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Apanard P. Angkinand
Milken Institute

Wanvimol Sawangngoenyuang
Bank of Thailand

Clas Wihlborg
Chapman University, wihlborg@chapman.edu

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Apanard P. Angkinand
The Milken Institute
pangkinand@milkeninstitute.org

Wanvimol Sawangngoenyuang
Bank of Thailand
Wanvimos@bot.or.th

Clas Wihlborg
Argyros School of Business and Economics, Chapman University and
Copenhagen Business School
wihlborg@chapman.edu

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 Abstract: Several studies indicate that financial liberalization contributes to the likelihood of a financial crisis. We focus on banking crises and argue that they are most likely to occur after some degree, but not full, liberalization. An inverted U-shaped relationship between liberalization and the likelihood of crisis is hypothesized and found. We ask whether the relationship remains when institutional characteristics of countries and dynamic effects of liberalization are considered. Finally, we ask whether explanations of crises can be improved by distinguishing among different types of financial liberalization. Using a recently updated dataset for financial reforms in 48 countries between 1973 and 2005, we decompose liberalization into behavioral liberalization (credit and interest rate liberalization), competitive liberalization (equity market, capital account liberalization, and banks' entry and activity liberalization), and privatization. The empirical results indicate that the relationship between liberalization and banking crises depends strongly on the strength of capital regulation and supervision. With very weak regulation and supervision the probability of banking crises is increasing with liberalization but this relationship is reversed as regulation and supervision become stricter. The most important type of liberalization seems to be behavioral (a relaxation of interest and credit controls). A policy implication is that positive growth-effects of liberalization can be achieved without increasing the risk of a banking crisis if appropriate institutions are developed.

JEL Classification: G21; G28; F3
Keywords: Banking Crises; Financial Liberalization; Capital Regulation and Supervision

Financial Liberalization and Banking Crises: A Cross-Country Analysis

I. Introduction

Many countries liberalized their financial sectors during the 1980s and the 1990s with the objective of increasing economic growth through financial sector development.[1] However, financial liberalization has often been followed by financial instability and is often considered a cause of banking crises (Caprio and Klingebiel, 1996, Kaminsky and Reinhart, 1999). This finding is controversial and there exist a number of arguments discussed below why liberalization could enhance financial stability as well as growth. In this paper, we ask whether the noted relationship between liberalization of the financial sector and banking crisis holds over all ranges of liberalization and whether it depends on institutional characteristics of the liberalizing country. The institutional factors considered are strength of financial supervision and capital regulation, the existence of deposit insurance, and the quality of institutions in the liberalizing country. We also ask whether different types of financial liberalization affect the likelihood of banking crises to different degrees.

In our empirical analysis of the effects of financial liberalization on banking crises covering the period 1973-2005 we use a new Financial Reforms Database from Abiad, Detragiache and Tressel (2008), International Monetary Fund. This database divides financial reform data into several dimensions. The extent of liberalization is specified in each dimension for each year. Most existing studies examining financial liberalization capture periods of non-liberalized and liberalized financial systems using a 0/1 dummy.[2] A common finding is that liberalized financial systems have a higher probability of banking crises. One may ask whether this observation simply captures a truism since some degree of liberalization is probably required for losses in the banking system to

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[1] See, for example, Tornell et al (2004), Bekaert et al (2005).
[2] See, for example, Demirgüç-Kunt and Detragiache (2001), Eichengreen and Arteta (2002), Noy (2004), Ranciere et al (2006).

be manifested as a banking crisis. A highly repressed banking system may perform very poorly and still survive based on different forms of more or less overt state support.

Some existing studies include measures of degrees of financial liberalization. For example, Eichengreen and Arteta (2002) use the ratio of capital flows to GDP as a proxy for the extent of external liberalization. Bekaert et al (2005) use the intensity of equity market liberalization as defined by a measure of market capitalization. These variables reflect changes in economic outcome that may occur as a result of liberalization. Kaminsky and Schmukler (2008) and Abiad and Mody (2005) construct indices that capture both the intensity of and changes in policy with respect to financial liberalization. Kaminsky and Schmukler construct a three-level financial liberalization index for 28 countries based on the liberalization of capital account, interest rate control, and equity market.

The Financial Reforms Database categorizes financial reforms into seven dimensions each year. Six of them refer to liberalization in the form of elimination of credit allocation controls, interest rate controls, capital account controls, equity market controls, entry barriers and privatization while the seventh dimension captures strength of bank capital regulation and supervision. The intensity of each reform category is captured on a four-point scale from fully repressed to fully liberalized for the six dimensions of liberalization.

One of our objectives is to analyze whether there is more information with respect to the likelihood of banking crises when disaggregating a financial liberalization index into types of liberalization. For this reason we use both a simple aggregate index of the six dimensions of liberalization to capture the degree of total financial liberalization and each of different types of liberalization. Since one type of liberalization is often accompanied or followed by other types of liberalization, the correlations among the six categories tend to be high. We combine some categories to distinguish among three types of liberalization denoted behavioral liberalization,

competitive liberalization, and privatization. Behavioral liberalization refers to banks' ability to set interest rate and credit amounts without regulatory constraints while competitive liberalization refers to competitive conditions within the banking sector and between banking and other sources of finance.

Existing theory discussed below does not allow us to specify a clear theory-based hypothesis for the relationship between the level of financial liberalization and banking crises. There are competing theories with different implications. As we argue below, increased liberalization may increase or decrease the likelihood of banking crises or the likelihood of a crisis may be particularly high at a particular level of liberalization. We formulate the specific hypothesis that, starting from financial repression, increased liberalization up to an intermediate degree of liberalization will increase the likelihood of banking crisis and that the relationship is reversed at relatively high degrees of liberalization. We explore whether such a non-linear relationship can be explained by dynamic learning effects of liberalization or by institutional characteristics interacting with the degree of liberalization.

The need for strong capital regulation and supervision at the time of liberalization is often emphasized but there is little empirical evidence on the impact of regulation and supervision on the likelihood of banking crises for different degrees of liberalization.[3] Deposit insurance systems are also considered in the analysis because effects of liberalization are likely to depend on risk-taking incentives and opportunities.

The sample of 48 countries is divided into two groups: 21 advanced economies and 27 emerging markets. It is possible that emerging markets are more vulnerable to banking crises after liberalization because capital flows are relatively volatile and skills in risk assessment and supervision may be lacking.

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[3] Most empirical studies that take into account the interactive effect of institutions and liberalization use a 0/1 liberalization dummy.

In Section II we review literature on effects of financial liberalization referring to literature on growth effects as well as on the link between liberalization and crises. The financial liberalization data and types of liberalization are described in Section III. The main hypotheses and the empirical methodology are described in Section IV. Results of the empirical tests are presented in Section V. Conclusions and policy implications follow in Section VI.

II. Financial liberalization, growth and crises in the literature

Banks dominate the financial system in large parts of the world. Restrictions on bank activity can be based on a variety of arguments. For instance, governments implement capital controls for fears that excessive capital inflows can promote boom-bust cycles and reduce the effectiveness of monetary policy. Financial repression in the form of direct regulation of interest rates and credit allocation can be used by governments to favor particular groups and activities, and to reduce the costs of government borrowing (Giovannini and de Melo, 1993, Fry, 1997). For these reasons governments in many countries have long treated banks as public utilities and implicitly more or less guaranteed their survival (Honohan, 1997).

The main argument in favor of financial liberalization is that it enhances economic efficiency and growth in a market economy. Shaw (1973) and McKinnon (1973) analyzed how financial repression discourages savings and contributes to misallocation of credit. Artificially low interest rates make credit rationing necessary. The public sector, large firms, favored industries and established clients tend to receive credit at favorable terms while small-scale investors have to obtain funds in relatively expensive informal credit markets (Diaz-Alejandro, 1985).

In response to the evidence of inefficiencies of financial repression and to pressures from trading partners and international financial institutions; the IMF and WTO, in particular, many countries embarked on reforms of their financial sectors during the 1980s and the 1990s. Domestic

(internal) financial liberalization typically included the removal of interest rate controls and direct credit allocation schemes. Often banks were allowed to expand the scope of their activities and state-owned banks were privatized to reduce political influences. International (external) financial liberalization referred to the removal of capital account controls of foreign direct investments as well as of portfolio capital flows.

In the 1990s there was a wave of theoretical and empirical contributions about the impact of financial sector development on economic growth.[4]. Several studies found that financial liberalization is one of the determinants of financial development and growth.[5] More recent studies specifying and estimating time series models for individual countries indicate that in some countries the causality between financial development and growth is reversed.[6] Independent of this causality it appears that financial liberalization is a requirement for increased intermediation associated with financial development.[7]

Other studies of financial liberalization focus on effects on the firm level. For example, Leaven (2003) find that the financing constraints are reduced for both large and small firms over time in liberalizing countries. Desai et al (2006) find that capital controls discourages foreign direct investment (FDI).

In studies of the effects of financial liberalization on the financial sector, Beim and Calomiris (2000) show that financial repression results in reduced economic growth because banks have little incentive to explore new opportunities and to become innovative. Both external and internal financial liberalizations tend to improve the financial infrastructure and bank governance

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[4] Examples are Greenwood and Jovanovic (1990), Bencivenga and Smith (1991, 1993), Obstfeld (1994) and Saint-Paul (1992).

[5] See, for example Ranciere et al (2006) and Tressel and Detragiache (2008). Levine (1997) surveys this literature through the mid 1990s.

[6] This literature employs cointegration and error-correction mechanisms to analyze short-run and long-run causality between finance and growth. Some well-known examples are Demetriades and Hussein (1996), Arestis and Demetriades (1997), Arestis et al (2001) and Arestis et al (2004).

[7] Christopoulos and Tsionas (2004) estimate an error correction model for a panel of 10 countries and find that long run causality runs from financial development to growth.

(Schmukler, 2004). These effects stand in contrast to a common view that liberalization in the form of elimination of interest rate and credit regulation reduces the profitability of banks through increased competition and, thereby, increases the fragility of the banking system (e.g. Hellman et al, 2000, Noy, 2004).

Berger et al (2008) test whether increased competition increases or reduces financial fragility in 23 developed nations. Although the results generally favor a "competition-fragility" view there is some evidence that competition also induces banks to hold more equity capital and employ risk-mitigating techniques.

Increased financial fragility in the sense of an increased likelihood of banking crises does not necessarily contradict increased efficiency of the banking system from the point of view of credit allocation and economic growth. The question can be asked is whether a higher likelihood of banking crises is a necessary evil accompanying higher economic growth following liberalization or whether a higher likelihood of banking crises depends on a different set of factors in conjunction with liberalization. The answer to this question depends partly on what factors explain banking crises.

There are a number of theories, hypotheses and stories about the origin of financial crises. Although not mutually exclusive we can distinguish among five types of explanations[8]:

1) macroeconomic developments and leverage[9], 2) behavioral factors, speculation and optimism[10], 3) shift to liquidity and safety[11], 4) management failure[12], and 5) institutional weaknesses.

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[8] This categorization is based on Ostrup, Oxelheim and Wihlborg (2009).

[9] See e.g. Mishkin (1991, 1997), who discusses five different types of macroeconomic shocks that may cause financial crises. Fisher (1933) developed the 'debt-inflation' theory suggesting that the level of debt in financial and non-financial enterprises is the crucial factor that determines the probability and size of financial crises under certain macroeconomic conditions. Bernanke, Gertler and Gilchrist (1994), Kioytaki and Moore (1997), and von Peter (2004) emphasize asset price inflation as a source of leverage and fragility.

[10] This view goes back to Keynes (1936). Minsky (1964) and Kindleberger (1989) took similar views of asset speculation as the origin of financial crises.

In the empirical analysis of the relationship between financial liberalization and banking crises discussed below we control for macroeconomic factors in the same way as most of the existing literature on banking crises. We also take into account banks' leverage and the strength of capital regulation and supervision.

Financial liberalization plays an important role in the behavioral explanations of crises since the speculative behavior that causes crises would not be possible with restrictions on bank lending and financial investment opportunities. Several studies associate increased capital mobility with financial crises in emerging markets. For example, McKinnon and Pill (1997) point out the possibility that a surge of inflows can create an asset price bubble followed by a capital flow reversal.

Financial crises caused by sudden shifts to safe and liquid assets requires that the financial system is relatively free from restrictions on risk-taking since the portfolio shift presumes that investors have been able to obtain risky portfolios in accordance with their preferences. A portfolio shift may also be the result of liberalization, however. Martin and Rey (2006) develop an open economy model wherein financial liberalization in emerging markets triggers capital flight and a collapse in the demand for assets as key elements of a financial crisis following liberalization.

The fourth explanation of crises refers to management failures to evaluate and control risk-taking in financial institutions. Systematic managerial failures in a country would depend on managerial incentives and corporate governance. To address the role of governance and managerial failure in crises we turn to institutional weaknesses as explanations of crises.

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[11] Already Bagehot (1873) discussed how a sudden demand for liquid, safe assets could be caused by a sudden sentiment of fear. Friedman and Schwartz (1963) describe how bank runs contributed to the crisis in the 1930s.
[12] Irvine H. Sprague (1986 [2000], p. 233), chair of the Federal Deposit Insurance Corporation (FDIC) from 1979 to 1986 gave the following account of financial failures: "the greed factor…remains the major – often the only – reason for a bank's failure. Banks fail in the vast majority of cases because their management seek growth at all cost, reach for profits without due regard to risk, give privileged treatment to insiders, or gamble on the future course of interest rates. Some simply have dishonest management that loots the banks".

Institutional weaknesses can cause financial crises for a variety of reasons. For example, a weak political structure may cause budgetary deficits, inflation and subsequent losses in financial institutions, which may have been pressured into holding government assets to finance the deficit. In this case financial repression would contribute to the likelihood of a crisis.

Strong explicit and implicit guarantees of banks' creditors and shareholders can explain a tendency of banks to shift risk to deposit insurance funds and tax payers. This "moral hazard problem" in banking is often referred to as an explanation of insufficient attention to risk-management and insufficient bank capital relative to credit risk.[13] It can be expected that the moral hazard explanation of banking crises is particularly relevant if explicit or implicit protection of banks' liabilities are extensive and if there are few restrictions on banks' risk-taking behavior. Thus, financial liberalization and protection of banks' liabilities can be expected to be interacting explanations of banking crises. We return to this issue in the empirical section below.

The effectiveness of capital regulation and supervision should also be considered among institutional factors affecting the likelihood of banking crises. In the empirical section below we ask whether the impact of financial liberalization on banking crises depends on the effectiveness of supervision.

Other institutional characteristics affecting the likelihood of banking crises can be the strength of creditor rights and the ability of creditors to enforce contracts. A study by La Porta et al (1998) shows a larger risk of financial crises in countries with weak enforcement of property rights. In the empirical work below we control for such factors using a general proxy for institutional quality.

This brief review of causes of crises indicates that arguments can be made for a positive as well as a negative relationship between financial liberalization and the likelihood of banking crises.

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[13] See, for example, Bhattacharya and Thakor (1993).

Furthermore, the relationship may depend on institutional characteristics of countries interacting with liberalization.

There are few explicit models incorporating effects of liberalization on economic growth as well as on the likelihood of crises. One exception is Daniel and Jones (2007). They develop a model of a transition period following liberalization showing that financial liberalization can increase the likelihood of banking crises in the medium term while also enhancing economic efficiency. In the model the immediate effect of liberalization is to lower the cost of capital and, thereby, to increase real investment activity. Banks finance more risky projects and over time projects with lower returns will be accepted. At this point, when the capital stock has increased and marginal projects offer lower returns, banks become more vulnerable and the likelihood of a crisis increases.

The result in Daniel and Jones (2007) does not require the existence of deposit insurance and associated moral hazard. It depends strongly on effect of liberalization on the average cost of capital and assumes that all projects before and after liberalization are expected to offer a positive net present value. However, an important aspect of liberalization in the literature discussing effects on bank behavior is that the allocation of credit to an increasing extent will be based on market determined economic criteria as opposed to political criteria and relationships of bank managers.[14] If so, financial liberalization could reduce the fragility of the banking system as a result of improved governance.

Most of the literature discussed above with the exception of Daniel and Jones (2007) is not specific with respect to the time dimension. There are reasons to believe that dynamic effects are important, however. Prior to financial liberalization, bank managers and staff are used to work within a controlled non-competitive environment. Post-liberalization the poor performance of pre-

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[14] See for example, references to the original literature on costs of financial repression as McKinnon (1973).

liberalization portfolios becomes exposed (Alba et al, 2000 and Caprio et al, 2000) and new types of risk arise. If the managers and the supervisors are not familiar with the new environment, they may be unable to monitor banks' risky activities properly. Over time a competitive environment would tend to favor the managers with greater risk management skills unless government guarantees are very strong. The rate of innovation and exploration of business opportunities are likely to increase as well in a competitive environment as noted by Beim and Calomiris (2000). Thus, the short and long run effects of financial liberalization on the likelihood of a crisis may be opposite in an environment with effective legal and regulatory institutions. These considerations are taken into account in the hypotheses below.

Turning to the empirical evidence the association between financial liberalization and banking crisis has been observed in several empirical studies (e.g. Williamson and Mahar, 1998, Kaminsky & Reinhart, 1999, Demirgüç-Kunt and Detragiache, 2001, Weller, 2001, Eichengreen and Arterta, 2002 and Noy, 2004). Demirgüç-Kunt and Detragiache (2001) focus on domestic financial liberalization by observing the date policy makers announce interest rate decontrols in 53 countries during the period 1980-1995. They find that financial liberalization is strongly and positively correlated with the probability of a subsequent banking crisis. Weller (2001) also finds are more likely after domestic financial liberalization.

Eichengreen and Arteta (2002) extend the analysis in Demirgüç-Kunt and Detragiache by distinguishing between the effects of internal and external financial liberalization. The latter is captured by a 0/1 dummy. They find that capital account liberalization does not contribute to a banking crisis but internal financial liberalization does. Furthermore, they find that capital account liberalization increases the likelihood of banking crises for countries that liberalize internally. Noy (2004) considers interactions between domestic financial liberalization and supervision and concludes that banking crises occur as a result of weak supervision after liberalization.

Ranciere et al (2006) study the relationship between financial liberalization and crises using one proxy for equity market liberalization and another for relaxation of capital account restrictions. Both financial liberalization variables are associated with higher probabilities of banking and currency crises (twin crises).

Barth et al (2004) focus on restrictions on bank activity, entry restrictions, and privatization. They find that restrictions on banking activity and foreign bank entry increase the likelihood of banking crises, while government ownership do not have a significant effect on this likelihood. Barth et al use data for the types of regulatory restrictions on banks from their country survey, *The Regulation and Supervision of Banks around the World: a New Database*. Although these variables capture the extent of regulatory restrictions across countries, they exist only as cross sectional data for the years 1999, 2003, and 2007.

The implication of this overview is that different aspects of liberalization may have different effects on the likelihood of banking crises. Thus, to identify effects of one type of liberalization it is desirable to control for other types of liberalization. In addition, the benefits of liberalization can be accompanied by risks if incentives in the market place do not encourage prudence and supervision. Excessive risk taking can be exacerbated by far-reaching guarantees of banks, low levels of skills in risk assessment, weak governance in banks and lax supervision.

Before developing explicit hypotheses based on the discussion above the data on types and strength of liberalization are described.

III. Data for types of financial liberalization

Data on liberalization of different types of restrictions and supervision are taken from Abiad, Detragiache and Tressel (2008). The potentially important advantage of the database is that it has time-series measures for the intensity of reforms in seven dimensions. As noted in their analysis of

the pace of financial reform, there is variation among countries in terms of type of liberalization, intensity and speed of reform. The data set for our analysis includes 21 advanced countries and 27 emerging markets during the period 1973-2005.[15] The list of countries for each country group is reported in the Appendix A.

For each country, the following six dimensions capture liberalization of different types of restrictions:

(1) Elimination of credit controls and high reserve requirements,

(2) Elimination of interest rate controls,

(3) Elimination of entry barriers and of restrictions on the scope of banks' activities,

(4) Securities market policy,

(5) Elimination of capital account restrictions,

(6) Reduction of state ownership in the banking sector,

The seventh dimension of financial reform does not refer to liberalization per se, but to capital regulation and prudential supervision:

(7) Enhancement of capital regulations and prudential supervision (CRS) of the banking sector.

The dimensions (1)-(6) are measured on a scale from 0 to 3 where 0, 1, 2 and 3 represent fully repressed, partially repressed, largely liberalized, and fully liberalized. For banking capital regulation and supervision (CRS) the scale goes from unregulated and unsupervised (0), through weakly regulated and supervised (1), largely regulated and supervised (2), to strongly regulated and supervised (3). The description of each dimension is reported in the Appendix B.

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[15] Abiad, Detragiache and Tressel (2008)'s dataset covers 91 economies, including 22 advanced countries and 69 developing countries. We focus on 27 emerging markets (EMGs) rather than using their sample of all 69 developing countries as the effects of financial liberalization are more relevant for EMGs. In particular, EMGs tend to be more open and have much larger and more volatile capital flows in relation to the size of their domestic capital markets. For other lower-income developing countries, the role of banks in the economy and the degree of capital mobility are usually much lower and hence banking crises are less of a problem. We also follow Abiad, Detragiache and Tressel in including Israel in the group of advanced economies.

Since there is substantial correlation among the dimensions of liberalization (see Panel A, Table 2), we combine these dimensions to create three types of liberalization. We argue that interest rate and credit controls are nearly equivalent since freedom to allocate credit without freedom to set interest rates on loans implies that the allocation will be determined by the interest rate structure. To enjoy faster growth, many governments have initiated liberalization by allowing banks to set interest rates or to allocate credit more freely or both. Credit and interest rate controls of all kinds can be viewed as restrictions on banks actions and behavior. Thus, we combine the first two dimensions of liberalization, eliminations of credit and interest controls, into one type denoted "Behavioral Liberalization". The Behavioral Liberalization score refers to the sum of the scores for these two dimensions added together:

i) Behavioral Liberalization = Score (1) + Score (2)

Other types of liberalization include restrictions in equity markets and on international capital transactions implying restrictions on the set of available sources and uses of bank funds, as well as on competition from non-bank financial institutions and foreign entry. Restrictions on the range of activities of banks and restrictions on entry have similar effects on the competitive situation in financial markets. The scores for the third through the fifth dimensions are, therefore, added to create a score for "Competitive Liberalization":[16]

ii) Competitive Liberalization = Score (3) + Score (4) + Score (5)

We consider government ownership a third separate type of restriction. Liberalization in this dimension is denoted Privatization.

iii) Privatization = Score (6)

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[16] We also run regressions by including all three components instead of the aggregate variable of Competitive Liberalization after controlling for other types of liberalization. The p-value of the Wald Chi-square test for the equality of the coefficients is higher than 0.10, indicating that the effects of these three components on banking crises cannot be identified. Thus, it is likely that not much information is lost when using Competitive Liberalization index instead of (3), (4) and (5) individually (See Section V).

The correlation between the first two types of liberalization remains high as shown in Table 2 raising questions about the possibility of distinguishing between effects of types (i) and (ii). We return to this issue.

Total FL represents total financial liberalization captured by the sum of scores for categories (1)-(6). CRS represents the score for the strictness of bank capital regulation and supervision. The descriptive statistics of financial liberalization variables are reported in Table 1.

[Tables 1 and 2 here]

IV. Hypotheses and model specification

The review of the literature on effects of financial liberalization and explanations of banking crises does not lead to a simple theoretical prediction about the relationship between financial liberalization and the likelihood of banking crises. Nevertheless, hypotheses can be formulated based on the arguments we expect to have the greatest weights.

The dominating view in the empirical literature is that increased financial liberalization of any type increases the likelihood of banking crises. Explanations could be that behavioral as well as competitive liberalization would increase the possibility that banking crises erupt as the result of speculative behavior, mistaken expectations, as well as of sudden shifts in portfolio preferences. In addition, high leverage contributing to the vulnerability of the banking system may build up during periods of optimistic sentiments in the market. Privatization would increase the likelihood of crises simply because government support in different forms would decline.

The main argument contradicting this view is that all types of financial liberalization contribute to a more competitive environment wherein banks are subject to market discipline providing incentives for improved governance, risk management and innovation. A minimum degree of liberalization would be required to obtain any degree of effective market discipline. On

these grounds the following hypothesis can be formulated independent of dynamic effects of liberalization.

Hypothesis 1: There is a degree of partial total liberalization (Total FL), as well as of each type of liberalization, at which the likelihood of a banking crisis is at a maximum when controlling for macroeconomic and institutional factors.

One weakness of this hypothesis is that it does not distinguish between transitional and permanent effects of liberalization. In fact, the inverted U-shaped relationship implied by Hypothesis 1 may be explained by dynamic effects of liberalization because most of the variation in degree of liberalization occurs as an increase in the degree of liberalization over time. It has been argued that behavioral and competitive liberalization can increase the likelihood of banking crises temporarily, because there is a transition period before risk assessment and risk management skills can be developed in an environment with greater ability and opportunity for risk-taking. Furthermore, banks are often settled with large amounts of pre-liberalization bad loans that were not recognized as bad before.

A temporary period of learning to deal with risk in a new, more liberal environment could be followed by a decline in financial fragility as a result of improved governance and risk-management. Kaminsky and Schmukler (2008) show that financial markets are more volatile during three years following financial liberalization but financial cycles become more stable over time because institutions tend to improve after the deregulation of financial markets. This observation is also consistent with the theoretical mechanism developed by Daniel and Jones (2007). They predict that the risk of banking crisis is relatively high some time after liberalization when marginal projects are implemented.

If liberalization has been increasing over most of our estimation period we may observe the inverted U-shaped relationship described in Hypothesis 1 but as a result of the dynamic effects

discussed above. To analyze this issue further we will include lags of liberalization and formulate the following hypothesis:

Hypothesis 2. The probability of banking crisis increases after liberalization with a lag up to a point where-after the probability decreases. The decline is the result of improved governance, risk-management and credit allocation in a liberalized system after a period of learning.

This hypothesis will be tested using lags of liberalization up to four years. We initially included the change in liberalization during some years before observations of crisis or non-crisis but found that we could not distinguish between a variable capturing the level of financial liberalization and a variable capturing the change in liberalization during a five year period before observations of crisis or no crisis.

Institutional factors as explanations of banking crises were emphasized in the review section above. Institutional factors can themselves influence the likelihood of crisis but they are also likely to interact with liberalization. They may also explain the observation of the inverted U-shaped relationship described in Hypothesis 1 if institutional factors are correlated with liberalization. Table 2 shows that the CRS measure from the same data base as the liberalization measures is positively correlated with behavioral and competitive liberalization, in particular.

The institutional factors we include in the analysis are GDP/capita, Rule of Law (Law) and Lack of Corruption as alternative proxies for general institutional quality, strictness of capital regulation and supervision (CRS) and explicit deposit insurance coverage. Stricter regulation and supervision would weaken any relationship while stronger explicit deposit insurance coverage is expected to reduce market discipline and, thereby, strengthen a positive relationship between liberalization and the likelihood of crisis. However, if increased liberalization reduces the likelihood of crises expanded protection of depositors would weaken this relationship. Thus, expanded deposit insurance coverage is expected to make the relationship more positive whether it is positive or

negative to begin with. Higher institutional quality can be thought of as better governance translating into stronger governance and effectiveness of market discipline. Thus, the effects of higher institutional quality would be the same as for reduced explicit deposit insurance coverage.

The following hypotheses are formulated with respect to the interaction between institutional factors and financial liberalization:

Hypothesis 3a. Stronger capital regulation and supervision (CRS) are expected to weaken any positive or negative association between each type of financial liberalization (and Total FL) and the occurrence of banking crises.

Hypothesis 3b. Expanded protection of bank depositors and other creditors (DI Coverage) is expected to make the relationship between each type of liberalization (and Total FL) and the occurrence of banking crisis more positive whether the relationship is positive or negative to begin with.

Hypothesis 3c. Higher general, legal and political institutional quality (GDP/Capita, Rule of Law, Lack of Corruption) in a country is expected to make the relationship between each type of liberalization (and Total FL) and the occurrence of banking crisis more negative whether the relationship is positive or negative to begin with.

After testing these hypotheses for total financial liberalization we distinguish among the three types of liberalization expecting behavioral and competitive liberalization to have stronger effects than only privatization. One difficulty we face when testing for the impact of the different types of liberalization is that they tend to be highly correlated as Table 2 shows. Privatization is less correlated with Total FL than the other two types.

The hypotheses are tested for the entire sample of 48 countries and for each county group separately, since advanced economies and emerging markets have different characteristics in terms of financial development and the extent of capital mobility. We expect that the effects of financial

liberalization on the incidence of banking crises are stronger for emerging markets. Generally, these countries have less experience with risk management, relatively weak financial regulation and supervision, weak market discipline, and more volatile capital flows. We cannot expect that the institutional variables control completely for these differences between the country groups.

We test the above hypotheses using Logit estimation based on the following initial model specification:

$$L_{i,t} = \left[\frac{P_{i,t}}{1 - P_{i,t}}\right] = \alpha + \beta\, \mathrm{FL}_{i,t-1} + \delta\, \mathrm{Institution}_{i,t-1} + \gamma\, \mathrm{Macro}_{i,t-1} + \varepsilon_{i,t}$$

where

$$P_{i,t} = \mathrm{Prob}(\mathrm{BC}_{i,t} \mid \mathrm{X}) = \frac{1}{1 + e^{-(\alpha + \beta\, \mathrm{FL}_{i,t-1} + \delta\, \mathrm{Institution}_{i,t-1} + \gamma\, \mathrm{Macro}_{i,t-1})}}$$

BC is a banking crisis dummy, which takes a value of one in a crisis year and 0 if there is no crisis. The subscript i refers to a country and t indicates time. Crisis years following the initial year of a specific crisis are excluded from the main regressions to reduce the simultaneity problem caused by the possibility that the occurrence of a banking crisis triggers financial reforms. Furthermore, the hypotheses refer to the impact of liberalization on the likelihood that a crisis will occur but not to the duration of a crisis. A crisis lasting more than one year would get excess weight in the analysis and possibly bias the results if all crisis years were included.

Data for banking crisis episodes, including both systemic and borderline banking crises, are taken from Caprio et al (2005).[17] FL in the equation refers to either the aggregate index of financial liberalization (Total FL) or its three types (behavioral liberalization, competitive liberalization and privatization), which were discussed in the previous section. When testing the nonlinear relationship

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[17] In Caprio et al (2005)'s banking crisis dataset, both a start and end date of each crisis episode are reported. We also check the dates of crisis episodes with A New Database of Systemic Banking Crises by Laeven and Valancia (2008). If a start date of the same crisis episode is different, we use the one from Laeven and Valancia. However, the New Database is limited to systemic banking crises and only a start date of banking crises is reported.

between banking crises and financial liberalization (the inverted U-shaped in Hypothesis 1), we enter FL in the quadratic functional form as well.

Institution refers to the capital regulation and supervision of banks (CRS), deposit insurance systems (DI coverage) and the quality of domestic institutions. We use the real GDP per capita to capture general institutional quality. In the robustness check, we also use the rule of law and (lack of) corruption variables to capture the quality of the legal and political systems in a country.[18] A proxy for the coverage of explicit deposit insurance captures the difference in deposit insurance systems. It measures the maximum deposit insurance coverage in a country relative to the value of the average (per capita) deposit. To test whether the impact of financial liberalization depends on institutional variables (Hypothesis 3), we include the interaction terms between FL with each of the institutional variables.

Macro refers to a standard set of macroeconomic control variables used in the reviewed literature. They include the real GDP growth rate, the ratio of current account to GDP, the ratio of money supply to international reserves, the growth rate of the ratio of domestic credit provided by banking sector to GDP, the ratio of capital flows to GDP, the inflation rate, the Northern interest rate[19] and a currency crisis dummy. The currency crisis dummy is included because there are studies that find a strong relationship between currency and banking crises (e.g., Kaminsky and Reinhart, 1999). Capital flows are included as an independent variable in order to control for the possibility that portfolio shifts in or out of a country can contribute to the likelihood of a banking crisis. The descriptive statistics of the variables used in regressions are reported in Table 1. The descriptions and sources of these variables are reported in the Appendix B.

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[18] We use the rule of law and corruption only in the robustness check because the data, which are taken from the International Country Risk Guide, starts in 1984 while our data on financial reform starts in 1973.

[19] Following Arteta and Eichengreen (2002), we calculate the Northern interest rate from the weighted average of the interest rates in Germany, USA, UK, Switzerland, France and Japan. The weights are the fractions of debt denominated in the relevant currencies. Since we control for the world interest rate, we do not include the real domestic interest rate in regressions.

We consider several ways to reduce any source of bias arising from unobserved country characteristics in the panel data model and from simultaneity caused by reverse causality between liberalization and banking crisis in particular. In the reported regressions (Tables 3-6) all independent variables are lagged one year and crisis years following the onset of a banking crisis are excluded. To reduce the problem of correlated error terms across countries and over time in the panel regressions, we use robust and clustering standard errors of estimates by country to correct the covariance matrix of the estimates for heteroskedasticity and autocorrelation among the observations across time within each country.

We do not introduce the conditional fixed-effects Logit model because including country dummies in banking crisis regressions would throw countries without any banking crises out of the sample.[20] An instrumental Logit regression is an alternative way to eliminate the endogeneity bias. Since there is no ideal instrument for financial liberalization we undertake alternative approaches to deal with reverse causality concerns. We inspect individual crisis episodes in our sample and observe changes in the level of financial liberalization after the eruption of banking crises. We do not find a significant pattern of reversal of liberalization after the crisis onset.[21] In unreported regressions, we also regress the aggregate index of liberalization (with a 0-18 scale) on the onset of banking crisis dummy and other macroeconomic control variables using the Order Logit model. The p-value for the banking crisis dummy is about 0.6. These investigations suggest that our reported regressions based on the Logit model are not driven by the endogeneity.

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[20] Estimations based on the random-effect Logit model do not seem to differ much in terms of the signs of coefficients from those reported in Tables 3-6. The results are available upon request.

[21] In our sample, only few banking crises are followed by the large reversal of liberalization. These are banking crises in Chile in 1981, Mexico in 1980 and Malaysia in 1997. The trend towards greater financial liberalization is still found in other countries that experienced banking crises.

V. Financial liberalization and banking crises: empirical results

Tables 3-5 report the empirical results for the effect of the aggregate index for financial liberalization (Total FL) on the onset of banking crises for the entire sample of 48 countries and two country groups. The squared term is added in a separate regression for each country group in each table. Table 3 includes neither dynamic consideration nor interactions with institutional factors. Table 4 includes dynamic considerations while the interactions between financial liberalization and institutional variables are introduced in Tables 5 for Total FL. In Table 6 we replace Total FL with the three types of liberalization (behavioral liberalization, competitive liberalization and privatization) to investigate whether different types of liberalization provide additional information relative to the aggregate index. All tables report the marginal effects from Logit estimations.

The results in Table 3, Columns (1), (3) and (5), where a linear relationship between Total FL and the occurrence of banking crisis is assumed, are consistent with the conventional wisdom that increased financial liberalization is associated with a higher likelihood of banking crisis. The coefficient for Total FL is positive and strongly significant in the regressions for all countries (ALL), advanced countries (ADV) as well as emerging market countries (EMG). Results with respect to Hypothesis 1 referring to an inverted U-shaped relationship are reported in Columns (2), (4) and (6) indicate that the conventional wisdom needs to be nuanced. The hypothesis is supported by the significant, negative coefficients for Total FL squared in regressions for all countries as well as for the sub-samples. The Wald Chi-Square increases in all country groups when the squared term is included.

[Table 3 here]

The inverted U-shaped relationship is also supported in Figure 1 where the frequency of banking crises is shown for different levels of the three types of liberalization. In Figure 2, Panel A, the predicted probabilities of banking crises based on the results in Table 3, columns (2), (4) and (6)

are drawn at different levels of Total FL. The maximum probability occurs at an intermediate level of liberalization for both country groups and for ALL countries. For EMG countries the maximum probability is much higher than for ADV countries but the maximum for the EMG countries occurs at a much lower level of liberalization. Thus, the positive association between liberalization and the likelihood of banking crises appears to hold only as long as financial markets remain relatively repressed in emerging economies.

[Figures 1 & 2 here]

Among the institutional variables we control for, Capital Regulation and Supervision (CRS) and GDP/Capita, a proxy for general institutional quality, have a significant negative effect on the probability of banking crises for ALL countries. Their coefficients are less significant for the two country groups wherein there is less variation in CRS and GDP/Capita. Deposit insurance coverage as a stand alone variable is far from significance in all regressions.

Several macroeconomic variables affect the probability of banking crises significantly. The results are mostly consistent with the existing literature. Increased inflation and a higher world interest rate increase the likelihood of banking crises in both country groups. A low level of foreign exchange reserves relative to M2 (higher M2/Reserves) and higher credit growth are associated with greater likelihood of banking crisis in emerging economies. Most interesting is that greater capital flows are associated with a higher likelihood of banking crises in the EMG group, but not in ADV group of countries. A currency crisis in the preceding year seems to reduce the likelihood of banking crises in EMG countries, however.

In the following we analyze how the results in Table 3 hold up when we take dynamic effects into account (Table 4), when we allow interaction between liberalization and institutional variables (Table 5), and when we distinguish among types of liberalization (Table 6). In particular, we ask whether the quadratic relationship observed above remains.

Three lags of Total FL are included in the regressions presented in Table 4, Columns (1) - (3), in addition to the Total FL with one lag. In Columns (4) - (6), the average Total FL for the three additional lag periods substitutes for the three lag terms. The levels of Total FL for the four lags are highly correlated as shown in Table 2, panel B. Results must therefore be interpreted with some care.

Total FL the year before a banking crisis (t-1) remains significant in the regressions in Table 4. The negative squared term of Total FL remains significant in the regression for ALL countries and for EMG countries.

The dynamic pattern for the impact of liberalization implied by the coefficients in Columns (1) - (3) is only weakly consistent with Hypothesis 2. The first additional lag (t-2) has no explanatory power while the second additional lag (t-3) has a positive significant or nearly significant coefficient in the three regressions. Thus, financial liberalization seems to increase the probability of a crisis erupting three years later. The third additional lag (t-4) has a negative coefficient, however, indicating that in the fourth year the probability of crisis declines again as Hypothesis 2 suggests. In Columns (4) - (6), the additional lags of Total FL are replaced by the average value. The positive coefficient of the average Total FL is smaller than those of the first lag, similarly indicating the decline of the effect of Total FL over time. It can also be seen that using three additional lag terms or simply the average makes little difference for the results on other variables. In the remainder of the analysis we include only the average Total FL for the three additional lag periods to control for dynamic effects.

Another result that can be noted in Table 4 is that the negative effect of CRS seems weaker than in Table 3. For the ADV countries the CRS coefficient is not significant. Thus, dynamic learning effects of liberalization may substitute for regulation and supervision after some time.

[Table 4 here]

In Table 5 we introduce the interaction between Total FL and CRS to test Hypothesis 3.a and to analyze whether the inverted U-shaped relationship in Table 3 holds up when interaction is taken into account. Interactions between deposit insurance coverage and financial liberalization and between institutional quality (GDP/capita, Rule of Law and lack of corruption) are not included in Table 5 because these interaction terms were not significant. Appendix C shows that deposit insurance and GDP/capita interactions are not significant. Hypotheses 3.b and 3.c are accordingly rejected.

Table 5 shows that the significance of coefficients for Total FL and for Total FL squared standing alone do not survive the inclusion of the interaction term. Only for EMG countries are the coefficients nearly significant. Instead the interaction term between CRS and Total FL is negative and significant while the sign for CRS alone becomes positive and significant or nearly significant.

[Table 5 here]

To interpret the results more easily, Figure 2, Panel B, shows the predicted relationship between the probability of banking crises and Total FL at different degrees of strictness of CRS based on regression coefficients in Column (1). The figure shows that in countries with very weak capital regulation and supervision (CRS=0) the probability of banking crises increases with increased liberalization. In other countries with higher values for CRS (CRS=1, 2 and 3) the crisis probability decreases with increased liberalization. Furthermore, the stricter the regulation and supervision is the steeper is the decline in crisis probability with increased liberalization.

To interpret these results further it can be noted in Figure 2, Panel B, that there are no observations for some combinations of CRS and Total FL. Specifically there are no countries with liberalization levels below 8 (out of 18) with strong regulation and supervision (CRS=3). Thus, Total FL is correlated with CRS as can be expected. This correlation in combination with different

effects of liberalization at different levels of CRS may explain the inverted U-shaped relationship we observed when interactions were not included in the regressions.

Hypothesis 3.a stating that strong regulation and supervision tends to make banking crises more independent of the degree of liberalization is clearly not supported. On the contrary, increased strength of regulation and supervision seem to allow countries to benefit from increased competition and market discipline associated with liberalization. This result could be sensitive to the particular way strength of supervision and regulation is measured. We return to this issue below.

The final step in the analysis is to introduce the three types of liberalization instead of Total FL. In Table 6 Total FL is replaced by Behavioral liberalization, Competitive liberalization and Privatization. In Columns (1) - (3) the specification is the same as in Table 3 although the quadratic liberalization term is introduced only for Behavioral liberalization. In Columns (4) - (6) the specification is the same as in Table (5) although only Behavioral Liberalization interacts with CRS. We do not include quadratic terms and interactions for all types of liberalization because the correlations among the types are quite high as shown in Table 2. We have chosen to include these terms with Behavioral liberalization because this type seems to have the highest explanatory value for the probability of banking crises.

[Table 6 here]

Distinguishing among different types of liberalization does not seem to add much explanatory value to the regressions in Tables 3 and 5. The additional information obtained in Table 6 is that Behavioral Liberalization seems to be the most important type of liberalization from the point of view of its effect on the likelihood of banking crises. However, it is important to note that the effects of Behavioral and Competitive liberalizations may not be separable with any certainty since their correlation is as high as 0.80. Privatization, on the other hand, is less correlated with the other types of liberalization. Our results indicate that increased privatization reduce the likelihood

of banking crises particularly for the group ADV countries. The coefficients are not significant for all countries and the group EMG countries.[22]

Since capital regulation and supervision seems to play a very important role for the results we want to see whether the above results are robust when an alternative measure of the quality of regulation and supervision is introduced. For this reason we use an index for quality of regulation and supervision from the World Bank database (*The Regulation and Supervision of Banks around the World: a New Database*). This index is created in a completely different way from the CRS variable used above. CRS in the Financial Reform database is based on assessment of available information each year. The World Bank collects the data for financial regulation and supervision from country surveys and questionnaires referring to the organization and legal framework for supervision. The data exists for only a few years. Thus, the World Bank database is most suitable for a cross section analysis while the time-series aspect is an important factor in our analysis above.[23]

Correlations in Table 2, Panel A, show that the two proxies for capital regulation and supervision are hardly correlated at all. Thus, the time dimension is responsible for a large share of the variation in our data. Appendix D shows that coefficients for the World Bank CRS variable and its interaction terms are not significant but the signs of coefficients are the same as those in Table 5. The lack of any significant results for the World Bank proxy indicates that effectiveness of regulation and supervision has changed over time in many countries and affected the impact of financial liberalization.

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[22] We run regressions with each type of liberalization alone as well. In this case both competitive and behavioral liberalization are significant. Each type seems to substitute for Total FL but behavioral liberalization appears to be most significant. Including only one type of liberalization does not allow us to separate effects of each type since the one type included in a regression captures effects of other types as well to the extent they are correlated.
[23] We use the World Bank's 2003 survey. The survey is also conducted in 1999 and 2007.

VI. Conclusion

The evidence presented in Tables 3-6 indicates that the common view that financial liberalization leads to an increase in the likelihood of banking crises is not robust. This commonly observed relationship may be the result of a lack of overt financial crises in countries with severely repressed financial, government controlled and subsidized financial system. A possible negative relationship over a range of liberalization could be hidden in an analysis based on the assumption that the relationship is linear. In regressions disregarding interaction between institutional variables and financial liberalization but controlling for institutional and macroeconomic variables we find that liberalization increases the probability of banking crisis up to a partial level of liberalization. After this point increasing liberalization reduces the probability of crisis. The level of liberalization beyond which further liberalization reduces the likelihood of banking crisis is relatively low in emerging market countries.

It was noted that the observed inverted U-shaped relationship between financial liberalization and the probability of banking crisis may be explained by dynamic effects of liberalization or by interaction between liberalization and correlated institutional variables. The results indicate that interaction between strength of capital regulation and supervision, and financial liberalization explains the mentioned finding. Taking this interaction into account we find that financial liberalization reduces the likelihood of banking crisis except in countries with the weakest regulation and supervision. Thus, stronger regulation and supervision enable countries to obtain benefits of financial liberalization in terms of growth as well as reduced likelihood of banking crisis.

With respect to dynamic learning effects it was hypothesized that implementation of liberalization may increase the likelihood of banking crisis for some time before learning occurs and governance and risk-management skills develop in a more competitive environment. This

hypothesis was supported although the reduction in likelihood of crisis occurring with a four year lag was small.

When distinguishing among three types of financial liberalization: behavioral liberalization, competitive liberalization, and privatization, we find that behavioral liberalization explains most of the results obtained using the proxy aggregating all types of liberalization. Behavioral liberalization refers to the removal of interest rate and quantitative credit controls. However, Competitive liberalization referring to an expansion in the scope of domestic and cross-border financial activities is highly correlated with behavioral liberalization. The third type of liberalization, privatization, is less correlated with other types but the effect of privatization alone on the likelihood of banking crises seems to be weak.

One policy implication of the analysis is that positive growth effects of financial liberalization can be obtained without a simultaneous increase in the likelihood of banking crises. The positive growth effects are fairly well established in the literature. At a minimum the empirical evidence indicates that financial liberalization is a requirement for growth in a market economy. The results presented here indicate that financial liberalization may reduce the likelihood of banking crises as well if only a minimum effectiveness of capital regulation and supervision can be achieved.

These policy implications may seem contrary to the experiences of the recent financial crisis that originated in the USA and, thereafter, affected European countries the most. Europe and the USA are generally considered economies with relatively high degrees of liberalization as well as strength of regulation and supervision. However, it should be noted that the recent financial crisis was not primarily a banking crisis in the traditional sense but a securities market crisis in a country where traditional banking plays a much smaller role than in the rest of the world.

Appendix:

A. List of Countries in Different Country Groups

Advanced economies: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States

Emerging market Economies: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hong Kong, Hungary, India, Indonesia, South Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Sri Lanka, Thailand, Turkey, and Venezuela.

B. Data Descriptions and Sources

Variable	Description	Source
The Onset Banking Crisis	The onset of banking crisis dummy, which is equal to 1 in a first year of each banking crisis episode (both systemic and non-systemic banking crises), and 0 otherwise. A systemic banking crisis is defined as the situation when much or all of bank capital is exhausted, while a non-systemic or smaller banking crisis is identified when there is evidence of significant banking problems such as a government intervention in banks and financial institutions.	Caprio et al (2005) and Laeven and Valencia (2008)
GDP/Capita	The log of real GDP per capita (constant 2000 US$).	World Development Indicator (WDI)
GDP Growth	Real GDP growth (annual %)	WDI
CA to GDP	Current account balance (% of GDP)	WDI
Domestic Credit Growth	The natural log difference of the ratio of domestic credit provided by banking sector (% of GDP)	WDI
Capital Flows to GDP	The sum of capital inflows and outflows divided by GDP (current US$). Capital flows comprise foreign direct investment and portfolio flows (IFS 78bdd +78bed + 78bfd + 78bgd).	IFS and WDI
M2 to Reserve	The natural log of the ratio of money and quasi money (M2) to gross international reserves	WDI & International Financial Statistics (IFS)
Inflation	The log difference of GDP deflator	WDI
Northern Interest Rate	The weighted average of the interest rate in Germany, USA, UK, Switzerland, France, and Japan. The weights are the fraction of debt denominated in the relevant currencies	Authors' calculation following Eichengreen and Arteta (2000)
Currency Crisis	A dummy of one for the periods that currency crises occur. We use the data for currency crisis episodes from Glick and Hutchison (2001). For a sample of countries and time periods, which are not covered in their studies, we construct currency crisis index following their methodology. They construct the EMP index from a weighted average of monthly real exchange rate changes and international reserve loss. A crisis is identified when the EMP index exceeds two times country-specific standard deviation plus country-specific mean. The crisis window (whether the large value of the EMP is counted as the same or new crisis) is 24 months.	Glick and Hutchison (2001) and authors' calculation

Data Descriptions and Sources (continued)

Variable	Description	Source
Interest Rate Liberalization	Elimination of Interest Rate Controls. This variable has a scale of 0-3, which is based on the following three questions: 1) Are interest rates subject to ceilings/floors or determined by the central bank? 2) Are interest rates allowed to float within a band or are partially liberalized? 3) Are interest rates determined at market rates?	Abiad, Detragiache and Tressel (2008)
Credit Allocation Liberalization	Elimination of Credit Controls and Excessively High Reserve Requirements. This variable has a scale of 0-3, which is based on the following questions: 1) Are reserve requirements restrictive? 2) Are there minimum amounts of credit that must be channeled to certain sectors?, or are there ceilings on credit to other sectors? 3) Are there any credits supplied to certain sectors at subsidized rates? (yes=1; no=0)	Abiad, Detragiache and Tressel (2008)
Equity Market Liberalization	The liberalization of security market policy. This variable has a scale of 0-3, which is based on the following questions: 1) Has a country taken measures to develop security market? 2) Is a country's equity market open to foreign investors? (the answers for each question have a scale of 0-2).	Abiad, Detragiache and Tressel (2008)
Entry & Activity Liberalization	Elimination of entry barriers. This variable has a scale of 0-3, which is based on the following questions:1) To what extent does the government allow foreign banks to enter into a domestic market? 2) Does the government allow the entry of new domestic banks 3) have the government eased branching restrictions? 4) Does the government allow banks to engage in a wider range of activities? (yes=1; no=0)	Abiad, Detragiache and Tressel (2008)
Capital Account Liberalization	Elimination of Capital Account Restrictions. This variable has a scale of 0-3, which is based on the following three questions: 1) Is the exchange rate system unified? 2) Does a country set restrictions on capital inflow? 3) Does a country set restrictions on capital outflow? (yes=1; no=0)	Abiad, Detragiache and Tressel (2008)
Privatization	Reduction in State Ownership of the Banking Sector. This variable has a scale of 0-3, which is based on the percentage of the state ownership of banks (privatization = 3 if state ownership of banks is less than 10% and privatization = 0 if state ownership of banks is greater than 50%.	Abiad, Detragiache and Tressel (2008)
Behavioral Liberalization	Interest Rate Lib + Credit Allocation Lib. The scale is 0-6.	Authors' calculation based on Abiad, Detragiache and Tressel (2008)
Competitive Liberalization	Equity Market Lib + Entry & Activity Lib + Capital Account Lib. The scale is 0-9.	Authors' calculation based on Abiad, Detragiache and Tressel (2008)
Total FL (Financial Liberalization)	The aggregate financial liberalization, which is Behavioral Lib. + Competitive Lib. + Privatization. The scale is 0-18.	Authors' calculation based on Abiad, Detragiache and Tressel (2008)
CRS (Capital Regulation & Supervision)	Enhancement of prudential regulations and supervision of the banking sector. This variable has a scale of 0-3, which is based on the following three questions: 1) Has a country adopted a capital adequacy ratio based on the Basle standard? (yes=1; no=0) 2) Is a banking supervisory agency independent from the executives' influence? 3) Does a banking supervisory agency conduct effective supervisions through on-site and off-site examinations?	Abiad, Detragiache and Tressel (2008)
WB CRS	The World Bank capital regulation and supervision variable is a summation of the Official Supervisory Power variable and Capital Regulatory variables. The former is based on 16 surveyed questions relating banking supervisions and the latter is based on 10 surveyed questions on banks' capital requirements.	Barth, Caprio and Levine (2004)
DI Coverage	The interval data of the ratio of deposit insurance coverage per deposits per capita. This index ranges from 1 to 10 (the variable is constructed based on the data from Demirgüç-Kunt et al, 2005)	Demirgüç-Kunt et al (2005), Angkinand and Wilhborg (2006)

C. Interactions with CRS, GDP/Capita and Deposit Insurance

		(1)	(2)	(3)
	Sample	ALL	ADV	EMG
Total FL $_{t-1}$		-0.003	-0.009	0.004
		(0.569)	(0.559)	(0.675)
Total FL $_{average, t-2\ to\ t-4}$		0.003$^{\#}$	0.0008	0.006$^{\#}$
		(0.265)	(0.606)	(0.109)
(Total FL $_{t-1}$)^2		-0.0003$^{\#}$	-0.0001	-0.0005$^{\#}$
		(0.192)	(0.710)	(0.137)
(Total FL × CRS)$_{t-1}$		-0.004**	-0.003*	-0.006**
		(0.001)	(0.083)	(0.010)
(Total FL × DI Coverage)$_{t-1}$		0.000	0.00001	0.0001
		(0.570)	(0.817)	(0.669)
(Total FL × GDP/Capita)$_{t-1}$		0.001*	0.002	0.0004
		(0.088)	(0.520)	(0.727)
CRS $_{t-1}$		0.044**	0.037*	0.048$^{\#}$
		(0.004)	(0.088)	(0.114)
DI Coverage $_{t-1}$		-0.001	-0.001	-0.0004
		(0.747)	(0.813)	(0.885)
GDP/Capita $_{t-1}$		-0.019**	-0.004	-0.001
		(0.009)	(0.908)	(0.931)
No. ob Obs		1073	526	547
Prob > Chi-Square		0.000	0.000	0.000

Note: This table has the same model specification as in Table 5 with the inclusion of interaction terms between Total FL and DI Coverage/GDP per capita. Control variables are included, but not reported. Also see note from Table 5.

D. Using Capital Regulation and Supervision from *the Regulation and Supervision of Banks around the World: a New Database*

		(1)	(2)	(3)
	Sample	ALL	ADV	EMG
Total FL $_{t-1}$		0.0119*	0.0203**	0.0165$^{\#}$
		(0.094)	(0.014)	(0.197)
Total FL $_{average, t-2\ to\ t-4}$		0.0006	0.0006	0.0020
		(0.804)	(0.825)	(0.575)
(Total FL $_{t-1}$)^2		-0.0004*	-0.0005**	-0.0008**
		(0.054)	(0.039)	(0.024)
(Total FL × WB CRS)$_{t-1}$		-0.0001	-0.0002$^{\#}$	-0.0002
		(0.684)	(0.223)	(0.755)
CRS $_{t-1}$		0.0004	0.0042$^{\#}$	-0.0004
		(0.925)	(0.226)	(0.961)
No. ob Obs		975	477	498
Prob > Chi-Square		0.000	0.000	0.000

Note: This table has the same model specification as in Table 5, but uses the data for capital regulation and supervision from Barth, Caprio, Levine (2004) from the World Bank. Control variables are included, but not reported. Also see note from Table 5.

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Figure 1: The Frequency of Banking Crises under Different Types of Liberalization

Frequency of BC and Behavioral Liberalization (scale of 0-6)

Frequency of BC and Competitive Liberalization (scale of 0-9)

Frequency of BC and Privatization (scale of 0-3)
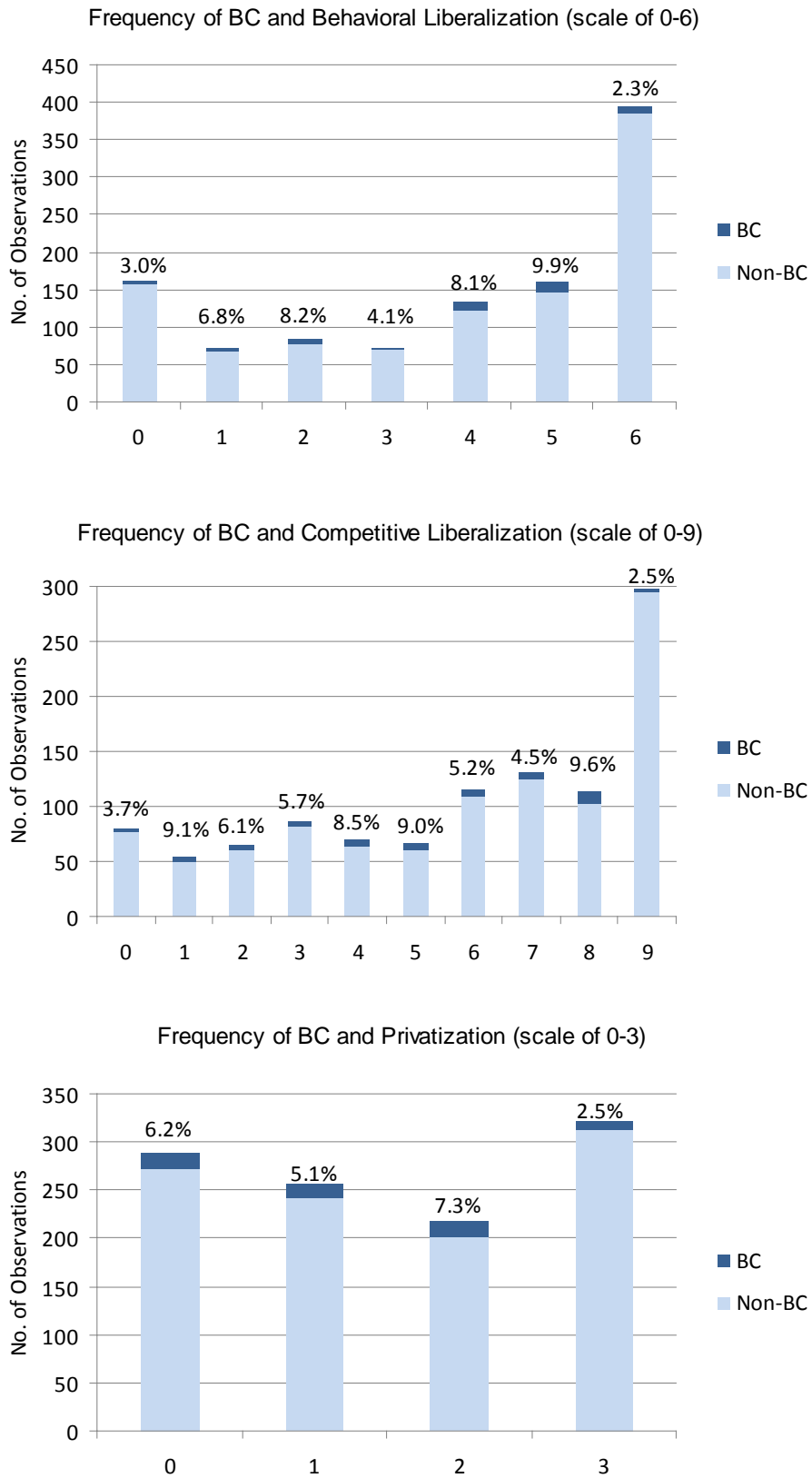
Figure 2: Predicted Probabilities of Banking Crises Based on Different Levels of Total FL

Panel A. Predicted Prob. of BC based on Regressions 2, 4 and 6 in Table 3
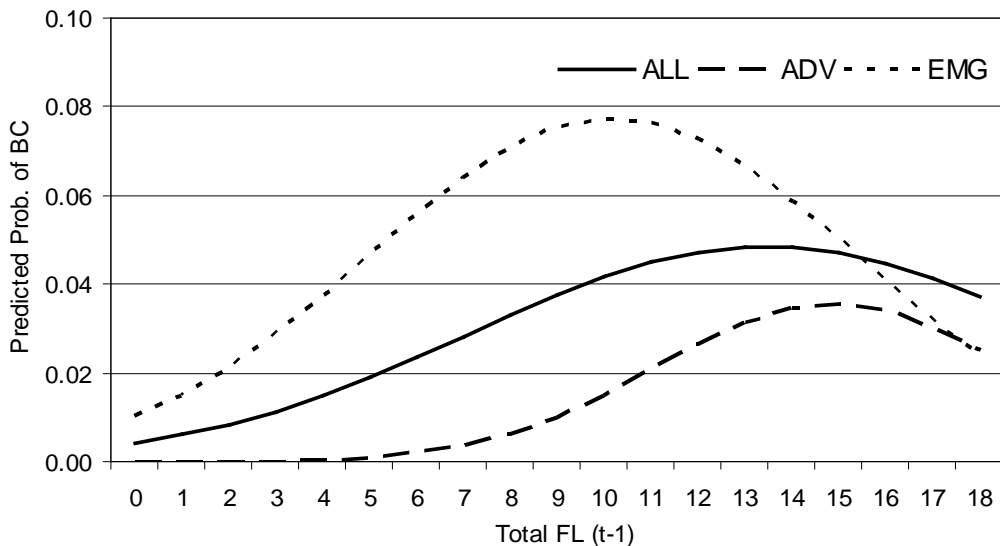
Panel B. Predicted Prob. of BC based on Table 5 (all countries)
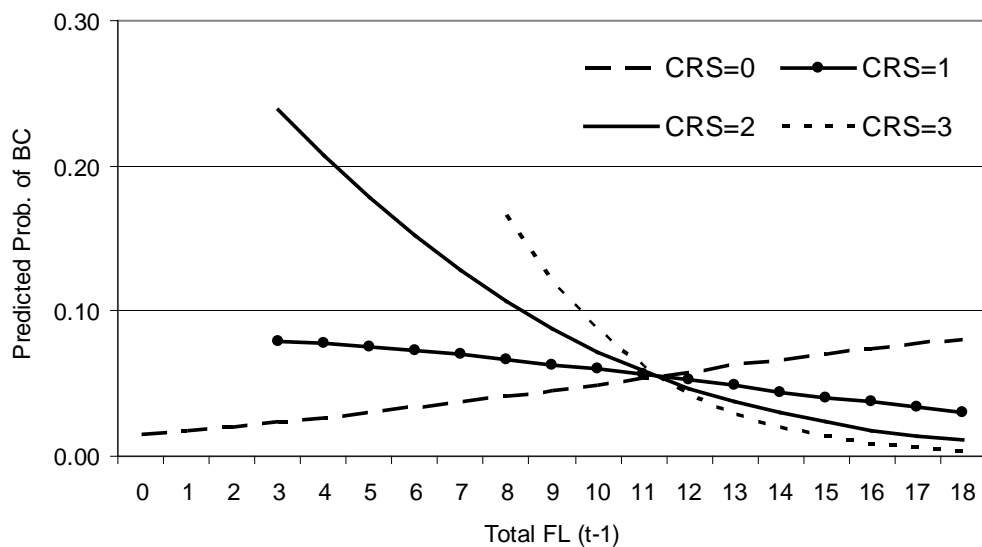
Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
The Onset of Banking Crisis	1089	0.051	0.221	0	1
GDP Growth Rate	1089	0.039	0.034	-0.126	0.183
CA/GDP	1089	-0.010	0.049	-0.197	0.242
M2/Reserves	1089	1.945	0.922	-0.267	4.405
Credit Growth	1089	0.030	0.133	-1.113	1.356
Capital Flows/GDP	1089	0.008	0.042	-0.308	0.341
Inflation	1089	0.129	0.282	-0.063	3.345
Northern Interest Rate	1089	0.063	0.025	0	0.160
Currency Crises	1089	0.090	0.286	0	1
Financial Liberalization Policies					
Total FL	1089	11.307	5.621	0	18
Behavioral Lib.	1089	3.996	2.147	0	6
Competitive Lib.	1089	5.783	2.988	0	9
Privatization	1089	1.528	1.173	0	3
Institutional Variables					
Capital Regulation and Supervision (CRS)	1089	1.001	1.083	0	3
World Bank CRS	991	16.331	3.276	11	23
DI Coverage	1089	2.559	3.183	0	10
GDP/Capita (in log)	1089	8.756	1.327	5.338	10.560
Law	789	4.515	1.480	0	6
(Lack of) Corruption	789	3.980	1.407	0	6

Table 2: Correlations

Panel A. Financial Liberalization and Institutional Variables

(observations = 1089)	Credit Allocation Lib	Interest Rate Lib.	Entry & Activity Lib.	Equity Market Lib.	Capital Account Lib	Privatization	Behavioral Lib.	Competitive Lib.	Total FL	CRS	World Bank CRS	Real GDP/Capita	DI Coverage	Law
Interest Rate Lib.	0.65	1												
Entry & Activity Lib.	0.65	0.65	1											
Equity Market Lib.	0.65	0.67	0.65	1										
Capital Account Lib	0.66	0.66	0.64	0.75	1									
Privatization	0.50	0.44	0.41	0.44	0.53	1								
Behavioral Lib.	0.90	0.91	0.72	0.73	0.73	0.52	1							
Competitive Lib.	0.74	0.75	0.87	0.90	0.90	0.52	0.82	1						
Total FL	0.84	0.84	0.82	0.84	0.87	0.68	0.92	0.95	1					
CRS	0.60	0.55	0.66	0.65	0.60	0.43	0.63	0.72	0.71	1				
World Bank CRS	-0.37	0.23	-0.10	-0.21	-0.02	-0.10	-0.30	-0.13	-0.24	0.09	1			
Real GDP/Capita	0.42	0.42	0.42	0.65	0.54	0.44	0.46	0.60	0.59	0.43	-0.13	1		
DI Coverage	0.08	0.16	0.28	0.17	0.20	0.02	0.13	0.24	0.19	0.16	-0.03	0.08	1	
Law	0.46	0.34	0.35	0.67	0.54	0.30	0.46	0.58	0.55	0.44	-0.12	0.71	-0.10	1
(Lack of) Corruption	0.26	0.27	0.18	0.40	0.34	0.27	0.30	0.34	0.36	0.20	-0.08	0.67	-0.08	0.65

Note: Correlations between World Bank CRS and other variables are based on 40 observations in 2003, which is the year the World Bank survey was conducted, and the correlations between Law/(Lack of) Corruption with other variables have 789 observations.

Panel B. Types of Liberalization during five-year periods

	Total FL $_{t-1}$	Total FL $_{t-2}$	Total FL $_{t-3}$	Total FL $_{t-4}$	Behavioral Lib $_{t-1}$	Behavioral Lib $_{t-2}$	Behavioral Lib $_{t-3}$	Behavioral Lib $_{t-4}$	Competitive Lib $_{t-1}$	Competitive Lib $_{t-2}$	Competitive Lib $_{t-3}$	Competitive Lib $_{t-4}$	Privatization $_{t-1}$	Privatization $_{t-2}$	Privatization $_{t-3}$
Total FL $_{t-2}$	0.98	1													
Total FL $_{t-3}$	0.96	0.98	1												
Total FL $_{t-4}$	0.94	0.96	0.98	1											
Behavioral Lib $_{t-1}$	0.93	0.91	0.88	0.85	1										
Behavioral Lib $_{t-2}$	0.91	0.93	0.90	0.87	0.96	1									
Behavioral Lib $_{t-3}$	0.89	0.91	0.93	0.90	0.92	0.96	1								
Behavioral Lib $_{t-4}$	0.86	0.88	0.91	0.93	0.87	0.91	0.96	1							
Competitive Lib	0.95	0.94	0.92	0.89	0.82	0.82	0.81	0.79	1						
Competitive Lib $_{t-2}$	0.94	0.95	0.94	0.91	0.82	0.82	0.82	0.81	0.98	1					
Competitive Lib $_{t-3}$	0.92	0.94	0.95	0.94	0.80	0.81	0.82	0.82	0.95	0.98	1				
Competitive Lib $_{t-4}$	0.90	0.92	0.94	0.95	0.78	0.80	0.81	0.82	0.93	0.95	0.98	1			
Privatization $_{t-1}$	0.67	0.68	0.68	0.67	0.51	0.52	0.53	0.52	0.51	0.52	0.52	0.53	1		
Privatization $_{t-2}$	0.66	0.67	0.67	0.67	0.50	0.51	0.51	0.52	0.50	0.50	0.52	0.52	0.97	1	
Privatization $_{t-3}$	0.63	0.65	0.66	0.66	0.48	0.49	0.50	0.50	0.48	0.49	0.50	0.51	0.94	0.97	1
Privatization $_{t-4}$	0.61	0.62	0.64	0.66	0.47	0.47	0.48	0.49	0.46	0.47	0.48	0.50	0.91	0.94	0.97

Table 3: The Aggregate Financial Liberalization Index (Total FL) and Banking Crises
(Marginal effects are reported)

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	ALL	ALL	ADV	ADV	EMG	EMG
Total FL$_{t-1}$	0.004**	0.011**	0.004**	0.016**	0.004**	0.016**
	(0.003)	(0.001)	(0.003)	(0.001)	(0.032)	(0.001)
(Total FL$_{t-1}$)^2		-0.0004**		-0.001**		-0.001**
		(0.026)		(0.017)		(0.005)
CRS$_{t-1}$	-0.017**	-0.010$^{\#}$	-0.006$^{\#}$	-0.001	-0.037**	-0.022$^{\#}$
	(0.004)	(0.140)	(0.320)	(0.797)	(0.008)	(0.105)
DI Coverage$_{t-1}$	0.0004	0.001	0.001	0.0001	0.0002	0.001
	(0.715)	(0.594)	(0.576)	(0.875)	(0.922)	(0.471)
GDP/Capita$_{t-1}$	-0.010**	-0.011**	0.020$^{\#}$	0.015$^{\#}$	0.007	0.006
	(0.011)	(0.004)	(0.128)	(0.136)	(0.353)	(0.376)
GDP Growth Rate$_{t-1}$	-0.259**	-0.244**	-0.041	-0.038	-0.470**	-0.425**
	(0.016)	(0.012)	(0.883)	(0.879)	(0.005)	(0.005)
CA/GDP$_{t-1}$	-0.272**	-0.258**	-0.206*	-0.196*	-0.329**	-0.304**
	(0.012)	(0.012)	(0.089)	(0.064)	(0.036)	(0.033)
M2/Reserves$_{t-1}$	0.009$^{\#}$	0.009*	0.005	0.007$^{\#}$	0.023**	0.023**
	(0.135)	(0.095)	(0.339)	(0.178)	(0.010)	(0.004)
Credit Growth$_{t-1}$	0.053**	0.050**	0.009	0.008	0.077**	0.069**
	(0.000)	(0.000)	(0.723)	(0.761)	(0.004)	(0.003)
Capital Flows/GDP$_{t-1}$	0.274**	0.272**	0.095	0.043	0.374**	0.413**
	(0.016)	(0.020)	(0.397)	(0.719)	(0.032)	(0.017)
Inflation$_{t-1}$	0.036**	0.032**	0.231*	0.225*	0.027**	0.019**
	(0.000)	(0.000)	(0.099)	(0.057)	(0.005)	(0.030)
Northern Interest Rate$_{t-1}$	0.481**	0.524**	0.450*	0.320$^{\#}$	0.461*	0.520**
	(0.017)	(0.007)	(0.065)	(0.180)	(0.089)	(0.042)
Currency Crises$_{t-1}$	-0.008	-0.008	0.008	0.007	-0.025*	-0.023*
	(0.465)	(0.448)	(0.595)	(0.606)	(0.073)	(0.062)
No of Obs	1089	1089	536	536	553	553
Wald Chi-Square	92.195	96.563	82.325	88.162	117.797	196.452
Prob > Chi-Square	0.000	0.000	0.000	0.000	0.000	0.000

The dependent variable is the onset of banking crisis dummy. Regressions are estimated using the Logit model with robust and clustered standard errors within a country. *, ** indicate the significance levels of 10% and 5%, respectively. $^{\#}$ indicates the coefficient value zero that falls outside one standard deviation of the estimate. The numbers in parentheses are p-values. For sample, ALL = all sample, ADV = Advanced economies, EMG = Emerging markets.

Table 4: The Dynamic Effects of Financial Liberalization on Banking Crises
(Marginal effects are reported)

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	ALL	ADV	EMG	ALL	ADV	EMG
Total FL $_{t-1}$	0.006$^{\#}$ (0.112)	0.014** (0.031)	0.008* (0.082)	0.008** (0.011)	0.013** (0.018)	0.012** (0.009)
Total FL $_{t-2}$	-0.003 (0.572)	-0.003 (0.453)	-0.001 (0.807)			
Total FL $_{t-3}$	0.011** (0.011)	0.006$^{\#}$ (0.132)	0.013** (0.029)			
Total FL $_{t-4}$	-0.005$^{\#}$ (0.112)	-0.003$^{\#}$ (0.349)	-0.005$^{\#}$ (0.246)			
Total FL$_{average,\ t-2\ to\ t-4}$				0.002$^{\#}$ (0.314)	0.001 (0.770)	0.005$^{\#}$ (0.123)
(Total FL $_{t-1}$)^2	-0.0003* (0.076)	-0.0005$^{\#}$ (0.119)	-0.001** (0.010)	-0.0004* (0.053)	-0.0004$^{\#}$ (0.122)	-0.001** (0.008)
CRS $_{t-1}$	-0.009$^{\#}$ (0.156)	-0.002 (0.696)	-0.022$^{\#}$ (0.112)	-0.010$^{\#}$ (0.122)	-0.002 (0.758)	-0.024* (0.073)
DI Coverage $_{t-1}$	0.001 (0.397)	0.0003 (0.685)	0.001 (0.547)	0.001 (0.500)	0.0004 (0.694)	0.004 (0.530)
GDP/Capita $_{t-1}$	-0.009** (0.040)	0.014$^{\#}$ (0.155)	0.007$^{\#}$ (0.254)	-0.011** (0.005)	0.016 (0.120)	0.004 (0.530)
GDP Growth Rate$_{t-1}$	-0.099 (0.337)	-0.124 (0.446)	-0.199$^{\#}$ (0.245)	-0.229** (0.022)	-0.119 (0.498)	-0.399** (0.012)
CA/GDP $_{t-1}$	-0.277** (0.010)	-0.185* (0.090)	-0.347** (0.010)	-0.268** (0.006)	-0.191* (0.085)	-0.308** (0.026)
M2/Reserves $_{t-1}$	0.008$^{\#}$ (0.143)	0.007$^{\#}$ (0.105)	0.019** (0.030)	0.008$^{\#}$ (0.134)	0.005$^{\#}$ (0.255)	0.021** (0.011)
Credit Growth $_{t-1}$	0.040** (0.003)	-0.018 (0.719)	0.060** (0.011)	0.049** (0.000)	-0.015 (0.746)	0.073** (0.002)
Capital Flows/GDP $_{t-1}$	0.278** (0.023)	0.063 (0.608)	0.454** (0.006)	0.280** (0.018)	0.055 (0.648)	0.431** (0.014)
Inflation $_{t-1}$	0.031** (0.000)	0.234** (0.024)	0.020** (0.022)	0.034** (0.000)	0.216* (0.054)	0.023** (0.010)
Northern Interest Rate $_{t-1}$	0.520** (0.014)	0.272$^{\#}$ (0.208)	0.418$^{\#}$ (0.121)	0.499** (0.009)	0.283$^{\#}$ (0.156)	0.475* (0.056)
Currency Crises $_{t-1}$	-0.006 (0.627)	0.005 (0.682)	-0.022$^{\#}$ (0.149)	-0.007 (0.513)	0.009 (0.519)	-0.025** (0.043)
No of Obs	1024	502	522	1073	526	547
Wald Chi-Square	169.6	360.236	343.691	86.840	155.783	133.784
Prob > Chi-Square	0.000	0.000	0.000	0.000	0.000	0.000

The dependent variable is the onset of banking crisis dummy. Regressions are estimated using the Logit model with robust and clustered standard errors within a country. *, ** indicate the significance levels of 10% and 5%, respectively. $^{\#}$ indicates the coefficient value zero that falls outside one standard deviation of the estimate. The numbers in parentheses are p-values. For sample, ALL = all sample, ADV = Advanced economies, EMG = Emerging markets.

Table 5: Interaction between the Aggregate Financial Liberalization Index and Capital Regulation and Supervision (Marginal effects are reported)

	(1)	(2)	(3)
Sample	ALL	ADV	EMG
Total FL $_{t-1}$	0.0004 (0.183)	0.003 (0.573)	0.007[#] (0.116)
Total FL $_{average, t-2 \text{ to } t-4}$	0.002 (0.341)	0.001 (0.553)	0.005[#] (0.119)
(Total FL $_{t-1}$)^2	-0.0001 (0.666)	-0.00001 (0.959)	-0.0004[#] (0.154)
(Total FL $\times$ CRS)$_{t-1}$	-0.004** (0.001)	-0.003** (0.047)	-0.006** (0.008)
CRS $_{t-1}$	0.044** (0.006)	0.049** (0.050)	0.047* (0.100)
DI Coverage $_{t-1}$	0.0004 (0.652)	-0.0001 (0.932)	0.001 (0.696)
GDP/Capita $_{t-1}$	-0.009** (0.019)	0.020** (0.044)	0.003 (0.664)
GDP Growth Rate $_{t-1}$	-0.218** (0.017)	-0.106[#] (0.483)	-0.382** (0.010)
CA/GDP $_{t-1}$	-0.285** (0.004)	-0.183* (0.085)	-0.275** (0.048)
M2/Reserves $_{t-1}$	0.009[#] (0.117)	0.006[#] (0.144)	0.018** (0.019)
Credit Growth $_{t-1}$	0.043** (0.001)	-0.012 (0.718)	0.063** (0.006)
Capital Flows $_{t-1}$	0.239** (0.042)	0.077 (0.509)	0.355** (0.019)
Inflation $_{t-1}$	0.032** (0.000)	0.179* (0.062)	0.022** (0.015)
Northern Interest Rate $_{t-1}$	0.424** (0.016)	0.194[#] (0.240)	0.443** (0.040)
Currency Crises $_{t-1}$	-0.009 (0.341)	0.008 (0.458)	-0.024* (0.023)
No of Obs	1073	526	547
Wald Chi-Square	94.307	147.214	157.478
Prob > Chi-Square	0.000	0.000	0.000

The dependent variable is the onset of banking crisis dummy. Regressions are estimated using the Logit model with robust and clustered standard errors within a country. *, ** indicate the significance levels of 10% and 5%, respectively. [#] indicates the coefficient value zero that falls outside one standard deviation of the estimate. The numbers in parentheses are p-values. For sample, ALL = all sample, ADV = Advanced economies, EMG = Emerging markets.

Table 6: Different Types of Financial Liberalization and Banking Crises (marginal effects are reported)

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	ALL	ADV	EMG	ALL	ADV	EMG
Behavioral Lib$_{t-1}$	0.016* (0.056)	0.015* (0.071)	0.023* (0.072)	0.004 (0.597)	0.002 (0.791)	0.008 (0.531)
Competitive Lib$_{t-1}$	0.002 (0.588)	0.001 (0.615)	0.007# (0.202)	0.001 (0.705)	-0.0005 (0.797)	0.006# (0.198)
Privatization $_{t-1}$	-0.002 (0.575)	-0.004* (0.069)	-0.007# (0.279)	-0.002 (0.613)	-0.003* (0.051)	-0.005 (0.400)
Behavioral Lib$_{average, t-2\ to\ t-4}$	0.005# (0.271)	0.003 (0.331)	0.007 (0.373)	0.005# (0.217)	0.004# (0.163)	0.006 (0.386)
(Behavioral Lib $_{t-1}$)^2	-0.002# (0.118)	-0.0001# (0.227)	-0.005** (0.034)	0.0003 (0.811)	-0.001 (0.597)	-0.001 (0.524)
(Behavioral Lib $\times$ CRS)$_{t-1}$				-0.012** (0.001)	-0.007# (0.080)	-0.019** (0.002)
CRS $_{t-1}$	-0.013** (0.026)	-0.003 (0.453)	-0.033** (0.004)	0.047** (0.007)	0.036* (0.082)	0.052* (0.057)
DI Coverage $_{t-1}$	0.001 (0.609)	0.0004 (0.590)	-0.0003 (0.861)	0.000 (0.756)	0.0001 (0.887)	-0.001 (0.738)
GDP/Capita $_{t-1}$	-0.009** (0.024)	0.017* (0.080)	0.009# (0.185)	-0.007* (0.051)	0.015** (0.035)	0.008# (0.222)
GDP Growth Rate $_{t-1}$	-0.224** (0.027)	-0.090 (0.482)	-0.359** (0.014)	-0.220** (0.017)	-0.054 (0.551)	-0.352** (0.010)
CA/GDP $_{t-1}$	-0.279** (0.007)	-0.140 (0.212)	-0.360** (0.026)	-0.285** (0.004)	-0.101** (0.153)	-0.296** (0.027)
M2/Reserves $_{t-1}$	0.007# (0.199)	0.005# (0.150)	0.020** (0.019)	0.009# (0.139)	0.005* (0.079)	0.017** (0.028)
Credit Growth $_{t-1}$	0.048** (0.000)	-0.012 (0.766)	0.074** (0.003)	0.042** (0.000)	-0.012 (0.686)	0.064** (0.004)
Capital Flows/GDP $_{t-1}$	0.280** (0.022)	0.065 (0.488)	0.353* (0.050)	0.238* (0.052)	0.068 (0.307)	0.288* (0.090)
Inflation $_{t-1}$	0.031** (0.000)	0.172* (0.098)	0.019** (0.041)	0.030** (0.000)	0.124 (0.046)	0.018* (0.051)
Northern Interest Rate $_{t-1}$	0.476** (0.021)	0.253# (0.089)	0.458* (0.100)	0.406** (0.037)	0.160* (0.146)	0.384# (0.109)
Currency Crises $_{t-1}$	-0.007 (0.536)	0.010 (0.499)	-0.023* (0.081)	-0.009# (0.303)	0.007 (0.370)	-0.022* (0.054)
No of Obs	1073	526	547	1073	526	547
Wald Chi-Square	85.052	637.658	181.316	95.171	374.871	185.334
Prob > Chi-Square	0.000	0.000	0.000	0.000	0.000	0.000

The dependent variable is the onset of banking crisis dummy. Regressions are estimated using the Logit model with robust and clustered standard errors within a country. *, ** indicate the significance levels of 10% and 5%, respectively. # indicates the coefficient value zero that falls outside one standard deviation of the estimate. The numbers in parentheses are p-values. For sample, ALL = all sample, ADV = Advanced economies, EMG = Emerging markets.