When to Dollarize[1]

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Revised, February 2000

1. Introduction

In the literature on dollarization, the issue of timing is touched on only obliquely. It might

seem appropriate that the timing of the transition is treated as a subsidiary issue. The key

question is whether dollarization is sensible; once that has been answered, analysis can turn to fine

points like when. In this view, contributions to this project should consider the costs and benefits

of dollarization in the steady state, leaving the analysis of timing to some later, follow-up stage.

I will argue that the question of timing in fact belongs at the heart of the dollarization

debate. Implicit in that debate are two very different views of sequencing of dollarization with

other reforms, which have very different implications for the present discounted value of the

associated costs and benefits. The more common view is that dollarization, to work smoothly and

yield more benefits than costs, must wait on the completion of complementary reforms. The

banking system must first be strengthened, so that the authorities' more limited capacity to

provide lender-of-last-resort services does not expose the country to financial instability. The

fiscal position must first be strengthened and the term structure of the public debt lengthened so that the absence of a domestic monetary authority able to absorb new issues does not expose the government to a funding crisis. Provision must first be made, through the negotiation of commercial or intergovernmental credit lines, for obtaining the liquidity needed to finance intervention if a crisis nonetheless occurs. The labor market must first be reformed, so that the absence of the exchange rate as an instrument of adjustment does not leave the country without a mechanism for accommodating asymmetric shocks. And the economy must first be restructured, perhaps through the negotiation of a free-trade agreement, to ensure that cyclical fluctuations and appropriate monetary conditions coincide with those in the United States. Since these reforms take time, most countries cannot realistically expect to dollarize anytime soon.

The other view is that dollarization need not wait on these other reforms, because the very act of dollarizing will produce the changes needed to smooth the operation of the new regime. Eliminating the possibility of exchange rate changes will produce the necessary labor market reforms, since unions will recognize the absence of alternative adjustment mechanisms and the need for additional labor market flexibility, wage flexibility in particular. Dollarization will strengthen the financial sector by eliminating currency mismatches in the banking system and enabling more domestic borrowers to fund long-term investment projects with long-term debt. Dollarization will improve the fiscal balance by bringing domestic interest rates down to U.S. levels and cutting debt-servicing costs. By removing the inflation tax from the fiscal menu, dollarization will harden the government's budget constraint. Dollarization will enable the government to lengthen the term structure of its debt by removing the currency risk that causes investors to prefer short maturities. Dollarization will enhance the government's access to

commercial credit lines, arming it with the resources to provide at least limited lender-of-last-resort services. And dollarization will lead to the synchronization of business cycles by bringing interest rates into line with those prevailing in the United States and encouraging more transactions between the two economies.

This controversy has a counterpart in the literature on European monetary unification, where it is known as the debate between the "monetarists" and the "economists."[2] The "economists," German officials for present purposes, argued that economic policies and performance had to converge and institutions had to be harmonized before Europe could proceed to monetary union. High inflation had to be brought down and cycles better synchronized. Excessive debt and deficits had to be eliminated and national central banks had to be made independent before national currencies were eliminated. This was referred to as the "coronation theory," in that the act of locking the exchange rate once and for all was akin to the coronation of a king after the latter had completed a long period of preparation. The "monetarists," represented by French officials, responded that fixing the exchange rate would itself bring about macroeconomic and institutional convergence and that monetary unification could therefore proceed sooner rather than later.[3] This is sometimes referred to as the "Nike approach," that the best way to lock the exchange rate or adopt a foreign currency was to "just do it." In the event, the German position won the day, and Europe adopted a lengthy, three-stage transition to

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[2]See for example Giovannini (1990) and Corden (1993).

[3]I am uncertain of the locus classicus of these two terms, but presumably the phrase-maker who coined them had a highly-developed sense of irony since he placed German officials and the Bundesbank in particular in the anti-monetarist camp.

monetary union.[4]

The remainder of this paper analyzes the evidence on whether dollarization would

significantly accelerate the process of policy reform and whether it can therefore precede rather

than follow other complementary measures. It is worth relating this debate to the two

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[4]Even today, some potential members of EMU remain out on the grounds that their business cycles are incompletely synchronized with those of the rest of Europe; this is a standard justification of the Blair Government for its continued reluctance to put the issue of EMU membership to a referendum. To be sure, European monetary unification and Latin American dollarization differ from one another. Europeans fear that excessive debts and deficits will place the European Central Bank under irresistible pressure to provide national governments with inflationary finance or to extend an inflationary debt bailout. Few advocates (and, for that matter, opponents) of dollarization believe that the Federal Reserve System would similarly rescue a Latin American government experiencing a debt run, both because the country in question would not possess a voice or a vote on the Federal Reserve Board (in contrast to the situation in the ECB) and because of the significantly lesser extent of political solidarity and integration generally in the Western Hemisphere. In other words, monetary unification in Western Europe is part of a larger project of economic and political integration, which raises the likelihood, for better or for worse, that EU countries will assist one another when they experience financial problems. Consequently, the fiscal and financial weaknesses of prospective dollarizers are regarded with concern not because of their potential inflationary consequences, as in Europe, but for fear that countries that dollarize may be exposed to a catastrophic financial and economic meltdown.

circumstances in which dollarization is currently contemplated. In the first, dollarization is essentially a device for making preceding policy reforms irreversible. Having brought down inflation, balanced the budget and strengthened the financial system, not just locking the door to the central bank (the currency board solution) but in addition throwing away the key (by abolishing the domestic currency) is seen as a way of preventing the government from reverting to its bad old ways. The country having already demonstrated a firm commitment to reform, dollarization hammers the last nail into the coffin of unsustainable policy. The credibility of reform thereby having been buttressed, dollarization will enhance the stability of interest rates, investor confidence, access to foreign capital, and economic growth whose benefits presumably provided the impetus for fundamental reform in the first place. This, of course, is the argument for Argentina to now move to dollarization.

The other circumstance is that of a country where fundamental policy reform has not yet begun. This country suffers from an unsustainable budget deficit, high inflation, severe banking problems, and political unrest. With the adoption of the dollar, inflation will come down at a stroke, and other policies will have to be brought into line with the hard-money constraint. This is the argument for dollarization by a country like Ecuador.

But while dollarization is an all-but-automatic source of monetary credibility, it does not automatically enhance the credibility of other policies. While intensifying the pressure for fiscal consolidation by eliminating the inflation tax and tightening the budgetary screws, it does not automatically create the social consensus needed to push through the necessary cuts. While heightening the pressure for financial-sector reform — that is, the pressure for the authorities to recapitalize a crisis-ridden banking sector and upgrade prudential supervision —

dollarization will not necessarily produce a political consensus on where to find the resources, or the bureaucratic competence and independence needed to administer prudential regulations. Having closed off monetary policy as a remaining safety valve, dollarization then leaves two options: either the consensus needed to push through fundamental reform is achieved, and the underlying conflict which gave rise to the crisis is resolved; or the economy and society, their last remaining safety valve having been removed, explode politically and economically (where the economic explosion involves debt default, bank failures, and output collapse, and the political collapse takes the form of the indigenous peoples descending from the highlands and calling for the government's ouster). Dollarization may or may not deliver the goods, but there is no denying that it is a high-risk strategy.

The weight we should attach to these risks should be a function to the **evidence** on how quickly other policies and practices adopt to the new monetary regime. Such evidence is marshaled in the remainder of this paper. I consider labor-market reform, fiscal reform, financial-sector reform, and closer synchronization of cyclical conditions across countries sharing the same currency, focusing on the recent experience of Europe.[5]

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[5] Europe's experience must be utilized cautiously, given its differences from other regions where dollarization is currently being contemplated. But Europe's monetary union is one of the few concrete sources of information we have on the interaction of monetary and other reforms. EMU is a fact, and studies like Garber (1997a,b) to the contrary notwithstanding, market participants attach an extremely low probability to it falling apart. We can therefore examine the evidence on whether EMU is delivering the structural reforms predicted by the "monetarists." In this we are aided by the fact that the Maastricht Treaty contained a hard-and-fast deadline for the inauguration of EMU (January 1st, 1999) and that the ex ante probability of it starting on time was perceived to be high. Given that EMU was expected to start on time, we can also ask whether it was having the anticipated structural effects in the period leading up to its inauguration.

2. Labor Market Reform

The intuition behind the belief that dollarization will intensify the pressure for labor market reform is straightforward. Assume that unions negotiate a path for nominal wages extending into the future, and that the authorities can then use monetary cum exchange rate policy to partially offset a unemployment. Unions will be aware of the ability of the monetary authorities to respond in this way when negotiating wages; this will partly limit the capacity of an inflation-averse monetary authority to respond to unemployment with expansionary monetary policy. But only partly: under discretionary monetary policy there will be a lower variance of unemployment as well as a higher average rate of inflation. At least this is the prediction of the textbook Barro-Gordon (1983a,b) model.

Hardening the exchange rate constraint thus will increase the variability of unemployment. If unions regard more variable unemployment unfavorably, that hard exchange rate constraint, imposed through inter alia dollarization, will provide additional incentive for reform.

Or will it? Calmfors (1998) and Belke and Kamp (1999) develop a model in which this logic can be shown to be flawed, or at least incomplete.[6] They extend the Barro-Gordon framework to include in the government's loss function not just inflation and unemployment but also the amount of (costly) labor market reform, where equilibrium unemployment is declining in the level of reform.[7] In the standard one-shot game, there is an optimal amount of labor-market

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[6]A similar analysis, reaching compatible conclusions, is Berthold and Fehn (1998).

[7]The government is assumed to decide the level of structural reform. Alternatively, the government's loss function (which has unemployment, inflation and costly reform as arguments) could be interpreted as a trade union preference function (where the arguments are unemployment, inflation and the real wage); the level of unemployment would then depend on the real wage, as opposed to the amount of reform, in standard labor-demand form. If wage setting

reform whose costs are just matched by the benefits in terms of the reduction in equilibrium

unemployment (and hence expected unemployment) plus the benefits of the reduction in inflation

(because lower equilibrium unemployment reduces inflationary bias). With dollarization, labor

market reform no longer results in a lower average rate of inflation.[8] Hence, labor market reform

following dollarization is less, not more.

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negotiations are centralized, the conclusions follow through (Cukierman and Lippi 1999, Gruner and Hefeker 1998).

[8]On the plausible assumption that the external monetary authority does not respond to the equilibrium level of unemployment in the dollarized country. Calmfors also considers the case where n symmetrical countries form a monetary union, and their common central bank sets monetary policy with union-wide conditions in mind. If n is large, then reform in one country has a negligible impact on union-wide unemployment and therefore a negligible impact on the inflationary bias of monetary policy. This, of course, is the case that is likely to be relevant to Latin American dollarization, where the Federal Reserve Board will presumably ignore the level of unemployment in the dollarized economy when setting U.S. monetary policy.

This result will disturb the advocates of rapid dollarization. It is important, therefore, to identify on what it depends. It depends, for one thing, on the assumption of quadratic loss functions.[9] If, instead, the marginal losses of deviations from desired unemployment and inflation increase more rapidly as those deviations grow larger, then it is possible to obtain more labor market reform as a result of dollarization. When loss functions are convex, more reform also reduces the variability of unemployment and therefore the variability of inflation (in the regime where discretionary monetary policy is used to offset movements in unemployment). With dollarization, reform no longer affects the variability of inflation but still affects the variability of unemployment. The absence of discretionary monetary policy in a dollarized economy implies a rise in unemployment variability. If this effect outweighs the elimination of gains from reform-induced reductions in inflation variability under discretion, then dollarization will lead to more structural reform as a precaution against exceptional unemployment problems.[10]

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[9]Which is standard to this literature.

[10]Alternatively, and again following Calmfors, one can assume that the effect of costly structural reform is not to reduce the natural rate of unemployment but to increase the responsiveness of wages to prices and unemployment (as opposed to expected prices and unemployment) — that is, to reduce the extent to which wages are pre-set. In the Barro-Gordon model (with the standard quadratic loss function), this will increase the incentive for reform insofar as eliminating monetary discretion increases the variability of unemployment. At the same time, it will reduce the incentive for reform insofar as the latter no longer promises lower inflation.

The direction of the net effect is uncertain.

The functional form of the loss function is a weak reed on which to hang policy advice.[11]

What about the evidence? Observers of Argentine convertibility will be skeptical that a hard exchange rate constraint guarantees labor market reform. Bargaining in Argentina remains highly centralized, encouraging wage compression and limiting flexibility, although it is now possible for negotiations to proceed on a company-by-company basis if (and only if) agreed to by the unions. New regulations affecting employment by small and medium-size enterprises were implemented in 1999, and two special labor statutes that give special privileges to workers in certain sectors were abolished and replaced by arrangements involving direct negotiations between the affected parties. Still, the fact that unemployment is well into the double digits and has remained there for years is hardly evidence of adequate labor market flexibility. An aggressive labor reform bill just passed by the Argentine Congress holds out hope for more comprehensive reform, but it will be phased in over time, starting more than a decade after the adoption of the hard currency peg.[12]

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[11]There is also a literature in the European context on whether monetary unification could increase labor mobility. Bertola (1989) presents a model in which the elimination of exchange rate uncertainty reduces the option value of waiting for workers contemplating migration, raising labor mobility in equilibrium. In practice, there appears to be little evidence, however, of significant effects of exchange rate uncertainty (Buscher and Muller 1999).

[12]The new law will extend the probationary period for temporary workers from one to three months, give priority to wage negotiations at the firm rather than the industy level, and eliminate the so-called "ultra-activity" law that allows for the automatic extension of prior labor

contracts if both parties do not agree to a revision. A final decision will be taken in April.

Perhaps Argentina has not seen more labor market reform because convertibility remains less than credible. This is one reason, it is argued, that it is necessary to take the additional step of dollarizing. This makes it useful to also consider Europe, where the commitment to exchange-rate stability is of long standing and monetary union is essentially irreversible.[13] As in Argentina, unemployment remains high, although there is anecdotal evidence of reform (Table 1). A number of country's case studies -- by Hochreiter and Winckler (1995) on Austria, Kremers (1990) for Ireland, Gressani et al. (1988) for Italy, and Artus and Salomon (1996) for France, for example -- do find some evidence of greater wage and price flexibility with the hardening of the exchange-rate commitment. It is suggestive that Netherlands has experienced the most far-reaching reform, since it has had a hard exchange-rate commitment for longest.[14] But there are also counterexamples -- countries like the UK, which have neither participated in the ERM for any period of time nor committed to the monetary union, where labor markets have been rendered significantly more flexible since the late 1970s, and other countries that have been committed to EMU from the start where labor market reform has been at best halting. If we construct an index of the extent of labor market reform from the scorecard in Table 2, assigning -1 for each item for which the country moved in the opposite direction from a recommended reform, +1 for partial movement in that direction, and +2 for comprehensive implementation of that reform, the simple compliance rates (in the third column) hardly differ between the countries with pegged and

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[13]The latest word on EMS credibility, with evidence supportive of the position I take in the text, is Bleaney and Mizen (1997).

[14]Thus, the Netherlands did not let its currency fluctuate more freely following the widening of ERM bands in August 1993, keeping the guilder confined to a band within the band for essentially the entire period.

floating rates. A t-test for differences in mean rates of compliance does not permit us to reject the null of a zero coefficient at reasonable confidence levels.

Artis and Omerod (1994, 1997) develop time series evidence for four European countries (France, Belgium, the Netherlands and Germany) to test for changes over time in the unemployment cost of adjusting to nominal disturbances. Only for Belgium is there much evidence that hardening exchange-rate commitment has led to significant labor market reform. Anderton and Barrell (1995) similarly study wage determination in ten European countries and find only small increases in wage flexibility, except in Italy, where the evidence of change is more substantial. An alternative is to estimate a vector-autoregressive model of the labor market in the attempt to recover the responsiveness of wages to labor supply and demand shocks. I have done this for a number of European countries, and report the results in Appendix 1. The estimates are generally well behaved: even in Europe, where real wage rigidity is notorious, wages respond to demand shocks in the expected manner. What there is *not* is compelling evidence of is flexibility rising over time. It cannot be argued with any conviction, on the basis of these results, that the hardening of the exchange rate constraint has produced a significant improvement increase in labor market flexibility.

What conclusions follow for dollarization? Theory cannot tell us whether dollarization will speed up or slow down labor market reform. There are conditions under which reform will accelerate, and many people's intuition will tell them that these are the plausible conditions. There is some anecdotal evidence that a hardening exchange-rate commitment and monetary union are encouraging efficiency-enhancing reforms in Argentina and Europe, but systematic analysis suggests that reform remains partial and incomplete. If a more flexible labor market is

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viewed as an essential concomitant of dollarization, then dollarization should wait on prior labor

market reform, since there is little evidence that dollarization itself will quickly produce the

requisite changes.

3. Financial Sector Reform

That the financial sector -- the banking system in particular -- should be strengthened prior

to dollarization is conventional wisdom. Dollarization by a country like Mexico would limit the

ability of the authorities to provide lender-of-last-resort services to backstop the market. To be

sure, the indispensability of such services is disputed; some would say that banks are no more

deserving of a public-sector safety net than nonfinancial corporations. The argument that they are

rests on two pillars: first, that banks operate in the information-impacted segment of the financial

market; and, second, that banking-system disruptions impose negative externalities on the rest of

the economy. Banks are in the business of delegated monitoring: they assess the credit worthiness

and monitor the actions of borrowers about whom public information is costly to obtain and

therefore incomplete. Hence, a bank will be able to raise liquidity on short notice only by selling

assets at fire-sale prices, which will irreparably damage its viability. Widespread distress in the

financial sector will then interrupt access to working capital and investable funds for firms

elsewhere in the economy, disrupting production, adding to nonperforming loans, and plunging

the economy into a crisis.

Since the freedom with which the government can provide lender-of-last-resort services is

limited by dollarization, a country contemplating that step must first strengthen its banking system

so that the need for such services is reduced.[15] Steps must be taken to remedy problems in the

banking system resulting from inadequacies in risk management, corporate governance, market

discipline, and prudential supervision. If the country is saddled with an inheritance of state banks

accustomed to sheltered markets, this excess capacity must be shed through exit or consolidation

and hard budget constraints imposed on the survivors. Risk management practices must upgraded

and prudential supervision and regulation strengthened before proceeding with dollarization.

The common implication of these arguments is that strengthening the banking system

should come first. The rebuttal is that the key weaknesses in the banking system can be remedied

by the very act of dollarizing.[16] Financial systems in emerging markets like Mexico are fragile,

this argument goes, because of the prevalence of currency and maturity mismatches, reflecting a

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[15]The argument is not that all lender-of-last-resort activities are ruled out. If the
government has dollars in its own accounts, it can use these to purchase the assets of the banks
and otherwise recapitalize distressed financial institutions. If the government has the capacity to
raise future taxes, it may be able to borrow now and use the proceeds to inject liquidity into the
banking system. It may be able to borrow against those future taxes either by floating additional
treasury bonds or bills or by pre-negotiating credit lines with foreign financial institutions. That
said, the government's capacity to lend in the last resort will almost certainly be more limited than
when it controls the printing press (and than when it is committed to a currency board, which it
can more easily abandon in the last resort). Few governments are able to accumulate financial
reserves that are large relative to the liabilities of the banking system. Interest income on foreign
assets is less than service obligations on domestic debt. This discrepancy will be less for a
dollarized economy, for which no currency risk remains, but it will still exist insofar as the
elimination of currency risk does not also eliminate country risk. The ability to borrow
commercially tends to dry up precisely when it is needed most. And the commitment fees for
standing credit lines are high enough that the resources which governments are prepared to
prearrange in this manner are likely to remain small relative to the liquidity needed to stem a run
on the banking system. Thus, Argentina's contingent repurchase facility with 13 commercial
banks (for which it was charged a commitment fee of 33 basis points) provides credits equivalent
to less than ten per cent of domestic bank deposits.

[16]I owe this argument to Ricardo Hausmann. My preferred version is Eichengreen and
Hausmann (1999).

legacy of distrust of the national currency. Banks and firms seeking funding abroad find themselves unable to borrow in the domestic currency. Since this leaves them saddled with mismatched dollar liabilities and domestic-currency-denominated assets, they get smashed whenever the currency depreciates.[17] And so long as currency depreciation remains a possibility, foreigners will be reluctant to lend, domestics to borrow, given the danger of bankruptcy and default. The domestic financial system will remain shallow and crisis prone.

Similarly, where there is a legacy of distrust in the currency, firms with long-term investment projects will be unable to fund them using long-term loans. Domestic intermediation will be skewed to the short end, saddling balance sheets with maturity mismatches. If the exchange rate is attacked, requiring the authorities to raise short-term interest rates, debt-servicing costs will rise relative to revenues, creating the danger of cascading bankruptcies. Given these dangers, the level of intermediation will be less. Again, the financial system will be narrow, fragile and likely to require lending in the last resort.

In the view of the dollarize-first school, eliminating the domestic currency promises to solve this problem in a stroke. Currency risk will disappear by definition. Eliminating currency risk should make it easier for firms with long-term projects to borrow long term at home as well

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[17]Denominating domestic loans in dollars is no solution so long as the nonfinancial firms that do the borrowing continue to rely on revenue streams denominated in domestic currency, since if the exchange rate depreciates they may be unable to repay. If all domestic revenue streams are denominated in dollars, the problem goes away, but this is precisely the definition (and associated merit) of dollarization.

as abroad. (It is assumed, in other words, that it was currency risk that previously impeded the emergence of a long-term market.) Currency mismatches having been eliminated and maturity mismatches having been attenuated, domestic financial markets will deepen and stabilize. The main threats to banking stability will be removed.

Another version of this argument is that the more limited capacity of the government to provide lender-of-last-resort services will force bank managers and supervisors to upgrade their own risk-management practices. Kaufman (1996) has noted the tendency for U.S. banks to hold larger amounts of capital and liquidity prior to the financial safety net. Gorton (1984) similarly emphasizes the greater tendency for banks to discipline and support one another through peer monitoring and lifeboat operations, respectively, prior to the founding of the Fed. The argument is that dollarization, by downsizing the safety net, will force managers to reinforce their own precautionary measures and intensify their peer monitoring, or go out of business.

If these arguments are valid, then one should expect to see a lower incidence of banking crises in countries with harder pegs. This hypothesis conflicts with another, widely-held belief that financial fragility is greater when currencies are pegged. It also runs up against ambiguous evidence. Eichengreen and Rose (1997) take a large sample of banking crises in the period 1975-92 and analyze a number of potential determinants of crisis incidence, including the exchange rate regime. They obtain positive coefficients on the IMF's dummy variables for fixed pegs, intermediate pegs, and managed pegs (where the omitted alternative is floating), but none of these coefficients differs significantly from zero at standard confidence levels. Alternatively, they categorize the exchange rate regime according to the actual variability of the exchange rate, constructing dummy variables for countries whose exchange rate varied by less than five per cent

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(alternatively, less than ten per cent) over the course of the previous year. When this alternative measure is used, it does appear that a more stable rate makes for fewer banking crises.[18]

This study does not distinguish hard pegs (currency boards and dollarization) from soft pegs. The argument for dollarization is precisely that the regime is less apt to change than a run-of-the-mill peg; hence, it is more likely to alter the behavior of investors, managers and regulators. Knowing that a soft peg can be abandoned in duress, when the authorities come under the greatest pressure to provide lender-of-last-resort services, the incentive to undertake the kind of reforms that would be compelling if the financial safety net was removed is correspondingly less. The argument against dollarization, in this context, is that the desired reforms may be slow to follow and that in the meantime dollarization severely limits last-resort lending.

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[18]Mendis (1999) undertakes a similar exercise, but interacts the exchange rate regime with two measures of external shocks (the deviation in the terms of trade from trend, and the size of capital inflows), on the grounds that a pegged rate should be stabilizing when shocks are domestic but destabilizing when they are imported. The results are consistent with these priors for terms of trade shocks (terms of trade shocks increase the risk of bank failures when the currency is pegged but not when the currency is floating), but the results for capital flows do not indicate that either a pegged or flexible exchange rate is to be preferred on these grounds.

We can try to get at these arguments in two ways: first, by adding a currency board-cum-dollarization dummy variable to the sample, and second by including the duration of a country's peg, a la Klein and Marion (1994), as a measure of credibility. Table 3 reports various permutations of the Eichengreen-Rose model updated through 1997. (Details on the procedures followed can be found in Appendix 2.) One result that now comes through clearly is that intermediate regimes (neither fixed nor floating according to Ghosh et al.'s (1995) tripartite categorization) are strongly associated with an increased incidence of crises; this is support for the "hollowing out theorem" that intermediate regimes are particularly crisis prone.[19] More worrisome and relevant for present purposes is that when we distinguish hard pegs (currency boards, dollarized economies) from soft pegs (other fixed rate arrangements), the former appear to be associated with a greater incidence of banking crises.[20] Since there are only two currency board countries, Argentina and Hong Kong, and one dollarizer, Panama, in the sample, not too much weight should be attached to this result. But for what it is worth, the findings here are not obviously consistent with the view that a hard exchange rate constraint stabilizes the banking system by eliminating mismatches and forcing banks to upgrade their risk management practices,

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[19]See Crockett (1994) and Eichengreen (1994).

[20]The results in the 6th column of Table 3 suggest that the credibility of the peg (and presumably the policies followed to obtain that credibility), as reflected in the length of the period for which it has been operated, is more important than the nature of the peg for fending off banking crises.

rather than rendering them more vulnerable by limiting the ability of the authorities to backstop the market.

While it is still premature to rate the validity of these arguments on the basis of European experience, some limited evidence is already available. The Maastricht Treaty transfers control of Europe's monetary policy to the European Central Bank while leaving responsibility for prudential supervision in the hands of national governments and regulatory agencies. It makes explicit that the ECB's overriding objective will be the pursuit of price stability.[21] All in all, it makes clear that a banking crisis in one EMU country is less likely to elicit a large-scale injection of liquidity than was the case when each country had its own central bank.

There is little evidence that, in Stage II of the transition to monetary union (1995-1998), European investors, bank managers and regulators responded to the impending reduction in lender-of-last-resort services by limiting risk taking. European banks were in the vanguard of lending to East Asia in the period that culminated in that region's financial crisis (see Table 4). Their exposures were greater than that of U.S. banks, prospects of a more limited safety net or not. The best way to understand this is as gambling for return in an increasingly brutal competitive environment. If dollarization leads to an intensification of competition in the financial sector and forces some scaling back of the financial safety net, Europe's experience suggests, it may lead to more rather than less risk taking in the short run.

Now that it is an economic and financial fact, monetary union has unleashed the wholesale

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[21]Although it also acknowledges the new central bank's responsibility for the stability of Europe's payments system.

reorganization of Europe's banking industry. Banks have merged and acquired competitors in order to better exploit economies of scale and scope. (See Table 5 on the opening salvos.) Prominent examples include the announcement that Banco Bilbao Vizcaya will acquire Argentaria Caja Posal y Banco Hipotecario, that the Bank of Scotland has launched a hostile takeover bid for National Westminster Bank, that Banca Intesa plans to take over Banca Commerciale Italiana, and that Bayerishce Hypotheken-und-Vereinsbank may merge with Dresdner Bank. This too is to be understood as a response to the advent of a more intensely competitive environment. Consolidation is presumably motivated by the idea that larger banks with better diversified portfolios will be better able to cope with an environment characterized by less government shelter. There is some evidence supportive of this link between bank size and banking-system stability (Grossman 1994).

Note, however, that all these mergers are national: to date, regulatory opposition and tradition have stood in the way of cross-border merger activity. It is widely argued (viz. Demirguc-Kunt, Levine and Min 1998) that the internationalization of the banking system is more important than the sheer size of domestic financial institutions for financial stability. Internationalization is likely to enhance portfolio diversification (especially for smaller, emerging markets), intensify market discipline, and deepen the pool of managerial expertise. That Europe has been unable to take this additional step is troubling to observers who remain concerned about the stability of its banking system. This fact also suggests that regulators elsewhere in the world cannot simply rely on dollarization to bring about the wholesale reorganization and strengthening of their banking systems. Rather, this requires positive steps to promote the internationalization of the Mexican financial system, given the more limited capacity of the lender of last resort.

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4. Reform of the Public Finances

There are two arguments that dollarization will produce quick consolidation of the public finances. First, dollarization will bring interest rates down to world levels, reducing debt servicing costs. Second, by removing the inflation tax as a revenue source of last resort, it will force governments to live within their means. Since governments can always increase their discretionary spending to offset any saving in debt-servicing costs, it is the second mechanism that is key.

Tornell and Velasco (1995, 1998) analyze what is special about dollarization in this regard, if only because the case they consider, a temporary exchange rate peg, contrasts so sharply with the presumed permanence of dollarization. Using a two period model, they analyze the incentives for fiscal consolidation (a reduction in budgetary outlays that are socially wasteful but beneficial for the politicians) under a monetary rule and an exchange rate rule. The exchange rate rule can be reduced to a policy of pegging the nominal rate.[22] The world ends with the completion of period 2. Under the assumption that the government budget constraint must hold (default, or Ponzi finance, is ruled out), borrowing to finance spending not covered by income and inflation taxes in period 1 must be repaid (with interest) out of income and inflation taxes in period 2. In other words, government spending in excess of income tax revenues, both measured in present value terms, must be financed by the inflation tax.

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[22]Nothing hinges on this assumption; the authors show that their results go through for a general class of preannounced exchange rate rules.

If the exchange rate is pegged in period 1 and, under the assumption of purchasing power parity, the inflation rate is given (at zero, for present purposes), but the peg can collapse in period 2, then inflation tax revenues accrue in the second period. Under a monetary rule, expectations of future inflation fuel current inflation (since the expectation of a higher price level in the future leads to higher nominal interest rates, a lower demand for money, and hence additional inflation in the present). Under a monetary rule, then, the inflation needed to finance excess government spending is spread over time (it occurs in both period 1 and period 2).

In this model it does not follow that pegging necessarily increases the incentive for fiscal consolidation. If the exchange rate is pegged, the inflation needed to finance excess government spending is pushed into the future. If the politicians' discount rate exceeds the market discount rate (the reciprocal of one plus the interest rate), then the policy of pegging the exchange rate implements an intertemporal distribution of the inflation tax burden which is closer to that preferred by the politicians. Since their discount rate is high, the politicians are happy to see the inflation tax pushed into the future. And since the present value of the costs associated with the inflationary distortion is less, the politicians will engage in additional deficit spending in the present. In light of the possibility that the incumbents will not still be in office tomorrow, there is reason to presume that their discount rate will be high relative to the social discount rate and that a less than fully credible peg will aggravate rather than reducing budgetary excesses. Gavin and Perotti (1997) present evidence consistent with this view for 13 Latin American countries in the period 1968-1995.

Dollarization — to come to the point — is different in that it tightens the government budget constraint. Since there is no inflation tax either now or in the future (on the assumption

that dollarization is permanent), there is no budget deficit. Fiscal consolidation will be immediate.[23] Thus, the impact effect of dollarization on the budget can be the opposite of the impact effect of a simple peg, if that peg lacks credibility as is plausibly the case. It is the greater assumed credibility (permanence) of dollarization that makes the difference.

The advantage of this model-based analysis is that it lays bare the assumptions behind the premise that dollarization encourages fiscal reform. That premise rests on the assumption that dollarization is more credible and permanent than a simple exchange-rate peg. Perhaps more controversially, it rests on the assumption of no Ponzi finance -- that the government is not permitted to default on its debt. If politicians still derive private benefits from additional government outlays and have a higher discount rate than other agents because they may no longer be in office in future periods, they will still be tempted to engage in excess spending now and let someone else deal with the consequences later. If the costs of default are high relative to the costs of inflation (as seems plausible -- this is also presumably why Tornell and Velasco modeled the balancing item in the government budget constraint as inflation rather than default) and/or if the mechanism translating future default risk into higher current interest rates operates powerfully compared to the analogous mechanism for inflation, then dollarization will still increase the pressure for fiscal consolidation. But by making default the only way of squaring the circle, it will also raise the stakes.

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[23]Although, if there are costs of adjusting the deficit downward, the authorities may still prefer to run relatively limited deficits in the first period, offset by surpluses in the second.

European experience is consistent with these conclusions. Removing the inflation tax

from the hands of Europe's more inflation-prone governments by imposing a hard exchange rate

constraint appears to have intensified the pressure for fiscal consolidation. Budget deficits in the

Euro Area fell from 4.8 per cent of GDP in 1996 to 2.1 per cent in 1998 and are projected to fall

further going forward (Table 6). Some of this progress has been driven by recovery from the

recession of the first half of the 'nineties, but part is also due to discretionary tax increases. (This

is evident in Table 7, from which cyclical effects on budget balances have been removed.)

Questions can also be asked about the sustainability of reform. In particular, there is reason to

worry that fiscal consolidation has mainly been accomplished by tax increases, not expenditure

reductions.[24] In addition, there is the argument that the stakes were highest so long as fiscal

consolidation was needed to qualify for EMU; now that 11 countries have been admitted, those

predisposed toward excess can relax.

Europe's experience also substantiates the point that monetary union and dollarization do

not rule out the possibility of default. The fear that fiscal profligacy may precipitate debt-

servicing difficulties for Europe's more deficit-prone economies explains why the Maastricht

Treaty features an extensive set of procedures to prevent excessive deficits along with penalties

for countries failing to comply (Eichengreen and von Hagen 1996). Given the deep political links

tying together the members of Europe's monetary union, there is reason to think that a debt crisis

will be met with an inflationary debt bailout of the crisis country by the ECB. The Maastricht

Treaty and the Growth and Stability Pact negotiated subsequently are designed to limit this

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[24]Alesina, Perotti and Tavares (1998) show that consolidation driven by tax increases in
countries where taxes are already high is less likely to be sustained.

danger.[25]

      A Latin American dollarizer that experienced a debt crisis would be left by the Fed to stew

in its own juices; a dollar bloc would lack the political solidarity that could impel the ECB to run

to rescue a European country in this plight. A crisis that led to an inflationary debt bailout in

Europe would instead precipitate a default in Latin America. Hence, the United States would not

demand Maastricht-like provisions of a Mexico or Argentina that chose to dollarize unilaterally.

The reason, however, would not be because dollarization removes the danger of default for

countries where fiscal reform is inadequate. It does not.

5. Synchronization of Cycles

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[25]The Stability Pact consists of two regulations, one on the Excessive Deficit Procedure of the Maastricht Treaty and another on surveillance, plus a European Council resolution that provides guidance on the application of the pact. The pact will exempt a deficit in excess of 3 per cent of GDP if a country's GDP does not decline by at least 2 per cent in the year in question. In addition, a deficit which occurs when GDP declined by more than 0.75 per cent but less than 2 per cent may also be granted an exemption by the Council. Sanctions against countries whose deficits exceed 3 per cent and have not been granted an exception will take the form of non-remunerated deposits, which start at 0.2 per cent of GDP and rise by one-tenth of the excess deficit up to a maximum of 5 per cent of GDP. Additional deposits will be required each year the deficit is not corrected. If the excess is not corrected within two years, the deposit will be converted into a fine; otherwise it will be returned.

The traditional argument against dollarization is the difficulty of squeezing different economies into the confines of a single monetary policy. Monetary policy is optimally used differently countries in which unemployment and business conditions fluctuate differently. The interest rate cuts needed to moderate increases in unemployment and the interest rate increases needed to counter increases in inflation will occur at different times in countries across which conditions differ. Thus, dollarization should wait on the harmonization of macroeconomic conditions in order to prevent the single monetary policy from aggravating cyclical imbalances. This was the position of the "economists" in the debate over European monetary unification and the justification for the lengthy, three-stage transition enshrined in the Maastricht Treaty, which required the harmonization of inflation rates, interest rates and budget deficits and the stabilization of exchange rates for an extended period prior to taking the leap to a single currency.

This argument has been called into question on several grounds. Some question the notion that discretionary monetary policy is a useful stabilization tool in a small, open economy with limited central bank credibility. Any countercyclical effects of an expansionary policy are quickly neutralized, it is argued, by the increase in import prices, which is immediately passed through into higher domestic prices in a small, open economy whose domestic producers compete with imports and depend on exports. Moreover, interest-rate cuts and currency depreciation do not stabilize the demand for domestic goods when their main effect is to cast doubt over the government's entire economic policy strategy, which in a small, open economy is typically keyed to the stability of the exchange rate.[26]

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[26]This will be especially true for a small country whose foreign liabilities are denominated in home currency (this being one of the classic conditions for a contractionary devaluation). And,

Hausmann et al. (1999) make this point with data for a cross section of Latin American countries. **Real interest rates in Latin American countries with floating exchange rates, they show, have averaged 9 percent in the 1990s, compared to 5 percent for Latins with fixed rates. Domestic interest rates have been more sensitive to foreign rates under floating rather than fixed regimes, implying less, not more, monetary autonomy.** When the cost of foreign borrowing rises by one percent, domestic interest rates rise on average by 1.4 percent under Argentina's currency board but by 5.9 percent under Mexico's floating regime.[27]

European countries — especially the small ones — have provided support for this argument by voting with their feet. The eagerness with which they have forsaken their monetary independence, it is argued, signals the impotence of discretionary monetary policy. As argued above, however, this may not be the right way of interpreting the evidence: European countries' willingness to sacrifice their monetary autonomy is plausibly attributable to political rather than narrowly economic motives.

Alternatively, it is argued that European experience documents the impotence of discretionary monetary policy under conditions of deep integration. Countries like the UK and Italy, which were ejected from the ERM in 1992 and responded by depreciating their currencies

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as argued above, this will necessarily be the situation in many countries that are candidates for dollarization.

[27]Frankel (1999) also finds that domestic interest rates are more sensitive to the U.S. federal funds rate in floating rate than fixed-rate countries.

and cutting their interest rates, did not recover faster from the recession of the early 1990s than their EU partners, whose interest rates were held up by Bundesbank's response to the inflationary effects of German reunification. Thus, Bergin and Moersch (1997), while confirming that countries which depreciated their currencies boosted their exports, do not find that this relatively rapid export growth translated into faster overall economic growth. It follows that the benefits of interest rate cuts are less than suggested by 1960s-style models of optimum currency areas.

The inconsistent behavior of exports and GDP noted by Bergin and Moersch will trouble those who argue that exchange rate-cum monetary changes are neutral even in the short run. Gordon (1999) offers a solution to this puzzle, namely, that countries which depreciated their currencies after 1992 also took the opportunity to cut their budget deficits. Currency depreciation boosted exports and stimulated growth, other things equal, but insofar as governments took advantage of the incipient acceleration of growth to cut their deficits, they further curtailed domestic demand. With little perceptible acceleration in inflation relative to countries with unchanged ERM parities, there was a shift in relative prices toward traded goods in countries which depreciated their currencies and a surge in exports, but no acceleration in growth due to the compensatory compression of the budget deficit. (The one country that does not fit this schema is the United Kingdom, where no dramatic Italian-style budgetary retrenchment was required. Its business cycle was out of phase, however, with that of Continental Europe: recovery had begun earlier and decelerated at roughly the same time the other countries depreciating their currencies felt the export surge.) The implication is that intra-European exchange rates retain some capacity to stabilize the economies of the member states, deep integration or not.

The other grounds on which to question that dollarization requires prior macroeconomic

convergence is that dollarization will produce the requisite macroeconomic convergence. It will

eliminate asymmetric monetary disturbances as a matter of definition. It will reduce asymmetric

fiscal impulses, according at least to those on one side of the fiscal debate reviewed in the

previous section. It will encourage trade and capital flows between the economies sharing a

common monetary standard, which will lead to further business-cycle conformance. As with

labor-market reform, financial-sector reform, and public-finance reform, the very fact of

dollarizing, it could be argued, will eliminate the problem.[28]

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[28]Despite the parallels, the argument of this section differs somewhat from the theme of
the three preceding sections on labor markets, financial markets, and the public finances. There,
the key argument was that dollarization would intensify the pressure for complementary reforms.
Here, in contrast, the suggestion is that dollarization and trade liberalization will automatically
produce the necessary changes in business-cycle conformance without the need for the
government to adopt complementary reforms. The closest parallel is with the argument that
dollarization will reduce financial-sector fragility by eliminating currency mismatches and reducing
maturity mismatches in the banking system; here too the hypothesis is that the result occurs
automatically, not through the application of additional pressure for the authorities to adopt
additional reforms.

The possible endogeneity of asymmetric shocks has been noted by Eichengreen (1992),

Krugman (1993), and Frankel and Rose (1996), but systematic studies are rare. Artis and Zhang

(1995) analyze aggregate fluctuations in various European countries and the U.S. since the early

1960s and find that most European countries' incomes were more highly correlated with the U.S.

than Germany through 1979 but that, with the exception of the UK, they have become more

correlated with Germany since joining the ERM; this does suggest that cyclical conformance

responds to the exchange rate regime. Even the fact that the UK is exceptional is reassuring,

since its participation in the Exchange Rate Mechanism was brief and, unlike a number of other

countries, it did not shadow the deutschmark while out of the ERM. Frankel and Rose (1996)

consider the issue for a panel of emerging markets, using trade flows as their measure of

integration and a variety of alternative measures of the coherence of cyclical fluctuations.[29] They

find that greater trade is associated with greater business-cycle coherence.

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[29]Since the volume of bilateral trade is likely to be endogenous, they instrument the
independent variable using the arguments of the gravity model (distance between the pair of
countries in question and dummy variables for common border and common language).

While the direction of the effect is clear, the questions of "how much" and "how quickly" remain. Rose (1999) has estimated that the adoption of a common currency raises cross border trade by 50 per cent, ceteris paribus. The estimated impact of trade on cyclical conformance, according to Frankel and Rose (1996), is such that the correlation of business cycles would rise by 5 percentage points (from .20 to .25, or from .70 to .75).[30] The correlation of GDP growth rates between Germany and other EU member states, from the early 'sixties to the late 'eighties, ranged from a high of 0.79 for the Netherlands to 0.09 for Ireland, averaging 0.6 across ten countries. Within the U.S. monetary union, the comparable correlation across regions (using Bureau of Economic Analysis standard regions, and considering correlations with the Mid-Atlantic) averaged 0.7 (Bayoumi and Eichengreen 1993). Thus, the prospective increase in business cycle coherence produced by the adoption of a common currency will, according to these estimates, produce just about the amount of additional business cycle coherence needed to bring the average EU country up to U.S. levels. But this will be of little help for Ireland where, historically, macroeconomic conditions have been very different, owing to the country's continued strong links with the UK and U.S. Mexico, for which the comparable historical correlation (with the U.S. Mid-Atlantic region) is -0.10, would seem to be in the same boat as Ireland, not the Netherlands.[31]

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[30]In other words, in the Frankel-Rose study the independent variable is the log of trade, but the regressand is the correlation (not logged).

[31]See Bayoumi and Eichengreen (1995) for data on the correlation of GDP growth rates between Mexico and various U.S. regions. This leaves open the question of how high this correlation would have to become to support the continued operation of a common currency. The Irish experience described below suggests that a strong commitment can hold even in the face of pronounced asymmetries. Del Negro and Ponce (1999) similarly report strongly asymmetric shocks across Mexican states, with the Northern states in some respects more similar to Texas

If the approach of a single currency brings about the convergence of growth rates, this is hardly apparent in Europe. ECB (1999) analyzes average real growth rates in various groups of countries. It finds that the standard deviation of the annual percentage change in GDP for the 11 founding members of Europe's monetary union has remained virtually unchanged between 1967 and 2000.[32]

Moreover, Ireland's experience under EMU suggests that these problems are unlikely to resolve themselves quickly. While there has been considerable reorientation of Irish trade away from the UK and toward Continental Europe as a result of the country's EU, ERM and EMU participation, quick convergence of business cycles has not resulted. At the time of writing, the Irish economy continues to expand rapidly (by over 8 per cent per annum, more than 3 times the EU average) despite growing links with its monetary-union partners. The fact that Irish interest rates have been forced down to levels better suited to conditions in Continental Europe has led to an acceleration of inflation and a run-up in equity and real-estate prices that raise fears of an

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than to the Southern Mexican states; these asymmetries have not presented Mexico itself from operating a common currency.

[32]ECB (1999), p.35. The number for 2000 is, of course, a forecast. OECD (1999b) similarly finds little change over time in the degree of specialization in production across Euro Zone countries, although that change which it detects tends to point in the direction of increased similarity in productive structures and therefore fewer asymmetries due to industry-specific shocks.

unsustainable financial boom to be followed by a crash. The authorities hope that by raising the prudential standards to which Irish banks are subject they can prevent this bubble, if and when it bursts, from threatening the stability of the financial system. Thus, the Bank of Ireland has issued warnings to domestic banks not to lower their lending standards, and the IMF has urged the Irish authorities to tighten further their prudential supervision. Whether these measures will suffice is to be seen. What is clear is that monetary union and the associated reorientation of trade will not by themselves solve the problem of asymmetric cyclical conditions that makes even some sympathizers of dollarization think twice.

6. Conclusions

This paper has assessed the arguments of those who recommend early and late dollarization and brought to bear the experience of Europe, where 11 countries have recently abolished their national currencies. Given the European view that abolishing the national currency should be the caboose on the train, it is perhaps unsurprising that much of the evidence suggests that significant reform should precede dollarization -- or at least that dollarizing in advance of other fundamental reforms is risky business.

Specifically, neither theory nor evidence suggests that removing all scope for an independent monetary policy will necessarily accelerate the pace of labor market reform. Neither theory nor evidence suggests that dollarization will lead to the immediate harmonization of business cycles in the countries sharing the same currency. Neither theory nor evidence suggests that abolishing the national currency will, by itself, eliminate the need for financial-sector reform. While reducing currency and maturity mismatches will strengthen the banking system, other

problems will remain. In the environment of deep integration that is viewed as a concomitant of dollarization, the competitive pressure on domestic banks will intensify. It is not clear that the weak will exit smoothly rather than gambling for redemption. And if there is systemic fallout, the government will have limited capacity to address it. Minimizing negative consequences requires upgrading prudential supervision and regulation, a process in which Europe and Argentina have been engaged for the better part of a decade. It also requires opening the domestic banking system to foreign entry and acquisition, which Argentina has done but about which other Latin American countries have reservations.

Finally, neither theory nor evidence suggests that dollarization will eliminate fiscal problems at a stroke. Dollarization will reduce debt servicing costs and tighten the government's budget constraint, but it will not necessarily eliminate fiscal brinkmanship by politicians with high discount rates. And it will limit the capacity of the authorities to mop up after any consequent problems.

These conclusions support the Argentine approach, in which a long series of policy reforms is pursued for a decade, at the end of which dollarization serves to lock in fundamental reform by making it virtually impossible for the government to revert to its bad old inflationary ways. But they raise questions about the advisability of dollarization for a country like Ecuador, where reform has barely begun. They cast doubt on assertions that those other reforms will necessarily follow from the decision to dollarize. They might, but if they don't the downside risks are considerable. Unlike the situation in countries like Argentina, where the groundwork for dollarization has been laid and the outcome can be clearly foreseen, dollarization by countries in the throes of a crisis is a high-stakes gamble.

Appendix 1: Structural VAR Analysis of Labor Market Flexibility

In this section I lay out the labor supply and demand framework used to analyze the flexibility of European labor markets. I utilize the structural VAR methodology of Blanchard and Quah (1989) as adopted by Bayoumi and Eichengreen (1993). There we analyzed the behavior of prices and output, on the assumption that aggregate demand shocks had only a temporary impact on output but a permanent impact on prices, while aggregate supply shocks had a permanent effect on both prices and output. Here I undertake an analogous exercise for the labor market, estimating the same model for wages and employment and tracing out the associated labor-supply and labor-demand curves. I compare the results for earlier and later periods and ask whether there is evidence of rising or falling wage rigidity.

The point of departure is the neoclassical labor demand and supply model. I assume that while the labor demand curve is downward sloping in wage-employment space, the short run labor supply curve is upward sloping, and the long run labor supply curve is vertical on the assumption that prices adjust to changes in wages, restoring the natural rate of (un)employment in the long run.

The effect of a shock to labor demand is shown in Figure 1. The labor demand curve shifts from D to D', shifting the equilibrium from E to the new intersection with the short run curve, $D\math0$ raising employment and wages. As the labor supply curve becomes more vertical over time, the labor market moves from the short run equilibrium $D\math0$to its new long run equilibrium, D''. This movement along the labor demand curve involves the return of employment

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to its initial level, while money wages rise permanently.[33] Hence the response to a permanent

positive demand shock is a short term rise in employment followed by a gradual return to its initial

level, and a permanent rise in wages.

The right-hand bottom panel of Figure 1 portrays the analogous dynamics for a labor

supply shock. In response to a rise in the natural rate of employment, the short and long-run

supply curves move rightwards by the same amount, raising employment and reducing wages in

the short run, shifting the equilibrium from E to S. As the supply curve becomes increasingly

vertical over time, the economy moves from S′ to S″, implying further increases in employment

and reductions in wages. Unlike labor demand shocks, labor supply shocks result in permanent

changes in employment. The two shocks have different effects on wages; positive labor demand

shocks raise wages while positive labor supply shocks reduce them.

Estimation proceeds as follows. Consider a system where the true model can be

represented by an infinite moving average representation of a (vector) of variables, X_t, and an

equal number of shocks, å. Using the lag operator L, this can be written as:

$$X_t = A_o \, \mathring{a} + A_1 \, \mathring{a}_{-1} + A_2 \, \mathring{a}_{-2} + A_3 \, \mathring{a}_{-3} \ldots$$

(1)

where the matrices A_i represent the impulse response functions of the shocks to the elements of X.

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[33]Depending on the adjustment mechanism, there could be cycling around the new long
run equilibrium.

Specifically, let X_i be made up of the change in employment and the change in wages, and let $\mathring{a}$ be demand and supply shocks. Then the model becomes

$$(2)$$

where n_t and w_t represent the logarithms of employment and wages, $\mathring{a}_{dt}$ and $\mathring{a}_{st}$ are independent supply and demand shocks, and a_{11i} is element a_{11} matrix A_i.

Since employment is first differenced, the cumulative effect of labor demand shocks on the change in employment ($\ddot{A}n_t$) must be zero. This implies the restriction,

$$(3)$$

Equations (2) and (3) can be estimated using a VAR. Each element of X_t can be regressed on lagged values of all the elements of X. Using B to represent these estimated coefficients, the estimation equation becomes,

$$(4)$$

where e_t represents the residuals from the equations in the VAR. In the case being considered, e_t is comprised of the residuals of a regression of lagged values of $\ddot{A}n_t$ and $\ddot{A}w_t$ on current values of each in turn; these residuals are labeled e_{nt} and e_{wt}, respectively.

To convert equation (4) into the model defined by equations (2) and (3), the residuals from the VAR, e_t, must be transformed into demand and supply shocks, $\mathring{a}$. Writing $e_t = C\mathring{a}$, four

restrictions are required to define the four elements of the matrix *C*. Two are simple

normalizations, which define the variance of the shocks $\mathring{a}_{dt}$ and $\mathring{a}_{st}$. A third restriction comes from

assuming that labor demand and supply shocks are orthogonal. The final restriction, which allows

the matrix *C* to be uniquely defined, is that demand shocks have only temporary effects on output.

As noted above, this implies equation (3). In terms of the VAR it implies,

$$ \tag{5} $$

This restriction allows the matrix *C* to be uniquely defined and the demand and supply shocks to

be identified.

Note that while (5) affects the response of employment to the two shocks, it says nothing

about their impact on wages. The model implies that labor demand shocks should raise wages,

while labor supply shocks should reduce them. But since these responses are not imposed, they

are useful for testing the interpretation of permanent output disturbances in terms of supply and

temporary ones in terms of demand.

I estimated the model for a variety of European countries, using annual data on wages and

the employment rate from the OECD data base. The most convenient way of summarizing the

results is in terms of impulse-response functions depicted in employment-wage space, as in the

accompanying figures. Subjecting the model to a positive labor-demand shock should trace out

the upward-sloping short-run labor-supply curve, so long as there exists a modicum of nominal

wage inertia, and then the contour of the labor-demand curve. The impulse response to a labor-

supply shock should similar trace out the demand curve.

This procedure yielded plausible results for the Netherlands, the UK, Spain, Greece, Italy,

Belgium, Denmark, and France. Only for the first two of these countries is there anything resembling a flatter short-run supply curve, as if real rigidities have declined. Plausibly enough, these are the two European countries where labor-market reform is said to have been most extensive. But the overall picture is one of little change, consistent with the conclusions in the text.

Appendix 2: Determinants of Banking Crises

The analysis of banking crises in the text follows the methodology in Eichengreen and Rose (1997). Data were assembled for more than 100 developing countries, all those for which information can be obtained for the period 1977-1997. Macroeconomic and financial data were drawn from Frankel and Rose (1996) and updated through 1997 using the World Bank's 1999 *World Data* CD rom. The Caprio-Klingabiel (1996) crisis indicators were extended through 1997 using information provided by the authors on the World Bank web site. The Ghosh et al. exchange-rate regime indicators were also updated using data from *International Financial Statistics (*and corrected where inconsistencies were discovered in the course of this extension). In addition to the exchange rate regime, key determinants of banking crises include international reserves as a percentage of monthly imports, and external debt, the current account and the degree of exchange rate overvaluation measured as percentages of GDP. Deviations of the real rate from trend were measured by adjusting the nominal rate for the domestic and foreign price levels and then normalizing the resulting ratio on a country by country basis. Domestic variables include the government budget balance (as a percentage of GDP), domestic credit growth, and the growth of GDP per capita. External variables include Northern interest rates (a weighted average o short-term rates for the advanced industrial countries) and the rate of growth of OECD GDP.

The dependent variable is constructed by defining a two-sided, three-year exclusion window around each Caprio-Klingebiel crisis. Other country-years which are not crises and do not fall into these exclusion windows constitute the control group of non-crisis observations.

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The basic results, in Table A2, are consistent with those of the earlier Eichengreen/Rose study. Domestic credit booms are the most robust correlate of banking crises. Decelerations in Northern output growth also precede banking crises in the South (over the longer period, at the 90 per cent rather than the 95 per cent level). Output growth, overvaluation and Northern interest rates have weaker effects than in the earlier study. None of these factors played the same role in the Asian crisis as in previous banking and currency crises in emerging markets (Goldstein 1998); from this perspective it is not surprising that their effects are weaker in the extended sample.

Table A2
Benchmark Probit Regression
(Dependent Variable is Bank Failure Dummy)

	Coefficient	Z-statistic
External debt/income	0.0001	(0.26)
Reserves/imports	0.0001	(0.29)
Current account/GDP (in percent)	-0.0015	(1.23)
Overvaluation	0.0002	(0.72)
Budget deficit (% of GDP)	-0.0066*	(3.39)
Domestic credit growth	0.0007*	(5.68)
Output growth	-0.0003	(0.03)
Northern interest rate	-0.0013	(0.58)
Observations	823	
McFadden's R^2	0.13	

* Coefficients are calculated as dF/dx. Z-statistic can be interpreted in t-ratio terms
Source: see text.

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Table 1
Euro Zone Labor Supply and Demand

	1980-85	1986-91	1992	1993	1994	1995	1996	1997	1998 estimates
Percentage changes									
Working age population	1.1	1.7	0.2	0.4	0.4	0.3	0.3	0.2	0.2
Labor force	0.6	2.2	-0.3	-0.0	0.3	0.1	0.5	0.5	0.3
Employment	-0.4	2.7	-1.4	-1.9	-0.6	0.4	0.0	0.4	1.1
Percentages									
Unemployment rate	8.5	9.6	9.6	11.3	12.2	11.9	12.3	12.4	11.7
Participation rate	64.0	64.3	65.0	64.7	64.7	64.5	64.6	64.8	64.9
Employment rate	58.5	58.1	58.8	57.4	56.8	56.8	56.7	56.8	57.2
Dispersion measures									
Unemployment rate	0.54	0.57	0.54	0.54	0.51	0.49	0.47	0.46	0.49
Participation rate	0.09	0.09	0.08	0.07	0.07	0.07	0.06	0.06	0.06
Employment rate	0.11	0.13	0.12	0.13	0.13	0.13	0.13	0.14	0.14

Source: OECD (1999b).

Table 2
Labor Market Reform Scorecard, 1990-1998

	Recommended	Implemented	Performance
Germany	46	19	0.41
France	30	3	0.10
Italy	18	8	0.44
United Kingdom	14	10	0.71
Austria	32	13	0.41
Belgium	26	9	0.35
Denmark	20	8	0.40
Finland	42	17	0.40
Greece	20	7	0.35
Ireland	16	6	0.375
Luxembourg	22	-1	-0.05
Netherlands	34	18	0.53
Norway	36	10	0.28
Portugal	14	3	0.21
Spain	34	11	0.32
Sweden	22	4	0.18
Switzerland	10	2	0.20

Notes: Column 1 gives 2 points to each OECD recommendation, and assigns two points for sufficient response, one point for "more needed," zero for no action, and minus one for opposite action.

Source: OECD (1999b), pp.182-183.

Table 3
Exchange Rate Regimes and Bank Failures
(Dependent Variable is Bank Failure Dummy Variable)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Soft peg (other than currency board or dollarization)	-0.020 (0.48)			-0.021 (1.10)	-0.031 (1.02)			-0.039 (1.32)	-0.022 (1.03)	-0.008 (0.30)
Intermediate (limited flexibility or managed float)	0.046* (2.02)		0.065* (2.32)	0.040* (1.97)	0.045* (2.00)		0.066* (2.34)	0.038 (1.93)	0.050* (2.07)	0.050* (2.10)
Duration of peg (soft peg, currency board, or dollarization)					0.001 (0.47)	-0.004* (3.15)	-0.001 (0.65)	0.001 (0.82)		-0.001 (0.72)
Dollarization	0.039 (0.81)				0.018 (0.33)					
Strong peg (currency board or dollarization)		0.262* (3.58)				0.453* (4.34)			0.228* (3.28)	0.292* (3.10)
Soft managed (soft peg or intermediate)		0.012 (0.82)				0.026 (1.77)				
Any peg (strong peg or soft peg)			0.004 (0.21)				0.016 (0.59)			

Notes: coefficients on controls (benchmark regression variables) estimated but not reported.

t-statistics in parentheses.

Asterisks denote significance at 95 per cent confidence level.

Source: See text.

Table 4

Distribution of the exposures of Industrialized Country Banks towards Emerging, Transitional and Developing Countries as of June 1998, USD million

	EU banks[2]	Japanese banks	US banks	Others	Grand total[3]
All emerging, transitional and developing countries in BIS Statistics	513,613	112,827	109,308	157,324	903,072
of which:					
Asia[1]	152, 674	114,745	29,440	28,166	325,025
Eastern Europe	106,231	4,148	12,402	10,973	133,754
– of which Russia	57,259	1,008	7,781	9,805	75,853
Latin America	167,118	14,784	64,183	49,627	295,712
– of which Brazil	47,632	5,179	16,777	14,997	84,585
Middle East	32,547	3,037	5,267	16,445	57,296
Africa	43,437	2,314	4,847	7,698	58,296

Source: *BIS International Banking Statistics* (November 1998).
1) Excluding Hong Kong, Singapore and Japan.
2) Information obtained from PT and GR inserted where possible to complete the EU figures (PT and GR do not report to the BIS).
3) All industrialized country banks.

Table 5
Volume of Bank Mergers
(US $ billion per year)

	1992-4	1995-6	May 1997-May 1998
World-wide	67	153	553
North America		85	392
Europe		35	127
– of which United Kingdom		22	

Source: CEPR (1999).

Table 6
Fiscal Positions in the Euro Area
(As a percentage of GDP)

General government surplus (+) or deficit (-)

	1995	1996	1997	1998	1999	2000
Euro area	-4.8	-4.1	-2.5	-2.1		
Belgium	-4.0	-3.1	-1.9	-1.3	-1.3	-1.0
Germany	-3.3	-3.4	-2.7	-2.1	-2.0	-2.0
Spain	-7.1	-4.5	-2.6	-1.8	-1.6	-1.0
France	-4.9	-4.1	-3.0	-2.9	-2.3	
Ireland	-2.1	-0.3	+1.1	+2.3	+1.7	+1.4
Italy	-7.7	-6.6	-2.7	2.7	-2.0	-1.5
Luxembourg	+1.8	+2.8	+2.9	+2.1	+1.1	+1.2
Netherlands	-4.0	-2.0	-0.9	-0.9	-1.3	–
Austria	-5.1	-3.7	-1.9	-2.1	-2.0	-1.7
Portugal	-5.7	-3.3	-2.5	-2.3	-2.0	-1.5
Finland	-4.6	-3.1	-1.2	+1.0	+2.4	+2.2

Source: Eurostat.

Table 7

Selected European Economies: General Government Structural Balances, and Long-Term
Interest Rates

	Fiscal balance in percent of potential output				Long-term interest rate			
	Structural balance		Primary structural balance		Nominal		Real	
	1998	change, 1995-98	1998	change, 1995-98	1998	change, 1995-98	1998	change, 1995-98
Germany	-0.7	2.2	2.2	2.0	4.6	-2.3	4.0	0.2
France	-1.3	2.3	1.6	1.9	4.8	-2.8	4.1	-1.7
Italy	-1.5	5.6	6.0	2.1	4.9	-7.3	3.1	-3.9
United Kingdom	-0.3	4.3	2.6	4.4	5.5	-2.7	2.9	-2.5
Austria	-1.8	3.1	1.2	2.7	4.7	-2.4	3.9	-1.6
Belgium	0.1	2.8	7.3	1.3	4.7	-2.6	3.8	-2.1
Denmark	-0.1	1.6	2.3	1.0	4.9	-3.4	3.2	-3.0
Finland	1.5	2.6	3.4	3.7	4.8	-4.0	3.4	-4.3
Greece	-2.5	7.7	6.6	4.0	7.8	-7.7	3.3	-3.3
Ireland	0.8	2.0	3.4	0.5	4.7	-3.5	2.3	-3.4
Netherlands	-1.4	1.9	2.6	1.1	4.8	-2.4	2.8	-2.4
Portugal	-2.4	2.2	1.0	-0.6	4.1	-5.9	1.3	-4.6
Spain	-1.3	4.0	2.4	2.7	4.8	-6.4	3.1	-3.5
Sweden	4.1	10.0	7.1	10.4	5.0	-5.2	5.2	-2.6

Source: *IMF World Economic Outlook.*

Figure 1

The Aggregate Demand and Supply Model

(a) The Model

(b) A Demand Shock

(c) A Supply Shock