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1. Introduction

Each time there is a sudden decline in stock prices and the newspapers publish those photos of pensive investors gazing at the ticker in the window of a retail brokerage house, economists receive phone calls from journalists asking "Could 'it' happen again?" Could the fall in asset valuations drag down the economy and lead to problems like those of 1929? The conventional answer is "yes but only if allowed to engulf the banking system." What made the Great Depression great is that declining asset prices and declining economic activity were allowed to disrupt the operation of financial intermediaries.[2] Loan defaults and depositor runs created problems on both the asset and liability sides of bank balance sheets. By setting the stage for banking panics and bank failures, they blocked a key channel supplying credit to the household and small-firm sectors. Firms starved of working capital were forced to limit production, and households were forced to compress their spending. Only when the authorities set aside other

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[1]Eichengreen is George C. Pardee and Helen N. Pardee Professor of Economics and Political Science, UC Berkeley. Arteta is a graduate student in the Department of Economics, UC Berkeley. We are grateful to Gerard Caprio, Asli Demirguc-Kunt, Enrica Detragiache, Geoffrey Garrett, Atish Ghosh, Reuven Glick, Michael Hutchinson, Daniela Klingebiel, and Jason Sorens for making their data available to us. We thank Enrica Detragiache, Maria Soledad Martinez-Peria, and seminar participants at the Inter-American Development Bank, the Bank of Croatia Monetary Conference, and the Harvard Institute for International Development for very useful comments. All errors are our own.

[2]Notably in the United States but also in other countries. The role of bank failures in the U.S. depression is emphasized by Friedman and Schwartz (1963) and Bernanke (1983). Their role in the depression in other countries is the subject of Bernanke and James (1991) and Grossman (1994).

objectives and intervened to stabilize the banking system was the collapse of activity halted and the stage set for economic recovery.

This pattern is of more than historical interest, for today it is again the instability of banking systems that distinguishes economic crises from ordinary recessions. This contrasts with the immediately preceding period: the quarter century following World War II was one of tight financial regulation and control which left little scope for banking crises. There was only one banking crisis between 1945 and 1971 in the sample of 21 industrial and emerging markets considered by Bordo and Eichengreen (1999).[3] In contrast, the 1980s and 1990s were decades of financial liberalization and decontrol, developments which were necessary but not sufficient for banking crises. The IMF counts 54 banking crises in member countries between 1975 and 1997, while World Bank lists an even larger number.[4]

The instability of banking systems is one way of understanding why the business cycle was more pronounced in the fourth quarter of the 20th century than the third.[5] In Latin America, the debt crisis of 1982 was preceded by significant financial liberalization and followed by serious banking problems (in Argentina, Colombia, Uruguay, Chile and Peru, among other countries). Sharp drops in the ratio of deposits to GDP (on the order of 20 per cent) created an atmosphere of credit stringency and contributed to the economic stagnation of the period. Finland, Sweden

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[3]In Brazil in 1963. Bordo and Eichengreen (1999), Appendix Table 1.

[4]See IMF (1998) and, for World Bank estimates, Caprio and Klingebiel (1996a). We discuss these at length below.

[5]Of course, one can also argue the opposite — that the increasing severity of recessions, occurring for independent reasons, was responsible for the growing frequency of banking crises. Economic historians have argued for this direction of causality, as in Gorton (1991) and Calomiris and Gorton (1991).

and Norway experienced severe banking crises in the late 1980s and early 1990s (with resolution costs of 4 to 10 per cent of GDP), along with recessions of unprecedented severity.[6]

Similar lessons can be drawn from the Latin American and Asian crises of the 1990s. It was the involvement of the banking system that distinguishes the Mexican crisis of 1994-5 from the Brazilian crisis of 1998-9 and explains why Mexico's recession was more severe and its recovery longer delayed than Brazil's. It is that banking systems became engulfed that explains the exceptional severity of the Asian crisis, and the relatively quick resolution of financial-sector problems that explains Korea's relatively rapid and robust recovery, in contrast to chronic problems elsewhere in the region.

Thus, the causes of banking crises, in emerging markets and generally, has become a key question for policy makers, prompting the growth of a large empirical literature. What this literature has not produced is agreement on the causes of banking crises. Among the leading suspects are lending booms, the exchange rate regime, destabilizing external factors, precipitous financial liberalization, inadequate prudential supervision, and weaknesses in the legal and institutional framework. Beyond this, however, consensus does not extend. Contested questions include the following. Is it mainly internal or external factors that set the stage for banking crises? Are fixed or flexible exchange rates more conducive to banking-sector problems? How important is domestic versus international financial liberalization? Does deposit insurance stabilize or destabilize banking systems? Should unusually severe business-cycle downturns be regarded as

[6] With GDP growth in Finland, the most dramatic case, swinging from +5 per cent in 1989 to -8 per cent in 1991. To be sure, the banking crisis was not the only factor involved in either Finland or Sweden (the collapse of Soviet trade and of property prices also belong on any respectable list), but it was a major one (Jonung, Soderstrom and Stymne 1996).

the cause or consequence of banking crises?

In part, the absence of consensus answers reflects problems intrinsic to this type of empirical work. Since there is no agreed-upon list of crises, different investigators focus on different episodes; they measure the dependent variable differently. Since they are concerned with different settings, they differ in including or excluding advanced industrial economies, transition economies, and low-income African economies. Since there is no single way of measuring the explanatory variables and no agreement on what explanatory variables to include, they do not obtain the same results concerning the impact of the latter.

This is not to imply, however, that nothing can be said. With sufficient sensitivity analysis it should be possible to determine which results are and are not robust. In this paper we use this approach in an attempt to determine what we know and what we don't know about the causes of banking crises in emerging markets. We employ a variety of different crisis-dating schemes, a variety of ways of measuring the independent variables, a variety of specifications, and a variety of estimators. To limit the field, we focus on emerging markets in the last 25 years.

2. The Literature

Table 1 is as good a summary as any of the literature on emerging market banking crises. It describes the approaches and findings of the principal contributions to the cross-country empirical literature.

The first systematic cross-country study of which we are aware is Demirguc-Kunt and Detragiache (1997), who considered the role of macroeconomic and institutional variables in 65 industrial and developing countries. They found that the risk of a banking crisis is heightened by

macroeconomic imbalances (slow growth, high inflation) and inadequate market discipline (which they attribute to the presence of deposit insurance and weak institutions). Their 1998 follow-up considered in addition the role of financial liberalization and found that recent liberalization (as proxied by the removal of interest-rate controls) further increased the likelihood of a banking crisis, but less so where the institutional environment (as proxied by the rule of law and the level of corruption) is strong. In a 2000 study they distinguish a variety of additional aspects of deposit insurance schemes (their funding, their coverage, etc.). Again they conclude that explicit deposit insurance tends to increase banking fragility, more so where bank interest rates are deregulated and the institutional environment is weak. They also find that deposit insurance has a stronger adverse effect when its coverage is extensive, when it is funded, and when it is run by the government rather than the private sector — all of which the authors take as signs of moral hazard.

Several of these themes are pursued by Rossi (1999), who develops a longer list of institutional and regulatory variables by limiting his sample to 15 developing countries.[7] However, Rossi's conclusions regarding the impact of domestic financial liberalization (proxied for by the level of domestic interest rates) contradict those of Demirguc-Kunt and Detragiache: where the level of deposit rates enters significantly, Rossi finds that it has a negative sign, suggesting that liberalization reduces crisis risk. Deposit insurance enters with the same positive sign as in the Demirguc-Kunt and Detragiache study but the coefficient never differs from zero at the 95 per cent confidence level.

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[7]And to the period 1990-97. The countries are Argentina, Brazil, Chile, Colombia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Philippines, South Africa, Thailand and Venezuela.

Hardy and Pazarbasioglu (1998) expand the range of macroeconomic indicators.[8] They too consider a relatively limited sample of countries (38 in number). Their main findings are that crisis risk rises when GDP growth rates fall, domestic credit growth is rapid, inflation is variable, and domestic interest rates and capital inflows are high.

The role of lending booms in setting the stage for banking crises has been a particular bone of contention. Gavin and Hausmann (1996) argue that lending booms have typically preceded banking crises in Latin America; Kaminsky and Reinhart (1999) verify this for their sample of 20 emerging markets, as do Gourinchas, Valdes and Landerretche (1999) for a different sample of countries.[9] However, Caprio and Klingebiel (1996b) find little evidence of a link between lending booms and banking crises.

Eichengreen and Rose (1998) emphasize instead the role of external factors, finding that higher world interest rates and slower world growth strongly increase the probability of crises in emerging markets. On the other hand, they find little evidence of a connection between crises and the exchange rate regime. One of these authors (Eichengreen 2000) subsequently reestimated the Eichengreen-Rose model with five additional years of data. With the expanded time frame, the role of external factors turns out to be weaker (suggesting that there was something different about the 1997 crises).

The subsequent literature has proceeded in three directions. One strand distinguishes different parts of the world. Thus, Hutchison (1999) attempts to ascertain what is distinctive

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[8]Their objective is to construct an early warning system, so the institutional variables are of relatively little interest, given that these change only slowly over time.

[9]Honohan (1997) similarly finds that domestic lending booms predict subsequent banking crises.

about Europe's banking crises, while Hutchison and McDill (1999) ask what is distinctive about the Japanese banking crisis. A second strand pursues the links between currency and banking crises. The pioneering study here, by Kaminsky and Reinhart (1999), concludes that banking crises contribute to currency crises (rather than the other way around), and that recent financial liberalization sets the stage for banking crises (a la Demirguc-Kunt and Detragiache). Glick and Hutchison (1999) reach similar conclusions for a larger sample of countries: while banking crises predict currency crises, the converse is not also true; and recent financial liberalization is the most powerful single predictor of banking-sector problems.

The third strand of work focuses on the connections between the exchange rate regime and external shocks. For a sample of 41 developing countries, Mendis (1998) finds that adverse external shocks are less likely to precipitate banking crises in countries with a flexible exchange rate regime. Less intuitively, he finds that a flexible rate limits vulnerability to terms of trade (real) shocks but not shifts in capital flows (monetary) shocks.[10]

Thus, only a limited degree of consensus has emerged from the recent literature. The role of lending booms is questioned. The predictive power of macroeconomic variables is contested. Whether deposit insurance weakens market discipline or provides insulation from depositor runs is disputed. The role of external factors and the exchange rate regime is uncertain. On the causes of banking crises in emerging markets, it is fair to say that the jury remains out.

3. Dating Banking Crises

A first reason different authors obtain different results is that they date crises differently.

[10]Where standard theory predicts the opposite.

While for currency crises it is possible to pinpoint crisis dates by constructing a numerical indicator of exchange market pressure (estimated as a weighted average of exchange rate changes, reserve changes and, where available, interest rate changes), quantitative measures of banking crises are more problematic. The value of nonperforming loans becomes available only with a lag, and even then official estimates of loan losses understate the problem. Because of the existence of deposit insurance and lender-of-last-resort intervention, depositor runs do not necessarily accompany banking-sector problems, making the change in the value of deposits a poor measure of banking-sector distress.

The typical approach, following Caprio and Klingebiel (1996a), is to use data on loan losses and the erosion of bank capital and make a judgement about whether an episode constitutes a crisis.[11] An episode is generally categorized as such if there is evidence that most or all of banking-system capital is eroded. Smaller, borderline banking crises where only a subset of financial intermediaries is affected require a heavier dose of judgement.

Frydl (1999) compares five lists of crisis dates, those of Caprio and Klingebiel (1996b), Demirguc-Kunt and Detragiache (1997), Dziobek and Pazarbasioglu (1997), Kaminsky and Reinhart (1996), and Lindgren, Garcia, and Saal (1996). In fact, not all of these studies warrant comparison insofar as the 1996 study by Caprio and Klingebiel is the root source of many of the other lists.[12] In addition, the lists used in Kaminsky and Reinhart's widely-cited study and

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[11]Typically, the judgements of the authors are supplemented by the judgements of country economists at the IFIs and national experts. This same approach is used by Bordo and Eichengreen (1999) in constructing historical banking-crisis dates.

[12]Caprio and Klingebiel have recently corrected some discrepancies in their earlier list and updated it through 1998 (see Caprio and Klingebiel 1999).

Dziobek and Pazarbasioglu's follow-up are partial in coverage: the former considers only 20 countries and excludes crises in Africa, which account for a large number of episodes, while the latter, though not excluding Africa, considers only 24 countries, rendering its list of crisis dates of dubious utility for comparative purposes.

In this section we concentrate on the following crisis lists: the corrected and updated Caprio-Klingebiel list (CK-99 for short), Demirguc-Kunt and Detragiache (DKD-97 for short), and Lindgren, Garcia, and Saal (LGS-96 for short). Initially, we consider crises through the end of 1995. To recapitulate, these lists have the following features.

- Caprio and Klingebiel (CK-99) includes episodes from the mid-1970s to 1998. It divides crises into systemic and non-systemic (i.e. smaller, borderline) events. It is based on published sources and interviews with experts familiar with particular episodes.
- Demirguc-Kunt and Detragiache (DKD-97) includes episodes from 1980 to 1995. It does not distinguish systemic and non-systemic crises. For an episode of to be classified as a crisis, non-performing assets as a share of total financial assets in the banking system must exceed 10 percent, the cost of a rescue operation must be at least two percent of GDP, banking sector problems must result in the large-scale nationalization of banks, extensive bank runs must have taken place, and/or emergency measures (deposit freezes, prolonged bank holidays, generalized deposit guarantees) must have been enacted.
- Lindgren, Garcia, and Saal (LGS-96) cover the late 1970s to 1995. They distinguish systemic episodes (also known as "crises") and non-systemic ("other significant") episodes. The former are instances marked by runs or other substantial portfolio shifts, collapses of financial

firms, or large-scale government interventions. The latter are episodes of unsoundness short of crises.

Table 2 compares the crisis dates in these three lists.[13] DKD-97 includes fewer crises since its authors do not cover a number of countries included in the other studies, not because they identify fewer crises in countries that are common to all three data sets.[14]

The classification of crises into systemic and non-systemic in CK-99 and LGS-96 (Table 3) paints a different picture. Although the vast majority of episodes considered by CK-99 are classified as systemic crises, the opposite is true in LGS-96.

While this comparison of dating schemes here considers only data through 1995, in analyzing the causes of banking crises it will be informative to include dates that come up as close as possible to the present.[15] For purposes of that analysis, we therefore use the updated CK-99 list, as well as an alternative series due to Glick and Hutchison (1999). Glick and Hutchison (GH-99 for short) supplement DKD-97 with CK-99 and, to a lesser extent, LGS-96 and national and international sources.

Table 4 compares CK-99 and GH-99, the two alternative lists available up through 1997. Since GH-99 draws on CK-99, it is not surprising that their two lists are highly correlated. With

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[13]For consistency, only non-transition developing countries are considered. To be precise, Table 2 and its sequels consider the year of onset of each crisis, since these data sets typically provide a span of years during which each crisis persisted.

[14]For instance, DKD-97 count 46 developing-country crises between 1980 and 1995, while CK-99 count 69 developing-country systemic crises in the same period. In the countries that overlap, they only differ in 9 episodes. If we redefine CK-99 to include both systemic and non-systemic crises, there are only 3 discrepancies between DKD-97 and CK-99 in the countries and years that overlap.

[15]Given the controversy surrounding the causes of the Asian crises.

2231 common observations covering the years 1975-1997, the correlation of their crisis dates is 0.92. The correlation is lower when we separate systemic and non-systemic crises (the respective correlations for the two subgroups are 0.85 and 0.82), indicating some disagreement about what constitutes a systemic crisis.

4. Data, Methodology and Benchmark Results

Given the preceding, we focus on the updated Caprio-Klingebiel crisis dates through 1997.[16] In our baseline regressions, we consider only CK-99's systemic crises.[17] While crisis dates for 122 developing countries can be constructed from CK-99, the availability of data on the independent variables limits us to 75 developing countries.[18] There is good reason for thinking that banking crises in developing and developed countries differ. Banks account for a larger share of total assets of financial institutions in developing countries. The maturity of bank liabilities is typically shorter, supervision and regulation is typically less well developed, and opportunities to hedge external risk are fewer (Rojas-Suarez and Weisbrod 1996).

We partition the sample into crisis and noncrisis following Eichengreen, Rose and Wyplosz (1996), constructing two-sided, three-year exclusion windows around each crisis to

[16]Where results differ when alternative measures of the dependent variable are used, we report these discrepancies in Appendices B and C and in subsequent footnotes.

[17]It turns out that the results of estimating the baseline model are robust to redefining the dependent variable as all CK-99 crises (including the so-called "nonsystemic").

[18]We add OECD countries to the sample where previous studies and our own sensitivity analysis suggest that this extension of the country sample is important.

capture the observed persistence of banking crises. This gives us 78 crisis episodes and 2248 non-crisis observations.[19]

All regressions include a standard list of macroeconomic variables: international reserves as a percentage of monthly imports, external debt relative to GNP, the current account relative to GDP, the government budget surplus relative to GNP, real exchange rate overvaluation, the ratio of M2 to reserves, the rate of domestic credit growth, the rate of growth of GNP per capita, the OECD growth rate, and a weighted average of interest rates in the advanced-industrial countries.[20]

Figure 1 shows the behavior of these macroeconomic and financial variables around the crisis dates (denoted by the vertical lines). In each panel, the horizontal line is the mean for the noncrisis observations, and the values of the variables for the crisis cases are surrounded by two-standard-error bands. Some interesting patterns are evident. Growth rates decline in the period preceding the crisis (relative to the behavior of the typical non-crisis country), bottoming out in the crisis year and the year subsequent. There is evidence of domestic credit booms preceding banking crises. On the other hand, while there is also some evidence of declining OECD growth in the run-up to crises, the overlap between the horizontal line and the two-standard-error bands

[19]When (in Appendix B) we substitute GH-99, we have 77 crisis episodes and 1657 noncrisis observations. For purposes of this exercise, "crisis" means year of onset. Thus, if a crisis lasts more than one year, we only consider the year of its onset and disregard the subsequent observations.

[20]This is the same baseline model used in Eichengreen and Rose (1998), where the specification is more fully justified. For purposes of this paper, we exclude Korea and Mexico from the "OECD" classification, despite the fact that they entered the OECD toward the end of the sample period.

makes it impossible to reject the hypothesis that OECD growth rates are no different in the run-up to crises than in tranquil periods.

We estimate probit regressions by maximum likelihood. All observations are weighted by per capita GNP.[21] In some cases it matters whether the explanatory variables are lagged. Consider for example the exchange rate regime. As Kaminsky and Reinhart (1996) have shown, banking crises often lead to currency crises which force a currency peg to be abandoned in favor of floating. Since the data on exchange rate regimes used by most authors are for the end of the calendar year, if the explanatory variables are not lagged then one is likely to observe a contemporaneous correlation between floating and the incidence of banking crises and infer that floating causes banking-sector problems. In fact, floating could equally well be the result of banking-sector problems, as Kaminsky and Reinhart argue.[22] Or consider growth and banking crises. Previous investigators have found that a declining rate of economic growth is associated with an increased incidence of crises. Interpretation is problematic, however, because banking

[21]Following Eichengreen and Rose (1998). This procedure attaches more weight to middle-income developing countries, which is sensible given data-quality considerations. In practice, regressions using unweighted observations yields similar results. While we report unadjusted standard errors for ease of comparison with other studies, we also computed heteroscedasticity-robust (Huber/White) standard errors which differed little in practice. We also estimated robust standard errors adjusted for the clustering of within-country observations (thus relaxing the assumption of within-country independence), again obtaining similar results. The robustness of the baseline results to these alternatives is documented in Appendix Table C1. Unless noted otherwise in subsequent footnotes, subsequent regressions were similarly insensitive to the use of these alternative estimators.

[22]We pursue this point in Section 5 below.

crises plausibly reduce the rate of economic growth. To minimize simultaneity, we lag our explanatory variables by one year in all regressions reported below.[23]

Table 5 reports our basic regressions, in the first column for the full period through 1997, in the second column through 1992 for comparison with earlier studies.[24] Domestic credit booms are strongly associated with banking crises; this appears to be one of our most robust results. Low reserves (relative to the liabilities of the banking system, as proxied by M2) may be another symptom of rapid credit growth that sets the stage for crises.[25] In addition, the anomaly noted by previous investigators, that budget *surpluses* rather than deficits are associated with banking crises, is confirmed for both periods. However, this result appears to be driven by the collinearity between the budget balance and other regressors like the debt/GNP and current account/GDP ratios. Indeed, the twin-deficits hypothesis suggests a strong positive correlation between the current account and the budget deficit, as is evident in the data. Eliminating these regressors

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[23]A final reason for lagging the independent variables one period is that crises tend to be recognized with a lag. The results, aside from the examples mentioned in this paragraph, are generally robust to substitution of the alternative lag structure. Where this is not the case, we mention so in subsequent footnotes.

[24]Although we refer to "coefficients," for ease of interpretation we report dF/dx, the change in the probability of a crisis given a change in the regressor, evaluated at the mean of the regressor, except when dealing with binary independent variables, which show the effect of a discrete change from zero to one in the value of the dummy. A constant term is included in all equations but not reported in the tables. As mentioned above, we also ran the probit regressions with contemporaneous values of the explanatory variables (instead of first lags). We reached similar conclusions, with the exception of output growth, which is negative and significant, underscoring the problem of reverse causality between output fall and crisis onset.

[25]Previous studies reporting similar findings can be criticized on the grounds that reserve losses are as plausibly a consequence as a cause of banking crises (given the findings of the twin-crisis literature). Since this result continues to come through strongly when we lag the independent variables by one period, we are skeptical that all we are picking up is reverse causality.

(and/or Northern interest rates) eliminates the positive coefficient on the budget surplus. Thus, we are inclined to take this last result with a grain of salt.[26]

5. External Factors and Exchange Rate Regimes

The role of external factors has been a flashpoint in the literature on banking crises. Economists convinced of the need for changes in the international financial architecture have pointed to the sharp tightening of credit in the advanced-industrial core and to slowdowns in OECD-country growth as setting the stage for financial difficulties in emerging markets.[27] They point to the Volcker disinflation — the dramatic monetary tightening and recession in the United States in 1979-81 — as setting the stage for debt and banking problems in Latin America in 1982. They similarly point to monetary tightening in the United States in 1994 as setting the stage for the Mexican crisis. Others are inclined to dismiss this emphasis on external factors as an attempt to divert attention from policy problems in the emerging markets. They observe that it is harder to point to external factors which could have contributed to Asia's difficulties in 1997.

Eichengreen and Rose (1998), in one of the first empirical studies of the issue, found a strong effect of external factors -- OECD interest rates in particular, OECD growth rates to a lesser extent -- on the probability of banking crises. However, they used data only through 1992. Updating these results through 1997, Eichengreen (2000) found less evidence of an OECD effect.

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[26]While the current account balance/GDP ratio is insignificant in the baseline regressions, it is actually significant (and intuitively negative) in many regressions.

[27]See for example Calvo, Leiderman and Reinhart (1993), Goldstein and Turner (1996), and Taylor and Sarno (1997). The literature on this subject is reviewed in Eichengreen and Fishlow (1998).

This could reflect the fact that tightening global credit conditions (rising U.S. and European interest rates in particular) were less evident in the run-up to the Asian crisis in 1997 than in the episodes which preceded it (Eichengreen and Mathieson 1998). There is a further complication, as Mendis (1998) notes: the impact of external factors will vary with the exchange rate regime, which may or may not insulate the domestic banking system from shocks, depending on the nature of the regime and of the shocks involved.

Some light can be shed on these questions by the coefficients in Table 5 on growth and interest rates in the advanced industrial countries. For the period ending in 1992, we confirm the Eichengreen-Rose result that higher Northern interest rates and slower Northern growth raise crisis risk. But when the sample is extended through 1997, the interest-rate effect is weaker This suggests that the banking crises of the mid-1990s have been different: external factors (as proxied by the Northern variables) have played a smaller role, internal factors a larger one.[28]

Table 6 shows that the incidence of crises is 3 per cent when the exchange rate is fixed, 7 per cent when it is floating, and 6 per cent for intermediate regimes.[29] But does the role of the exchange rate regime remain once we control for other variables? There is some evidence in Table 7 that fixed rates tend to be associated with a lower incidence of banking crises and that intermediate regimes are associated with a higher one (floating rates being the omitted alternative in both cases). But when proxies for both fixed and intermediate regimes are included in the same equation, neither differs significantly from zero at standard confidence levels. Thus, neither effect

[28]This post-1992 change also emerges when we use GH-99 as the alternative source of our dependent variable (see Appendix Table B1).

[29]We can decisively reject that its incidence is the same across these three regimes.

is robust.[30] It would appear that countries with fixed and flexible rates are equally susceptible to banking crises. This is inconsistent with the beliefs of the "double mismatch" school, according to which exchange rate fluctuations are conducive to banking-sector problems through their interaction with currency and maturity mismatches on financial institutions' balance sheets (Hausmann et al. 1999). But it is also inconsistent with the assertions of those who criticize soft pegs like those which prevailed in Asia prior to its crisis for encouraging the accumulation of unhedged exposures (Lindgren, Balino, Enoch, Gulde, Quintyn and Teo 1999), and those critical of hard pegs and currency boards for hamstringing the lender-of-last-resort function (Wood 1999).[31]

To probe the robustness of this result, we redefined our measure of the exchange-rate regime in variety of ways.[32] Reinhart (2000) questions the IMF's official classification of exchange rate arrangements, observing that more than a few countries officially classified as floating limit the flexibility of their exchange rates in practice. Following Eichengreen and Rose (1998), we therefore included two measures of the actual stability/variability of the nominal rate:

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[30]Unweighted, robust, and clustered estimates also yield coefficients insignificantly different from zero regardless of whether the "fixed" and "intermediate" dummies are included together. We also substituted the GH-99 crisis dates for CK-99; reassuringly, the findings again carry over (as shown in Appendix Table B1). The evidence that fixed rates are associated with a lower incidence of crises is more robust if we end the sample in 1992, but, as Table 7 shows, this effect is not robust when we use data through 1997.

[31]The incidence of banking crises in a number of the hard peg countries in our sample — notably Argentina and Panama — and the fact that a number of floating-rate countries — India for example — have been immune from serious banking crises raises questions about both assertions. The econometric evidence indicates that these exceptions are prevalent enough to lead to rejection of both hypotheses.

[32]We report these results in Appendix Table C2.

one a dummy variable for cases where the exchange rate changed by less than 5 per cent in the last year, the second an analogous dummy with a 10 per cent variability cutoff. Adding these exchange-rate-stability measures to the benchmark specification for the same year as the dependent variable (that is, both the onset of the banking crisis and the rate of depreciation of the exchange rate are for the same calendar year), we find strong negative coefficients on currency stability (which differ from zero at the 99 per cent confidence level in both cases).[33] But once the stability of the exchange rate is lagged a year, these effects disappear: it is impossible to reject the null that the coefficients on these variables in fact equal zero at any reasonable confidence level.[34] This inclines us to interpret the relationship of exchange-rate variability and banking crises in terms of reverse causality: banking crises force the abandonment of implicit or explicit currency pegs, as argued in the "twin-crisis" literature.[35]

As a further sensitivity check, we constructed a Frankel-Rose (1996) measure of currency crashes (a dummy variable that equals one when the first difference of the log of the exchange rate exceeds 25 per cent and the rate of depreciation accelerated by at least 10 per cent). Again, we found a stronger effect of currency crashes in the current year than of currency crashes in the preceding year, consistent with the view that the correlation reflects causality running from banking crises to currency crises rather than the other way around.[36] The implication is that the

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[33]Eichengreen and Rose (1998) report the same finding.

[34]And the point estimates are now positive, not negative.

[35]See e.g. Kaminsky and Reinhart (1999), Rossi (1999) and Glick and Hutchison (1999).

[36]Although neither effect was significant at standard confidence levels (see Appendix Table C2).

Indonesian syndrome where a currency collapse precipitates a banking collapse is not all that common.[37]

Theory (and results reported by Mendis 1998) suggests that the association of the exchange rate regime with banking crises should depend on the source of shocks and, conversely, that the effects of shocks should vary with the exchange rate regime. Table 8 therefore interacts two measures of the severity of external shocks (net capital flows as a percentage of GDP, and the percentage change in the terms of trade) with the dummy for floating rates. When we use observations through 1992, these interaction terms enter with significant coefficients but implausible signs; rather than helping to insulate the banking system from capital-account and terms-of-trade shocks, floating rates appear to do the opposite.[38] We are not inclined to place too much stock in these results, however, for these effects evaporate when we extend the data set through 1997.[39] And the dummy variable for floating-rate regimes entered in levels (as opposed to the interaction term) is insignificant regardless of time period. While the conclusion of Gavin and Hausmann (1996, p.29), that "when banking systems are fragile, some degree of exchange rate flexibility will reduce the likelihood that an averse shock will be transformed into a highly disruptive banking crisis..." remains appealing on intuitive grounds, the evidence for it is weak.

The unavoidable conclusion is that contrary to assertions by the advocates of fixed and

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[37]As Glick and Hutchison (1999) put it, "the occurrance of banking crises provides a good leading indicator of currency crises in emerging markets....The converse does not hold, however, as currency crises are not a useful leading indicator of the onset of future banking crises."

[38]As suggested by Hausmann et al. (1999).

[39]In addition to the first difference of the log of terms of trade, and following Mendis (1998), we also experimented with the deviations of the long-term trend (i.e. time-averaged mean) country-specific terms-of-trade index. We again obtained insignificant results.

flexible rates alike, there is no stable association between the exchange rate regime and banking crises.

6. Financial Liberalization

There are many exponents of the view that financial liberalization heightens the risk of banking crises. Table 9 shows a two-way partition of observations into cases of domestic financial liberalization/control and banking crises/periods of tranquility.[40] A Pearson chi-squared test rejects the null that these distributions are the same and suggests that crises are more likely when domestic financial markets are liberalized.

But the evidence regarding capital-account liberalization is weaker. While banking crises have actually been more frequent when capital accounts are closed than when they are open (Table 10), this difference only borders on statistical significance. The Pearson chi-squared test rejects the null of equal distributions at the 94.9 per cent (but not the 95 per cent) confidence level.

Convincing conclusions require controlling for other determinants of crisis risk. The most widely-cited source of evidence is Demirguc-Kunt and Detragiache (1997), who find that recent liberalization (as proxied by the removal of interest-rate controls) increases the risk of a banking crisis.[41] But these authors do not distinguish domestic from international financial liberalization (where critics of financial globalization point accusing fingers at the latter). Table 11 therefore

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[40]The liberalization dummy is lagged one period relative to the crisis dates, paralleling the procedure we follow in the multiple regressions.

[41]Kaminsky and Reinhart (1998) similarly report that financial liberalization preceded banking crises in 18 of the 25 crisis cases in their sample.

adds to our baseline model dummy variables for both domestic financial liberalization (proxied for by deposit rate decontrol) and an open capital account. The former enters with a strong positive coefficient which differs from zero at the 99 per cent confidence level, confirming Demirguc-Kunt and Detragiache's finding that domestic financial liberalization heightens crisis risk, presumably by facilitating risk taking by intermediaries.[42]

In contrast, the dummy variable for capital-account liberalization displays a zero coefficient when entered in levels and when interacted with domestic liberalization.[43] To be sure, the binary measure of capital-account openness constructed from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* is a blunt measure of external liberalization. An alternative is to focus on outcome- rather than policy-input-based measures and to substitute gross capital flows as a percentage of GDP (with the numerator constructed as the sum of inflows

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[42]When we use the Glick-Hutchison crises (in Appendix Table B2), the domestic financial liberalization dummy is even more strongly significant, documenting the robustness of this result. These conclusions are robust to alternative estimation methods (which take the clustering of observations into account, do not weight by GNP, and calculate robust standard errors). The literature suggests a number of explanations for this association of financial liberalization with the risk of banking crises. Bank credit managers accustomed to a controlled financial environment may not possess the skills needed to evaluate additional sources of credit and market risk. The intensification of price competition may pressure banks to undertake riskier activities. While interest-rate decontrol might not seem like the ideal empirical proxy for financial liberalization, Hellmann, Murdock and Stiglitz (2000) show that allowing banks to compete for deposits on price in an environment characterized by insurance guarantees can lead to a reduction in franchise values and a significant increase in risk-taking by financial intermediaries. Our results support their intuition.

[43]This confirms a result obtained by Rossi (1999) for a much more limited list of countries and years. Since capital-account liberalization creates pressure for greater exchange-rate flexibility, we worried that the capital-account liberalization measure might also be picking up the effects of the exchange rate regime. We therefore added a dummy for floating rates to the regressions discussed in the text, but since the additional variable was never significant and did not alter the coefficients on the liberalization measures, we ended up excluding it.

and outflows, both in absolute-value terms) as a measure of external liberalization. When entered in levels, this measure has no significant impact on crisis risk. Strikingly, however, when capital flows and domestic financial liberalization are interacted, they enter with a positive coefficient that differs from zero at the 95 per cent confidence level. We get the same result when we instead interact domestic financial liberalization with *net* capital inflows — that is, inflows net of outflows.[44] This suggests an interpretation in terms of the Hellmann-Murdock-Stiglitz (2000) hypothesis, that external liberalization allows banks entitled to engage in price competition for deposits to lever up their bets.[45]

7. Deposit Insurance

Many economists would argue that the extent of these risks depends on the nature of the financial safety net and the quality of supervision and regulation. Some (e.g. Demirguc-Kunt and Detragiache) would argue that deposit insurance increases crisis risk by weakening market discipline and encouraging excessive risk-taking. Others (e.g. Gropp and Vesala 2000) would insist that deposit insurance plays a stabilizing role by removing the depositor-panic problem and that this dominates any adverse effect on market discipline.

In Table 12 there is no obvious difference in the frequency of crises in countries with and

[44]As in our analysis of Mendis's hypothesis, above.

[45]A complementary interpretation, advanced by Calvo and Goldstein (1996), is that capital-account liberalization heightens crisis risk by making it easier for depositors fearful for the stability of the banking system to substitute foreign for domestic assets. A rival interpretation, that financial stability is threatened by external liberalization prior to domestic financial decontrol and the removal of implicit guarantees -- the Goldstein (1998)-Dooley (2000) interpretation of the Asian crisis -- receives little support.

without deposit insurance.[46] But DKD (1997, 2000) conclude on the basis of their regression analysis that deposit insurance heightens crisis risk. Strikingly, we find the opposite in Table 13. That Hutchison (1999) and Rossi (1999), for their part, report insignificant coefficients for deposit insurance underscores that there is less than complete consensus on this issue. Also striking is that the Huchison-McDill (1999) moral-hazard variable — the interaction of deposit insurance with domestic financial liberalization — has no consistent effect.[47]

Two factors appear to account for the difference between our Table 13 results and those of DKD: we consider different countries, and we use a different deposit insurance series. The preceding result use the CK-99 crisis dates, which are available for a substantially larger set of developing countries and a longer period. When we limit the sample to developing countries included in DKD (2000) and follow their deposit insurance coding, we are able to replicate their finding of a positive and significant coefficient on deposit insurance.[48] But when we substitute

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[46]In this case, the Pearson chi-squared test fails to reject the null of equal distributions at standard confidence levels.

[47]The effect is somewhat stronger when we use the GH-99 crisis dates, as in Table B3, but only in some specifications, and we are still unable to reject the null of a zero coefficient at standard confidence levels.

[48]Not reported. However, this coefficient is insignificant when we do not weight the observations, as emphasized below. We use DKD's crisis dates, though the choice between DKD and CK-99 is inconsequential once we limit the sample to the subset of developing countries considered by DKD. Hence, from this point onward, we use the same crisis list as DKD (2000). While DKD-2000 includes crises up to 1997, it actually covers fewer countries than DKD-97. Nevertheless, we prefer DKD-2000 because the inclusion of the recent Asian crises provides information which is lost when the sample ends in 1995, and because this is the crisis list used by DKD in their paper dealing exclusively with deposit insurance. (Reassuringly, using DKD-97 and DKD-2000 yield similar results, except when, for sensitivity purposes, we add industrial countries and an OECD dummy -- a point to which we return below. Given the number of robustness checks we undertake in this section, we do not report the regressions using DKD-97.)

our preferred measure of deposit insurance (from GH-99), this coefficient no longer differs significantly from zero at standard confidence levels.[49] While the two series for deposit insurance are almost identical for the countries and years they have in common (their correlation is 0.99), their coverage differs: the GH-99 deposit insurance series is available for 56 developing countries, while the DKD deposit insurance series is available for only 41.[50] In other words, considering more countries -- which are available when we use the GH-99 deposit insurance series and the CK-99 crisis dates, both of which are available for more countries than their DKD counterparts -- weakens the result.[51]

The effect of adding OECD countries, where deposit insurance is more prevalent, turns

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[49]As shown in Appendix Table C3.

[50]There are only three discrepancies between the two deposit insurance series -- for Argentina in 1992, 1993 and 1994, when DKD code deposit insurance as present but GH-99 code it as absent. The fact is that Argentina abolished an extremely broad and generous deposit insurance scheme in 1992 and then reinstituted a limited one (funded by the private sector) in 1995 (Calomiris and Powell 2000). DKD (2000) do not include Argentina in their sample, while we do. This is another reason why we prefer the GH-99 deposit insurance series.

[51]As mentioned before, the differences between our results and DKD's appears to reflect the larger sample of countries and years we use: while DKD-2000 have 34 emerging-market crises in the period 1980-1997, CK-99 have 76 emerging-market systemic crises in the same years. In all, there are eight discrepancies between the crisis coding in DKD-2000 and CK-99's systemic crises (the variant considered here) for countries and years that overlap. Six are cases where DKD code crises and CK-99 code ***nonsystemic*** crises. But when we use all CK-99 crises as the dependent variable (and not just the systemic crises), eliminating three-fourths of the discrepancies in the coding of the dependent variable, the results we report in the text are unchanged. Therefore, it is not discrepancies in what is considered a crises but rather differences in country and year coverage between the two lists of crisis dates that explain the differences in results. Note that while the regressions reported in DKD (1997, 2000) have more observations, ours have more crises. The main reason we have fewer non-crisis observations is our three-year, two-sided exclusion window, which DKD do not use.

out to be more complex.[52] If we use the DKD-2000 crisis list for both developed and developing countries together with our preferred GH-99 deposit insurance measure, the coefficient on deposit insurance again turns positive and significant.[53] But this result is sensitive to weighting observations by GNP per capita, as we do in most of our analysis.[54] Weighted regression places particularly heavy weight on the OECD countries, which appear to be driving these results. In unweighted regressions, the significant coefficient on deposit insurance vanishes, regardless of the crisis list used.[55]

Thus, there is at least as much evidence that deposit insurance has favorable effects — that it provides protection from depositor panics — as that it destabilizes banking systems by weakening market discipline in emerging markets.[56] But neither effect is robust. Probably the

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[52]Out of 1326 developing-country observations, only 225 have deposit insurance; on the other hand, out of 504 developed-country observation, 322 have deposit insurance.

[53]See column 5 of Appendix Table C3. Using the joint LDC/OECD sample requires us to drop the debt/GNP ratio and the "northern" variables (industrial-country interest rates and OECD output growth). Table C3 (columns 3 to 6) and Table C4 include the remaining seven regressors (although we do not report their coefficients). If we use the CK-99 systemic crises, the coefficient on deposit insurance weakens, as reported in column 3 of Appendix Table C3.

[54]As noted elsewhere, most of our other results are insensitive to this weighting scheme. The effect of deposit insurance is an important exception.

[55]The sensitivity of the results for deposit insurance to the inclusion of OECD countries and their weighting suggests adding an OECD dummy to see whether this affects the deposit-insurance coefficient. There is weak evidence that OECD countries are less likely to suffer banking crises, ceteris paribus, as reported in Appendix Table C4. The OECD dummy performs poorly when we use DKD-97 (not reported) instead of DKD-2000, reflecting the relatively large number of emerging-market crises after 1995. More importantly, the DKD deposit insurance result obtains even after including the OECD dummy. However, once we use unweighted regressions (again, not reported), any significant coefficient of deposit insurance vanishes, while the coefficient of the OECD dummy still displays a marginal significance.

[56]This same result obtains whether or not we lag the independent variable(s).

most judicious conclusion is that there is no consistent effect. The deeper investigation also provides a reminder that small differences in coding, sample and estimation can have an important impact on the results. Even significant coefficients should not be overinterpreted, in other words.

8. Institutional Quality

The argument that crisis risk is greatest where institutions are weak is straightforward and intuitive. Where supervision and regulation are weak, banks will have the most scope to indulge in excesses.[57] Where contract enforcement is poor, banks are most likely to be left holding the bag when credit boom turns to credit bust, because loans go bad and because of the difficulty of seizing collateral.[58]

But does the evidence support this presumption? Table 13 also addresses the hypothesis that stronger domestic institutions reduce crisis risk.[59] We proxy institutional quality by an index of law and order which is available for 52 countries.[60] Since this index runs from 0 to 6, with

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[57]Thus, Drees and Pazarbasioglu (1998, p.21) emphasize that in the Nordic countries "little emphasis was placed at the time of deregulation on strengthening and adapting prudential safety-and-soundness regulations to the new competitive environment, in particular in the areas of real estate and foreign currency lending."

[58]As Goldstein and Turner (1996, p.24) put it, "If the legal system makes it difficult to seize or to transfer the collateral behind delinquent loans, or for debtors to pledge collateral for bank loans, or to adjudicate cases of corporate or individual bankruptcy, then both banks' credit losses and the cost of borrowing for firms will be (abnormally) high."

[59]In addition to the destabilizing effects of deposit insurance, DKD also find that crises are less likely when the institutional environment is strong. See DKD (1997, 1998, 2000).

[60]This series is available for 1985-95 in our data set. In order to cover the entire 1975-97 period, we use time-averaged values per country for this index in our regression analysis. In fact, using the original series (i.e. without time-averaging them) yields very similar results (not reported), since these indices change slowly over time.

larger values indicating stronger institutions, we anticipate a negative coefficient. While the coefficient is indeed negative, it does not differ significantly from zero at standard confidence levels. An alternative measure, reliability of contract enforcement, yields only a slightly stronger coefficient (with a t-statistic of 1.6).[61]

We next consider the interaction of institutional quality with deposit insurance, the argument being that moral hazard and the erosion of market discipline should be most pronounced where institutions are weak. Disappointingly, neither deposit insurance nor the product of deposit insurance and rule of law enters with a coefficient that differs significantly from zero at standard confidence levels. When we include only the interaction term, however, the coefficient is significantly different from zero at standard confidence levels. And when we substitute contract enforcement for rule of law, the coefficient remains negative (and the t-statistic rises to 2.41). There is some support, in other words, for the hypothesis that the interaction of weak institutions and deposit insurance is a source of moral hazard.

In parallel with the literature on deposit insurance, it has been argued that weak domestic institutions magnify the risks of financial liberalization. We test this by interacting deposit insurance with institutional quality. We find no support for the hypothesis when we use as a proxy for institutional quality respect for law and order, the measure available for the largest number of developing countries. When we proxy institutional development by the quality of contract enforcement and limit the analysis to a smaller country sample that is usable in this case,

[61]We again used time-averaged values for the series. When we use the GK-99 crises, the contract enforcement variable performs more strongly, consistently displaying the expected negative sign and differing from zero at standard confidence levels. One should be cautious not to overinterpret this result, since the contract-enforcement index is only available for a limited sample of 24 countries for the period 1980-95.

the results are somewhat more supportive: the interaction of institutional quality and domestic liberalization enters with the expected negative coefficient (so long as the dummy variable for domestic liberalization is also included) but falls short of statistical significance at standard confidence levels.[62]

We used sensitivity analysis to identify the source of the differences between our results and those of previous investigators. It appears that weighting of observations and treatment of OECD countries is key. When the sample is limited to the developing countries in DKD-2000, the law and order index displays a pleasing negative sign and significant coefficient. While we continue to get a negative coefficient when we add observations for OECD countries, the addition of an OECD dummy (which enters negatively) reduces the coefficient on the institutional index to insignificance.[63] Moreover, once we use unweighted observations, the coefficient on the institutional quality variable becomes uniformly insignificant regardless of the crisis list used, of the inclusion of OECD countries, and of the presence or absence of the OECD dummy. These results convince us that findings for institutional quality are fragile and that implications for policy

[62]Does this last pair of results reflect differences in how the two measures capture the quality of the relevant institutions or differences in country sample? To get at this, we re-estimated our equations for financial liberalization and institutions using rule of law as a measure of institutional quality while limiting the sample to the smaller number of countries for which we also have data on contract enforcement. (In this smaller sample of developing countries, the correlation of the two (time-averaged) measures of institutional quality is 0.57. When we include industrial as well as developing countries, the correlation rises to 0.74.) The results are unchanged; in other words, it is not the country coverage of the two indices that is driving the difference in results.

[63]As columns 3 and 6 of Table C4 show. The correlation between the OECD dummy and the law and order index is 0.82. In other words, there are fewer banking crises in OECD countries where institutions are stronger. But OECD countries plausibly differ in other respects as well, some of which can be even more difficult to measure. Thus, dummying out the OECD countries robs the institutional-quality index of much of its explanatory power.

should be drawn with caution.

9. Conclusions and Implications

What have we learned from running ten thousand regressions? One way of organizing the results is to distinguish the robust from the fragile. Among the robust causes of banking crises in emerging markets are rapid domestic credit growth, large bank liabilities relative to reserves, and deposit-rate decontrol. This suggests that bank stability in emerging markets is at risk when macroeconomic and financial policies combine with financial deregulation to create an unsustainable lending boom. Monitoring borrowers becomes more difficult when the volume of lending rises rapidly; hence, the quality of loans declines. Macroeconomic policies conducive to rapid credit growth and financial overheating generally (allowing bank liabilities to grow large relative to international reserves) set the stage for these problems. Domestic interest-rate liberalization, which allows banks to compete for deposits, finances these unsustainable lending activities, while the associated reduction in franchise values encourages the pursuit of risky activities. There is also some indication that external liberalization which is allowed to give rise to large inflows further heightens those risks, especially when domestic financial institutions are allowed to compete for deposits on price.

These results should resonate with the European audience for which this paper was written. In all three Nordic countries experiencing banking crises in the early 1990s, for example, the crisis was preceded by liberalization of banks' funding sources and very significant deregulation-related credit booms. In Norway, the ratio of bank loans to GDP increased from 40 per cent in 1984 to 65 per cent in 1988. The surge in lending occurred later in Finland and

Sweden but was equally dramatic, rising between 1984 and 1990 from 55 to 98 per cent in Finland and from 41 to 58 per cent in Sweden. In all three cases the increase in funding opportunities and reduction in franchise values (coming on top of inadequate levels of capitalization) encouraged the rapid growth of bank lending.[64] In all three cases there followed a credit-financed surge in capital formation and deterioration in the current account balance, neither of which proved sustainable.[65] In all three cases there was a reluctance to tighten monetary conditions despite the sharp growth of lending and private indebtedness.

On the other hand, there is little evidence of any particular relationship between the exchange-rate regime and banking crises. Different results obtain for different specifications and different classifications of exchange-rate regimes. We suspect that those who have imputed a strong effect of the exchange rate regime on banking-sector stability may have inverted cause and effect. There is little reason to think that a particular exchange rate regime — be it a free float, a currency board, or something else — will magically dissolve the problem of banking-sector instability.

Another fragile finding is the weaker the institutional environment, the greater the risks of financial liberalization. While the logic for this argument is clear, the evidence for it is not robust. Whether this lack of robustness reflects the crude nature of these institutional proxies, their incomplete country coverage, or the secondary role of contract enforcement and the rule of law is

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[64]"Fearing that they could lose ground in the vigorous competition touched off by liberalization, many banks, in particular some large ones, pursued aggressive lending policies as a premptive response and were prepared to accept higher risk. In this context, the aggressive lending behavior of the Finnish savings banks following a loss of market share in the early 1980s may not be surprising in hindsight." Drees and Pazarbasioglu (1998), p.20.

[65]See Lehmussaari (1990).

clearly an important topic for further investigation.

Similarly, the evidence that deposit insurance, by weakening market discipline, heightens crisis risk in emerging markets is of questionable robustness. There is at least as much evidence that deposit insurance reduces crisis risk by solving the depositor-run problem than there is of it encouraging crises by weakening market discipline. Again, these are questions deserving of additional research. But until that research is completed, these arguments should be made with circumspection.

References

Bernanke, Ben (1983), "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *American Economic Review* 73, pp.257-276.

Bernanke, Ben and Harold James (1991), "The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison," in R. Glenn Hubbard (ed), *Financial Markets and Financial Crises*, Chicago: University of Chicago Press, pp.33-68.

Bordo, Michael and Barry Eichengreen (1999), "Is Our Current International Financial Environment Unusually Crisis Prone?" in David Gruen and Luke Gower (eds.), *Capital Flows and the International Financial System*, Sydney: Reserve Bank of Australia, pp.18-75.

Calomiris, Charles and Gary Gorton (1991), "The Origins of Banking Panics: Models, Facts, and Bank Regulation," in R. Glenn Hubbard (ed), *Financial Markets and Financial Crises*, Chicago: University of Chicago Press, pp.109-173.

Calomiris, Charles and Andrew Powell (2000), "Can Emerging Market Bank Regulators Establish Credible Discipline? The Case of Argentina, 1992-1999," NBER Working Paper no. 7715 (May).

Calvo, Guillermo and Morris Goldstein (1996), "Crisis Prevention and Crisis Management after Mexico: What Role for the Official Sector?" in Guillermo Calvo, Morris Goldstein, and Eduard Hochreiter (eds), *Private Capital Flows to Emerging Markets After the Mexican Crisis*, Washington, D.C.: Institute for International Economics.

Calvo, Guillermo, Leo Leiderman and Carmen Reinhart (1993), "Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors," *Staff Papers* 40, pp.108-151.

Caprio, Gerard, Jr. and Daniela Klingebiel (1996a), "Bank Insolvencies: Cross-Country Experience," Policy Research Working Paper 1620, Washington, D.C.: The World Bank.

Caprio, Gerard, Jr. and Daniela Klingebiel (1996b), "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking?" Paper presented to the Annual World Bank Conference on Development Economics, Washington, D.C.: The World Bank (April).

Caprio, Gerard, Jr. and Daniela Klingebiel (1999), "Episodes of Systematic and Borderline Financial Crises," unpublished manuscript, World Bank (May).

Demirguc-Kunt, Asli and Enrica Detragiache (1997), "The Determinants of Banking Crises: Evidence from Developing and Developed Countries," IMF Working Paper no. WP/97/106 (September).

Demirguc-Kunt, Asli and Enrica Detragiache (1998), "Financial Liberalization and Financial Fragility," IMF Working Paper no. WP/98/83 (March).

Demirguc-Kunt, Asli and Enrica Detragiache (2000), "Does Deposit Insurance Increase Banking System Stability?" IMF Working Paper no. WP/00/3 (January).

Dooley, Michael P. (2000), "A Model of Crises in Emerging Markets," *Economic Journal* 110, pp.256-272.

Drees, Burkhard and Ceyla Pazarbasioglu (1998), "The Nordic Banking Crises: Pitfalls in Financial Liberalization?" IMF Occasional Paper no. 161 (April).

Eichengreen, Barry (2000), "When to Dollarize," unpublished manuscript, University of California, Berkeley (January).

Eichengreen, Barry and Albert Fishlow (1998), "Contending with Capital Flows: What is Different About the 1990s?" in Miles Kahler (ed.), *Capital Flows and Financial Crises*, Ithaca: Cornell University Press, pp.23-68.

Eichengreen, Barry and Donald Mathieson, et al. (1998), "Hedge Funds and Financial Market Dynamics," *IMF Occasional Paper* (May).

Eichengreen, Barry and Andrew Rose (1998), "Staying Afloat When the Wind Shifts: External Factors and Emerging-Market Banking Crises," NBER Working Paper no. 6370 (January).

Eichengreen, Barry, Andrew Rose and Charles Wyplosz (1996), "Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks," *Economic Policy* 21, pp.249-312.

Frankel, Jeffrey and Andrew Rose (1996), "Currency Crashes in Emerging Markets: An Empirical Treatment," *Journal of International Economics* 41, pp.351-366.

Friedman, Milton and Anna Schwartz (1963), *A Monetary History of the United States, 1863-1960*, Princeton: Princeton University Press.

Frydl, Edward (1999), "The Length and Cost of Banking Crises," IMF Working Paper no. WP/99/30 (March).

Gavin, Michael and Ricardo Hausmann (1996), "The Roots of Banking Crises: The Macroeconomic Context," in Ricardo Hausmann and Liliana Rojas-Suarez (eds), *Banking Crises in Latin America*, Baltimore: Johns Hopkins University Press, pp.27-63.

Glick, Reuven and Michael Hutchison (1999), "Banking and Currency Crises: How Common Are Twins?" unpublished manuscript, Federal Reserve Bank of San Francisco and UC Santa Cruz

(September).

Goldstein, Morris (1998), *The Asian Financial Crisis*, Washington, D.C.: Institute for International Economics.

Goldstein, Morris and Philip Turner (1996), "Banking Crises in Emerging Economies: Origins and Policy Options," BIS Economic Papers no. 46 (October).

Gorton, Gary (1991), "Banking Panics and Business Cycles," in N.F.R. Crafts, N.H. Dimsdale, and S. Engerman (eds.), *Quantitative Economic History*, Oxford: Clarendon, pp.221-251.

Gourinchas, Pierre-Olivier, Rodrigo Valdes and Oscar Landerretsche (1999), "Lending Booms: Some Stylized Facts," unpublished manuscript, Princeton University and Central Bank of Chile (August).

Gropp, Reint and Jukka Vesala (2000), "Deposit Insurance and Moral Hazard: Does the Counterfactual Matter?" unpublished manuscript, European Central Bank.

Grossman, Richard (1994), "The Shoe that Didn't Drop: Explaining Banking Stability during the Great Depression," *Journal of Economic History* 54, pp.654-682.

Hardy, Daniel and Ceyla Pazarbasioglu (1998), "Leading Indicators of Banking Crises: Was Asia Different?" IMF Working Paper no. WP/98/91 (June).

Hausmann, Ricardo, M. Gavin, C. Pages-Serra and E. Stein (1999), "Financial Turmoil and the Choice of Exchange Rate Regime," unpublished manuscript, Inter-American Development Bank.

Hellmann, Thomas, Kevin Murdock and Joseph Stiglitz (2000), "Liberalization, Moral Hazard in Banking and Prudential Regulation: Are Capital Requirements Enough?" *American Economic Review* 90, pp.147-165.

Honohan, Patrick (1997), "Banking System Failures in Developing and Transition Economies: Diagnosis and Prediction," BIS Working Paper no. 39.

Hutchinson, Michael (1999), "European Banking Distress and EMU: Institutional and Macroeconomic Risks," unpublished manuscript, University of California, Santa Cruz (November).

International Monetary Fund (1998), "Financial Crises: Characteristics and Indicators of Vulnerability," in *World Economic Outlook* (May), pp.74-97.

International Monetary Fund (various years), *Annual Report of Exchange Arrangements and Exchange Restrictions*, Washington, D.C.: IMF.

Jonung, Lars, Hans Tson Soderstrom and Joakim Stymne (1996), "Depression in the North: Boom and Bust in Sweden and Finland, 1985-1993," *Finnish Economic Papers* 9, pp.55-71.

Kaminsky, Graciela and Carmen Reinhart (1998), "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems," *American Economic Review* 89, pp.473-500.

Kyei, Alexander (1995), "Deposit Protection Arrangements: A Survey," IMF Working Paper no. WP/95/134.

Lehmussaari, Olli-Pekka (1990), "Deregulation and Consumption: Saving Dynamics in the Nordic Countries," *Staff Papers* 37, pp.71-93.

Lindgren, Carl-Johan, Tomas J.T. Balino, Charles Enoch, Anne-Marie Gulde, Marc Quintyn, and Leslie Teo (1999), "Financial Sector Crisis and Restructuring: Lessons from Asia," IMF Occasional Paper no. 188.

Lindgren, Carl-Johan, Gillian Garcia and Matthew I. Saal (1996), *Bank Soundness and Macroeconomic Policy*, Washington, D.C.: IMF.

Mendis, Chandima (1998), "External Shocks and Banking Crises in Small Open Economies: Does the Exchange Rate Regime Matter?" unpublished manuscript, Center for the Study of African Economies, Oxford (October).

Reinhart, Carmen (2000), "The Mirage of Floating Exchange Rates," *American Economic Review Papers and Proceedings* (forthcoming).

Rojas-Suarez, Liliana and Steven Weisbrod (1996), "Banking Crises in Latin America: Experiences and Issues," Ricardo Hausmann and Liliana Rojas-Suarez (eds), *Banking Crises in Latin America*, Baltimore: Johns Hopkins University Press, pp.3-21.

Rossi, Marco (1999), "Financial Fragility and Economic Performance in Developing Countries: Do Capital Controls, Prudential Regulation and Supervision Matter?" IMF Working Paper WP/99/66 (May).

Taylor, Mark and Lucio Sarno (1997), "Capital Flows to Developing Countries: Long- and Short-Term Determinants," *World Bank Economic Review* 11, pp.451-470.

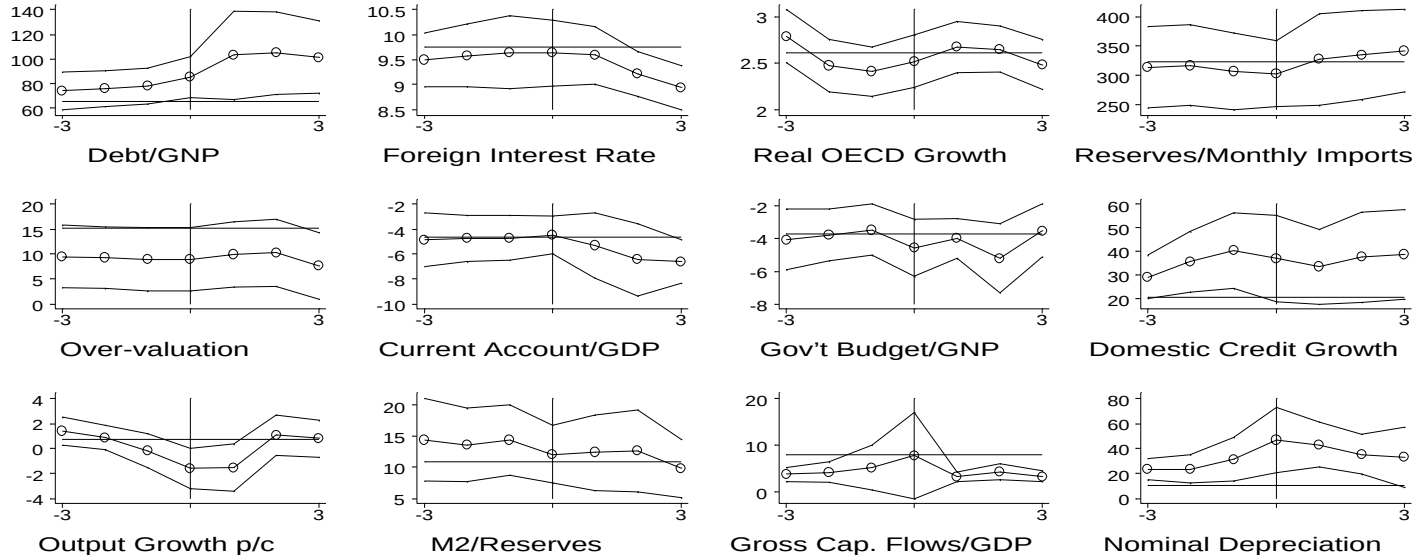
Wood, Geoffrey (1999), "Great Crashes in History: Have They Lessons for Today?" *Oxford Review of Economic Policy* 15, pp.98-109.

World Bank (1999), *World Development Indicators*, Washington, D.C.: World Bank.

World Bank (1999), *Global Development Finance*, Washington, D.C.: World Bank.

Figure 1: Macroeconomic and Financial Characteristics of Banking Crises

Crisis Onset (Caprio-Klingebiel); Non-Crisis Mean Marked.
Data from 1975-1997. Scales and Data Vary by Panel.



Mean plus two standard deviation band; all figures are percentages.
Movements 3 Years Before and After (78) LDC Bank Crise

Table 1: A Survey of Systematic Empirical Studies on Banking Crises

Study	Main Question(s)	Other Question(s)	Sample and Methodology	Explanatory Variables	Main Finding(s)	Other Finding(s)
Demirgüç-Kunt and Detragiache (1997)[3]	Determinants of systemic banking crises. Dating of crises.	Impact of deposit insurance, law enforcement.	65 developing and developed countries, 1980-1994. Multiv logit.	Growth, TOT, int. rates, credit, inflation, gov't def., depreciation, M2/Res, GNP/capita, bank assets, dep. insurance, law&order.	Higher crisis probability if low growth, high infl., high int. rates, dep. insurance, weak law&order.	N/A
Demirgüç-Kunt and Detragiache (1998)[3]	Impact of financial (i.e. int. rates) liberalization on financial fragility. Dating of crises.	Impact of financial liberalization on financial development.	53 developing and developed countries, 1980-1995. Multiv. logit.	Liberalization dummy, same variables as their 1997 paper, other institutional variables.	Fin. liberalization increases probability of crisis (less when institutions are strong).	Fin. liberalization improves financial development in some cases.
Demirgüç-Kunt and Detragiache (2000)[3, 6]	Impact of various explicit deposit insurance schemes on bank stability.	N/A	61 developing and developed countries, 1980-1997. Multiv. logit.	Various explicit deposit insurance schemes, same variables as their 1997, 1998 papers.	Explicit deposit insurance increases probability of crises (more under financial liberalization, weak institutional environment).	Adverse impact of deposit insurance is stronger if coverage extensive, scheme funded, scheme run by government (rather than private sector).
Eichengreen and Rose (1998)[1]	Impact of external conditions (industrial-country int. rates and output growth).	Impact of debt composition and exchange rate regime.	105 developing countries, 1975-1992. Univ. graphical and multiv. probit analysis.	Northern int. rate, OECD growth, reserves, debt, current account, overvaluation, gov't budget, credit growth, exch. rate regime, GDP/capita growth.	Higher crisis probability if higher northern interest rates, low northern growth, more short-term debt.	No clear impact of exch. rate regime.
Eichengreen (2000)[2]	In subsection, impact of exchange rate regime, type of peg, and duration of peg	N/A	110 developing countries, 1975-1997. Multiv. probit.	Same as Eichengreen and Rose (1998) plus definitions of "strong" pegs, duration of pegs.	Higher crisis probability if intermediate regimes, short-lasting pegs.	No impact of northern interest rates (suggesting unique nature of 1997 crises).
Frydl (1999)[1, 3, 4, 5]	Review of discrepancies among recent studies with regard to dating, length, and cost of crises.	Relation between crisis length and cost.	Four databases used in previous studies. OLS regressions of costs on length.	Crisis length, credit, output gap, int. rate. (Cost is dep. variable).	Important differences between timing, length, and cost of crises.	Some link between crisis length and forgone GDP.
Glick and Hutchinson (1999)[2, 3]	Causes of banking and currency crises. Measure of individual and joint ("twin") occurrence of crises.	Whether each type of crisis provides information about the likelihood of the other.	90 industrial and developing countries, 1975-1997. Biv., multiv., and simult. eq. probit.	GDP growth, inflation, fin. liberalization. (Currency/banking crises dummy dep. variables.)	Twin crisis more common in emerging mkts (mainly if fin. liberalized).	Bank crises good leading indicator of currency crises. Converse not true.
Gourinchas, Valdés, and Landerretche (1999)[1, 4]	In subsection, impact of lending booms and financial crises.	Identification of set of stylized facts surrounding lending booms.	91 developing and developed countries, 1960-1996. Univ. and biv. analysis around lending booms.	GDP gap, banking/currency crises, real int. rates, inflation, current acc., RER, cap. flows, short-term debt, TOT. (Credit/GDP dep. var.)	Lending booms increase vulnerability to banking or BoP crisis.	Lending booms associated with output gains. Also, real int. rates higher, short- term debt higher.
Hardy and Pazarbasioglu (1998)[4]	Identification of macro and fin variables as leading indicators.	Assessment of value of leading indicators in predicting Asian crisis	38 developing and developed countries, 1980-1997. Multiv. logit.	GDP growth, consumption gr., investment gr., ICOR, deposit liab., credit, foreign liab., inflation, in. rate, RER, imp. growth, TOT.	Higher crisis prob. if GDP gr. fall, infl. cycles, credit gr., cap. inflows, high int. rates, ICOR fall, RER fall, adverse TOT shock.	Macro indicators of limited value for Asia. Difference b/n severe and full-blown crises.
Hutchinson (1999)[2, 3, 4, 6]	Determinants of crises, highlighting European experience.	Vulnerability of EU to systemic risk.	90 developing and developed countries, 1975-1997. Multiv. probit.	GDP, inflation, exchange rate pressure, fin. lib., plus new data on regulatory/financial environment.	Lower crisis prob. if competent bureaucracy, legal enforcement, high accounting standards.	Model predicts low probability of distress in EMU countries.
Hutchinson and McDill (1999)[1, 3, 6]	Determinants of crises, highlighting Japanese experience.	Identification of leading indicators.	97 developing and developed countries, 1975-1997. Multiv. probit.	Dep. insurance, fin. lib., central bank indep., GDP growth, credit growth, int. rates, inflation, stock prices, gov't budget, M2/Res, depreciation.	Higher crisis probability if asset prices decline, low growth, fin lib., dep. insurance, low central bank indep.	At crisis onset, Japan in stronger macro position. Real int. rates and asset prices good leading indicators.
Kaminsky and Reinhart (1998)[5]	Links between banking and currency ("twin") crises.	Common causes of crises.	20 developing and developed countries, 1970s-1995. Univ, biv. analysis.	M2 multip., credit., int. rates, TOT M2/res, deposits, exp/imp, RER, GDP, stock returns, gov't bdgt, etc	Typically, banking crisis precedes currency crisis, and fin. lib. precedes banking crisis.	Common macro causes: credit boom, large cap. Inflows, overvaluation – then recession.
Mendis (1998)[1, 3]	Effect of terms of trade shocks and capital flows, and interaction of exch. rate regime.	Other determinants of banking crises.	41 developing countries, 1970-1992. Multiv. logit model.	TOT, cap. flows, credit, M2/Res, debt, inflation, RER, GDP growth, exchange rate regime.	Countries with flexible exch. rates able to lessen impact of TOT (but not cap. flows).	GDP growth, debt, RER also have impact.
Rossi (1999)[4]	Links among capital account liberalization, prudential regulation & supervision, and financial crises.	Development of new measures of liberalization and regulation and supervision	15 developing countries, 1990-1997. Multiv. logit	Control on inflows and outflows, prudential regulation, supervision, deposit safety (plus GDP growth, int. rates, inflation, M2/Res., TOT, inflation, credit, GDP/capita, etc.).	Higher crisis prob. if controls on outflows, more lax prudential supervision, and higher deposit safety	Low GDP growth associated with crises.

Notes: [1] Uses Caprio and Klingebiel crisis dates. [2] Uses updated Caprio and Klingebiel crisis dates. [3] Uses Demirgüç-Kunt and Detragiache crisis dates. [4] Uses Lindgren, Garcia, and Saal crisis dates. [5] Uses other (less comprehensive) crisis dates. [6] Uses other sources to update/extend dates.

Table 2
Comparison of Crises, 1980-1995

	DKD-97	CK-99	LGS-96	Common to All
Number of episodes	46	91	89	39
Average Length	3.6	4.2	3.7	2.7

Table 3
Comparison of Crises, CK-99 and LGS-96 (Distinction between Systemic and Non-Systemic), 1975-1995

	CK, Systemic	CK, Non-Systemic	LGS, Systemic	LGS, Non-Systemic	Common Systemic	Common Non-Systemic
Number of episodes	72	24	30	61	25	17
Average Length	4.3	3.5	4.1	3.4	3.9	3.4

Table 4
Comparison of Crises, CK-99 and GH-99 (Distinction between Systemic and Non-Systemic), 1975-1997

	CK All	CK Syst.	CK Non-Syst.	GH All	GH Syst.	GH Non-Syst.	Common All	Common Syst.	Common Non-Syst.
Number of episodes	107[48]	79	29	101	78	23	96	68	21
Average Length	4.3	4.5	3.4	4.3	4.6	3.4	4.0	4.2	3.3

[48]The apparent discrepancy in the number of CK-99 crises reflects the fact that in Kenya a systemic crisis became non-systemic (so there is an onset of a non-systemic crisis but no corresponding additional number of total crises).

Table 5
Banking Crises: Benchmark Regression

	1 1975-1997	2 1975-1992
External Debt/GNP	-0.009 (0.4)	0.017 (1.3)
Reserves/Imports	0.001 (0.8)	0.001 (1.0)
Current Account (%GDP)	0.159 (1.4)	0.063 (1.0)
Overvaluation	0.009 (0.4)	0.007 (0.4)
Budget Balance (%GNP)	0.605 (3.5)	0.176 (2.0)
Domestic Credit Growth	0.056 (4.7)	0.028 (4.1)
Per-Capita Output Growth	-0.004 (0.0)	-0.020 (0.3)
M2/Reserves	0.321 (4.1)	0.151 (3.6)
Northern Interest Rate	-0.216 (1.1)	0.365 (2.5)
Northern Output Growth	-1.271 (2.4)	-0.788 (2.2)
Observations	814	706
Pseudo R2	0.163	0.231
Slopes [c^2test](P-value)	55.96 (0.0)	49.38 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined as Caprio-Klingebiel systemic episode.

Table 6
Banking Crises Across Regimes, 1975-1997

	1 Fixed	2 Intermediate	3 Floating	4 Total
Tranquil	1552	283	264	2099
Banking Crises	43	16	19	78
Total	1595	299	283	2177

Pearson $c^2(2)=$ 14.3690
Pr= 0.001

Table 7
Banking Crises and the Exchange Rate Regime, 1975-1997

	1	2	3
External Debt/GNP	-0.016 (0.7)	-0.013 (0.6)	-0.016 (0.7)
Reserves/Imports	0.002 (0.9)	0.002 (1.0)	0.002 (0.9)
Current Account (%GDP)	-0.168 (1.6)	-0.159 (1.5)	-0.164 (1.5)
Overvaluation	0.011 (0.5)	0.017 (0.8)	0.015 (0.7)
Budget Balance (%GNP)	0.548 (3.3)	0.553 (3.3)	0.539 (3.3)
Domestic Credit Growth	0.042 (3.7)	0.049 (4.4)	0.043 (3.8)
Per-Capita Output Growth	-0.035 (0.3)	-0.032 (0.3)	-0.040 (0.4)
M2/Reserves	0.304 (4.2)	0.312 (4.2)	0.305 (4.3)
Northern Interest Rate	-0.102 (0.6)	-0.141 (0.8)	-0.107 (0.6)
Northern Output Growth	-0.977 (2.0)	-1.020 (2.0)	-0.947 (1.9)
Fixed Regime	-3.525 (2.5)	—	-2.048 (1.2)
Intermediate Regime	—	4.007 (2.6)	1.991 (1.1)
Observations	814	814	814
Pseudo R2	0.183	0.182	0.186
Slopes [c^2test](P-value)	62.50 (0.0)	62.38 (0.0)	63.69 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses
Crisis is defined as Caprio-Klingebiel systemic episode.

Table 8:
Banking Crises, External Shocks and Regimes

	1	2
	1975-1997	1975-1992
External Debt/GNP	-0.035 (1.1)	0.011 (0.7)
Reserves/Imports	0.006 (2.1)	0.002 (0.9)
Current Account (%GDP)	-0.092 (0.5)	0.135 (1.4)
Overvaluation	-0.003 (0.1)	0.006 (0.3)
Budget Balance (%GNP)	0.637 (2.8)	0.163 (1.4)
Domestic Credit Growth	0.074 (4.3)	0.032 (3.5)
Per-Capita Output Growth	0.041 (0.3)	0.012 (0.2)
M2/Reserves	0.557 (4.7)	0.248 (4.2)
Northern Interest Rate	-0.269 (1.1)	0.414 (2.4)
Northern Output Growth	-1.664 (2.4)	-0.958 (2.2)
Terms-of-Trade (TOT) Change	-0.044 (0.1)	-0.025 (0.8)
Net Capital Flows/GDP	0.447 (1.9)	0.056 (0.3)
Floating Regime	-2.659 (0.9)	-1.665 (1.1)
TOT x Floating	0.168 (1.1)	0.160 (1.7)
Net Cap. Flows x Floating	0.759 (0.9)	2.098 (2.7)
Observations	701	603
Pseudo R2	0.181	0.294
Slopes [c^2test](P-value)	64.86 (0.0)	65.67 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses
Crisis is defined as Caprio-Klingebiel systemic episode.

Table 9
Banking Crises and Domestic Financial Liberalization

	1 Not Liberalized	2 Liberalized	3 Total
Tranquil	729	351	1080
Banking Crises	14	37	51
Total	743	388	1131

Person $c^2(1) = 34.6593$
Pr = 0.000

Table 10
Banking Crises and Capital Account Openness, 1975-1997

	1 Not Open Capital	2 Open Capital	3 Total
Tranquil	1685	437	2122
Banking Crises	69	9	78
Total	1754	446	2200

Person $c^2(1) = 3.8169$
Pr = 0.051

Table 11
Banking Crises and Financial Liberalization, 1975-1997

	1	2	3	4	5	6
External Debt/GNP	-0.045 (1.6)	-0.059 (1.5)	-0.044 (1.7)	-0.047 (1.6)	-0.042 (1.2)	-0.036 (1.4)
Reserves/Imports	0.004 (1.4)	0.006 (1.6)	0.004 (1.5)	0.002 (0.9)	0.004 (1.1)	0.002 (0.8)
Current Account (%GDP)	-0.510 (3.3)	-0.575 (2.7)	-0.494 (3.4)	-0.582 (3.2)	-0.496 (2.5)	-0.613 (3.7)
Overvaluation	-0.006 (0.2)	0.002 (0.0)	-0.005 (0.2)	0.001 (0.0)	0.023 (0.6)	0.001 (0.0)
Budget Balance (%GNP)	0.613 (3.1)	0.972 (3.5)	0.592 (3.1)	0.653 (3.3)	0.806 (3.3)	0.612 (3.6)
Domestic Credit Growth	0.038 (3.4)	0.067 (4.1)	0.037 (3.4)	0.040 (3.5)	0.064 (4.3)	0.043 (4.0)
Per-Capita Output Growth	-0.154 (1.1)	-0.118 (0.6)	-0.133 (1.0)	-0.182 (1.3)	-0.126 (0.7)	-0.110 (0.9)
M2/Reserves	0.479 (4.4)	0.646 (4.1)	0.477 (4.5)	0.485 (4.2)	0.623 (4.4)	0.409 (4.2)
Northern Interest Rate	0.344 (1.5)	-0.289 (1.0)	0.355 (1.6)	0.288 (1.3)	0.112 (0.4)	0.318 (1.6)
Northern Output Growth	-0.691 (1.1)	-1.882 (2.4)	-0.680 (1.2)	-0.669 (1.0)	-1.604 (2.0)	-0.573 (1.0)
Open Capital Account	-2.131 (1.4)	—	2.612 (0.6)	—	—	—
Domestic Fin. Liberalization	10.638 (5.0)	—	11.706 (5.0)	11.127 (4.9)	—	3.810 (1.5)
Open Capital x Dom. Fin. Lib.	—	0.064 (0.0)	-3.361 (1.4)	—	—	—
Gross Capital Flows/GDP	—	—	—	0.077 (0.3)	—	-1.191 (2.0)
Gross Capital Flows x Dom. Lib.	—	—	—	—	1.192 (4.6)	1.477 (2.3)
Observations	598	598	598	572	572	572
Pseudo R2	0.275	0.168	0.28	0.273	0.232	0.293
Slopes [c^2test](P-value)	92.37(0.0)	56.63 (0.0)	94.14 (0.0)	89.22 (0.0)	75.76 (0.0)	95.67 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined as Caprio-Klingebiel systemic episode.

Table 12
Banking Crises and Deposit Insurance, 1975-1997

	1 No Deposit Insurance	2 With Deposit Insurance	3 Total
Tranquil	736	131	867
Banking Crises	42	8	50
Total	778	139	917

Person $c^2(1) = 0.0291$
Pr = 0.864

Table 13
Banking Crises, Deposit Insurance and the Institutional Quality, 1975-1997

	1	2	3	4	5	6	7	8
External Debt/GNP	-0.056 (1.5)	-0.113 (2.2)	-0.116 (2.3)	-0.118 (2.3)	-0.077 (1.7)	-0.083 (1.7)	-0.118 (2.9)	-0.111 (2.9)
Reserves/Imports	0.003 (1.0)	0.003 (0.8)	0.003 (0.8)	0.003 (0.7)	0.003 (0.7)	0.007 (1.5)	0.002 (0.6)	0.002 (0.5)
Current Account (%GDP)	-0.708 (3.3)	-1.022 (3.7)	-1.024 (3.7)	-1.016 (3.7)	-0.832 (2.8)	-0.989 (3.1)	-0.859 (4.2)	-0.826 (4.2)
Overvaluation	0.045 (1.1)	0.051 (1.2)	0.059 (1.4)	0.063 (1.5)	0.068 (1.4)	0.022 (0.5)	0.013 (0.4)	0.016 (0.5)
Budget Balance (%GNP)	0.989 (3.6)	0.774 (2.5)	0.808 (2.7)	0.807 (2.6)	1.260 (3.4)	1.229 (3.2)	0.520 (2.4)	0.506 (2.5)
Domestic Credit Growth	0.069 (4.0)	0.068 (3.8)	0.069 (3.9)	0.069 (3.9)	0.080 (3.8)	0.078 (3.5)	0.047 (3.6)	0.044 (3.5)
Per-Capita Output Growth	0.004 (0.0)	0.079 (0.4)	-0.095 (0.5)	-0.097 (0.5)	-0.098 (0.4)	-0.100 (0.4)	-0.069 (0.4)	-0.060 (0.4)
M2/Reserves	0.507 (3.3)	0.424 (2.5)	0.425 (2.5)	0.425 (2.5)	0.781 (3.5)	0.850 (3.6)	0.350 (2.5)	0.342 (2.6)
Northern Interest Rate	-0.339 (1.2)	-0.388 (1.2)	-0.412 (1.3)	-0.402 (1.3)	-0.251 (0.7)	-0.381 (1.0)	0.176 (0.7)	0.198 (0.8)
Northern Output Growth	-1.602 (2.1)	-1.699 (2.0)	-1.698 (2.0)	-1.695 (2.0)	-1.856 (1.9)	-2.247 (2.2)	-0.506 (0.7)	-0.467 (0.7)
Deposit Insurance	-4.643 (2.3)	-4.388 (2.1)	-3.353 (0.5)	—	-9.131 (2.2)	—	—	—
Institutional Environment	—	-1.131 (0.9)	—	—	—	—	-0.739 (0.7)	—
Dept. Insurance x Institutions	—	—	-4.838 (0.2)	-1.610 (2.0)	—	—	—	—
Domestic Liberalization	—	—	—	—	—	—	—	5.221 (1.3)
Dep. Insurance x Liberalization	—	—	—	—	10.780 (1.1)	-3.857 (1.2)	—	—
Institutions x Liberalization	—	—	—	—	—	—	2.587 (4.2)	1.100 (1.1)
Observations	465	365	365	365	425	425	395	395
Pseudo R2	0.228	0.265	0.261	0.26	0.212	0.187	0.328	0.333
Slopes [c^2test](P-value)	61.60 (0.0)	60.06 (0.0)	59.32 (0.0)	59.10 (0.0)	58.33 (0.0)	51.41 (0.0)	81.60 (0.0)	82.93 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined as Caprio-Klingebiel systemic episode.

Appendix A: Data Sources

As explained in the text, we begin with data for 122 developing (non-transitional) countries. In practice, missing values limit the sample to the following 75 countries: Argentina, Bangladesh, Barbados, Belize, Benin, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, Chile, Colombia, Republic of Congo, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Arab Republic of Egypt, Fiji, Gabon, The Gambia, Ghana, Guatemala, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Islamic Republic of Iran, Jamaica, Kenya, Republic of Korea, Lesotho, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Morocco, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Rwanda, Senegal, Seychelles, Sierra Leone, Solomon Islands, South Africa, Sri Lanka, St. Vincent and the Grenadines, Sudan, Swaziland, Syrian Arab Republic, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela, Zambia, and Zimbabwe.

DEPENDENT VARIABLES

Banking Crises Dates for Comparison Purposes

- Caprio and Klingebiel Banking Crisis Dates (CK-99). Source: Caprio and Klingebiel (1998).
- Glick and Hutchison Banking Crisis Dates (GH-99). Source: Glick and Hutchison (1999), Hutchison (1999), Hutchinson and McDill (1999) (via personal correspondence).
- Demirguc-Kunt and Detragiache Banking Crises Dates (DKD-97). Source: Demirguc-Kunt and Detragiache (1997, 1998).
- Demirguc-Kunt and Detragiache Banking Crises Dates (DKD-2000). Source: Demirguc-Kunt and Detragiache (2000).
- Lindgren, Garcia, and Saal Banking Crisis Dates (LGS-96). Source: Lindgren, Garcia, and Saal (1996)

Banking Crises Dates Used as Dependent Variables in Probit Regressions

- Lead of Caprio and Klingebiel Banking Systemic Crisis Dates (CK-99). (Default dependent variable)
- Lead of Glick and Hutchison Banking Systemic Crisis Dates (GH-99). (Alternative dependent variable for sensitivity analysis).
- Lead of Dermirguc-Kunt and Detragiache Banking Crisis Dates (DKD-2000). (Alternative dependent variable for sensitivity analysis).

INDEPENDENT VARIABLES FOR PROBIT REGRESSIONS
(Unless otherwise noted, source for all data is the *World Development Indicators*.)

Macroeconomic ("Core") Regressors

- Total external debt /GNP (percent). Source: *Global Development Finance*.
- Gross International reserves / months of imports (percent).
- Current account balance/GDP (percent).
- Real exchange rate overvaluation, defined as deviation from time-averaged country-specific real exchange rate [i.e. log (price level) / (U.S. price level * nominal exchange rate with US$) * 100]
- Budget balance/GNP (percent), defined as budget balance divided by GNP (both in current local currency) * 100.
- Domestic Credit Growth (percent), defined as the first difference of the log of net domestic credit (in current local currency) * 100.
- Output Per-capita Growth (percent), defined as the first difference of the log of per-capita GNP (in 1995 US$) * 100.
- M2/Reserves (percent).

External Factors

- Northern Interest Rates (percent), defined as weighted average of short-term interest rates from the US, Germany, Japan, France, the UK, and Switzerland; the weights being proportional to the fraction of debt denominated in the relevant currencies. Sources: *International Financial Statistics* (for short-term rates), *Global Development Finance* (for share of debt).
- Northern Output Growth (percent), defined as the first difference of the log of real OECD output (GNP in constant US$) growth.

Exchange Rate Regime

- Fixed Regime, a dummy for fixed exchange rate regimes against a particular currency, a basket of currencies, or SDR (including soft pegs, currency boards, and dollarized systems). Source: IMF *Annual Report on Exchange Arrangements and Exchange Restrictions* (various issues).
- Intermediate Regime, a dummy for limited flexibility (against a single currency or a cooperative arrangement) or a managed float with a pre-announced path for the exchange rate. Source: IMF *Annual Report on Exchange Arrangements and Exchange Restrictions* (various issues).
- Floating Regime, a dummy for managed float with no pre-announced path for the exchange rate, or independent floating. Source: IMF *Annual Report on Exchange Arrangements and Exchange Restrictions* (various issues).

External Shocks

- Terms-of-Trade Shocks (percent), defined as the first difference of the log of the terms-of-trade index in goods and services (1995=100).
- Net Private Capital Flows / GDP (percent).
- Interaction Term of Terms-of-Trade Shocks and Floating Regime.
- Interaction Term of Net Private Capital Flows/GDP and Floating Regime.

Financial Liberalization

- Open Capital Account, a dummy for the absence of capital account controls. Source: IMF *Annual Report on Exchange Arrangements and Exchange Restrictions* (various issues).
- Domestic Financial Liberalization, a dummy for the absence of interest rate ceilings. Source: Demirguc-Kunt and Detragiache (1997, 1998), as updated to 1997 by Glick and Hutchison (1999) (via personal correspondence).
- Interaction Term of Open Capital Account and Domestic Financial Liberalization.
- Gross Private Capital Flows / GDP (percent), as a proxy for open capital account.
- Interaction Term of Gross Private Capital Flows/GDP and Domestic Financial Liberalization.

Institutional Variables

- Deposit Insurance, a dummy for the presence of an explicit deposit insurance scheme. Source: Kyei (1995), as updated by Glick and Hutchison (1999) (via personal correspondence).
- Institutional Environment, measured by an index for law and order (default, ranging from 0 to 6, where a higher value denotes a better institutional framework) or an index for contract enforcement (alternative index, ranging from 0 to 4, where a higher value denotes a better institutional framework). Source: Business Environment Risk Intelligence for contract enforcement, *International Country Risk Guide* for law and order, as gathered by Demirguc-Kunt and Detragiache (1997, 1998).
- Interaction Term of Deposit Insurance and Institutional Environment
- Interaction Term of Deposit Insurance and Domestic Financial Liberalization
- Interaction Term of Institutional Environment and Domestic Financial Liberalization

Appendix B: Results for Alternative Crisis Dates

In this appendix we document the robustness of our conclusions to alternative sources of crisis dates, reporting two tables that use Glick and Hutchison's dates in place of those of Caprio and Klingabeil. Table B1 shows the results for external factors, exchange rates and their interaction, Table B2 shows the results for financial liberalization, and Table B3 shows the results for the regulatory and institutional environment.

Table B1
Banking Crises, External Factors and Exchange Rates, 1975-1997

	1	2	3	4	5
External Debt/GNP	-0.022 (0.8)	-0.027 (1.0)	-0.026 (1.0)	-0.027 (1.0)	-0.053 (1.5)
Reserves/Imports	0.001 (0.3)	0.001 (0.4)	0.001 (0.4)	0.001 (0.4)	0.004 (1.4)
Current Account (%GDP)	-0.204 (1.6)	-0.213 (1.8)	-0.207 (1.7)	-0.210 (1.7)	-0.146 (0.8)
Overvaluation	0.023 (0.8)	0.022 (0.8)	0.029 (1.1)	0.027 (1.0)	0.017 (0.5)
Budget Balance (%GNP)	0.664 (3.6)	0.618 (3.4)	0.613 (3.4)	0.606 (3.4)	0.652 (2.8)
Domestic Credit Growth	0.059 (4.7)	0.049 (3.9)	0.054 (4.4)	0.050 (4.0)	0.083 (4.6)
Per-Capita Output Growth	-0.022 (0.2)	-0.051 (0.4)	-0.056 (0.4)	-0.060 (0.5)	-0.025 (0.2)
M2/Reserves	0.316 (3.8)	0.307 (3.9)	0.310 (3.9)	0.308 (3.9)	0.537 (4.4)
Northern Interest Rate	-0.423 (2.0)	-0.328 (1.6)	-0.349 (1.7)	-0.329 (1.6)	-0.608 (2.2)
Northern Output Growth	-0.955 (1.7)	-0.733 (1.4)	-0.725 (1.3)	-0.687 (1.3)	-1.234 (1.8)
Peg Regime	—	-2.650 (1.8)	—	-1.116 (0.6)	—
Intermediate Regime	—	—	3.437 (2.1)	2.368 (1.1)	—
Floating Regime	—	—	—	—	-4.671 (1.6)
Terms-of-Trade (TOT) Change	—	—	—	—	0.011 (0.2)
Net Capital Flows/GDP	—	—	—	—	0.542 (2.1)
TOT x Floating	—	—	—	—	0.260 (1.5)
Net Cap. Flows x Floating	—	—	—	—	1.472 (1.5)
Observations	767	767	767	767	664
Pseudo R2	0.162	0.172	0.175	0.176	0.188
Slopes [c^2test](P-value)	54.41 (0.0)	57.71 (0.0)	58.68 (0.0)	59.04 (0.0)	66.85 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined by Glick-Hutchinson systemic episode.

Table B2:
Banking Crises and Liberalization, 1975-1997

	1	2	3	4	5	6
External Debt/GDP	-0.060 (2.1)	-0.071 (1.8)	-0.055 (2.0)	-0.059 (2.0)	-0.057 (1.5)	-0.052 (1.9)
Reserves/Imports	0.004 (1.3)	0.005 (1.4)	0.004 (1.3)	0.003 (0.9)	0.004 (1.2)	0.002 (0.8)
Current Account (%GDP)	-0.613 (3.9)	-0.677 (3.0)	-0.578 (3.9)	-0.634 (3.6)	-0.576 (2.8)	-0.674 (4.0)
Overvaluation	-0.009 (0.3)	-0.005 (0.1)	-0.007 (0.3)	-0.004 (0.2)	0.016 (0.4)	-0.003 (0.1)
Budget Balance (%GDP)	0.630 (3.2)	1.065 (3.6)	0.592 (3.2)	0.631 (3.3)	0.843 (3.3)	0.599 (3.5)
Domestic Credit Growth	0.041 (3.6)	0.074 (4.3)	0.039 (3.6)	0.041 (3.7)	0.068 (4.5)	0.043 (4.0)
Per-Capita Output Growth	-0.206 (1.5)	-0.184 (0.9)	-0.171 (1.3)	-0.217 (1.5)	-1.808 (1.0)	-0.159 (1.2)
M2/Reserves	0.440 (4.0)	0.618 (3.8)	0.436 (4.1)	0.442 (4.0)	0.606 (4.2)	0.394 (4.0)
Northern Interest Rate	0.077 (0.3)	-0.639 (2.0)	0.105 (0.5)	0.043 (0.2)	-0.172 (0.6)	0.095 (0.5)
Northern Output Growth	0.093 (0.2)	-1.240 (1.5)	0.021 (0.0)	-0.024 (0.0)	-1.042 (1.3)	-0.013 (0.0)
Open Capital Account	-1.681 (1.1)	—	4.097 (0.9)	—	—	—
Domestic Fin. Liberalization	11.715 (5.2)	—	13.025 (5.1)	11.648 (5.0)	—	5.436 (2.0)
Open Capital x Dom. Fin. Lib.	—	0.804 (0.3)	-3.416 (1.5)	—	—	—
Gross Capital Flows/GDP	—	—	—	0.069 (0.3)	—	-0.979 (1.6)
Gross Capital Flows x Dom. Lib.	—	—	—	—	1.191 (4.6)	1.214 (1.9)
Observations	588	588	588	572	572	572
Pseudo R2	0.289	0.169	0.294	0.29	0.237	0.303
Slopes [c^2test](P-value)	96.62 (0.0)	56.69(0.0)	98.54 (0.0)	94.36 (0.0)	77.09 (0.0)	98.56 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined by Glick-Hutchinson systemic episode.

Table B3:
Banking Crises, Deposit Insurance and the Institutional Quality, 1975-1997

	1	2	3	4	5	6	7	8
External Debt/GDP	-0.066 (1.6)	-0.131 (2.5)	-0.134 (2.5)	-0.136 (2.5)	-0.086 (2.0)	-0.104 (1.9)	-0.149 (3.2)	-0.137 (3.2)
Reserves/Imports	0.003 (0.9)	0.003 (0.8)	0.003 (0.7)	0.003 (0.7)	0.002 (0.4)	0.007 (1.4)	0.001 (0.4)	0.001 (0.3)
Current Account (%GDP)	-0.777 (3.4)	-1.122 (3.9)	-1.125 (3.9)	-1.115 (3.9)	-0.835 (3.0)	-1.125 (3.3)	-1.008 (4.7)	-0.939 (4.7)
Overvaluation	0.047 (1.1)	0.052 (1.2)	0.059 (1.3)	0.063 (1.4)	0.075 (1.6)	0.017 (0.3)	0.013 (0.4)	0.018 (0.6)
Budget Balance (%GDP)	1.012 (3.7)	0.754 (2.5)	0.787 (2.6)	0.787 (2.6)	1.191 (3.5)	1.245 (3.1)	0.467 (2.2)	0.434 (2.2)
Domestic Credit Growth	0.073 (4.1)	0.072 (3.9)	0.072 (4.0)	0.073 (4.0)	0.082 (4.0)	0.084 (3.6)	0.049 (3.6)	0.043 (3.6)
Per-Capita Output Growth	-0.029 (0.2)	0.030 (0.1)	0.046 (0.2)	0.047 (0.2)	-0.150 (0.6)	-0.176 (0.7)	-0.161 (0.9)	-0.141 (0.9)
M2/Reserves	0.506 (3.2)	0.400 (2.4)	0.401 (2.4)	0.402 (2.4)	0.698 (3.4)	0.843 (3.4)	0.276 (1.8)	0.259 (1.9)
Northern Interest Rate	-0.584 (1.9)	-0.680 (2.0)	-0.699 (2.1)	-0.684 (2.0)	-0.437 (1.2)	-0.667 (1.6)	-0.059 (0.2)	-0.024 (0.1)
Northern Output Growth	-1.286 (1.6)	-1.279 (1.5)	-1.274 (1.5)	-1.288 (1.5)	-1.083 (1.2)	-1.755 (1.7)	0.350 (0.5)	0.380 (0.6)
Deposit Insurance	-5.057 (2.5)	-4.663 (2.2)	-4.256 (0.6)	—	-13.344 (2.1)	—	—	—
Institutional Quality	—	1.015 (0.8)	—	—	—	—	-1.077 (1.0)	—
Dept. Insurance x Institutions	—	—	-0.201 (0.1)	-1.708 (2.1)	—	—	—	—
Domestic Liberalization	—	—	—	—	—	—	—	7.366 (1.9)
Dep. Insurance x Liberalization	—	—	—	—	38.669 (1.6)	-3.104 (0.9)	—	—
Institutions x Liberalization	—	—	—	—	—	—	2.908 (4.5)	0.840 (0.9)
Observations	461	360	360	360	421	421	382	382
Pseudo R2	0.226	0.266	0.263	0.262	0.222	0.179	0.337	0.347
Slopes [c^2test](P-value)	61.50 (0.0)	60.63 (0.0)	60.02 (0.0)	59.65 (0.0)	61.12 (0.0)	49.29 (0.0)	83.77 (0.0)	86.37 (0.0)

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined by Glick-Hutchinson systemic episode.

Appendix C: Further Sensitivity Analysis

TABLE C1:
Baseline Regression: Sensitivity Analysis of Estimation Method, 1975-1997

	1	2	3
	Robust Estimation	Clustered Estimation	Unweighted Estimation
External Debt/GDP	-0.009 (0.3)	-0.009 (0.3)	0.020 (1.2)
Reserves/Imports	0.001 (0.7)	0.002 (0.6)	0.002 (0.9)
Current Account (%GDP)	-0.159 (1.2)	-0.159 (1.1)	0.023 (0.2)
Overvaluation	0.009 (0.2)	0.009 (0.2)	0.015 (0.5)
Budget Balance (%GDP)	0.605 (3.0)	0.605 (3.0)	0.372 (2.6)
Domestic Credit Growth	0.056 (3.6)	0.056 (2.9)	0.044 (3.3)
M2/Reserves	-0.004 (0.0)	-0.004 (0.1)	-0.091 (0.9)
Per-Capita Output Growth	0.321 (3.9)	0.321 (2.9)	0.154 (3.6)
Northern Interest Rate	-0.216 (0.7)	-0.216 (0.7)	0.101 (0.5)
Northern Output Growth	-1.271 (2.8)	-1.271 (3.2)	-0.866 (1.7)
Observations	814	814	814
Pseudo R2	0.163	0.163	0.111
Slopes [c^2test](P-value)	53.61	47.26	33.39

Probit regressions estimated with maximum likelihood. Columns 1 and 2 are weighted by GNP per capita.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined as Caprio-Klingebiel systemic episode.

Robust estimation uses robust standard errors.
Clustered estimation uses robust standard errors adjusted for clustering of within-country observations.

TABLE C2:
Banking Crises and Exchange Rate Stability, 1975-1997

	Using Current Values of Regressors			Using Lagged Values of Regressors		
	1	2	3	4	5	6
|Exchange Rate Change| <5%	-3.783 (3.0)	—	—	1.492 (1.2)	—	—
|Exchange Rate Change| <10%	—	-5.689 (4.0)	—	—	0.893 (0.63)	—
Exchange Rate Crash	—	—	-1.984 (1.1)	—	—	0.402 (0.2)
Observations	843	843	843	814	814	814
Pseudo R2	0.219	0.239	0.195	0.167	0.165	0.163
Slopes [c^2test](P-value)	78.88	85.95	70.20	57.28	56.36	55.98

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Ten baseline regressors included in the estimation but not reported.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
Crisis is defined as Caprio-Klingebiel systemic episode.

TABLE C3:
Banking Crises, Deposit Insurance, and Institutional Quality, 1975-97:
Sensitivity Analysis using Different Crisis Definitions and Country Groups

	DKD-2000 LDCs only		CK-99 LDCs and OECDs		DKD-2000 LDCs and OECDs	
	1	2	3	4	5	6
Deposit Insurance	-0.108	-6.851	0.202	0.266	1.879	1.884
	(0.0)	(1.3)	(1.0)	(2.0)	(2.1)	(2.4)
Institutional Quality	—	-22.585	—	-0.130	—	-0.870
		(2.0)		(2.6)		(2.4)
Observations	214	156	849	714	464	464
Pseudo R2	0.224	0.237	0.356	0.429	0.236	0.275
Slopes [c^2test](P-value)	35.92	30.28	62.40	62.85	32.80	38.10

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Columns 1 and 2: Ten baseline regressors included in the estimation but not reported.
Columns 3-6: Seven regressors (ten baseline regressors minus debt/GNP, northern interest rates, and OECD output growth) included in the estimation but not reported.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
DKD-2000: Crisis is defined as Demirguc-Kunt and Detragiache (2000) episode.
CK-99: Crisis is defined as Caprio-Klingebiel (1999) systemic episode.

TABLE C4:
Banking Crises, Deposit Insurance, and Institutional Quality, LDCs and OECDs, 1975-97:
Sensitivity Analysis using Different Crisis Definitions and OECD Dummy

	CK-99 LDCs and OECDs			DKD-2000 LDCs and OECDs		
	1	2	3	4	5	6
OECD Dummy	-1.642	-1.233	0.009	-2.283	-5.783	-0.542
	(2.4)	(2.3)	(0.0)	(1.3)	(2.0)	(0.2)
Deposit Insurance	—	0.294	0.265	—	2.185	1.943
		(1.6)	(1.9)		(2.4)	(2.3)
Institutional Quality	—	—	-0.132	—	—	-0.754
			(1.6)			(1.1)
Observations	1253	849	714	566	464	464
Pseudo R2	0.237	0.386	0.429	0.188	0.266	0.275
Slopes [c^2 test](P-value)	58.75	67.68	62.85	31.73	36.86	38.15

Probit regressions estimated with maximum likelihood, weighted by GNP per capita.
Seven regressors (ten baseline regressors minus debt/GNP, northern interest rates, and OECD output growth) included in the estimation but not reported.
Derivatives (x100) reported for regressors; absolute z-statistics (for no significant effect) in parentheses.
DKD-2000: Crisis is defined as Demirguc-Kunt and Detragiache (2000) episode.
CK-99: Crisis is defined as Caprio-Klingebiel (1999) systemic episode.