but the effect is economically modest (a fully restrictive regime on average lowers FX dollarisation by about 2 percentage points). Furthermore, the size of the effect is cut in half if loan dollarisation is redefined to include cross-border lending. The interpretation is that with open capital accounts, FX restrictions on banks are not very effective because they may just divert borrowing to non-resident sources.

Finally, the literature confirms a robust relationship between firm-level “natural hedges” – the share of exports in firm revenue; and foreign ownership – and loan dollarisation. Virtually every paper confirms that exporters tend to borrow more in FX than non-exporters. This said, unhedged borrowers are also significantly indebted in foreign currency. By how much? With the exception of Kamil (2008) the literature is silent on this point, reflecting data limitations.

In spite of its richness, the literature leaves a number of questions open. For the purposes of drawing policy implications for the transition region, one would like to have a better sense the role of foreign financing and/or foreign banks *over and above* the more standard causes of financial dollarisation that have been identified in the literature. Second, it is important to obtain a sense of robustness of the results across methodologies and relevant time periods for the region. Third, one would like to use at least one methodology that allows for clearer causal interpretation than is the case in many paper. Some of the “determinants” of loan dollarisation identified in this literature qualify as deep causes of dollarisation (for example, weak institutions). For the most part, however, they represent macroeconomic and financial outcomes which are co-determined with dollarisation (for example, interest rates differentials, or loan-deposit ratios). Hence, regressions that attempt to uncover the effects macroeconomic variables on economy-wide measures of dollarisation are hard to interpret.

The remainder of this section takes a stab at these problems, by extending the analysis of two papers in the literature, in Brown, Ongena and Yeşin (2009) and Rosenberg and Tirpák (2009).<sup>5</sup> The approach is to use examine the statistical relationship between FX lending and a broad set of explanatory variables – capturing inflation history; institutional quality; exchange rate regimes, and the effects of foreign financing and foreign bank ownership, plus additional controls – using two different concepts to measure FX lending, and three data sets:

- firm-level data based on the third (2005) EBRD-World Bank Business Environment and Enterprise Performance Survey (BEEPS), which contains a question about the currency denomination of the last loan taken out by the firms participating in the survey. The answer to this question – whether the loan was in domestic or foreign currency – is represented using a dummy

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<sup>5</sup> We are very grateful to the authors of these papers for allowing us to use their data for this purpose.

variable, which is regressed on a set of firm variables and country variables, including several measures of financial integration

- a quarterly macroeconomic dataset with the same country-level variables and the same sample period (2002-05). The dependent variable in this analysis is the FX share in banking system liabilities for each country
- an annual macroeconomic dataset with similar variables, but comprising a longer period (2000-08).

Table 1 highlights the main results (see appendix for the full set of regression coefficients). For each of the three datasets used, it shows the results of three statistical models. All models comprise a number of potential country-level determinants of FX liabilities, including inflation volatility, a proxy for institutional quality (the EBRD governance and enterprise reform index), a dummy variable that takes the value of 1 if the country had a hard peg and 0 otherwise, the asset share of foreign banks, and an additional variable capturing financial integration. There are also a number of additional country-level control variables for which the results are not shown, as well as firm-level controls in the first group of regressions based on BEEPS data (see table notes, and appendix tables). The difference between the models used for each dataset is in the financial integration variable, namely: gross financial integration, cross-border bank lending (using data from the Bank for International Settlements – BIS) and the loan-to-deposit ratio of the banking system. The latter two are used as alternative measures of foreign financing.

The table shows that the governance indicator is a significant and robust determinant of the FX lending share, confirming the finding of earlier studies that FX lending is more prevalent in countries with weak institutions. The economic magnitude is large, with a 1-point improvement on the EBRD transition indicator scale (which runs from 1 to 4.3) associated with a reduction in the probability of FX borrowing by 22-33 percentage points (firm-level regressions), and a reduction in the share of FX lending of 12-22 percentage points (country-level regressions). Inflation volatility also matters in two out of the three datasets, but its effects are less robust (controlling for the governance indicator). Also, the association between hard pegs and FX borrowing seems to be strong, particularly in the macroeconomic data.

**Table 1. Determinants of FX lending in transition economies****(Regression coefficients; p-values in parentheses)<sup>1</sup>**

Variable	Firm regression, 2002-05 <sup>2</sup>			Quarterly dataset, 2002-05 <sup>3</sup>			Annual dataset, 2000-08 <sup>4</sup>		
	Financial integration (FI) measure <sup>5</sup>			Financial integration (FI) measure <sup>5</sup>			Financial integration (FI) measure <sup>5</sup>		
	GFI	BIS	L/D	GFI	BIS	L/D	GFI	BIS	L/D
Inflation volatility	0.035 (0.010)	0.026 (0.049)	0.012 (0.418)	5.986 (0.308)	5.499 (0.363)	11.040 (0.009)	-1.823 (0.204)	-4.648 (0.072)	-1.510 (0.270)
Governance <sup>6</sup>	-0.321 (0.000)	-0.228 (0.001)	-0.209 (0.004)	-15.800 (0.010)	-13.780 (0.030)	-17.070 (0.010)	-20.070 (0.006)	-17.070 (0.020)	-22.120 (0.001)
Hard peg <sup>7</sup>	0.013 (0.786)	0.001 (0.972)	0.075 (0.280)	32.220 (0.001)	33.300 (0.002)	23.350 (0.000)	23.020 (0.021)	24.040 (0.018)	19.500 (0.057)
FI measure	0.060 (0.360)	0.000 (0.540)	-0.185 (0.057)	4.625 (0.628)	0.068 (0.047)	12.940 (0.390)	2.564 (0.821)	0.016 (0.088)	3.048 (0.842)
Foreign banks	0.003 (0.000)	0.001 (0.001)	0.001 (0.166)	0.122 (0.243)	0.067 (0.473)	0.131 (0.321)	-0.049 (0.775)	0.024 (0.888)	-0.095 (0.587)
Observations	1574	1452	1541	223	212	196	74	74	59
Number of countries	21	19	19	21	20	20	15	15	15

<sup>1</sup> The table shows results from three statistical models using three datasets. For each dataset, the models differ only in terms of the financial integration measure used. The table shows only five variables of interest; additional controls are listed in the following.

<sup>2</sup> Firm-level quarterly data, 2002q1-2005q2, probit estimation, marginal effects reported. The dependent variable is a dummy for whether the last loan of the firm was in a foreign currency. Following Brown et al (2009), additional controls used include inflation, depreciation and depreciation volatility, firm-level controls (exporter duration to multinationals, international accounting, dummy for firm size, age of firm), loan characteristics (duration, collateral) and banking sector and institutional controls (interest rate differential), foreign exchange deposits, CIS dummy, dummy for forward FX exchange market, capital controls and foreign exchange).

<sup>3</sup> Panel estimation, 2002q1-2005q2. The dependent variable is the share of FX loans to total loans, in per cent. Estimated using Generalised Method of Moments, using past values as instruments. Additional controls include inflation, depreciation, depreciation volatility, interest differential and foreign exchange deposits.

<sup>4</sup> Panel estimation, 2000-08. The dependent variable is the share of FX loans to total loans, in per cent. Estimated using Generalised Method of Moments, using past values as instruments. Additional controls include inflation, depreciation, depreciation volatility and interest differential.

<sup>5</sup> GFI: level of gross financial integration (external assets+external liabilities in per cent of GDP); BIS: cross-border bank lending, year-on-year change in per cent; L/D: loan-to-deposit ratio.

<sup>6</sup> EBRD governance and enterprise restructuring indicator (defined from 1 to 4.3)

<sup>7</sup> Dummy variable taking the value 1 for Bosnia-Herzegovina, Bulgaria, Estonia, Latvia and Lithuania, and 0 otherwise.

Sources: Brown et al (2009); Claessens et al. (2008); Lane and Milesi-Ferretti (2006); Abiad et al. (2009); EBRD, BIS; IMF IFS; BEEPS III; Basso et al (2007).

Regarding the role of foreign financing and foreign banks, there is some disagreement between the firm-level and the macroeconomic regressions.

- In the firm-level regression, the presence of foreign banks appears to make FX borrowing more likely, and significantly so in two out of the four specifications shown. Additional regressions using a broader set of financial inflow and integration controls (as used in Table 3.2, for example) reveal a statistically significant impact in 10 out of 14 specifications. In contrast, the other FI measures do not seem to have this effect.
- In contrast, in the macroeconomic regressions bank lending inflows, but not foreign banks, appear to be associated with FX borrowing. According to these regressions, what mattered is bank lending to transition countries – regardless of whether this took the form of parent bank lending to a subsidiary, direct cross-border lending or syndicated lending.

- The level of gross financial integration does not seem to be associated with higher liabilities in FX.

In summary, there is some evidence that foreign financing and/or the presence of foreign banks played a role, on top of determinants such as inflation history, quality of institutions, and the exchange rate regime, in encouraging FX lending in transition economies. However, the results are not conclusive on whether foreign banks contributed to the FX lending bias beyond their role as a conduit for foreign financing. Furthermore, they imply that if there was such an effect, it was economically small, with a 10 per cent increase in the share of foreign bank assets increasing the probability of FX denomination of lending and the share of FX lending by at most 3 percentage points. (See the second column of firm-level regressions in Table 1)

## **Policy**

Based on the theory and evidence presented in the previous section, we now sketch the outlines of a strategy for addressing the currency mismatch problem in the transition region. Before doing so, it is worth reviewing a success story in de-dollarisation: Latin America.

### ***How did Latin America de-dollarise?***

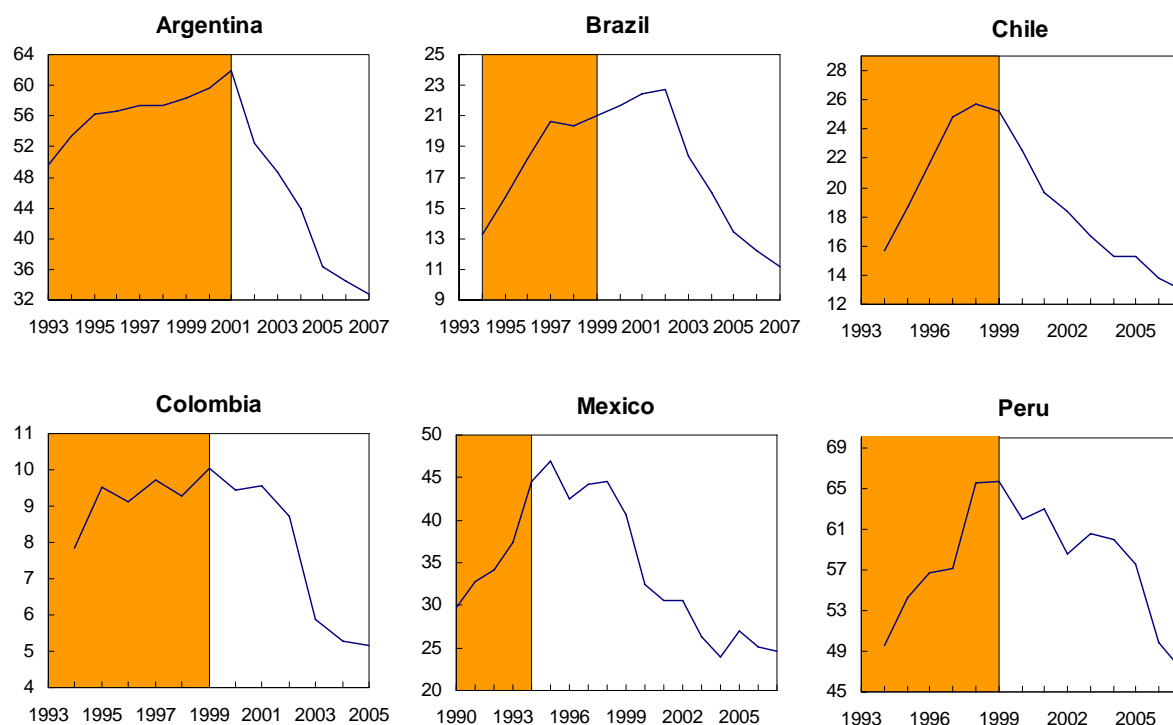
Financial dollarisation and currency substitution has been endemic to Latin America for many decades. Given the region's history of crises and macroeconomic volatility, this is not surprising. Most major Latin American countries experienced hyperinflation in the 1970s and/or 1980s (Colombia is the main exception). In some cases (for example, Argentina and Brazil) this lasted into the 1990s.

By the middle of the decade, however, in the wake of "Washington consensus" reform efforts and following the conclusion of Brady deals with most major countries and the resolution of the painful but brief Tequila crisis, virtually all of Latin America had stabilized to moderate or even low levels of inflation. A gradual decline in dollarisation was widely expected to follow. But surprisingly, this did not happen. On the contrary: while currency substitution (use of FX in current transactions) declined in some countries, deposit and loan dollarisation continued to increase. It was this astonishing fact that put financial dollarisation on the map and focused the minds of policymakers and academics alike. The literature described in the previous section has its origins in this experience.

Almost immediately after the phenomenon had been recognized, however, it began to recede. After peaking in the mid- to late 1990s, the FX share in total firm debt fell sharply in Latin American countries, albeit from different starting levels (Figure 1). Progress was even more dramatic when export revenues are taken into account, with exports as a percentage of short term dollar liabilities rising from 10-20 percent to over 100 percent in Colombia and Mexico by 2005, from about 50 percent to over 100 percent in Chile, and from less than 5 percent to about 50 percent in Peru. In Brazil the rise was more modest, with export coverage of dollar liabilities going from 25 to

45 percent, but this likely underestimates the extent of hedging because it ignores hedges purchased on Brazil's highly developed derivatives markets.

Figure 1. Dollarisation of Liabilities of the Corporate Sector in Latin America  
(In percent, annual average across firms)



Source: Kamil (2008). Darker (orange) area represents period with fixed or pegged exchange rate regime; white area period of managed or independent floating.

What happened? Roughly, Latin America's de-dollarisation process seems to have been driven by five related events and policy initiatives.<sup>6</sup>

First, most Latin America countries experienced economic downturns and crises in the second half of the 1990s. The first of these was the home-grown 1995 Mexican crisis, but most crises took place in the last years of the decade, triggered by a "sudden stop" in emerging market finance after the 1998 Russian default and devaluation. The crises ranged from relatively orderly recessions (Chile, 1999) to currency collapses, political upheaval, and sovereign default (Ecuador, 1998-2000; Argentina, 2001-2002). Loan dollarisation played a critical role in virtually all of these cases. In the cases of Argentina and Ecuador, sovereign debt dollarisation was a contributing cause in sovereign defaults (once the devaluations occurred, public sector debt became unsustainable), and dollarisation in the private sector created or magnified systemic banking crises in Argentina, Ecuador and Uruguay (2002-03). But loan dollarisation played an important role even Chile, whose 1999 recession was in part a result of an interest rate defence of the currency in 1998. Among the major countries, only Brazil managed to escape a recession during this period, and it did so because it spent its international reserves in the final months of 1998 on removing

<sup>6</sup> The following account is based on Borensztein et al (2004), Kamil (2008), and various IMF reports.

private sector currency mismatches – much in the same way in which Russia did so ten years later – just ahead of its January 1999 currency crisis.

Second, following these crises, the affected countries switched to flexible exchange rate regimes (the main exception was Ecuador, which adopted the US dollar as legal tender). Unlike in Asia in the 1990s and in some transition economies today, these regimes for the most part floated *de facto* and not just *de jure*. There is convincing evidence (see Martinez and Werner, 2002 for Mexico, and Kamil, 2008 for a broader group of countries) that this move encouraged de-dollarisation of corporate liabilities.

Third, with the exception of Argentina, the switch to floating typically went along with a move (albeit gradual) toward full-fledged inflation targeting regimes, and in some cases fiscal rules and other structural-fiscal reforms. In other words, the monetary and macroeconomic regimes changed not just in a way that made exchange rate volatility more visible, but also in one that stabilized inflation expectations and more generally made the recurrence of macro-induced crises much less likely.

Fourth, a few years into the new regimes, most countries began to de-dollarise their *public* debts by issuing longer-dated nominal peso bonds at gradually longer maturities in domestic markets. Mexico led the way, issuing 3-year and 5-year bonds in 2000, followed by 7-year and 10-year bonds in 2002, a 20-year bond in 2003, and a 30 year bond in 2006. Most other large Latin American countries followed, with Chile, Colombia and Peru all issuing long term non-indexed domestic currency bonds by the middle of this decade (Argentina did so as part of its 2005 debt exchange). In several of these countries, pension reform (the creation of a private pension pillar) is believed to have contributed to demand for long-term domestic currency bonds. The icing on the cake came during 2005-2007, when several of these countries took advantage of favourable global liquidity conditions to issue long term bonds in local currency in *international* markets, while at the same time buying back or prepaying FX-denominated international bonds, such as Brazilian or Mexican Brady bonds.

Fifth, the development of derivatives markets, particularly in Brazil (Luca and Petrova, 2008). In the middle of the decade, derivatives trading surged in the larger economies in the region, with Brazil, Mexico, Colombia, and Chile registering a combined daily trading volume of close to US\$110 billion (notional) in 2006; of which US\$46 billion corresponded to Brazil. Brazil and Mexico developed exchange-based derivatives markets, while over-the-counter (OTC) derivatives trading are dominant in the other countries. Interest rate derivatives (swaps, options, and forward rate agreements) represented about 70 percent of total trading activity; with most of the remainder taken up by currency derivatives (FX forwards and swaps).

In contrast, there does not appear to be any direct evidence that regulation of domestic FX exposures (either directly or through regulation of the banking system) has contributed to the Latin American de-dollarisation process, except possibly in the household sector (Colombia prohibits households from holding FX deposits with resident banks).

## *Main elements of a strategy for Emerging Europe*

Like in Latin America in the 1990s, financial dollarisation in Emerging Europe has remained stubbornly high in this decade despite relatively stable macroeconomic environments since the beginning of this decade (if not earlier). However, there are several factors that distinguish the recent dollarisation experience in transition economies from that in Latin America, in particular the role of foreign financing of banking systems, and expectations of Euro adoption. Taken together, the economic literature, the Latin American experience and these special factors point to three policy areas that are likely to play a role – to greatly varying degrees across countries – in addressing the currency mismatch problem.

***Reforming macroeconomic regimes and institutions.*** At one level, the persistence of dollarisation in the EBRD region is not surprising. As we have seen, dollarisation in Latin American countries did not begin to fall until countries had established credible macroeconomic policy frameworks based on floating exchange rates and inflation targeting. Very few transition countries have such regimes, namely, Czech Republic (since 1998), Poland (1999), Albania (2001), Romania (2005), Hungary (2007),<sup>7</sup> and Serbia (2009). Tellingly, the two countries with the oldest and most established of these regimes, the Czech Republic and Poland, also have low rates of dollarisation or euroization.

In emerging Europe, reforming macroeconomic frameworks and improving credibility could mean several things, depending in part on whether countries have the option to freely float their currencies or are constrained by international commitments such as ERM2 membership. To the extent that there is no such commitment, countries are serious about de-dollarising can improve their policy and institutional credibility by building formal inflation targeting regimes, and demonstrating their success over time. Countries with weak fiscal records may also require fiscal-structural reforms to make inflation targets credible over the longer term. Fortunately, following the 1998-2000 crises and defaults in three transition countries (Russia, Ukraine, and Moldova) many transition countries have built a track record of sound public finances.

Countries that are in the ERM2 exchange rate mechanism and/or have the strong intention to adopt the Euro in the near term<sup>8</sup> ought to focus on the credibility of Eurozone entry over the targeted time frame. In light of high crisis-related deficits, this will require a fiscal adjustment programme to attain the Maastricht debt and deficit criteria. The ECB could support a countries' path to the Euro zone through currency swap arrangements against local currencies provided that fiscal consolidation, and supportive monetary policy, remains on track. These arrangements would be technically similar to what the ECB has deployed during the global financial crisis to other well-managed non Euro zone EU members such as Denmark and Sweden, except that these would be used in cases of speculative currency attacks and not financial crisis conditions, so long as good macroeconomic policies remain in place.

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<sup>7</sup> Hungary began inflation targeting in 2001, but maintained an additional exchange rate target until late 2007.

<sup>8</sup> Upon EU membership, all new EU member states agreed to eventually adopt the Euro – without, however, committing to a timetable.



***Developing local currency and derivatives markets.*** Although the economic literature does not focus on underdeveloped local currency bond markets as a cause of dollarisation (rather, it is interpreted as a consequence of the same factors that also drive financial dollarisation as commonly defined, i.e. dollarisation of bank loans and deposits), in practice, de-dollarisation experiences have often been accompanied or even preceded by the development of such markets. This link may not be causal: for example, the government's ability to issue long-term bonds in local currency may simply be a barometer of its macroeconomic credibility, which directly affects financial dollarisation.

However, this may not be the whole story. A causal link from the development of local currency bond markets (typically, beginning with government bonds) to financial de-dollarisation could arise as follows. Moving from back to front in the causal chain, the existence of a corporate bond market could help de-dollarise bank loans and deposits by providing local currency funding opportunities to banks in an environment in which deposits are mostly dollarised. At the same time, they could broaden the local currency investment opportunities of banks, hence enabling them to offer local currency term deposits at more attractive terms.

In turn, creating corporate bond markets requires the creation of a legal and market infrastructure – that is, supportive laws, regulations, and institutions. One institution that is sometimes cited as a necessary precursor is a liquid (short maturity) money market, since it may be critical in the development of a primary dealer network (Schinasi and Smith, 1998). Developing a corporate bond market may also require the development of a public bond market, in order to overcome the “first mover” or coordination problems that are often associated with financial innovation (see, for example, Allen and Gale, 1994). Once a yield curve based on government bonds of various tenors has been established, corporate bonds can be priced “off” that curve, enabling potential investors to disentangle interest rate risk and corporate default risk (relative to the government). The same benchmark role can potentially be played by a large (relative to potential market entrants) and highly rated private sector or IFI borrower, such as the EBRD. Importantly, to serve their purpose, benchmark bonds must be liquid, which may not be easy in markets without a developed institutional investor base. Domestic currency benchmark bonds that meet these requirements exist only in a few transition countries, namely Poland, Hungary and Russia.

Creating a successful corporate bond market may also involve building a “demand side” of local institutional investors who are interested purchasing medium and long term financial assets in local currency. Private institutions that might play a key role in this regard are pension funds and insurances. Both of them need to invest a flow of local currency receipts (contributions or premia) to service future local currency obligations. Hence, regulatory frameworks and more generally market conditions that help the development of non-bank financial institutions could play a critical role in building local currency capital markets.

Finally, derivatives markets that allow borrowers to hedge against currency and interest rate risk can also help manage currency mismatches. The most obvious channel through which this can occur is by allowing FX borrowers to hedge at affordable prices. Somewhat less obviously – since one might think that the presence of affordable currency hedges may encourage firms to borrow more in FX – there is

some indication that derivatives markets can contribute to the de-dollarisation of corporate liabilities (Luca and Petrova, 2008). There are two possible channels. First, for given deposit dollarisation, forward exchange markets can help *banks* hedge foreign currency risk and hence allow them to play the role of a buffer between deposit and loan dollarisation. Second, by allowing firms to hedge against (local currency) interest rate risk, derivatives markets may take away an important reason that pushes firms toward FX borrowing.

Aside from creating market institutions and through their own bond issuance, should governments provide fiscal or regulatory incentives for creating local currency markets? Tax benefits in the form of preferential treatment of long term local currency savings and lending instruments can potentially play a role in building a local currency yield curve. More importantly, fiscal or regulatory obstacles need to be *removed* in several countries. For example, in Kazakhstan pension funds are obligated to hold at least 30 percent of their portfolio in long-term government bonds, many of which earn interest rates below inflation. Reducing this requirement and/or issuing inflation-indexed government bonds would remove an important obstacle for building a corporate bond market.

***Regulatory measures.*** Regulation can ameliorate financial dollarisation if the latter is not – or not just – a reflection of lack of macroeconomic credibility, but instead is caused by a distortion like moral hazard or a crisis externality; or reflects irrational or short-sighted behaviour on the side of corporate or household borrowers.

Regulation does not seem to have played a critical role in Latin America's de-dollarisation. However, emerging Europe may be different in this respect, for two reasons. First, there is some direct evidence that cross-country differences in regulation help explain cross-country differences in loan dollarisation in the new member states of the EU (Rosenberg and Tirpák, 2008). Second, and more importantly, the main factors that seem to distinguish dollarisation in emerging Europe from dollarisation in Latin America and elsewhere – expectations of Euro adoption, and reliance on foreign funding of bank loans – imply that regulation could be a potentially important remedy in many European countries. Basic macroeconomic credibility and inflation problems are less likely to play a role in countries that are in the EU (or EU candidates) and have started their convergence with the Eurozone. In addition, the convergence process may reinforce some of the underlying causes of dollarisation/euroization that are best addressed by regulation, particularly: a false sense that the exchange rate will remain stable throughout the convergence process (this may have played a role in Hungary, see Kiraly, 2009), and that government commitments to stabilize the exchange rate give rise to implicit guarantees. Finally, if foreign funding of the banking system generates under pricing of FX loans, as some papers have suggested, this may also generate a rationale for regulation.

The appropriate form of regulation will depend on the nature of the problem, i.e. the distortion that biases borrowers in favour of FX lending:

- If the problem is that borrowers are misinformed, then the right response is to force disclosure of FX risk. In light of large depreciations in some countries, this source of FX borrowing preference must have become less relevant as a result of the financial crisis;

- If the underlying problem is that FX interest rates are too low because borrowers and lenders do not internalize the social risk of FX borrowing in the event of a crisis, then the underlying distortion can be corrected through regulatory measures that change the relative price of FX and local currency lending. This could take the form of an unremunerated reserve requirement on FX lending by banks (Korinek, 2009), higher capital requirements for FX loans, or more demanding provisioning requirements for foreign exchange loans (or, conversely, depending on the demand conditions, lower capital or provisioning requirements on local currency lending). These measures will not only have the effect of protecting the bank balance sheets from the higher credit risk that banks assume by lending to unhedged borrowers, but will result in relatively higher FX interest rates, and hence level the playing field between local currency and FX loans.
- Finally, if the problem is either implicit guarantees or myopia on the side of the borrower, who focuses only on the interest rate differential, then even the these more heavy-handed regulatory measures might not work unless they make the interest rate differential go away altogether (which may in turn be undesirable because it *over* promotes local currency loans to borrowers that are not guaranteed or myopic). In this case, the answer may be to place limits on the open FX position of *borrowers*, or make some classes of borrowers ineligible for FX loans altogether.

Of the three approaches, the one described last is the least applied and the most difficult to implement. However, to the extent that one believes that myopia or implicit guarantees are really what is driving demand for FX borrowing on the side of, for example, households or SMEs, it would be well worth exploring. At the practical level, the main difficulty is that although many countries have elaborate institutions for monitoring and supervising the balance sheet risks of the banking sector, there are no equivalent institutions for supervising similar risks in the vastly more populous and fragmented corporate and household sectors. As such, instruments that try to limit foreign currency exposure of these sectors tend to be blunt – for example, prohibiting households from mortgage borrowing in foreign currency altogether.

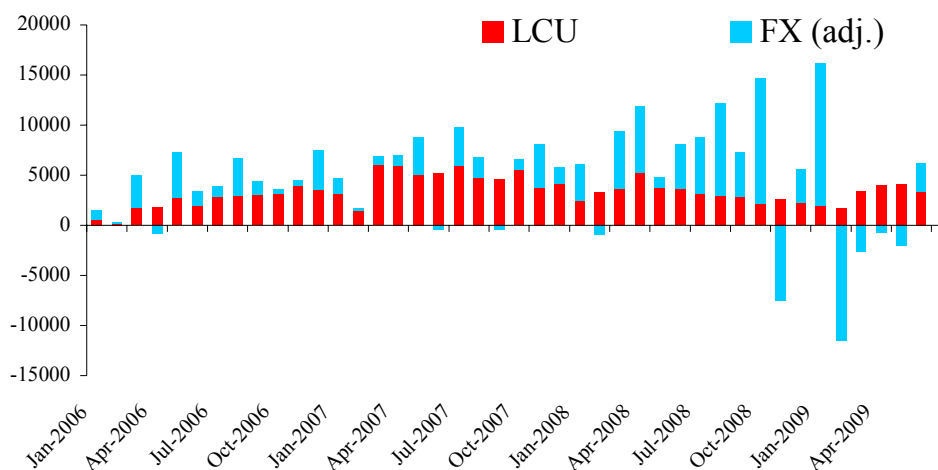
One way to make balance sheet regulations for corporates and households less blunt without creating new “big brother” type agencies might be to impose some of the burden of supervising borrower balance sheet structures on banks. In effect, this supervision is already part of the natural due diligence process that banks apply to borrowers. For example, when households apply for a mortgage loan, they typically need to disclose not only their income but also their assets and liabilities. It may not be too difficult to require banks to take account of currency risks in the balance sheet of a potential borrower in the same way. A bank would need to establish the currency exposure of a corporate borrower and would only be allowed to lend in foreign currency if that exposure remains below a certain limit. On the household side, a similar principle could be applied, or alternatively lower loan-to-value ratios could be applied for FX borrowers, which would ensure that the borrower retains positive equity even after a devaluation of a certain size. This principle underlies Poland’s “Recommendation S” which was introduced in 2006 and is credited with curbing unhedged FX lending during the higher of the boom (Box 1). It also underlies regulations that are being currently considered in Hungary and Kazakhstan.

### Box 1. Poland's "Recommendation S"<sup>9</sup>

"Recommendation S on good practices regarding mortgage-secured credit exposures", introduced by the Polish Commission for Banking Supervision in June 2006 comprises two essential elements to discourage FX lending. First, it recommends requiring higher creditworthiness when a customer applies for a residential loan in a foreign currency than when they apply for a zloty loan of the same value. Second, and related to this point, it sets a high standard for disclosing FX related risks. The bank is advised to first present a zloty loan offer. When a customer still wishes to take out a foreign currency loan, the bank is asked to inform him or her about the currency risk and show a simulation of the value of loan instalments assuming zloty depreciation (of 20 per cent and the difference between the highest and the lowest zloty exchange rate in the past 12 months) and an increase of the interest rate to the level of a similar zloty-denominated loan.

Recommendation S has been credited with an rise in the share of local currency loans in new lending in the second half of 2006, although it did not affect the overall growth rate of mortgage debt. In 2007, also the narrowing interest rate differential between Poland and Switzerland may also have dampened the demand for Swiss franc loans. The renewed increase in the demand for FX mortgage loans in 2008 may be attributable to the gradual of income criteria for FX loans and the appreciation of the zloty until the fourth quarter (see Chart 1.1).

**Chart 1.1 Poland: Net new credit to households**  
(in millions of Zloty)



While Recommendation S may not have had a lasting impact on curbing FX borrowing, its real success may have been to raise the credit quality of FX loans. Data confirm that Polish FX mortgage borrowers tend to be well-educated first-time borrowers with strong employment prospects. As of mid-2009, the ratio of non-performing FX mortgage loans remained low, at 1.2 per cent, against 4.2 per cent for Zloty denominated consumer credit.

<sup>9</sup> Prepared by Anatoli Annenkov.

Finally, it is important to recognise that regulation, particularly in financially integrated Europe, will only be effective if similar regulatory principles apply across jurisdictions. Consider for example a tough regulation in an Eastern European host country of an international banking group. If the home country does not impose a similar regulation, the host country regulation can be easily circumvented (except in the presence of capital controls) by borrowing directly from the parent bank rather than the subsidiary. In addition, host countries may not want to apply tougher regulation than exists in other potential host countries to avoid discouraging capital inflows.

However, there are unlikely to be any EU-wide regulations on higher capital or prudential requirements in the foreseeable future for three reasons. First, there is a recognition that the problem is in part rooted in macroeconomic factors that need to be addressed first. Second, there is a concern that under the prevailing cyclical conditions, a “tax” on FX lending would prolong the credit crunch and slow the recovery in emerging Europe. Third, it is unlikely that the 27 EU members will agree on EU-wide regulatory changes without conducting the usual impact studies accompanying such changes.

There are two pragmatic short-run alternatives to EU-wide regulation. First, regulators of internationally active bank groups can affect the operations of these banks. Home country supervisors can lead this effort, in close coordination with host supervisors. Austrian authorities, for example, have issued a warning against foreign exchange exposures of unhedged borrowers both in its home market and in the host countries of its banking groups in emerging Europe. Second, the main bank groups could agree among themselves a set of lending standards that in effect embodies, and pre-empts, the main restrictions that regulators might otherwise impose. A combination of the two, with home countries setting some basic coordinated guidelines and effectively encouraging banks to incorporate them in their lending standards would be a desirable possibility.

**Country insurance.** The flavour of the regulatory measures discussed in the previous subsection is to accept the fact that financial dollarisation cannot be rooted out, but instead manage – and limit – the risks that go along with it. One way of doing that is to manage risks at the macro level in addition to the micro level. This means offsetting an aggregate FX mismatch in the private sector by a long FX position (ideally, on a contingent basis) in the public sector. In the event of a “sudden stop” or other event triggering pressure on the currency, this public long FX position can then be mobilized in a way that softens the blow to the private sector. This is how Brazil (1998) and Russia (2008) managed pressures on their currencies in light of private sector open FX positions. In effect, international reserves were spent to allow the private sector to close its FX position ahead of a devaluation (or accompanying a very gradual devaluation).

The problem with this approach is that it is potentially expensive for the public sector, particularly if the “country insurance” consists simply in the hoarding of large amounts of international reserves. Even worse, if the delivery of FX (or FX risk hedges) from the public to the private sector involves a subsidy, then the country insurance mechanism may become a source of moral hazard, and hence help create the very problem that it is meant to mitigate. This said, these problems are not insurmountable: for example, FX support will not create a distortion if it takes the form of (fairly priced) lending rather than a transfer. Furthermore, country insurance could be cheaper if it involves international risk-sharing, either through a public institution such as the IMF, or through private contingent credit lines (see Caballero and Panageas, 2005, and Sturzenegger and

Zettelmeyer, Chapter 12, for a survey). In general, a country that decides to “live with” some degree of private sector currency mismatch is well advised to have a crisis mitigation framework in place that will allow it to cope with the consequences of pressures on the currency.

### *A framework for country-specific de-dollarisation strategies*

Not all of the elements discussed in the previous subsection are equally suited to all emerging European countries with private sector loan dollarisation. In particular, two sets of constraints or considerations need to be taken into account when defining country-specific strategies to reduce or limit the risk of FX exposures.

First, EU membership or EU candidate status matters, through several channels. As argued in the previous section, it affects the diagnosis of dollarisation/euroisation in the direction of giving more weight to causes that point to regulation as an appropriate response. Expectations of Euro adoption also make it less likely that developing either liquid bond market in local currency or derivatives markets will be successful (Laurent and Lehmann, 2006). Finally, and most obviously, international commitments and geography may limit the extent to which countries may be able to, or wish to, reform their monetary institutions in the direction of free floating and inflation targeting. In particular, several members of the European Union have undertaken commitments under ERM2 that limit currency flexibility, or have adopted rigid pegs in anticipation of Euro adoption.

Second, the economic analysis of financial dollarisation suggests that the main approaches to de-dollarisation discussed above only make sense when applied in a certain sequence, or when applied in response to a particular underlying cause of why financial dollarisation is present in the first place. This logic boils down to two main constraints:

- It does not make sense to push the development of local currency bond markets in countries that do not have reached a minimum level of macroeconomic policy and institutional credibility (if attempted, such efforts would fail).
- It may make even less sense, in such countries, to try to reduce financial dollarisation through regulatory measures, because financial dollarisation may be a constrained-optimal response to a weak institutional environment. In other words, although regulation might be successful in reducing financial dollarisation, this may come at the expense of precluding access to finance by unhedged borrowers, and perhaps shutting down some forms of finance (for example, longer term borrowing) altogether.

Taken together, these constraints suggest a three-way country grouping.

1. In countries with weak institutions and volatile macroeconomic environments, the main focus of a strategy to address financial dollarisation should be to build institutions and credible macroeconomic policy frameworks. While this process is underway, countries should attempt to limit the risk of disruptions to external finance and external volatility, for example, through an IMF-supported arrangement. Attempts to develop local currency markets and/or limit financial dollarisation through regulatory means should receive less emphasis.

2. Countries that have built reasonably strong macro institutions and that are either not candidates for the Euro or not constrained by ERM2 or hard Euro pegs could mobilise all four elements of the strategy described above to varying degrees. They should continue to build macro policy credibility in the context of floating exchange rates; develop local currency markets and possibly derivatives markets (except in countries that are so small that they would not meet minimum scale and liquidity requirements); strengthen regulations; and seek country insurance to minimize risks while the de-dollarisation process is ongoing.
3. Finally, EU members that are in ERM2 or have committed to hard pegs in anticipation of Euro adoption should focus on regulatory measures, as their exchange rate commitments preclude development of inflation targeting regimes with floating exchange rates, and attempts to develop local currency markets are unlikely to be successful in the close proximity to Euro adoption. These countries could also strengthen, in collaboration with the ECB and the European Commission, their policy credibility by committing to a strong convergence program towards, and then within, the ERM2 framework to meet the Maastricht criteria. The ECB could facilitate these countries' path to the Euro zone by providing genuine Euro currency swaps facilities against local currencies so long as countries' convergence programmes remain on track.

The question is which countries fall in which categories. This is easy to answer for some countries, but there is a “grey zone” (and judgement) involved with classifying others.

***ERM2 countries or countries with hard pegs in anticipation of Euro entry*** include the Baltic countries and Bulgaria. Countries that are outside the EU and do not currently have candidate status make up the complementary group. This leaves highly euroized EU members or candidates such as Hungary, Romania, and possibly Croatia in a grey zone. For these countries, both choices could be on the table – to build further on past progress in improving institutions and local currency markets with the aim of reducing euroization; or to accept euroization and manage its risks, primarily through regulation. Regardless of which “box” these countries fit in, regulation can be expected to play an important role in these countries, for reasons explained in the last section. At the same time, these countries have room to strengthen both monetary and fiscal policy credibility and to improve local capital market infrastructure. Hence, they should not confine themselves to a “regulation only” approach.

It is also difficult, but not hopeless, to attempt to classify countries according to ***monetary policy credibility***. In the spirit of Jeanne (2003), one way of approaching the issue is as follows. Suppose a firm, producing one unit of real output  $t$  periods in the future, had been given the choice of borrowing long term either in local currency units, or in Euro units, both at a fixed interest rate. Viewed from today, the debt due at time  $t$  (expressed in whatever units it was contracted in) is known with certainty. What is not known, however, is the repayment capacity of the firm expressed in the same currency unit that was used to fix the repayment amount. Suppose that uncovered interest parity holds, so that future debt constitutes the same share of *expected* firm revenue regardless of what unit debt and revenue are expressed in. Then, the probability that the firm will be able to repay its debt in local currency will be higher than if it is denominated in Euros if and only if the volatility of future output in local currency units is lower than that of future output expressed in Euros. Thus, one way of assessing the relative riskiness of local-

currency debt, and Euro debt is simply to compare the volatility of output expressed in the two units.

Table 2 does just that, for three different measures of volatility. First, to assess the risk faced by the borrower from not knowing precisely what the value of his production will be in the units in which the debt has been contracted, one would ideally want to compare the predictability of output, over a  $t$  horizon, expressed in the various units, (see Borensztein et al, 2004, Box 1). The group of columns on the left side of the table do so by computing the standard deviation of the forecast error of cumulative GDP growth over a 4-year horizon, computed as the difference of four-year ahead WEO forecasts made for 2005 (in the 2001 WEO), 2006 (in the 2002 WEO) etc. and the actual GDP values for these years.

**Table 2. GDP volatility: comparing standard deviations across currency units**

	4y forecast error, 2005-09 <sup>1/</sup>		SD minimizing	SD growth, 1994-2009		SD minimizing	SD growth, 2001-2009		SD minimizing
	Local	EUR		Local	EUR		Local	EUR	
Albania	3.0	17.8	Local	11.9	17.0	Local	3.0	6.4	Local
Armenia	19.1	10.5	EUR	1169.3	22.2	EUR	6.2	13.9	Local
Azerbaijan	96.0	12.7	EUR	532.5	23.7	EUR	22.3	24.4	Local
Belarus	149.0	13.2	EUR	416.0	85.1	EUR	22.6	12.1	EUR
Bulgaria	13.2	7.0	EUR	217.9	20.8	EUR	5.2	4.5	EUR
Croatia	6.8	14.7	Local	29.2	8.4	EUR	3.5	4.9	Local
Czech Republic	5.7	12.7	Local	5.3	7.5	Local	3.8	8.7	Local
Estonia	19.9	17.3	EUR	12.1	12.3	Local	8.5	8.4	EUR
Georgia	13.9	11.0	EUR	2085.9	30.2	EUR	5.1	10.5	Local
Hungary	5.6	20.0	Local	8.1	7.0	EUR	4.0	8.1	Local
Kazakhstan	50.1	26.1	EUR	323.4	31.4	EUR	11.4	16.5	Local
Kyrgyz Republic	43.8	16.0	EUR	29.0	18.3	EUR	8.6	8.8	Local
Latvia	34.8	14.4	EUR	11.6	16.7	Local	12.6	12.5	EUR
Lithuania	12.4	7.9	EUR	14.6	14.4	EUR	6.8	6.4	EUR
Macedonia, FYR	19.7	11.6	EUR	35.4	8.8	EUR	5.1	5.2	Local
Moldova	32.1	12.8	EUR	36.5	15.6	EUR	6.7	11.0	Local
Mongolia	50.8	11.7	EUR	20.1	16.0	EUR	11.5	15.7	Local
Poland	15.7	18.2	Local	13.2	9.7	EUR	2.7	11.8	Local
Romania	22.5	14.5	EUR	39.5	11.1	EUR	11.0	11.3	Local
Russia	32.4	23.7	EUR	63.9	24.2	EUR	9.3	16.3	Local
Serbia	...	...	...	28.7	17.9	EUR	27.1	13.2	EUR
Slovak Republic	9.2	13.6	Local	12.2	11.1	EUR	3.7	5.9	Local
Slovenia	1.6	11.5	Local	4.2	3.8	EUR	3.6	3.0	EUR
Tajikistan	19.3	19.4	Local	98.6	25.7	EUR	8.5	7.3	EUR
Turkey	142.0	31.3	EUR	34.8	15.8	EUR	15.4	15.3	EUR
Turkmenistan	133.7	52.8	EUR	338.5	27.2	EUR	16.7	18.5	Local
Ukraine	54.2	40.0	EUR	186.1	18.8	EUR	9.6	18.5	Local
Uzbekistan	28.5	20.3	EUR	289.0	18.2	EUR	10.7	17.3	Local
Canada	6.6	19.9	Local	2.9	9.4	Local	3.2	7.1	Local
Japan	3.7	6.2	Local	2.0	10.6	Local	2.2	8.0	Local
United Kingdom	5.0	28.1	Local	2.0	9.3	Local	2.5	8.2	Local
United States	5.1	4.3	EUR	2.1	9.1	Local	2.6	7.2	Local

<sup>1/</sup> Standard deviation of percentage differences between 4- year ahead GDP forecasts published in Spring 2001-2005 WEOs and realized (or in the case of 2009, projected) GDPs based on April 2009 WEO.

<sup>2/</sup> For data availability reasons, sample for Serbia starts in 1997.

<sup>3/</sup> Standard deviation of cumulative 5-year ahead forecast errors based on previous year growth rate (i.e. 2000 rate used to generate cum. forecast for 2005, 2001 used to generate forecast for 2006, etc.)

Focusing on this measure, the results indicate (not surprisingly) that a number of CEB countries would have been better off denominating debt in local currency units (Croatia,



Czech Republic, Hungary, Poland, Slovak Republic and Slovenia) compared to Euro units. Most other countries (including the hard pegs, all of which have resisted a devaluation so far, and most CIS and SEE countries) would have fared better with Euro-denominated debt. There are two anomalies: Tajikistan and the United States, which is included as a memorandum item together with a few other advanced countries. This can be attributed to the tiny sample of only 5 observations underlying each standard deviation.

To get around the sample size problem, we additionally compute the standard deviation of growth itself (rather than cumulative growth forecasts) over two horizons: 1994-2009; i.e. a period comprising almost the entire transition sample except for the early stabilization and liberalization years; and 2001-2009 (2009 is always included to reflect crisis-related devaluations in the volatility measures). As it turns out, the longer sample is often still dominated by high inflation experiences in the first half of the 1990s. For this reason, local currency units very rarely emerge as the volatility-minimizing unit of account. This changes if the sample period is reduced to 2001-09 with local currency denomination emerging as the variance-minimizing unit in most countries. The exceptions are Belarus, Tajikistan, and Serbia (and most of the hard pegs, as before).

In sum, there appears to be a group of countries, comprising at least the Central European countries, where lack of general policy and institutional credibility is probably not the main driving factor behind loan dollarisation, and where the general policy credibility issue has become an issue of credibility of Euro zone membership within a certain time frame. Conversely, there is another group, located in the CIS and the Balkans region, where lack of monetary policy credibility is likely to be an important factor. How one delineates the boundary between these groups exactly will in part depend on whether one takes the view that memories of high inflation in the 1990s continue to affect monetary policy credibility. Furthermore, a broader view of real interest volatility, which focuses not just on volatility due to inflation but also on nominal interest rate volatility driven by liquidity squeezes, erratic macroeconomic policies, and political shocks, will tend to shift the boundary in the direction of attributing the main blame for loan dollarisation to domestic policy credibility.

Figure 2 summarises this discussion.

- The “top right” box contains countries that for which tightening regulation and fiscal consolidation are the main options to manage the risks of currency mismatches; both because weak institutions are not the principal underlying problem in these countries, and because existing policy commitments limit the options for institutional reform and for local currency capital market development.
- The “bottom left” countries includes the group for which macroeconomic and institutional credibility is the main issue, and regulation and aggressive market development is unlikely to be useful (or even, in the case of aggressive regulation, counterproductive) until some degree of credibility has been achieved.
- The “top left” box, finally, includes the remaining countries, which will want to use combinations of all tools to address currency mismatches. Within this heterogeneous group, the emphasis given to particular tools will vary, with more prominence given to regulation in countries with relative advanced institutional environments and membership of, or closer proximity to, the European Union.

Furthermore, country size may limit the scope for local market development, particularly in some countries in south-Eastern Europe.

The bottom right box is empty. In a sense, countries such as Kosovo and Montenegro which have unilaterally adopted the Euro fit in this box; however, their adoption of the Euro precludes the need for a further policy response, at least conditional on that policy choice.

**Figure 2. Framework for Policy Responses to Liability Dollarisation in Transition Economies**

		In ERM2; or hard peg in anticipation of Euro?	
		No	Yes
Macro and institutional credibility?	Ok	<ul style="list-style-type: none"> <li>• Further reform monetary and fiscal institutions and/or build track record;</li> <li>• Local market development;</li> <li>• Regulation;</li> <li>• Country insurance.</li> </ul> <p><i>Poland, Hungary, Romania; Croatia, Serbia, and most other south-eastern European countries; Russia</i></p>	<ul style="list-style-type: none"> <li>• Regulation</li> <li>• Fiscal consolidation and/or fiscal-structural reforms</li> </ul> <p><i>Baltic countries, Bulgaria</i></p>
	Low	<ul style="list-style-type: none"> <li>• Reform monetary and fiscal institutions and build credibility track record;</li> <li>• Country insurance.</li> </ul> <p><i>Ukraine; most early transition countries; some countries in the Western Balkans.</i></p>	

## Conclusion

As in other emerging market region, liability dollarisation in emerging Europe and in the transition economies further East has multiple causes. First among these is lack of macroeconomic credibility. In some countries, high inflation volatility may have encouraged financial contracts in foreign currency as opposed to local currency. Even in countries with more solid inflation track records, imperfect credibility has meant that FX borrowing has typically been cheaper than local currency borrowing. Combined with implicit guarantees associated with hard pegs; or simply a disregard for exchange rate risk in light of low exchange rate volatility and expected Euro adoption in the medium term, this created incentives for foreign currency borrowing. Abundant foreign financing appears to have aggravated the situation, perhaps because it led to more aggressive pricing of FX loans.

Policy responses to the liability dollarisation problem will be successful only if they are shaped by the right diagnosis. In countries in which monetary and fiscal institutions are weak and resort to the inflation tax remains a concern, regulatory responses – making FX lending more expensive, or banning it outright – could be counterproductive, as they may lead borrowers to take higher risks and/or undermine lending altogether. In these countries, the focus of reforms must be to go straight to the core of the problem, by reforming macroeconomic institutions and strengthening public finances. In the remaining countries, regulation can play a useful role, but should be embedded in a broader strategy that seeks to further improve macroeconomic credibility and develop local currency markets. Regulation can be useful through two channels: first by limiting corporate and household FX exposures and hence the risks associated with currency mismatches even while much of the financial system remains dollarised; and second, by correcting distortions that may have made FX borrowing too cheap.

At the same time, regulation to address the FX liability bias needs to be handled with care. Like any regulation, it comes at the cost of making potentially welfare improving transactions more expensive, or impeding them altogether. This is a particular concern at a time when net credit growth is still weak or negative in many emerging European countries, and many households and firms need to refinance FX debts. When introducing such regulation, policy-makers will need to trade off these risks against the desire to take advantage of post-crisis political momentum favouring financial sector reforms.

Finally, attempts to introduce regulation need to solve the cross-border coordination problem. In a financially integrated Europe, where cross-border banking groups own the bulk of financial system assets in many emerging European countries, regulatory discrepancies across countries could lead to regulatory arbitrage: shopping for loans where regulation is the weakest. This can be avoided by EU wide regulation which is also adopted in the EU neighbourhood. In the absence of such regulation, informal coordination between regulatory authorities can help. One good thing to emerge from the ongoing crisis is that it has created mechanisms for cross-border coordination in the context of crisis management (see EBRD, 2009, Box 1.4). The success of the post-crisis cleanup and reform effort could hinge on whether these mechanisms can be maintained and developed beyond the crisis.

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Table A1. Firm Level Regressions: Full Results  
(Regression coefficients; p-values in parentheses)

Variable	Foreign financing/integration measure (FI measure)							
	GFI	BIS	L/D	fintliab	fintdebl	ca 3	fintdeb ch	kaopen
Inflation volatility	0.0353 (0.010)	0.0255 (0.050)	0.0118 (0.418)	0.0355 (0.008)	0.0337 (0.008)	0.0629 (0.000)	0.0337 (0.009)	0.0292 (0.038)
Governance	-0.321 (0.000)	-0.228 (0.001)	-0.209 (0.004)	-0.317 (0.000)	-0.299 (0.000)	-0.440 (0.000)	-0.300 (0.000)	-0.224 (0.007)
Hard peg	0.013 (0.786)	0.001 (0.972)	0.075 (0.280)	0.015 (0.756)	0.009 (0.857)	0.204 (0.005)	0.007 (0.889)	0.001 (0.981)
FI measure	0.0601 (0.360)	-0.0003 (0.540)	-0.1850 (0.057)	0.0008 (0.331)	0.0007 (0.487)	-0.0103 (0.202)	0.0006 (0.490)	-0.0061 (0.821)
Foreign banks	0.060 (0.000)	0.000 (0.001)	-0.185 (0.166)	0.001 (0.000)	0.001 (0.000)	-0.010 (0.544)	0.001 (0.000)	-0.006 (0.004)
Inflation	-0.001 (0.933)	-0.001 (0.915)	0.000 (0.969)	0.000 (0.968)	0.000 (0.980)	0.004 (0.544)	0.000 (0.992)	-0.002 (0.793)
Interest differential	-0.001 (0.863)	0.002 (0.477)	0.000 (0.915)	-0.001 (0.760)	-0.001 (0.773)	0.006 (0.051)	-0.001 (0.855)	0.002 (0.501)
Depreciation	-0.003 (0.175)	-0.001 (0.620)	-0.002 (0.223)	-0.003 (0.145)	-0.003 (0.119)	-0.005 (0.0163)	-0.003 (0.134)	-0.001 (0.621)
Depreciation volatility	0.005 (0.234)	0.002 (0.592)	0.003 (0.355)	0.005 (0.232)	0.005 (0.254)	0.006 (0.264)	0.005 (0.252)	0.002 (0.556)
Exporter	0.115 (0.000)	0.127 (0.000)	0.121 (0.000)	0.115 (0.000)	0.114 (0.000)	0.132 (0.000)	0.114 (0.000)	0.128 (0.000)
Sales to multinationals	0.0349 (0.381)	0.0346 (0.411)	0.0386 (0.346)	0.0347 (0.382)	0.0361 (0.363)	0.0594 (0.211)	0.0359 (0.366)	0.0326 (0.439)
International accounting	0.0480 (0.270)	0.0590 (0.244)	0.0627 (0.176)	0.0477 (0.272)	0.0476 (0.273)	0.0473 (0.390)	0.0475 (0.275)	0.0573 (0.253)
Small firm	-0.004 (0.893)	-0.014 (0.671)	-0.001 (0.982)	-0.004 (0.908)	-0.004 (0.902)	-0.022 (0.603)	-0.004 (0.896)	-0.012 (0.701)
Age	-0.001 (0.558)	0.000 (0.691)	-0.001 (0.315)	-0.001 (0.561)	-0.001 (0.540)	-0.001 (0.414)	-0.001 (0.543)	0.000 (0.696)
CIS	-0.128 (0.098)	-0.129 (0.084)	-0.0565 (0.450)	-0.136 (0.087)	-0.122 (0.102)	-0.0551 (0.478)	-0.118 (0.112)	-0.140 (0.058)
Forward fx market	-0.0142 (0.826)	-0.0812 (0.150)	-0.0228 (0.737)	-0.0129 (0.841)	-0.0158 (0.806)	0.0181 (0.811)	-0.0211 (0.741)	-0.0734 (0.163)
Capital controls	-0.0690 (0.059)	-0.0806 (0.009)	-0.0857 (0.015)	-0.0646 (0.061)	-0.0621 (0.063)	-0.0504 (0.237)	-0.0644 (0.064)	-0.0825 (0.075)
Open fx position	0.004 (0.040)	0.006 (0.000)	0.004 (0.048)	0.004 (0.048)	0.004 (0.060)	0.010 (0.000)	0.004 (0.061)	0.006 (0.004)
EU	-0.011 (0.842)	0.000 (0.998)	0.006 (0.914)	-0.015 (0.785)	-0.015 (0.790)	0.010 (0.836)	-0.013 (0.820)	0.001 (0.981)
Forex deposits	-0.00303 (0.032)	-0.00191 (0.158)	-0.00154 (0.345)	-0.00307 (0.027)	-0.00326 (0.015)	-0.00958 (0.000)	-0.00326 (0.017)	-0.00185 (0.175)
Collateralized	-0.0169 (0.752)	-0.0102 (0.862)	-0.0178 (0.738)	-0.0171 (0.750)	-0.0161 (0.767)	-0.00614 (0.929)	-0.0165 (0.762)	-0.00927 (0.874)
Duration	0.00314 (0.000)	0.00307 (0.000)	0.00291 (0.000)	0.00314 (0.000)	0.00314 (0.000)	0.00341 (0.000)	0.00313 (0.000)	0.00310 (0.000)
Observations	1574	1452	1541	1574	1574	1121	1574	1461
Number of countries	21	19	19	21	21	15	21	20

Note: see next page for variable definitions

<b>Variable Name</b>	<b>Definition</b>
Forex	loan 1= last loan of firm was in a foreign currency, 0= last loan of firm was in local currency.
Duration	Duration of the loan, in months.
Collateralized	1= yes, 0= no.
Exporter	1= firm has export revenues, 0= otherwise.
Income via bank	Share of firm revenues that are received through bank transfers.
International accounting	1= firm applies international accounting standards (IAS or USGAAP), 0= otherwise.
Small firm	1= less than 50 employees, 0= otherwise.
Age	Age of firm at time of loan disbursement, in years.
Security costs	Expenses for security services over sales.
State firm	1= at least 50% of ownership in state hands, 0= otherwise.
Interest differential	money market rate minus Eurepo rate, in the past quarter.
Deprec. volatility	Variance of monthly changes in the real exchange rate versus Euro, in %, during the past 4 quarters.
Depreciation	Depreciation of local currency versus the Euro, nominal, in %, during the past quarter.
Peg	1= country has crawling peg fixed peg or currency board exchange rate regime, 0= otherwise.
EU	1= country is or has completed negotiations to become EU member, 0= otherwise.
Inflation	Consumer price inflation, in the past quarter.
Inflation volatility	Variance of monthly changes in the consumer price index, in %, during the past 4 quarters.
Foreign banks	Assets share of foreign controlled banks in domestic banking system, in %.
Governance	EBRD index of Enterprise reform. Scale: 1 to 4.33.
Forex deposits	Share of deposits in the banking sector denominated in foreign currency, in %.
CIS	1= country is member of commonwealth of independent states, 0= otherwise.
Forward fx market	1= country has developed forward foreign exchange market, 0= otherwise.
Capital controls	1= country has controls on foreign borrowing by or FDI in domestic firms, 0= otherwise.
Open fx position	Maximum total open foreign exchange position of banks over capital, in %
GFI:	stock of external assets and liabilities, % GDP
fintliab:	Total external liabilities, % GDP
fintdebt:	External debt liabilities, % GDP
L/D	Loan to deposit ratio
kaopen	Chinn-Ito index of capital account liberalization
ca_3	Average Current account deficit in the 3 years previous, % GDP
BIS	FX adjusted quarterly change in BIS flows, %
fintdebt_ch	3 year change in external debt, %



Table A2. Quarterly Dataset, 2002-05: Full Results

(Regression coefficients; p-values in parentheses. Dependent variable is percent of FX lending in total lending)

Variable	Foreign financing/integration measure (FI measure)							
	GFI	BIS	L/D	fintlial	fintdebl	ca 3	fintdebt	ch kaopen
Inflation volatility	5.986 (0.308)	5.499 (0.363)	11.04 (0.009)	6.101 (0.285)	5.543 (0.255)	11.47 (0.013)	5.687 (0.276)	5.856 (0.304)
Governance	-15.8 (0.010)	-13.78 (0.030)	-17.07 (0.010)	-15.08 (0.017)	-15.43 (0.030)	-15.13 (0.150)	-14.37 (0.032)	-23.47 (0.010)
Hard peg	32.22 (0.001)	33.3 (0.002)	23.35 (0.000)	32.12 (0.001)	35.64 (0.001)	39.53 (0.000)	35.64 (0.001)	27.95 (0.006)
FI measure	4.625 (0.628)	0.068 (0.047)	12.94 (0.390)	0.0600 (0.630)	-0.177 (0.171)	-0.019 (0.979)	-0.110 (0.351)	4.834 (0.216)
Foreign banks	0.122 (0.243)	0.0665 (0.473)	0.131 (0.321)	0.102 (0.374)	0.0958 (0.314)	0.0916 (0.473)	0.0652 (0.484)	0.0944 (0.406)
Inflation	-1.268 (0.098)	-1.634 (0.047)	-1.243 (0.133)	-1.312 (0.082)	-1.200 (0.128)	-1.508 (0.018)	-1.141 (0.150)	-0.932 (0.283)
Interest differential	0.785 (0.092)	0.919 (0.028)	0.682 (0.084)	0.747 (0.084)	0.704 (0.104)	1.823 (0.001)	0.646 (0.170)	0.473 (0.293)
Depreciation	-0.188 (0.502)	0.0255 (0.922)	-0.316 (0.246)	-0.196 (0.490)	-0.113 (0.659)	-0.386 (0.281)	-0.143 (0.573)	0.0275 (0.918)
Depreciation volatility	0.505 (0.389)	0.580 (0.326)	0.486 (0.437)	0.487 (0.394)	0.625 (0.231)	0.290 (0.702)	0.593 (0.285)	0.257 (0.644)
Forex deposits	-0.159 (0.407)	-0.211 (0.226)	-0.240* (0.099)	-0.146 (0.456)	-0.220 (0.228)	-0.576 (0.182)	-0.198 (0.275)	-0.0998 (0.602)
Capital controls	-14.39 (0.010)	-11.85 (0.029)	-12.95 (0.017)	-13.81 (0.019)	-15.82 (0.0123)	-7.529 (0.307)	-14.89 (0.015)	-12.14 (0.085)
Observations	223	212	196	223	223	164	223	214
Number of countries	21	20	20	21	21	16	21	20

Note: variable names: see notes to Table A.1. Estimated using GMM.

Table A.3. Annual Dataset, 2000-08: Full Results

(Regression coefficients; p-values in parentheses. Dependent variable is percent of FX lending in total lending)

Variable	Foreign financing/integration measure (FI measure)							
	GFI	BIS	L/D	fintliab	fintdebl	ca_3	fintdebt_ch	kaopen
Inflation volatility	-1.823 (0.204)	-4.648 (0.072)	-1.510 (0.270)	-1.822 (0.180)	-1.814 (0.178)	-1.182 (0.361)	-1.757 (0.188)	-3.631 (0.137)
Governance	-20.07 (0.006)	-17.07 (0.020)	-22.12 (0.001)	-20.64 (0.005)	-20.7 (0.010)	-21.43 (0.020)	-19.73 (0.013)	-21.47 (0.005)
Hard peg	23.02 (0.021)	24.04 (0.018)	19.57 (0.057)	22.68 (0.018)	24.86 (0.023)	11.98 (0.211)	23.77 (0.029)	18.6 (0.031)
FI measure	2.564 (0.821)	0.0164 (0.088)	3.048 (0.842)	0.106 (0.487)	-0.123 (0.525)	-1.339 (0.424)	-0.0122 (0.937)	7.137 (0.000)
Foreign banks	-0.0486 (0.775)	0.0237 (0.888)	-0.0946 (0.587)	-0.0648 (0.714)	-0.0107 (0.951)	0.0620 (0.722)	-0.0430 (0.832)	-0.0771 (0.642)
Inflation	-0.0123 (0.981)	-0.0645 (0.961)	-0.289 (0.702)	-0.0925 (0.864)	0.0863 (0.884)	0.238 (0.748)	0.0409 (0.945)	-0.0569 (0.963)
Depreciation volatility	0.255 (0.703)	1.702 (0.156)	0.208 (0.739)	0.271 (0.677)	0.268 (0.676)	-0.00621 (0.992)	0.218 (0.729)	1.425 (0.209)
Depreciation	0.0553 (0.834)	0.0766 (0.775)	0.134 (0.674)	-0.0287 (0.906)	0.178 (0.478)	0.0188 (0.939)	0.0855 (0.768)	0.00307 (0.992)
Interest differential	-0.862 (0.158)	-1.059 (0.0406)	-0.743 (0.141)	-0.937 (0.101)	-0.707 (0.300)	-1.325 (0.044)	-0.818 (0.131)	-0.606 (0.190)
Observations	79	74	64	79	79	61	79	74
Number of countries	16	15	16	16	16	13	16	15

Note. variable names as in notes to Table A.1, except that inflation now denotes the previous year's CPI inflation; depreciation the percent change of local currency per Euro during the previous year, inflation volatility the standard deviation of monthly inflation over the previous 5 years, and depreciation volatility the standard deviation of monthly percent changes in the bilateral real exchange rate against the Euro. Estimated using GMM.