Banking crises and market discipline: International evidence

Elena Cubillas[*†]
Ana Rosa Fonseca[*]
Francisco González[*]

University of Oviedo

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†Corresponding author: Elena Cubillas, Department of Business Administration, University of Oviedo. Avenida del Cristo s/n, 33071. Oviedo. Spain. Tel.: +34-985103794. e-mail: cubillaselena@uniovi.es.

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ABSTRACT

This paper analyzes the effect of banking crises on market discipline in an international sample of banks. We also evaluate how bank regulation, supervision, institutions, and crisis intervention policies shape the effect of banking crises on market discipline. We control for unobservable bank, country, and time specific effects using a panel data set of banks from 66 countries around 79 banking crises. The results suggest that on average market discipline weakens after a banking crisis. This weakening is greater in countries where bank regulation, supervision, and institutions promoted market discipline before the banking crisis, and where a more accommodative approach is adopted to resolve it.

Keywords: Market discipline, banking crisis, crisis intervention, regulation, supervision, institutions.

*JEL Classification***:** E43, G01, G21, G28.

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1. Introduction

Market discipline is one of the three pillars generally accepted by regulators and scholars to limit the bank risk-shifting incentives that are exacerbated by financial safety nets. Basel II explicitly emphasizes the strengthening of market discipline (Pillar 3) as well as official supervision (Pillar 2) and capital requirements (Pillar 1) as tools to improve bank stability. The current global financial crisis and adoption of accommodative interventions, however, prompt a debate on the incentives depositors have to discipline bank risk-taking after a crisis. We address this issue by asking three questions: How does a banking crisis change the market discipline that depositors impose to control bank risk-taking? To what extent do variations in market discipline after a banking crisis depend on a country's bank regulation, supervision, and institutions? Do the types of intervention and resolution policies that governments adopt during a banking crisis change market discipline?

To respond to these questions, we provide empirical evidence on changes in depositor market discipline in a cross-country sample of banking crises over the 1989-2007 period. As market discipline can be described as a situation in which depositors penalize riskier banks by requiring higher interest rates or by withdrawing deposits, we focus on how the relation between bank risk and the cost of bank deposits changes after a banking crisis. We check that results do not vary with respect to the relation between bank risk and the growth of uninsured bank deposits. We also analyze how regulation, official supervision, institutions, and crisis intervention policies shape changes in market discipline following a banking crisis.

The literature on market discipline has mainly analyzed whether there is market discipline in a particular country during a given period. Cross-country analysis, however, is necessary to see whether market discipline varies with the particular regulatory, supervisory, and institutional environment. To our knowledge, three empirical papers analyze country-level determinants of market discipline. Using cross-country information on deposit insurance, Demirgüç-Kunt and Huizinga (2004) show that the presence and the generosity of explicit deposit insurance weakens market discipline. Nier and Baumann (2006) and Fonseca and González (2010) provide evidence that market discipline has a positive influence on capital buffers. None of these papers, however, analyzes whether market discipline changes after a banking crisis and, if so, how regulation, institutions, or intervention shape the change.

Two previous papers analyze the sensitivity of depositors to bank risk after a banking crisis. Martinez Peria and Schmukler (2001) study the experiences of Argentina, Chile, and Mexico during the 1980s and 1990s. They find that depositors punish banks for risky behavior, by both

withdrawing their deposits and requiring higher interest rates. Market discipline becomes more important after crises and deposit insurance does not appear to diminish the extent of market discipline. Hadad et al. (2011) analyze changes in the deposit guarantee scheme and capital regulation in Indonesian banks following the 1997-1998 financial crisis. They find that the adoption of a blanket guarantee scheme weakens market discipline, although market discipline works better in listed banks than unlisted banks and in foreign banks than domestic banks.

Our broader work makes several contributions. First, we provide systematic evidence on the influence of regulation, supervision, and institutions on changes in market discipline after a banking crisis. We analyze how bank entry requirements, restrictions on non-traditional bank activities, official supervision, government bank ownership, and institutional quality in a country shape changes in market discipline.

Second, we examine how crisis intervention policies influence changes in market discipline after a banking crisis. The policies include blanket depositor protection, prolonged and extensive liquidity provision, forbearance, government recapitalization, and nationalization.

Third, we provide information on a large number of crises and countries. The initial sample covers 79 banking crises in 66 countries, with bank-level data from up to 2,593 banks over 1989-2007. Even with missing information on country characteristics and intervention policies, we can analyze the influence of regulation, supervision, and institutions in a minimum of 54 countries and the influence on intervention policies in 18 countries.

Finally, we account for dynamic processes in deposit interest rates by using the generalized-method-of-moments (GMM) estimators developed by Arellano and Bond (1991) for dynamic panel data. GMM models are specifically designed to handle autoregressive properties in the dependent variable (cost of bank deposits) when lagged values are introduced as explanatory variables and endogeneity in the explanatory variables (other bank-specific characteristics) must be controlled for. The availability of an international panel data set allows us to control for unobserved bank-, country-, and time-specific effects. Although Maechler and McDill (2006) and Hadad et al. (2011) use GMM to analyze market discipline in the US and Indonesia, respectively, it has not yet been applied in studies of market discipline with an international database.

Our results indicate that market discipline weakens on average after a banking crisis, but to varying degrees across countries. The weakening is greater in countries where bank regulation, supervision, and institutions work to enhance market discipline before the crisis. A banking crisis, however, does not change market discipline in countries where discipline rarely exists

before the crisis. Market discipline weakens more in countries with less stringent barriers to bank entry and non-traditional bank activities, less official supervisory power, and better-quality institutions.

Our results also show that accommodative intervention policies during a crisis weaken market discipline. The adoption of an explicit blanket guarantee, forbearance, and government recapitalization and nationalization programs make deposit interest rates less sensitive to bank risk. We do not see, however, that the provision of liquidity support to banks has a negative effect on market discipline after a crisis. Our results are robust to alternative estimation techniques, proxies of bank risk, and definitions of the crisis windows.

The rest of the paper is organized as follows. Section 2 describes the theoretical background and discusses the hypotheses. Section 3 describes the data, variables, and methodology. Section 4 discusses the empirical results. Section 5 concludes the paper.

2. Theoretical background and hypotheses

The literature on market discipline is extensive, with a focus mostly on U.S. commercial banks. Typical findings show that bank risk is positively related to yields on deposits (Ellis and Flannery, 1992; Cook and Spellman, 1994); interest rates for uninsured deposits (Flannery and Sorescu, 1996; Hancock and Kwast, 2001); and risk premiums on subordinated notes and debentures (Flannery and Sorescu, 1996). Other authors on market discipline concentrate on the level of deposits (Calomiris and Wilson, 2004) or capital buffers held by banks (Flannery and Rangan, 2008). Park and Peristiani (1998) combine several of these approaches.

A limited research analyzes differences in market discipline across countries and how it relates to regulatory discipline, official supervision, or institutions. An important exception is Demirgüç-Kunt and Huizinga (2004). They use an international database of banks in 51 countries to show that explicit deposit insurance makes depositors less likely to monitor banks, weakening the degree of market discipline. The more generous the deposit insurance, the greater the weakening of market discipline. Nier and Baumann (2006) and Fonseca and González (2010) also use an international sample of banks to provide evidence that market discipline strengthens banks' incentives to hold capital buffers. Market discipline is enhanced with accounting disclosure and institutional quality but weakens with the extent of government safety nets, restrictions on bank activities, and official supervision.

The influence of banking crises on market discipline has been analyzed very little and theory does not provide clear predictions. It is possible that following bank interventions and failures, depositors may become more aware of the risk of losing deposits, so they may start exercising stricter market discipline. Then again, governments usually respond to banking crises with containment and resolution policies that strengthen bank safety nets and depositor protection. As a consequence, depositors may be more relaxed if a new banking crisis occurs and have fewer incentives to exercise discipline (Honohan and Klingebiel, 2003). Empirical evidence is not conclusive. Martinez Peria and Schmukler (2001) find in Argentina, Chile, and Mexico during the 1980s and 1990s that the relative importance of market discipline increases after crises and that deposit insurance does not appear to diminish the extent of market discipline. Hadad et al. (2011) find that adoption of a blanket guarantee scheme and the reduction in minimum capital adequacy ratios weaken market discipline in Indonesia following the 1997-1998 financial crisis. As either result for market discipline is theoretically possible, and empirical evidence is not conclusive, we make no *a priori* forecast as to changes in market discipline after banking crises, and treat the question as an empirical issue.

2.1. Bank regulation, official supervision, and institutions

Differences in bank entry barriers, restrictions on non-traditional bank activities, official supervision, government bank ownership, and institutions all may be responsible for differences across countries in changes in market discipline after a banking crisis. As these variables may influence the extent of market discipline both before and after a crisis, they may also affect a change in market discipline. In countries where bank regulation, official supervision, and institutions do not promote market discipline before the crisis, there is not so great a margin for changes in discipline afterward. One would expect more changes in market discipline in environments where bank regulation, official supervision, and institutions promote market discipline in the first place.

We discuss the potential influence of each country variable in turn. The first regulatory variable is barriers to bank entry. Entry restrictions may increase banks' charter value and provide established banks incentives to behave prudently (Keeley, 1990). This would reduce depositors' incentives to monitor banks, indicating that stricter barriers to bank entry dampen market discipline. We therefore expect less of a change in market discipline after a banking crisis in countries with stricter barriers to entry. Our hypothesis is:

H.1. Stricter barriers to bank entry reduce a change in market discipline after a banking crisis.

The second regulatory variable is restrictions on non-traditional bank activities; that is, activities that generate non-interest income (e.g., securities, insurance, real estate, and bank ownership of non-financial firms). There is no clear theoretical link between regulatory restrictions on bank activities and market discipline exerted by depositors. Less freedom for banks to pursue their activities might reduce bank opportunities for both diversification and risk-taking. Empirical studies, however, indicate that more strictly regulated bank markets are also less competitive (Claessens and Laeven, 2004). When bank market competition is not well developed, banks usually have higher charter values and more incentives to behave prudently (Keeley, 1990). This would reduce depositors' incentives to monitor banks. Consistent with this argument, Flannery and Rangan (2008) in the US and Fonseca and González (2010) in an international sample of banks show that tighter restrictions on bank activities are associated with lower capital ratios as a consequence of weakened market discipline. Given this evidence, we expect market discipline to be less developed in countries with tighter restrictions on bank activities both before and after a crisis. We therefore expect less of a change in market discipline after a banking crisis in countries with tighter restrictions. Our second hypothesis is:

H.2. Tighter restrictions on bank activities reduce a change in market discipline after a banking crisis.

The third country variable is official supervisory power. Greater official supervision aims to reduce bank risk-taking and replaces the lack of incentives of small depositors to control bank risk. Fonseca and González (2010) find evidence consistent with this argument. We thus expect a weakening market discipline in countries with more official supervisory power and less of a change in market discipline after a banking crisis in these countries. Our third hypothesis is:

H.3. More official supervisory power reduces a change in market discipline after a banking crisis.

The fourth country variable is government ownership of banks. When banks are government-owned, the implicit deposit guarantee is strong, at least to the extent that a government itself is considered creditworthy (Caprio and Honohan, 2004). Mondschean and Opiela (1999) show that state-owned banks in Poland pay significantly lower rates for deposits than banks with the same *de jure* guarantee. We forecast that depositors will exert less market discipline in countries where much of the banking system is government-owned, as depositors anticipate a government rescue of banks in the event of bankruptcy. Therefore, we expect less of a change in market discipline after a banking crisis in countries with higher bank government-ownership. Our fourth hypothesis is:

H.4. Higher government bank ownership reduces a change in market discipline after a banking crisis.

The fifth variable is the quality of institutions. The literature does not suggest a clear prediction. A growing number of recent papers highlight that well-functioning markets and financial development rely on contracts and their legal enforceability (La Porta et al., 1997, 1998). As the enforceability of contracts is the prime reason why investors have incentives to monitor and why markets develop and progress, one might expect market discipline by depositors to be strengthened with the quality of the legal and institutional environment. Fonseca and González (2010) provide international empirical evidence consistent with this argument. Caprio and Honohan (2004), however, question whether market discipline can be effective in countries with weak institutions. Offsetting factors to weaker market information infrastructures in less developed countries are the reduced complexity of the banking business, the growing internationalization of markets, and the smallness of the business and financial community. Moreover, there is a growing body of evidence showing interest rates are sensitive to bank risk in developing countries. Mondschean and Opiela (1999) provide evidence for Poland; Barajas and Steiner (2000) for Colombia; Martinez Peria and Schmukler (2001) for Argentina, Chile, and Mexico; and Hadad et al. (2011) for Indonesia. We therefore treat the influence of institutions on the change in market discipline after a banking crisis as an empirical issue.

2.2. Crisis intervention policies

Authorities may apply two broad types of intervention when a crisis emerges. On the one hand, an "accommodative" approach, adopting measures such as blanket deposit guarantees, liquidity support, forbearance by tolerating violations of bank solvency rules, government recapitalizations, or nationalizations. On the other hand, the alternative is a "strict" approach, where authorities intervene by restraining the actions of a bank that gets into severe liquidity problems or by requiring undercapitalized banks to raise sufficient additional capital to meet minimum capital requirements. When capitalization fails, a strict policy would lead to intervention by the authorities to restrain bank management, forcing personnel changes, selling the bank to a sound institution, and/or proceeding to liquidation (Honohan and Klingebiel, 2003).

Studies analyzing crisis intervention policies usually focus on the fiscal and output costs of alternative intervention policies. Most of these studies suggest that the fiscal cost is positively related to the extent to which countries adopt accommodative policies (Honohan and Klingebiel, 2003; Kane and Klingebiel, 2004; Claessens et al., 2005). There is, however, less evidence on the effects of crisis intervention policies on market discipline.

One condition for market discipline is that depositors bear the losses their risks generate. Demirgüç-Kunt and Huizinga (2004); Hoggart et al. (2005); Nier and Baumann (2006); Hadad et al. (2011) suggest that safety nets weaken market discipline. We expect that a crisis intervention reducing losses previously not insured weakens market discipline afterward as depositors anticipate stronger implicit guarantees in the future. Consistent with this argument, Hadad et al. (2011) find a weakening of market discipline in Indonesian banks when a blanket guarantee scheme and a reduction in the minimum capital adequacy ratio were adopted following the 1997-1998 crisis. Our fifth hypothesis is:

H.5. More accommodative crisis intervention policies reduce market discipline more after a banking crisis.

3. Data, variables, and methodology

3.1. Data

We use data from a variety of sources. We take the information from Caprio and Klingebiel (2003) on 168 banking crises in 138 countries since the 1970s. Bank-level information comes from the Fitch-IBCA Ltd. BankScope Database. Whenever they are available, we use consolidated bank balance-sheet and income-statement data. All data are expressed in US dollars and in real prices. As the BankScope Database began to provide information in 1989 we confine our analysis to the 1989-2007 period. We identify 86 countries that suffered 100 banking crises in these years and for which BankScope provides bank-level information.

Information on bank market concentration and development for each country comes, respectively, from the Bank Concentration and Financial Structure and Development Databases at the World Bank. Macroeconomic data are obtained from the International Financial Statistics of the International Monetary Fund (IMF). We exclude 20 countries because of lack of data to estimate the Lerner index or bank concentration and development. As we apply the GMM first-difference estimator with one lag of the dependent variable in the empirical analysis, banks with fewer than three consecutive years of data must also be excluded. Our estimations of the change in market discipline use a maximum sample of 79 banking crises and a panel data set of 2,593 banks in 66 countries.

The proxies for the regulatory and supervisory variables come from the World Bank's Bank Regulation and Supervision Database. As a proxy for the institutional quality of a country, we use the Kaufman et al. (2001) KKZ index. Missing information reduces the sample of country

characteristics to somewhere between 54 and 65 countries, depending on the regulatory or institutional variable.

Information on crisis intervention policies is obtained from Laeven and Valencia (2008). They only provide information for 27 countries of our sample so the analysis of the influence of the crisis intervention variables uses a smaller number of sample banks.

We follow Kroszner et al. (2007) and Dell'Ariccia et al. (2008) in classifying subperiods around banking crises. We use [t, $t+2$] as the crisis period, where t is the first year of the crisis period as reported by Caprio and Klingebiel (2003). We define the pre-crisis period as [t_1, t-1], where t_1 is the first year of the sample period (1989). We define the post-crisis period as [t+3, T], where t is the crisis inception year and T is the end of the sample period (generally, 2007). When a country suffers multiple crises, we estimate one single crisis. Thus, we define the crisis period as [t_a, t_b+2], where t_a and t_b are the crisis year corresponding to the first and the last crisis, respectively. Consequently, we define the pre-crisis period as [t_1, t_a-1] and the post-crisis period as [t_b+3, T]. We check that results do not change when we use alternative definitions of the crisis period, such as [t-3, t+3] and [t-5, t+5]. Table 1 describes the banking crises that we analyze.

INSERT TABLE 1 ABOUT HERE

3.2. Variables

3.2.1. Dependent variable

We test the presence of market discipline by analyzing whether depositors penalize riskier banks by requiring higher interest rates. The dependent variable is the cost of deposits for bank i in country j in year t ($COSTD_{ijt}$). As BankScope does not provide specific data on the interest paid by banks on different types of deposits, we follow Martinez Peria and Schmukler (2001), Demirgüç-Kunt and Huizinga (2004), and Hadad et al. (2011) using an implicit interest rate. It is measured by the annual ratio of interest expense to interest-bearing debt of the bank minus the average interest rate in the country for that year, i.e., $COSTD_{ijt}$=InterestRatio$_{ijt}$-InterestRatio$_{jt}$, where $\sum_{jt} COSTD_{ijt}$=0. The average rate (InterestRatio$_{jt}$) is calculated as in Lown and Peristiani (1996) as a simple average of the interest expense to interest-bearing debt ratio for banks in country j in year t using all the information available in BankScope. Expression of a rate as a deviation from its average in each year and for each country is intended to reveal rate premiums

traditionally used in the literature.[1]

3.2.2. Bank risk

Following Martinez Peria and Schmukler (2001) and Hadad et al. (2011), we consider three types of bank risk: insolvency, liquidity, and credit risk. We use the Z-score of a bank (ZSCORE) as a proxy for bank insolvency. ZSCORE equals the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A four-year moving window is used to estimate standard deviations for each bank each year. A higher Z-score indicates that a bank is more stable because it is inversely related to the probability of bank insolvency. Because the Z-score is highly skewed, we use the natural logarithm of the Z-score, which is normally distributed. Laeven and Levine (2009) and Hadad et al. (2011), among others, have recently used the Z-score as a proxy for bank insolvency risk. The use of a four-year moving window to estimate ZSCORE reduces the sample to no more than 1,630 banks analyzed for this proxy for bank risk.

We use the ratio of liquid assets to total assets (LIQUIDITY) as a proxy for liquidity risk. Demirgüç-Kunt and Huizinga (2004) and Hadad et al. (2011), among others, have also used this variable for the same purpose. Finally, we use the ratio of loan-loss provision to total gross loans (LLP) as a proxy for credit risk following, among others, Gropp and Vesala (2004) and Nier and Baumann (2006).[2]

3.2.3. Control variables

We include bank-level, industry-level, and macroeconomic variables as control variables. Among bank-specific characteristics are the percentage of customer deposits (CUSTOMERD), the bank's asset size (SIZE), overhead costs (OVERHEAD), and the Lerner index (LERNER).

CUSTOMERD is the ratio of customer deposits to total interest-bearing liabilities. As BankScope does not provide information on bank interest expenses by type of deposit, we use this variable to control for the percentage of bank deposits that are generally insured and are less sensitive to market discipline. We do not make a clear forecast for the expected coefficient of CUSTOMERD

[1] We check that the main results do not change when we use deviations from the government interest rate in each country, but the data available are limited because information on the Treasury bill rate and the discount rate is not available for 35 and 15 countries, respectively.

[2] We check that the main results do not vary when we use the capital buffer as a proxy for insolvency risk and the non-performing loans ratio (NPL) or the loan loss reserves-to-total gross loans ratio (LLGRGL) as alternative proxies for credit risk. Information on NPL and LLGRGL in BankScope is much more limited, and the number of sample banks is substantially reduced.

as differences in maturity also affect interest rates for deposits and this information is not available on BankScope.

SIZE is the natural logarithm of total bank assets. We control for the influence of size for several reasons. On the one hand, deposits might cost big banks less if, as the "too-big-to-fail" hypothesis suggests, depositors believe they will be compensated by the regulator in the event of difficulties or if they have lower risk as a consequence of the enhanced diversification of their asset portfolio. On the other hand, larger banks may pay higher deposit rates than small banks if they have better investment options or compete more intensively than smaller banks. The empirical evidence on size is not conclusive. Most of the empirical studies, using US data, show that large banks pay lower deposit rates than small banks (Park and Peristiani, 1998). Rosen (2007), however, finds that the effect of bank size on deposit rates has changed over time in the US; mega-banks have recently become more aggressive competitors and pay higher deposit rates than small banks.

As in Demirgüç-Kunt and Huizinga (2004), OVERHEAD is defined as non-interest bank expenses divided by assets. Differences in OVERHEAD may capture differences in employment or wage levels as well as banks' product mixes and quality of service. Higher expenditures may be associated with less efficient banks and thus lower interest rates on deposits, according to the traditional efficient-structure hypothesis (Berger and Hannan, 1989). Higher expenditures-to-total assets, however, may also be associated with better service to customers. If we could control for quality of service, we would expect an increase in non-interest expenditures to have a positive impact on interest rates. In our case, given that we cannot control for the quality of bank services, the effect of this variable on interest rates is unclear.

LERNER, as a banking competition variable, is a proxy for bank market power, defined as the difference between price and marginal cost expressed as a percentage of price.[3] Like Hadad et al. (2011), we do not predict a clear sign for LERNER as banks may use greater market power to pay lower interest rates on their deposits but they may also use it to pay higher interest rates to continue increasing their market power.

We use two industry-level variables as control variables following Beck et al. (2006), Fonseca and González (2010), and Hadad et al. (2011): (1) CONC, as a market structure variable, is a proxy for bank concentration, defined as the fraction of assets of the three largest banks as a share of assets of all commercial banks in our sample; and (2) PRIVATECRED, as a proxy for bank development, is the private credit by deposit money banks and other financial institutions over

[3] We estimate a single indicator of the Lerner index using the same procedure as Maudos and Fernández de Guevara (2004) and Fonseca and González (2010).

GDP.

Finally, we include macroeconomic characteristics as control variables. We follow Demirgüç-Kunt and Huizinga (2004) and Hadad et al. (2011) and control for the real gross domestic product growth (GDPGR) and inflation rate (INFLATION) of country *j* in year *t*.

Table 2 reports descriptive statistics in Panel A and correlations in Panel B for bank-level, industry-level, and macroeconomic variables. The dependent variable, COSTD, increases its mean in the post-crisis period (-0.0125) compared to the pre-crisis period (-0.1281). The proxies for bank risk suggest a lower average bank risk in the post-crisis period. ZSCORE and LIQUIDITY increase their mean values from 2.7281 and 0.3243 in the pre-crisis period to 2.9251 and 0.3538, respectively in the post-crisis period; whereas LLP decreases its mean from 0.0261 in the pre-crisis period to a value of 0.0152 in the post-crisis period. Banks in our sample in the post-crisis period have a lower SIZE, and higher mean values for CUSTOMERD and OVERHEAD. These changes in means may be the consequence of the typical writedowns of bank assets during a banking crisis. The market power of banks (LERNER) increases on average in the post-crisis period whereas the fraction of assets of the three largest banks (CONC) diminishes on average. This is consistent with banking crises involving some of the largest banks. Consistent with a reduction in aggregate levels of leverage after a banking crisis, we observe a lower mean value of PRIVATECRED in the post-crisis period.

Panel B shows that the cost of deposits is negatively correlated with LIQUIDITY but positively with ZSCORE. We do not, however, find a significant correlation between the cost of deposits and LLP and there are no significant correlations between our measures of bank risk. Correlations between the cost of deposits and other explanatory variables are mostly significant although always below 10%. The correlations between the independent variables are mostly significant although not strong. Only the correlations between PRIVATECRED and SIZE (44.04%) and between CONC and CUSTOMERD (30.01%) are stronger by 30%.

INSERT TABLE 2 ABOUT HERE

3.2.4. Bank regulation, official supervision, and institutions variables

We use a set of proxy variables for a country's regulation, official supervision, and institutions (REGINST). These variables include barriers to bank entry, for both domestic and foreign banks, restrictions on bank activities, official supervisory power, government ownership of banks, and the quality of a country's institutional environment. The World Bank's Bank Regulation and

Supervision database provides information for only three particular years (1997, 2001, and 2005), and there has been very little change over time (Barth et al., 2004). For this reason, we follow other authors using this database and pick one particular time (Nier and Baumann, 2006; Fonseca and González, 2010). We choose 1997, as 89% of the crises analyzed happen before that year.

Regulatory and supervisory variables are defined following Barth et al. (2004).[4] We measure barriers to entry by the number of documents required to obtain a license to operate a bank (ENTRY). This variable is based on whether or not the following information is required from applicants for a banking license: (1) draft by-laws; (2) intended organizational chart; (3) financial projections for first three years; (4) financial information on main potential shareholders; (5) background/experience of future directors; (6) background/experience of future managers; (7) sources of funds to be used to capitalize the new bank; and (8) market differentiation intended for the new bank. Each type of information is assigned a value of 1 if it is required and 0 otherwise. Thus, higher values indicate greater restrictiveness. We also check that basic results do not change when we measure entry restrictions by the fraction of rejected entry applications.

We also include the extent to which foreign banks may own domestic banks and enter a country's banking industry (FORENTRY). We measure it by adding a value of one for each positive answer to three questions: 1) Are foreign entities prohibited from entering through acquisition? 2) Are foreign entities prohibited from entering through subsidiaries? 3) Are foreign entities prohibited from entering through branches? Again, higher values indicate greater restrictiveness to foreign entry.

The third regulatory variable is an index of regulatory impediments to banks engaging in activities other than banking (RESTRICT). Specifically, RESTRICT measures whether bank activities in the securities, insurance, and real estate markets and bank ownership and control of non-financial firms are: (1) unrestricted, (2) permitted, (3) restricted, or (4) prohibited. Values range from 4 to 16. A higher value indicates more restrictions on banks engaging in such activities.

We include an index of the power of the commercial bank supervisory agency (OFFICIAL). This index ranges from 0 to 14 and captures the power of supervisors to undertake prompt corrective action, to restructure and reorganize troubled banks, and to declare a deeply troubled bank insolvent. Higher values indicate more official supervisory power. We measure the influence of

[4] Claessens and Laeven (2004), Demirgüç-Kunt et al. (2004), Nier and Baumann (2006) and Fonseca and González (2010), among others, have also used some of these variables to proxy bank regulation and supervision across countries.

government bank ownership (STATE) by using the percentage of government-owned banks in each country.

Finally, we use the Kaufman et al. (2001) KKZ index as an indicator of the quality of a country's institutional environment. This is calculated as the average of six indicators: voice and accountability in the political system; political stability; government effectiveness; regulatory quality; rule of law; and control of corruption. As this indicator is available beginning in 1996, we use yearly data over the 1996-2007 period plus the 1996 indicator for previous years. Demirgüc-Kunt et al. (2004) and Beck et al. (2006) use this index for purposes similar to ours. We examine the robustness of our results by including alternative measures of the quality of the legal and institutional environment: (1) the law and order index of the International Country Risk Guide and (2) the Index of Economic Freedom published by the Heritage Foundation. Results are not significantly different using these alternatives.

3.2.5. Crisis intervention policy variables

We define crisis intervention policy variables (INTERV) using the data provided by Laeven and Valencia (2008). These are all dummy variables taking the value of 0 when the intervention policy was strict and 1 when a more accommodative approach was chosen. We differentiate between containment and resolution phases of crisis policy responses. In the containment phase, we consider two types of intervention using two variables: (1) BLANKG is a dummy variable that takes a value of 1 if authorities issue an explicit blanket guarantee to depositors and creditors after the initial onset of a crisis, or if market participants are implicitly protected from any losses if public banks' market share exceeds 75%; otherwise, it takes a value of 0; and (2) LIQSUP is a dummy variable that takes a value of 1 if authorities provide emergency liquidity support; otherwise, it takes a value of 0. The definition of "emergency" support is when claims from monetary authorities on banks' deposit money to total deposits reach at least 5 per cent and at least twice as much as in the year before the crisis.

In the resolution phase, we consider three types of intervention using different variables: (1) FORBEAR is a dummy variable that takes a value of 1 if some banks are permitted to continue functioning despite technical insolvency, or if prudent banking regulations such as loan classification and loan loss provisioning standards are suspended or not fully applied during the first three years of a crisis; (2) RECAP is a dummy variable that takes a value of 1 if banks are recapitalized by the government during the first three years of the crisis and 0 otherwise; and (3) NATION is a dummy that takes a value of 1 if banks are nationalized during the first five years of the crisis.

3.3. Methodology

We apply the generalized method of moments (GMM) estimator developed for dynamic models of panel data by Arellano and Bond (1991) to study changes in the relation between bank risk and the cost of bank deposits after banking crises. This methodology is specifically designed to address three relevant econometric issues: (1) the presence of unobserved bank-specific effects, which are eliminated by taking first-differences of all variables; (2) the autoregressive process in the data regarding the behavior of cost of deposits (i.e., the need to use a lagged dependent variables model to capture the dynamic nature of the cost of deposits); and (3) the likely endogeneity of the explanatory variables. The panel estimator controls for this potential endogeneity by using instruments based on lagged values of the explanatory variables.

The basic model is:

$$
\begin{aligned}
COSTD_{ijt} = {} & \beta_0 + \beta_1\, COSTD_{ijt-1} \\
& + \beta_2\, RISK_{ijt} \\
& + \beta_3\, CRISIS_{jt} \\
& + \beta_4\, RISK_{ijt} \times CRISIS_{jt} \\
& + \beta_5\, BANK_{ijt} \\
& + \beta_6\, MACRO_{jt} \\
& + \sum_{j=1}^{66} Country_j + \sum_{t=1989}^{2007} T_t + \mu_i + \varepsilon_{ijt} \qquad [1]
\end{aligned}
$$

where i, j, t refer to the bank, country, and year, respectively. $COSTD_{ijt}$ is the cost of deposits for bank i in country j in year t. $RISK_{ijt}$ is the set of three proxies of risk for bank i in country j in year t (*ZSCORE*, *LIQUIDITY*, and *LLP*). We introduce both separately and simultaneously all risk variables. $CRISIS_{jt}$ is a dummy variable that takes a value of 1 for years after the banking crisis and zero for the pre-crisis period. We check that the basic results do not change when we include the crisis period in a separate dummy variable.

In our specification, β_2 measures the importance of market discipline in the pre-crisis period, and β_4 captures changes in it after the banking crisis. As higher values of ZSCORE and LIQUIDITY indicate lower levels of bank risk, the presence of market discipline in the pre-crisis period would imply a negative coefficient for these variables. Weakening (enhancement) of market discipline after banking crises would imply a positive (negative) coefficient for the interaction between each of these two proxies of bank risk and the crisis dummy variable. As LLP is positively related to

bank risk, interpretation of the coefficients of this variable would be the opposite of the one described for ZSCORE and LIQUIDITY.

$BANK_{ijt}$ is the vector of control bank-level and industry-level variables. $MACRO_{jt}$ is the vector of macroeconomic variables. An additional three specific effects- country, year, and bank-specific effects- should control for most shocks affecting the cost of deposits. $\sum_{j=1}^{66} \text{Country}_j$ is a set of country dummy variables to control for characteristics that are specific to each country, as long as these are persistent over time. $\sum_{t=1989}^{2007} T_t$ is a set of dummy time variables to capture any unobserved bank-invariant time effects not included in the regression. Including these specific effects means the regulatory, supervisory, institutional, and crisis intervention variables do not need to be included in the regression on their own. It allows us in the next extensions to focus only on the terms of their interaction. μ_i is an unobservable bank-specific effect, which is assumed to be constant over time. Finally, ε_{ijt} is the white noise error term.

To analyze whether changes in market discipline after banking crises vary across countries depending on regulation, official supervision, and institutions, we sequentially include an interaction term for each of these characteristics in country j ($REGINST_j$) with the proxy of bank risk, separating between before and after the banking crisis. The model is:

$$
\begin{aligned}
COSTD_{ijt} = {} & \beta_0 + \beta_1 COSTD_{ijt-1} \\
& + \beta_2 RISK_{ijt} \\
& + \beta_3 CRISIS_{jt} \\
& + \beta_4 RISK_{ijt} \text{ x } REGINST_j \\
& + \beta_5 RISK_{ijt} \text{ x } CRISIS_{jt} \\
& + \beta_6 RISK_{ijt} \text{ x } CRISIS_{jt} \text{ x } REGINST_j \\
& + \beta_7 BANK_{ijt} \\
& + \beta_8 MACRO_{jt} \\
& + \sum_{j=1}^{66} Country_j + \sum_{t=1989}^{2007} T_t + \mu_i + \varepsilon_{ijt} \qquad [2]
\end{aligned}
$$

In this specification, the coefficient of RISK captures the presence of market discipline for periods before a banking crisis. The coefficient of RISKxREGINST indicates how different

market discipline is before the crisis when the particular regulatory or institutional variable increases its value. The coefficient of RISKxCRISIS captures how different market discipline is after the crisis. Finally, the coefficient of RISKxCRISISxREGINST indicates how different market discipline is after the crisis when the particular regulatory or institutional variable increases its value.

Finally, we analyze how intervention policies during banking crises shape post-crisis variations in market discipline. We introduce in the regressions a triple interaction term among bank risk, the crisis dummy variable, and variables capturing the types of intervention ($INTERV_j$) adopted during the crisis. The model is:

$$
\begin{aligned}
COSTD_{ijt} = {} & \beta_0 + \beta_1 COSTD_{ijt-1} \\
& + \beta_2 RISK_{ijt} \\
& + \beta_3 CRISIS_{jt} \\
& + \beta_4 RISK_{ijt} \times CRISIS_{jt} \\
& + \beta_5 RISK_{ijt} \times CRISIS_{jt} \times INTERV_j \\
& + \beta_6 BANK_{ijt} \\
& + \beta_7 MACRO_{jt} \\
& + \sum_{j=1}^{66} Country_j + \sum_{t=1989}^{2007} T_t + \mu_i + \varepsilon_{ijt} \qquad [3]
\end{aligned}
$$

In this specification, the coefficient of *RISK* again captures the presence of market discipline for periods before a banking crisis. The coefficient of RISKxCRISIS captures how different market discipline is after the crisis in countries where the particular intervention policy is not adopted, and the coefficient of RISKxCRISISxINTERV indicates how different market discipline is after the crisis when the particular intervention policy is adopted.

We control for the potential endogeneity of the bank-level variables and their interactions with the country-level variables in the GMM estimations by using two- to four-period lags of the same variables as instruments. A major stumbling block in empirical analysis that includes regulatory and institutional variables is to separate out the effects and the correlated outcomes. Such interrelations and the potential endogeneity of country-level variables make it difficult to tease out the specific effect of each variable and to know which of them plays the major role. Our empirical analysis uses a number of instruments for the observed values of each country variable to identify the exogenous component of each country variable included in REGINST and

INTERV, and to control for potential simultaneity bias. The instruments are defined following Barth et al. (2004): four binary variables indicating English, German, French, or Scandinavian legal origin; a country's latitudinal distance from the equator; and four religious composition dummy variables. Religious composition is measured as the percentage of population in each country that is Roman Catholic, Protestant, Muslim, or other.[5] Then, CONC, PRIVATECRED, MACRO, and the dummy variables are considered exogenous.

We use one-step estimation and specify the robust estimator of the variance-covariance matrix of the parameters derived by Arellano and Bond (1991). We also examine the hypothesis that there is no second-order serial correlation in the first-difference residuals (m_2). The lack of second-order serial correlation in the first-differenced errors would indicate no evidence of model misspecification. First-order serial correlation (m_1) in the differentiated residuals is attributable to the first difference of models.[6]

4. Empirical results

4.1. Banking crises and market discipline

Table 3 reports the results of model [1]. In columns (1)-(3) we introduce each proxy for bank risk separately, and in columns (4)-(7) we introduce all risk variables simultaneously. The results are consistent with the presence of market discipline during the pre-crisis period. ZSCORE and LIQUIDITY have negative coefficients, and LLP has a positive coefficient, all of them statistically significant at least at the 0.05 level in columns (1)-(3).[7] ZSCORE and LIQUIDITY keep their negative and significant coefficients when the three risk variables are included together in columns (4)-(7). Only LLP does not have statistically significant coefficients in columns (4)-(7). These results for the pre-crisis period corroborate those found by Demirgüç-Kunt and Huizinga (2004) in a database of 30 countries, indicating that riskier banks pay higher interest rates during normal periods.

[5] Results are robust to alternative definitions of the set of instruments. For instance, we check that results do not change when we use as instruments only the country's legal origin as in La Porta et al. (1998) or when we use its legal origin and an index for the efficiency of its legal system produced by the Business International Corporation as in Rajan and Zingales (1998).

[6] The presence of heteroskedascity in the error term leads us to use the robust estimator. This estimator allows us to relax the assumption that the error term is identically distributed and to use standard errors to make valid statistical inference about our coefficients.

[7] The results for LLP should be treated with caution, however, because m_2 in column (3) indicates an inability to reject the null hypothesis of the absence of second-order serial correlation in the first-difference residuals.

The coefficients of CRISIS are statistically positive in all estimations, indicating that on average deposit rates are higher after a banking crisis. Coefficients of the interaction terms between the risk variable and the crisis dummy variables suggest that market discipline weakens after a banking crisis. These coefficients have the opposite sign from those of the bank risk variables in columns (1)-(3). ZSCORExCRISIS and LIQUIDITYxCRISIS have positive and statistically significant coefficients at the 0.01 level in all estimations of Table 3. Only LLPxCRISIS does not have statistically significant coefficients when we introduce it simultaneously with the other two risk variables in columns (6) and (7). These results suggest a reduced sensitivity of the cost of deposits to bank risk after a banking crisis, as the negative influence of ZSCORE and LIQUIDITY on the cost of bank deposits and the positive influence of LLP weaken after a banking crisis. The weakening of market discipline is consistent with the idea that depositors are less concerned after a banking crisis because they anticipate their governments will protect them if a new crisis occurs.

The change in market discipline is substantial in economic terms. Using, for instance, the results in column (1) of Table 3, a variation of one standard deviation in the ZSCORE (1.1449) would reduce the interest rate on deposits before a banking crisis by 1.13 times its standard deviation. After a banking crisis, however, the cost of deposits would not fall if the ZSCORE increases.

INSERT TABLE 3 ABOUT HERE

The non-significant coefficients of CUSTOMERD indicate that banks do not pay on average lower interest rates for their customer deposits. They suggest that the deposit insurance is not fully credible because even insured deposits exercise market discipline in our sample. Cook and Spellman (1994) for US banks and Martinez Peria and Schmukler (2001), using data from Argentina, Chile, and Mexico, find a similar result. The coefficients of SIZE are positive and statistically significant in all estimations. This positive influence is consistent with larger banks having better investment options or competing more intensively than smaller banks. It is not, however, consistent with the lower risk expected for larger banks due to, for instance, greater asset portfolio diversification or anticipation of support from the regulator in the event of difficulties (the too-big-to-fail hypothesis). The coefficients of OVERHEAD are not significant in explaining the cost of bank deposits in six of the seven estimations. It has a positive and significant coefficient only in column (6). This may reflect the net result of making up for lower bank cost efficiency by offering better services to depositors. LERNER has statistically positive coefficients in four estimations, consistent with the idea that banks with greater market power can

pay higher rates for their deposits.

CONC does not present statistically significant coefficients except in column (2) where LERNER has a non-significant coefficient. This suggests that market concentration does not affect bank deposit rates in our sample through channels different to changes in bank market power. The proxy for bank development (PRIVATECRED) has statistically negative coefficients in all estimations. Finally, among the macroeconomic variables, GDP growth and INFLATION are associated in all the estimations with higher interest rates for deposits.

4.2. Bank regulation, official supervision, institutions, and market discipline

Table 4 shows results for whether changes in market discipline after a banking crisis vary across countries depending on the exogenous components of regulation, official supervision, and institutions. To save space, we report results for introducing the two statistically significant risk variables simultaneously in the basic regression (ZSCORE and LIQUIDITY). The primary results do not change when we introduce the three proxies of bank risk separately.

Column (1) reports results for interactions with ENTRY. We obtain significant coefficients for ZSCORE and its interactions but not for interactions with LIQUIDITY. The negative coefficient of ZSCORE and the positive coefficient of ZSCORExENTRY indicate that the stricter the bank entry restrictions in a country, the weaker the market discipline before a banking crisis. The positive coefficient of ZSCORExCRISIS indicates that market discipline weakens after a banking crisis in countries with fewer barriers to entry, while the negative coefficient of ZSCORExCRISISxENTRY suggests that the stricter the barriers to bank entry, the less market discipline weakens after a banking crises. This result is consistent with our hypothesis H.1 and the argument that market discipline weakens more after banking crises in countries whose less stringent barriers to entry promote greater market discipline before the crisis.

Column (2) reports the results when we focus on limitations only on foreign bank entry and ownership (FORENTRY). We do not obtain significant coefficients for its interaction terms. Only ZSCORE and LIQUIDITY and their interaction with CRISIS have significant coefficients, confirming a weakening of market discipline after a banking crisis. The non-significant coefficients of the interaction with FORENTRY and the significant ones of the interactions with ENTRY suggest that it is overall restrictions on bank entry, rather than specific ones on foreign banks, that weaken market discipline more during normal periods and change it after a banking crisis.

We find similar results for RESTRICT and OFFICIAL in columns (3) and (4). The only difference is that interactions of RESTRICT have significant coefficients when we use LIQUIDITY, and not ZSCORE, as a proxy for bank risk. The statistically positive coefficients of the interactions LIQUIDITYxRESTRICT and ZSCORExOFFICIAL suggest, respectively, that more stringent restrictions on bank activities and greater official supervisory power reduce market discipline during normal periods; the negative coefficients of the triple interaction terms (LIQUIDITYxCRISISxRESTRICT and ZSCORExCRISISxOFFICIAL) suggest less weakening of market discipline after a banking crisis in such environments. These results are, respectively, consistent with our hypotheses H.2 and H.3.

We do not obtain significant coefficients when in column (5) we analyze differences in the relation between the cost of deposits and bank risk depending on government bank ownership in a country. The coefficients of ZSCORE and ZSCORExCRISIS are, respectively, negative and positive, indicating that market discipline weakens after a banking crisis. Although their signs are as expected, the coefficients of ZSCORExSTATE and ZSCORExCRISISxSTATE are not statistically significant. These non-significant coefficients do not confirm our H.4 because we do not find that higher government bank ownership significantly reduces the change in market discipline after a banking crisis.

Finally, we obtain the opposite coefficients in column (6) when we analyze the impact of the quality of a country's institutions. The negative coefficients of ZSCORE and ZSCORExKKZ indicate that good-quality institutions strengthen market discipline during normal periods. The positive coefficients of ZSCORExCRISIS and ZSCORExCRISISxKKZ suggest that the better the quality of the institutions in a country, the more that market discipline weakens after a banking crisis. This result is consistent with the argument that market discipline works better where the enforceability of contracts and strong institutions promote well-functioning markets.

Coefficients of control variables (bank-level, industry-level, and macroeconomic variables) are consistent with those in Table 3. The coefficients of OVERHEAD are not significant in any estimation. LERNER has positive and significant coefficients in all estimations confirming that greater market power allows banks to pay higher deposit rates. The coefficients of CONC are positive but only significant in column (6). The coefficients of the remaining control variables (CUSTOMERD, SIZE, PRIVATECRED, GDPGR, and INFLATION) are similar to those in Table 3.

Our results therefore indicate the relevance of the legal and institutional environment in a country for reinforcing market discipline. Less stringent barriers to bank entry, less stringent restrictions

on bank activities, less official supervisory power, and higher-quality institutions enhance market discipline during normal periods. In the same environments, however, a banking crisis has a greater negative impact on market discipline.

INSERT TABLE 4 ABOUT HERE

4.3. Crisis intervention policies and market discipline

Table 5 reports the results for model [3], where we analyze how intervention policies during banking crises shape post-crisis variations in market discipline. We use dummy variables for five types of accommodative intervention. These variables indicate, respectively, whether or not blanket guarantee, liquidity support, forbearance, government recapitalization, or nationalization measures are adopted during the crisis. As we have seen that market discipline is present only in countries with better-quality institutions, we focus on countries that the World Bank classifies as high-income and upper-middle-income. Laeven and Valencia (2008) provide information on crisis intervention policies for crises in 27 countries of our initial sample. We analyze intervention policies for 23 crises in 18 countries.[8]

Our results are consistent with H.5 and suggest that accommodative intervention policies are positively related to a weakening of market discipline after a banking crisis. We obtain positive and statistically significant coefficients for interaction terms of four of the five intervention policies (ZSCORExCRISISxBLANKG, ZSCORExCRISISxFORBEAR, ZSCORExCRISISxNATION, and LIQUIDITYxCRISISxRECAP). Only results for the provision of liquidity support do not indicate a positive relation with the weakening of market discipline after a banking crisis. These positive and significant coefficients indicate that the negative relation between bank risk and the cost of deposits is reduced after a banking crisis with adoption of an explicit blanket guarantee to depositors, forbearance measures, government recapitalization or nationalization to resolve the crisis.[9]

The weakening of market discipline after the introduction of a blanket guarantee is consistent

[8] The results are not significant when we replicate the analysis for crises in countries classified as low- or lower-middle-income or when we include all countries with available data on intervention policies.

[9] The results obtained when the two containment policies and all intervention policies are simultaneously introduced in the regressions should be treated with caution because m_2 in columns (6) and (8) indicates an inability to reject, at the 10 per cent level, the null hypothesis indicating the absence of second-order serial correlation in the first-difference residuals.

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with the findings of Hadad et al. (2011) for Indonesian banks following the 1997-1998 financial crisis. It is also consistent with the negative influence of explicit deposit insurance and its generosity on the sensitivity of banks' interest payments to bank risk reported by Demirgüç-Kunt and Huizinga (2004).

Our results indicate that recapitalizations and the provision of liquidity support have a different effect on market discipline although both measures help improve bank liquidity. The reason might be that both types of intervention have a different influence on depositors' potential losses. Liquidity support is more typically deployed at the earlier stages of a crisis, usually referred to as the containment phase, when it is difficult to assess the extent to which the turmoil is due to liquidity or solvency problems. However, recapitalization programs are usually adopted in a posterior stage, the resolution phase, to deal with clear solvency problems in the banking industry (Laeven and Valencia, 2008). Since depositors should suffer losses not when the bank is illiquid, but when it is insolvent, intervention policies may damage market discipline more precisely when they do not impose such losses on depositors to deal with bank solvency problems. Our result therefore suggests that it is the authorities managing bank solvency problems, rather than liquidity problems, that affect market discipline.

The coefficients of some control variables change compared to those in Tables 3 and 4. This suggests a different influence of these variables in developed countries to that found in the overall sample of developed and developing countries. CUSTOMERD has significant positive coefficients suggesting that banks in developed countries pay on average higher interest rates for customer deposits than for other kinds of deposit. As we do not have data on the maturity of deposits there is no clear way to separate how important strong implicit insurance or longer maturity are for explaining this result. The non-significant influence of SIZE would be consistent with better investment opportunities or more intense competition offset by better diversification opportunities and/or the too-big-to-fail problem in larger banks in developed countries. Although the coefficients of LERNER remain positive, they are mostly non-significant and only the coefficient in column (4) is significant. It suggests that bank market power is less associated with higher deposit rates in developed countries. The negative coefficient of CONC is consistent with the traditional structure-performance hypothesis, where banks in more concentrated markets pay lower interest rates for their deposits. The non-significant coefficients of the proxy for bank development, PRIVATECRED, are consistent with its reduced variability when we only include the developed countries. Higher GDP growth is associated with lower deposit rates in the developed countries included in our sample, whereas inflation rates do not have statistically significant coefficients. OVERHEAD has similar coefficients to those reported in Tables 3 and 4.

INSERT TABLE 5 ABOUT HERE

4.4. Robustness checks

In further analysis we check for the robustness of the results. First, we analyze whether depositors penalize riskier banks by withdrawing uninsured deposits. In this case, we use the annual growth in interbank deposits for bank *i* in country *j* in year *t* as the dependent variable. We analyze the growth in deposits in the interbank market to focus on uninsured deposits. The large and unsecured nature of deposits in the interbank market makes monitoring and therefore market discipline more important than in other types of bank deposit (Furfine, 2001). We do not use total or customer deposits because these are less sensitive to market discipline, as they are made up of largely insured deposits. The alternative of using large time deposits is not feasible for lack of data in BankScope. The basic results do not change.

Second, we find that the basic results do not change when we apply static panel data procedures, using both fixed (without country dummy variables) and random effects, or when we exclude some control variables that reduce our sample of banks (LERNER, CONC, PRIVATECRED). In these cases, we run our basic regressions using a maximum of 99 banking crises in 85 countries.

5. Conclusions

Our analysis of the effect of banking crises on market discipline in a sample of 79 banking crises over 1989-2007 uses an international bank dataset to evaluate how changes in market discipline depend on a country's regulation, official supervision, institutions, and crisis intervention policies. We apply the GMM difference estimator to an international panel data set of 2,593 banks in 66 countries to control for potential endogeneity of the explanatory variables and unobservable bank-, country-, and time-specific effects.

We conclude that banking crises generally weaken market discipline, but to different degrees across countries. Market discipline is weakened most in environments where the regulatory climate and the country's institutions enhanced market discipline before a crisis. That is, less strict restrictions on bank entry and bank activities, less official supervisory power, and better-quality institutions enhance market discipline in normal periods but also weaken it more after a banking crisis. We also find that the weakening of market discipline is positively related to the accommodative policies applied to contain and resolve the crisis. The adoption of an explicit blanket guarantee, forbearance, government recapitalization, and nationalization programs are

interventions that have a weakening effect on market discipline. We do not observe, however, that the provision of liquidity support to banks has a specific negative effect on market discipline after a crisis.

Our results have some policy implications. Regulation, official supervision, institutions, and interventions during banking crises are complementary in enhancing market discipline. We provide empirical evidence on the contradiction between enhancing market discipline by, for instance, strengthening accounting and auditing requirements and adopting the intervention policies that are usually resorted to for solving banking crises. The interventions to increase safety nets and depositor protection that governments usually adopt to resolve banking crises make depositors less concerned about future banking crises and reduce their incentives to exert discipline. Therefore, although market discipline has gained importance as an instrument for controlling bank behavior under Basel II, one must question its effectiveness for controlling bank risk-taking in the years following financial crises. Consequently, Basel III should consider not only that there are the complementarities between market discipline and the different tools for controlling bank risk (legal restrictions on bank activities and entry, official supervision, and institutional quality) but also that adopting of strict policies to contain and resolve a crisis provides an opportunity to enhance market discipline in the future.

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Table 1
Episodes of Systemic and Borderline Financial Crises

Country	Crisis inception year	Number of banks	Country	Crisis inception year	Number of banks	Country	Crisis inception year	Number of banks
Albania	1992	8	Georgia	1991	12	Norway	1990	16
Algeria	1990	14	Ghana	1997	12	Paraguay	1995, 2001	16
Angola	1991	9	Greece	1991	24	Philippines	1998	34
Argentina	1989, 1995, 2001	56	Hong Kong	1998	42	Poland	1992	54
Armenia	1994	15	Hungary	1991	26	Romania	1990	25
Australia	1989	33	Iceland	1993	4	Russian Fed.	1995, 1998	719
Bolivia	1994	12	India	1993	68	Rwanda	1991	5
Botswana	1994	8	Indonesia	1994, 1997	64	Sierra Leone	1990	4
Brazil	1990, 1994	147	Italy	1990	185	Slovakia	1991	20
Bulgaria	1996	23	Jamaica	1994, 1996	7	Slovenia	1992	20
Burundi	1994	5	Japan	1991	27	South Africa	1989	29
Cameroon	1995	7	Jordan	1989	11	Sri Lanka	1989	12
Cape Verde	1993	4	Kenya	1992, 1993, 1996	30	Swaziland	1995	4
Costa Rica	1994	26	Korea Rep.	1997	18	Sweden	1991	23
Croatia	1996	41	Kyrgyzstan	1990	5	Thailand	1997	22
Czech Rep.	1989	33	Latvia	1995	22	Togo	1993	3
Ecuador	1996, 1998	29	Lithuania	1995	8	Tunisia	1991	16
El Salvador	1989	13	Macedonia	1993	12	Turkey	1994, 2000	34
Estonia	1992, 1998	6	Malaysia	1997	39	Uruguay	2002	20
Ethiopia	1994	7	Mauritius	1996	13	Venezuela	1994	44
Finland	1991	10	Mexico	1994	22	Vietnam	1997	22
France	1994	241	Nigeria	1991, 1997	45	Zambia	1995	8

Table 2
Descriptive statistics and correlations

COSTD is the cost of deposits measured as the difference between the ratio of the annual interest expense to interest-bearing debt for each bank and the average interest rate for each country in the respective year. ZSCORE equals the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A four-year moving window is used to estimate the standard deviation of asset returns for each bank in each year. LIQUIDITY is the ratio of liquid assets to total assets. LLP is the ratio of loan loss provisions to total gross loans. CUSTOMERD is the percentage of customer deposits to total interest bearing liabilities. SIZE is the natural logarithm of total assets. OVERHEAD is personnel expenses and other non-interest expenses over total assets. LERNER is the Lerner index and is defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. CONC is the fraction of assets of three largest banks as a share of assets of all commercial banks. PRIVATECRED is the private credit by deposit money banks and other financial institutions over GDP. GDPGR is the annual growth rate of real GDP per capita. INFLATION is the annual inflation rate from the GDP deflator. Bank data are from the BankScope data base of Fitch IBCA, macro data are from the IMF's International Financial Statistics. The sample period is 1989-2007.

Panel A: Descriptive statistics

	COSTD	ZSCORE	LIQUIDITY	LLP	CUSTOMERD	SIZE	OVERHEAD	LERNER	CONC	PRIVATECRED	GDPGR	INFLATION
Mean												
Overall	-0.0227	2.8983	0.3512	0.0161	0.5636	13.4399	0.0510	0.3851	0.5206	0.4935	0.0468	0.0759
Pre-crisis	-0.1281	2.7281	0.3243	0.0261	0.5232	13.6729	0.0377	0.3141	0.5912	0.7493	-0.0058	0.1265
Post-Crisis	-0.0125	2.9251	0.3538	0.0152	0.5675	13.4175	0.0523	0.3919	0.5138	0.4689	0.0519	0.0710
Median	-0.0041	2.9846	0.3259	0.0077	0.6265	13.3423	0.0368	0.4300	0.5225	0.3164	0.0500	0.0531
Std. Deviation	0.1182	1.1449	0.2133	0.5753	0.2967	2.3173	0.1130	0.5860	0.2169	0.3608	0.1299	0.1191
N of obs.	17,674	10,963	17,671	16,701	17,674	17,674	17,674	17,674	17,674	17,674	17,674	17,674

Panel B: Correlations

	COSTD	ZSCORE	LIQUIDITY	LLP	CUSTOMERD	SIZE	OVERHEAD	LERNER	CONC	PRIVATECRED	GDPGR	INFLATION
ZSCORE	0.0383***											
LIQUIDITY	-0.0414***	-0.0000										
LLP	-0.0061	-0.0033	0.0117									
CUSTOMERD	0.0606***	0.0757***	0.0537***	0.0059								
SIZE	-0.0502***	-0.0097	-0.1155***	-0.0003	0.0649***							
OVERHEAD	0.0208***	-0.1091***	0.2217***	-0.0094	-0.0086	-0.2157***						
LERNER	-0.0089	0.1490***	0.0228***	-0.0087	0.0193**	-0.0193**	-0.1777***					
CONC	0.0373***	0.0488***	-0.0142*	0.0070	0.3001***	0.2150***	-0.0700***	-0.0451***				
PRIVATECRED	-0.1449***	0.0330***	-0.1957***	-0.0078	-0.0206***	0.4404***	-0.1365***	-0.0320***	0.1762***			
GDPGR	0.1457***	0.1536***	-0.0513***	-0.0223***	-0.1154***	-0.1145***	0.0084***	0.0448***	-0.2715***	-0.0571***		
INFLATION	0.0531***	-0.1039***	0.0908***	0.0180**	-0.0032	-0.1925***	0.0814***	0.0194***	-0.0590***	-0.3395***	-0.3242***	1

Table 3
Cost of Deposits, Market Discipline and Crises

Regressions are estimated using the Arellano and Bond (1991) one-step GMM difference estimator for panel data with lagged dependent variables and the robust estimator of variance. The dependent variable is the cost of deposits (COSTDEP). As explanatory variables, we include one lag of the dependent variable ($COSTDEP_{t-1}$). ZSCORE, LIQUIDITY, and LLP are alternative bank risk measures. ZSCORE is the natural logarithm of Zscore. Zscore equals the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A four-year moving window is used to estimate the standard deviation of asset returns for each bank in each year. LIQUIDITY is the ratio of liquid assets to total assets. LLP is the ratio of loan loss provisions to total gross loans. CRISIS is a dummy variable that takes a value of one during the post-crisis period and zero during the pre-crisis period. CUSTOMERD is the percentage of customer deposits to total interest bearing liabilities. SIZE is the natural logarithm of total assets. OVERHEAD is personnel expenses and other non-interest expenses over total assets. LERNER is the Lerner index, defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. CONC is the fraction of assets of three largest banks as a share of assets of all commercial banks. PRIVATECRED is the private credit by deposit money banks and other financial institutions over GDP. GDPGR is the annual growth rate of real GDP per capita. INFLATION is the annual inflation rate from the GDP deflator. Bank data are from the BankScope data base of Fitch IBCA, macro data are from the IMF's International Financial Statistics and crises episodes are classified by Caprio and Klingebiel (2003). The sample period is 1989-2007. t statistics are shown in parentheses. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

		Dependent Variable: COSTDEP						
	Expected signs	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$COSTDEP_{t-1}$		0.0436*	0.0417	0.0571**	0.0265	0.0285	0.0474*	0.0195
		(1.80)	(1.29)	(2.13)	(0.97)	(1.00)	(1.71)	(0.69)
ZSCORE	-	-0.1169***			-0.1086***	-0.0105***	-0.0102***	-0.0898***
		(-4.18)			(-3.86)	(-3.09)	(-2.92)	(-3.25)
LIQUIDITY	-		-1.3192***		-0.0700**	-0.9933***	-0.0655**	-0.8521***
			(-3.28)		(-2.39)	(-2.91)	(-2.41)	(-2.74)
LLP	+			0.1063**	-0.0020	0.0254	0.0783	0.0034
				(2.18)	(-0.04)	(0.38)	(1.59)	(0.04)
CRISIS		0.1143***	0.0858***	0.0630***	0.1127***	0.0951***	0.0828***	0.1179***
		(6.69)	(7.01)	(5.72)	(6.24)	(6.27)	(5.65)	(6.48)
ZSCORE x CRISIS		0.1105***			0.1049***			0.0857***
		(3.86)			(3.68)			(3.06)
LIQUIDITY x CRISIS			1.2705***			0.9781***		0.8280***
			(3.13)			(2.85)		(2.65)
LLP x CRISIS				-0.1469**			-0.0933	-0.0042
				(-2.59)			(-1.50)	(-0.05)
CUSTOMERD		0.0288	0.0049	-0.0148	0.0250	-0.0031	0.0084	0.0090
		(0.93)	(0.23)	(-0.72)	(0.84)	(-0.09)	(0.29)	(0.31)
SIZE		0.0319***	0.0213***	0.0275***	0.0254**	0.0237**	0.0281***	0.0211**
		(2.99)	(3.07)	(3.27)	(2.41)	(2.38)	(2.60)	(2.18)
OVERHEAD		0.1001	0.0088	-0.0270	0.0979	0.1116	0.2020*	0.0013
		(1.10)	(0.45)	(-1.10)	(1.12)	(1.07)	(1.79)	(0.01)
LERNER		0.0170**	0.0007	0.0047**	0.0170**	0.0105	0.0085	0.0163**
		(2.39)	(0.63)	(2.27)	(2.31)	(1.52)	(1.18)	(2.41)
CONC		0.0067	0.0167*	0.0114	-0.0049	0.0098	0.0124	0.0025
		(0.35)	(1.94)	(1.31)	(-0.27)	(0.59)	(0.74)	(0.15)
PRIVATECRED		-0.0901***	-0.0271***	-0.0329***	-0.0921***	-0.0922***	-0.1004***	-0.0845***
		(-5.90)	(-3.76)	(-4.27)	(-5.74)	(-5.58)	(-5.96)	(-5.69)
GDPGR		0.1080***	0.0333*	0.0488***	0.0994***	0.0926***	0.1132***	0.0916***
		(3.60)	(1.96)	(2.84)	(3.06)	(2.90)	(3.53)	(2.83)
INFLATION		0.2430***	0.1865***	0.1587***	0.2769***	0.2685***	0.2537***	0.2729***
		(3.70)	(4.07)	(3.31)	(3.57)	(3.71)	(3.53)	(3.67)
Time		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country		Yes	Yes	Yes	Yes	Yes	Yes	Yes
m_1		-8.05***	-8.49***	-8.47***	-7.94***	-7.97***	-7.74***	-8.30***
m_2		0.71	1.25	2.17**	0.23	0.57	0.60	0.39
# observations		6,762	12,198	11,483	6,331	6,331	6,331	6,331
# banks		1,630	2,593	2,515	1,564	1,564	1,564	1,564
# countries		66	66	66	66	66	66	66

Table 4. Cost of Deposits, Market Discipline, and Regulatory and Institutional Environment

Regressions are estimated using the Arellano and Bond (1991) one-step GMM difference estimator for panel data with lagged dependent variables and the robust estimator of variance. The dependent variable is the cost of deposits (COSTDEP). As explanatory variables, we include one lag of the dependent variable (COSTDEP $_{t-1}$). ZSCORE and LIQUIDITY are alternative bank risk measures. ZSCORE is the natural logarithm of Zscore. Zscore equals the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A four-year moving window is used to estimate the standard deviation of asset returns for each bank in each year. LIQUIDITY is the ratio of liquid assets to total assets. CRISIS is a dummy variable that takes a value of one during the post-crisis period and zero during the pre-crisis period. CUSTOMERD is the percentage of customer deposits to total interest bearing liabilities. SIZE is the natural logarithm of total assets. OVERHEAD is personnel expenses and other non-interest expenses over total assets. LERNER is the Lerner index, defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. CONC is the fraction of assets of three largest banks as a share of assets of all commercial banks. PRIVATECRED is the private credit by deposit money banks and other financial institutions over GDP. GDPGR is the annual growth rate of real GDP per capita. INFLATION is the annual inflation rate from the GDP deflator. ENTRY measures the requirements for a banking license. FORENTRY measures limitations on foreign bank entry and ownership. RESTRICT measures legal restrictions on bank activities. OFFICIAL measures official supervisory power. STATE is the percentage of banks that are government-owned. KKZ is an indicator of the quality of institutional development. We control for the potential endogeneity of the aforementioned political economy variables using as instruments four legal origin dummy variables, the latitudinal distance from the equator and four religious dummy variables. Bank data are from the BankScope data base of Fitch IBCA, macro data are from the IMF's International Financial Statistics and crises episodes are classified by Caprio and Klingebiel (2003). The sample period is 1989-2007. t statistics are shown in parentheses. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	Dependent Variable: COSTDEP						
	REGINST:	ENTRY	FORENTRY	RESTRICT	OFFICIAL	STATE	KKZ
	Expected signs	(1)	(2)	(3)	(4)	(5)	(6)
COSTDEP $_{T-1}$		-0.0208 (-0.77)	-0.0129 (-0.52)	-0.0315 (-1.29)	-0.0689*** (-3.16)	-0.0212 (-0.75)	0.0010 (0.04)
ZSCORE	-	-1.9922*** (-5.09)	-0.0854* (-1.90)	0.0326 (0.12)	-0.4983** (-2.31)	-0.1472** (-2.41)	-0.0551* (-1.96)
LIQUIDITY	-	0.0595 (0.01)	-1.5705** (-2.22)	-10.4323** (-2.07)	-2.8162 (-0.97)	-1.3615* (-1.65)	-1.1612*** (-2.93)
CRISIS		0.1011*** (5.51)	0.1208*** (6.90)	0.0931*** (4.71)	0.1010*** (5.70)	0.1131*** (6.39)	0.1028*** (5.98)
ZSCORE *x* REGINST	+ , unless in (6)	0. 2789*** (4.97)	-0. 0511 (-0.57)	-0. 0158 (-0.45)	0. 0453** (2.16)	0. 0027 (1.15)	-0. 1143** (-2.08)
ZSCORE x CRISIS		1.9166*** (4.80)	0.0867* (1.88)	-0.0786 (-0.29)	0.4620** (2.12)	0.1477** (2.38)	0.0532* (1.88)
ZSCORE *x* CRISIS x REGINST		-0.2690*** (-4.71)	0.0328 (0.36)	0.0222 (0.63)	-0.0417** (-1.97)	-0.0029 (-1.22)	0.1143** (2.06)
LIQUIDITY x REGINST	+ , unless in (6)	-0.1389 (-0.17)	2.2591 (1.08)	1.3628** (1.98)	0.1713 (0.60)	0.0294 (0.76)	-0. 6358 (-1.08)
LIQUIDITY x CRISIS		-0.6333 (-0.10)	1.4912** (2.08)	9.8305* (1.94)	2.5446* (0.87)	1.2796 (1.55)	1.1409*** (2.87)
LIQUIDITY x CRISIS x REGINST		0.2123 (0.26)	-2.0813 (-0.99)	-1.2795* (-1.85)	-0.1445 (-0.50)	-0.0265 (-0.68)	0.5183 (0.87)
CUSTOMERD		0.0177 (0.63)	0.0205 (0.77)	0.0101 (0.36)	0.0082 (0.35)	-0.0147 (-0.55)	-0.0039 (-0.15)
SIZE		0.0198** (2.34)	0.0251*** (3.02)	0.0242*** (2.88)	0.0271*** (3.30)	0.0171** (2.00)	0.0260*** (3.23)
OVERHEAD		0.1131 (1.30)	0.0385 (0.42)	0.0871 (0.93)	0.0295 (0.30)	0.0343 (0.34)	0.0312 (0.35)
LERNER		0.0157** (2.51)	0.0104* (1.71)	0.0118** (2.03)	0.0109* (1.96)	0.0107* (1.78)	0.0125** (2.05)
CONC		0.0152 (0.83)	0.0052 (0.27)	0.0103 (0.59)	0.0060 (0.33)	0.0312 (1.60)	0.0352** (2.02)
PRIVATECRED		-0.0891*** (-6.47)	-0.0820*** (-5.92)	-0.0737*** (-5.52)	-0.0806*** (-6.25)	-0.0843*** (-6.10)	-0.0735*** (-5.50)
GDPGR		0.1278*** (3.84)	0.1036*** (2.92)	0.1540*** (4.63)	0.1819*** (5.67)	0.1193*** (3.45)	0.0932*** (3.03)
INFLATION		0.3854*** (4.28)	0.3277*** (3.28)	0.4341*** (4.84)	0.4202*** (4.45)	0.3473*** (3.58)	0.2560*** (4.14)
Time		Yes	Yes	Yes	Yes	Yes	Yes
Country		Yes	Yes	Yes	Yes	Yes	Yes
m_1		-8.59***	-8.82***	-8.43***	-8.63***	-8.82***	-8.35***
m_2		-1.05	-0.77	-1.37	-1.55	-1.07	0.07
# observations		6,342	6,326	6,342	6,268	6,256	6,726
# banks		1,515	1,510	1,515	1,496	1,494	1,623
# countries		56	55	56	55	54	65

Table 5

Cost of Deposits, Market Discipline, and Interventions

Regressions are estimated using the Arellano and Bond (1991) one-step GMM difference estimator for panel data with lagged dependent variables and the robust estimator of variance. The dependent variable is the cost of deposits (COSTDEP). As explanatory variables, we include one lag of the dependent variable (COSTDEP $_{t-1}$). ZSCORE and LIQUIDITY are alternative bank risk measures. ZSCORE is the natural logarithm of zscore. Zscore equals the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A four-year moving window is used to estimate the standard deviation of asset returns for each bank in each year. LIQUIDITY is the ratio of liquid assets to total assets. CRISIS is a dummy variable that takes a value of one during the post-crisis period and zero during the pre-crisis period. CUSTOMERD is the percentage of customer deposits to total interest bearing liabilities. SIZE is the natural logarithm of total assets. OVERHEAD is personnel expenses and other non-interest expenses over total assets. LERNER is the Lerner index, defined as the difference between price (interest rate) and marginal cost expressed as a percentage of price. CONC is the fraction of assets of three largest banks as a share of assets of all commercial banks. PRIVATECRED is the private credit by deposit money banks and other financial institutions over GDP. GDPGR is the annual growth rate of real GDP per capita. INFLATION is the annual inflation rate from the GDP deflator. BLANKG is a dummy variable that takes a value of 1 if authorities issue an explicit blanket guarantee to depositors and creditors after the initial onset of the crisis or if market participants are implicitly protected from any losses if public banks' market share exceeds 75%. Otherwise, it takes a value of 0. LIQSUP is a dummy variable that takes a value of 1 if authorities provide emergency liquidity support. Otherwise, it takes a value of 0. FORBEAR indicates whether or not banks were permitted to continue functioning despite being technically insolvent, and whether or not prudential regulations (such as for loan classification and loan loss provisioning) were suspended or not fully applied during the first three years of the crisis. RECAP denotes whether or not banks were recapitalized by the government during the first three years of the crisis. NATION denotes whether or not banks were nationalized during the five three years of the crisis. Information on policy interventions comes from Laeven and Valencia (2008). Bank data are from the BankScope data base of Fitch IBCA, macro data are from the IMF's International Financial Statistics and crises episodes are classified by Caprio and Klingebiel (2003). The sample period is 1989-2007. t statistics are shown in parentheses. ***; ** and * indicate statistical significance at 1, 5, and 10 percent, respectively.

		Dependent Variable: COSTDEP							
	Expected signs	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
COSTDEP $_{T-1}$		-0.0705***	-0.07047***	-0.0700***	-0.0615***	-0.0649***	-0.0783***	-0.0735***	-0.0848***
		(-3.09)	(-3.08)	(-3.04)	(-2.70)	(-2.85)	(-3.45)	(-3.13)	(-3.60)
ZSCORE	-	-0.0169*	-0.0162	-0.0173*	-0.0184*	-0.0185*	-0.0167*	-0.0174*	-0.0151
		(-1.72)	(-1.63)	(-1.76)	(-1.87)	(-1.91)	(-1.70)	(-1.74)	(-1.50)
LIQUIDITY	-	0.0780	0.0389	0.0640	0.0803	0.1069	0.0527	0.0961	0.0890
		(0.94)	(0.49)	(0.80)	(1.02)	(1.31)	(0.64)	(1.17)	(1.05)
CRISIS		0.0145	0.0205	0.0192	0.0244*	0.0186	0.0129	0.0135	0.0082
		(1.09)	(1.55)	(1.44)	(1.82)	(1.39)	(0.98)	(1.00)	(0.62)
ZSCORE x CRISIS		0.0151	0.0164	0.0116	0.0328**	0.0141	0.0072	0.0138	0.0019
		(1.40)	(1.46)	(0.96)	(1.97)	(1.24)	(0.61)	(0.75)	(0.10)
ZSCORE x CRISIS x BLANKG	+	0.0233**					0.0197**		0.0073
		(2.51)					(2.22)		(0.73)
ZSCORE x CRISIS x LIQSUP	+		0.0120				0.0130		0.0090
			(1.44)				(1.59)		(1.21)
ZSCORE x CRISIS x FORBEAR	+			0.0169*				0.0103	0.0072
				(2.01)				(1.27)	(0.83)
ZSCORE x CRISIS x RECAP	+				-0.0069			-0.0054	-0.00004
					(-0.49)			(-0.39)	(-0.00)
ZSCORE x CRISIS x NATION	+					0.0210***		0.0140*	0.0090
						(2.73)		(1.88)	(1.06)
LIQUIDITY x CRISIS		-0.0507	-0.0025	-0.0324	-0.3067**	-0.1030	-0.0111	-0.3541***	-0.2933**
		(-0.58)	(-0.03)	(-0.35)	(-2.55)	(-1.13)	(-0.12)	(-2.66)	(-2.27)
LIQUIDITY x CRISIS x BLANKG	+	-0.0177					-0.0015		-0.1311
		(-0.13)					(-0.01)		(-0.98)
LIQUIDITY x CRISIS x LIQSUP	+		-0.0374				-0.0312		0.0098
			(-0.55)				(-0.51)		(0.16)
LIQUIDITY x CRISIS x FORBEAR	+			-0.0378				-0.0341	-0.0798
				(-0.56)				(-0.52)	(-1.07)
LIQUIDITY x CRISIS x RECAP	+				0.2769***			0.2978***	0.2622***
					(2.84)			(3.02)	(2.83)
LIQUIDITY x CRISIS x NATION	+					0.102		0.0670	0.1423*
						(0.12)		(0.72)	(1.86)
CUSTOMERD		0.0747**	0.0878**	0.0826**	0.0892**	0.0749**	0.0809**	0.0780**	0.0681**
		(2.17)	(2.45)	(2.36)	(2.39)	(2.02)	(2.47)	(2.27)	(2.17)
SIZE		0.0062	0.0059	0.0031	0.0051	0.0052	0.0040	0.0070	0.0028
		(0.57)	(0.51)	(0.28)	(0.42)	(0.46)	(0.38)	(0.63)	(0.29)
OVERHEAD		0.0973	0.0898	0.0777	0.0793	0.1146	0.0857	0.1186	0.1277
		(0.70)	(0.67)	(0.59)	(0.61)	(0.86)	(0.62)	(0.96)	(0.98)
LERNER		0.0126	0.0129	0.0126	0.0139*	0.0122	0.0114	0.0122	0.0100
		(1.62)	(1.64)	(1.56)	(1.66)	(1.57)	(1.47)	(1.57)	(1.31)
CONC		-0.1894***	-0.1901***	-0.1792***	-0.1897***	-0.1871***	-0.1925***	-0.1861***	-0.1862***
		(-5.42)	(-5.16)	(-4.99)	(-5.02)	(-5.41)	(-5.24)	(-5.14)	(-5.08)
PRIVATECRED		0.0155	0.0072	0.0112	0.0096	0.0115	0.0117	0.0158	0.0101
		(1.09)	(0.54)	(0.83)	(0.69)	(0.82)	(0.88)	(1.17)	(0.76)

GDPGR	-0.2031***	-0.1816***	-0.1837***	-0.1793***	-0.1900***	-0.1956***	-0.1904***	-0.1858***
	(-5.05)	(-4.58)	(-4.66)	(-4.57)	(-4.77)	(-4.81)	(-4.69)	(-4.62)
INFLATION	-0.0061	0.0092	0.0021	0.0101	0.0002	-0.0055	-0.0070	-0.0134
	(-0.19)	(0.29)	(0.07)	(0.31)	(0.01)	(-0.17)	(-0.22)	(-0.40)
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
m_1	-8.19***	-8.09***	-8.02***	-8.11***	-8.12***	-8.14***	-7.97***	-7.92***
m_2	-1.34	-1.38	-1.35	-1.14	-1.13	-1.67*	-1.53	-1.88*
# observations	1,945	1,945	1,945	1,945	1,945	1,945	1,945	1,945
# banks	575	575	575	575	575	575	575	575
# countries	18	18	18	18	18	18	18	18