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Central Bank Design and Banking Supervision

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The agenda of “*Central Banking and Monetary Policy: Which Will Be the New Normal?*” conference included a timely discussion about the involvement of central banks in the banking supervision, in the context of an optimal design of central banking. In the last 15 years, numerous changes in the institutional structures of prudential supervision have taken place. Prior the global financial crisis, central banks’ involvement in the prudential banking supervision has diminished due to a tendency to unify the prudential supervision in agencies outside of central banks. The aftermath of the global crisis sparked a new wave in which many countries integrated prudential supervision back under the authority of central banks. Nevertheless, the question of the optimal placement of banking supervision still persists while the empirical evidence is yet limited. Our empirical analysis suggests that countries with deeper financial markets and countries undergoing rapid financial deepening can benefit from having bank supervision in the central bank to better foster financial stability.

1. Historical perspective of central banks’ involvement in microprudential banking supervision

Besides their traditional role in the conduct of monetary policy and financial stability, some central banks have also assumed banking supervision authority. Changes in the institutional structures of prudential supervision, and especially the banking supervision, are among the transformations that have shaped the central banks in the last 15 years. Most important changes were related to the consolidation of prudential supervision and the involvement of central banks in bank supervision and eventually in the unified supervision. Namely, decisions concerned whether there should be one or multiple supervisory authorities and whether and how the central bank should be involved in supervision. A historical change in the architecture of prudential supervision was the establishment in 1998 of the UK’s Financial Services Authority (FSA) that was mandated with supervising all subsectors of the financial sector. With this, the banking supervision was removed from Bank of England’s mandate.

Similar changes followed the UK’s historical move, mainly during 2002-2007. A number of countries, for instance, Germany and Malta in 2002, Belgium in 2004, Colombia in 2005, Poland in 2006, founded FSAs¹ that were assigned with the prudential supervision of all financial subsectors. Other countries assigned the unified supervisory responsibilities to their central banks: for instance, Ireland and Kazakhstan (2003) and the Czech Republic and Slovak Republic (2006). Some countries chose to partially integrate the prudential supervision — two financial sectors supervised by the same institution — either in the central bank or an agency outside of the central bank (for instance, Croatia in 2004, Trinidad and Tabago in 2005). This wave of changes in the architecture of prudential supervision proved to be also a good opportunity to create an institutional framework for increased attention to business conduct supervision and its complementary function to prudential supervision. For instance, the central

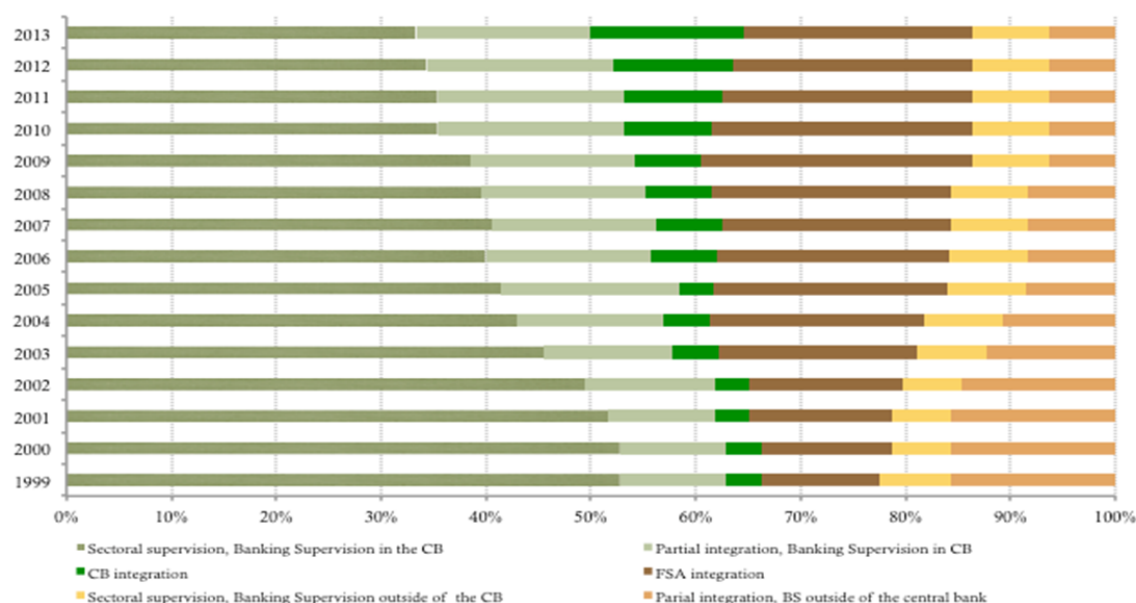
¹ FSA stands for Financial Supervision Authority, Financial Services Authority or Financial Services Agency.

bank of the Czech Republic created a unit in charge of supervising business conduct of financial institution when it became the sole prudential supervisor in 2006.

Figure 1, which is based on the updated database of financial supervisory structures in 97 high- and middle-income countries compiled by Melecký and Podpiera (2013), illustrates these changes. The dataset distinguishes among the following types of institutional structures: sectoral, partial or unified, with banking supervision in or outside the central bank. The figure shows that there has been a tendency among countries in the database to unify the prudential supervision. Between 1999 and 2010, the unification scene was dominated by consolidations in FSAs, with 14 new unifications of prudential supervision in a FSA and only five unifications in a central bank. This led to a diminished prevalence of central banks in the prudential banking supervision, proportionally even more in high-financial-depth economies. Nevertheless, a new wave of changes toward integrations in central banks was prompted by the global financial crisis. During 2011-2013, consolidations in central banks have dominated, with 8 new supervisory integrations in central banks. In 2013, the prevalence of central banks in banking supervision, based on our database, was similar to the corresponding figure back in 1999, when the proportion of countries hosting the banking supervision in their central banks was 65 percent.

The same data set also reveals certain inertia in the changes in the supervisory architecture until 2010. Countries that had originally sectoral or partial integration with the banking supervision outside of the central bank typically tended to either maintain their prudential supervisory structure or unify it in a FSA. At the same time, countries in which the central bank supervised the banking sector showed a higher probability to integrate the prudential supervision of financial subsectors under the central bank than under a FSA. However, after 2011, the changes were rather radical, with countries, such as Hungary or the UK, switching from FSA to central bank integration.

Figure 1. Development of institutional structures for microprudential supervision



Source: updated database based on Melecký and Podpiera (2013)

In an attempt to understand patterns of supervisory integration across financial subsectors, Melecky and Podpiera (2013) used the dataset described above to analyze country characteristics that increased the probability of integration before the global financial crisis, with the integration under the central bank being considered the highest level of integration. They found that small open economies were more likely to integrate their prudential supervision across financial subsectors. In addition, financial deepening was an important determinant as well. The size of the banking sector influenced positively the integration but development of the other financial subsectors affected negatively the tendency to integrate prudential supervision. Banking sector characteristics, for instance high aggregate liquidity exposures, increased the likelihood that a country would integrate prudential supervision. Finally, the number of past financial crises strongly increased the probability that a country would opt for integrating its prudential supervision. In addition, there is a particularly relevant finding for the discussion here, namely that the positive effect of the number of past crises and the negative effect of the stock market capitalization appear to influence only the preference toward the central bank unification.

The literature remains divided on whether placing bank supervision in the central bank is beneficial for financial stability. It produces two alternative hypotheses for empirical work: the possible synergetic and positive effect on financial stability from placing bank supervision in the central bank *versus* the possible negative effect from the same arrangement because of lack of checks and balances. In particular:

- On the one hand, placing bank supervision under one roof with the central bank may facilitate coordination and possible synergies in systemic risk management, crisis preparedness, and crisis resolution (De Grauwe, 2007; Cecchetti, 2008; Claessens et al., 2010; Brunnermeier et al., 2009).² The crisis experience showed that as long as the central bank is the lender of last resort, it is probably not a good idea to be isolated from supervision of institutions that create credit (De Grauwe, 2007). Information gains from having banking supervision in the central bank could make monetary policy more effective (Goodhart and Schoenmaker, 1995; Herrings and Carmassi, 2008). Crisis experience further revealed close links between the monetary policy and the financial stability — monetary policy has an important role to play in the prevention of financial crisis. An additional argument is related to the central bank capacity in attracting more skilled staff (Quintyn and Taylor, 2007).
- On the other hand, there are several reasons for separating the powers for microprudential and monetary policy: (1) potential conflicts of interest between monetary policy and supervisory mandates; (2) the reputational risk, as poor supervisory performance could damage the credibility of monetary policy makers; (3) the possible moral hazard effect, as banks can become less risk averse if the lender of last resort is also the supervisor; and (4) the potential that the bureaucratic powers of the central bank could become too big (Gerlach et al., 2009; Cecchetti, 2008; Masciandaro, 2009).

² This arrangement can capitalize on several factors: (1) the possibility for combining the knowledge of banking microstructures with the central bank's expertise in evaluating macro and financial conditions; (2) the opportunity for monetary policy makers and bank supervisors to internalize and align each other's objectives; (3) the potential for faster delivery of complete supervisory information about bank credit risk (solvency) to the lender of last resort in crisis times; and (4) the likely better capacity to coordinate cross-border supervision of regionally or globally systemic banks because of the greater role that central banks play in policy on international finance and management of the balance of payments.

2. New analysis of the effect of placing microprudential banking supervision in central banks on financial stability

Our new work examines whether placing the microprudential banking supervision in the central bank can improve the management of systemic risk in the financial sector, and more specifically, whether it mitigated the likelihood of banking crises during the global financial crisis of 2007-2012. The global financial crisis is still the elephant in the room for policy makers. One reason for the lingering uncertainty over how best to ensure the financial stability is that policy makers in many countries have failed to see the big picture of their financial systems through a proper macroprudential lens. Since the big picture is derived from a good knowledge of the microstructure of the system, separating microprudential supervision of banks, typically the systemic part of the financial system, from the central bank, typically entrusted with financial stability, could be suboptimal for fostering financial stability. This work contributes to the literature on optimal institutional arrangements for financial sector oversight and the early-warning models of banking crises.

The empirical literature that addresses the pros and cons of placing bank supervision in the central bank is just emerging, but is gaining importance. In one of the first studies, Masciandaro, Pansini, and Quintyn (2011) find that the degree of central bank involvement in supervision, with the highest involvement occurring when the central bank is the unified supervisor for all financial subsectors did not significantly affect economic resilience (real GDP growth during 2008–09). They also find that unifying microprudential supervision, either in the central bank or in the financial supervisory authority, negatively affected the measure of economic resilience. Boyer and Ponce (2012), using a formal model, argue that concentrating supervisory authority in the hands of a single supervisor could make the capture of the supervisor by banks more likely. Hence, full integration might not be the supervisory arrangement of social preference. Masciandaro and Romelli (2015) find that the occurrence of systemic banking crises as well as the reforms other countries are undertaking in the same period are important drivers of reforms in supervisory structure.

We find that placement of bank supervision in the central bank reduced the contribution of financial depth to banking crises. Our analysis is the first to show that having bank supervision into the central bank could generate substantial macroeconomic benefits by, at a minimum, helping countries with significant financial depth or those undergoing extensive financial deepening to greatly lessen their propensity for future systemic crises. Many countries still keep the banking supervision outside the central bank, partly because empirical evidence on which institutional arrangements work better in preventing or coping more efficiently with future banking crises is lacking. Other countries cannot reform because there is no political consensus and the reform requires broad support from the highest political levels (such as the parliament) for implementation. These results could help build the needed political consensus for reform.

2.1. Regression model and estimation methodology

We aim to identify variables that could have helped predict banking crises during 2007-12. We put an emphasis on identifying features of the supervisory architecture that could have lowered the probability of banking crises, and among them, we focus on the placement of banking supervision in the central bank. We analyze this question using a cross-sectional regression model that employs data from 124 countries.

Regression Model

We use the systemic banking crisis database of Laeven and Valencia (2013) to identify banking crises in individual countries. We construct a binary variable that takes the value of 1 if a country experienced a systemic banking crisis after 2007 according to Laeven and Valencia (2013) and 0 otherwise. There are 25 crisis countries; hence, about 20 percent of the 124 countries in our sample suffered a banking crisis during 2007–12. In addition, for the robustness tests, we use the banking crisis classification of Reinhart (2010) and Reinhart and Rogoff (2011). We relate this dependent variable to explanatory variables averaged over 2003–07.

More specifically, we estimate the following model:

$$y_i = \alpha + \sum_j \beta_j z_{ji} + \sum_p \delta_j x_{pi} + \varepsilon_i \quad (1)$$

where i identifies the country, y is the binary (0/1) crisis measure; z_j is a set of $j = 3$ institutional supervisory variables: (1) our variable of interest, a 1/0 dummy variable, indicating whether microprudential supervision of banks was in the central bank (hereafter BPSCB); (2) an index that measures the quality of microprudential supervision (Anginer, Demirgüç-Kunt, and Zhu 2013),³ and (3) a variable indicating how many years a central bank has been publishing a Financial Stability Reform (FSR) as a proxy of quality of financial stability. Parameters α , β , and δ stand for estimated coefficients and ε_i is an error term.

To construct the BPSCB variable, we rely on the data from Melecky and Podpiera (2013) and the 2003, 2007, and 2012 Bank Regulation and Supervision Surveys of the World Bank. The variable takes the value of 1 if the banking supervision is placed under the central bank and 0 otherwise. Note that the value of 1 is assigned both to countries with an institutional arrangement of fragmented, sectoral supervision in which the banking supervision is under the central bank as well as to countries with a unified supervision of all subsectors under the central bank. In contrast, the value of 0 is assigned to countries if the bank supervision is in an agency other than the central bank, including a financial supervisory authority that oversees all main financial subsectors on a microprudential basis.

The vector x_p is a set of $p = 10$ macroeconomic and financial variables used in the literature as established determinants of banking crises (Demirgüç-Kunt and Detraghiache 1998, 2005; Kaminsky and Reinhart 1999; Babecky et al. 2012) and/or the global financial crisis (Lane and Milesi-Ferretti 2011; Berkmen et al. 2009; Frankel and Saravelos 2012; Masciandaro, Pansini, and Quintyn 2011; Caprio et al. 2014; Eichengreen and Dincer 2011). The *macroeconomic variables* include GDP per capita, the real output gap,⁴ inflation, the real interest rate, and the exchange rate, while the set of *financial variables* includes the real private credit gap⁵ to identify credit booms, the private credit-to-GDP ratio, a liquidity

³ We followed the Anginer, Demirgüç-Kunt, and Zhu (2013) methodology and computed the index by aggregating the answers to 14 selected questions on supervisory powers that were collected in the 2003, 2007, and 2011 surveys conducted by Barth, Caprio, and Levine (2001).

⁴ The trend was estimated using the Hodrick–Prescott filter for the period 1990–2011.

⁵ The trend was estimated using the Hodrick–Prescott filter for the period 1995–2011. The period is shorter than for the computations of the GDP trend due to data constraints.

indicator (ratio of private credit to deposits), and a measure of financial openness (Chinn and Ito 2007).⁶ In addition, we estimate an alternative regression that replaces the ratio of private credit to GDP with an alternative measure of financial depth, the ratio of deposits to GDP, that we consider a more sustainable and robust measure of financial deepening than the credit to GDP ratio. We also condition on the cumulative number of past banking crises that a country experienced from 1970 to 2006 to allow for some historical dependence in the modeled crisis variable and investigate whether there could be a positive learning effect from the experience of past crises on a country's propensity to experience future crises.

Estimation methodology

We estimate the regression model explaining the probability of a banking crisis with a *binary choice logit* model with robust standard errors. Given the cross-country nature of the analysis, there is a risk of omitted relevant variables. We mitigate this risk by using a robust set of crisis predictors well established in the literature, which helps achieve a satisfactory fit of the model to the data. We further assess the risk of incompletely specified model using standard statistical tests.

2.2. Data Description and Summary Statistics

In 2007, 60 percent of those countries that soon experienced a banking crisis had the bank supervision outside their central bank (see Figure 2). Evidently, the crisis period triggered reforms. The share of countries that experienced a banking crisis and had bank supervision in the central bank increased to 48 percent in 2011. Among the countries that did not experience a banking crisis, 65 percent had the bank supervision in their central bank in 2007. This percentage increased further to 71 percent in 2011. Overall, the trend of placing bank supervision in the central bank seems to have increased for both crisis and non-crisis countries.

[Figure 2 here]

Macroeconomic and financial variables

On average, the crisis countries in our sample are characterized by a higher level of development (GDP per capita), lower inflation, and a higher output gap than the countries that did not experience a crisis. Changes in the real exchange rate were also significantly different among the two groups of countries, showing, on average, local currency appreciation for crisis countries and local currency depreciation for non-crisis countries (Table 1, panel a). Turning to the financial variables in the five-year period preceding the global financial crisis, we found that the private credit-to-GDP ratio and the deposits-to-GDP ratio (financial depth variables), the degree of financial openness, and the private credit-to-deposits ratio (that is, the exposure to aggregate liquidity risk) were, on average, significantly higher in crisis countries than in non-crisis countries (Table 1, panel b).

[Table 1 here]

⁶ We use gap measures instead of growth rates of real output and credit to be consistent with the measures of business and credit cycle overheating used in monetary policy models (Adolfson et al. 2008; Christiano, Eichenbaum, and Evans 2005; Smets and Wouters 2003) and Basel III.

2.3. Discussion of Estimation Results

When conditioning on macroeconomic and financial variables, we find that institutional variables, including the proxy for placing bank supervision in the central bank (BPSCB), are not statistically significant at common levels—columns (1)-(4) of the results table (Table 3). The difference between the specifications corresponding to columns (1) and (2) as well as between those of (3) and (4) comes from the financial depth variables in the regressions: in the columns (1) and (3), the financial depth variable is the credit to GDP ratio, while in the columns (2) and (4) the financial depth variable is the deposits to GDP ratio. Columns (1)-(2) of the Table 3 show the results of the regressions that include the variables for quality of microprudential supervision and of financial stability. Since their coefficients are not significant and their data coverage is very limited, we exclude them from further regressions. Among the macrofinancial variables, the GDP gap and the private credit-to-deposits ratio stand out as the most significant, with several other variables marginally significant.

[Table 2 Here]

We attempted to derive a parsimonious regression specification because of numerous significant cross-correlations among the macrofinancial variables. For this purpose, we employ the Lasso (least absolute shrinkage and selection operator) penalized regression estimator of Tibshirani (1996), which has the effect of shrinking coefficients of unimportant variables to zero, as a variable selection tool to reduce the set of indicators. The Lasso method is supported by extensive theoretical work; see Zou (2006) for a literature review.⁷ As a result of the Lasso variable selection, BPSCB, the inflation, and the growth in real exchange rate were eliminated along with several other variables. The corresponding parsimonious regressions thus include the number of past crises, the GDP gap, the real interest rate, the ratio of private credit to GDP, the ratio of private credit to deposits, and the deposits-to-GDP ratio in the alternative regression (column 6). We also tested for omitted relevant variables and could not reject that our model is properly specified.⁸

The signs of the estimated coefficients in the parsimonious regressions are as anticipated and are mostly in line with the literature. First, we see that countries that experienced a higher number of past crises had a lower probability of experiencing another crisis after 2007, likely as a result of efforts to address macroeconomic, financial, and institutional vulnerabilities after the past crises. Second, countries with greater deviations of real GDP from its potential showed a higher propensity to experience banking crises after 2007. This result is consistent with other earlier studies of banking crises, such as Kaminsky and Reinhart (1999) and Gourinchas and Obstfeld (2012), and Frankel and Saravelos (2012) which investigated the determinants of the recent global crisis. Our results also show a negative impact of the real interest rate on the probability of a banking crisis: low real interest rates support excessive borrowing that can ultimately generate banking crises. Frankel and Saravelos (2012) associate higher saving rates with lower incidence of crises. In contrast, Demirgüç-Kunt and Detragiache (1998, 2005) find that exposure to high real interest rates, which could intensify credit risk as well as negatively affect bank profits, was a source of bank fragility during 1980–2002.

⁷ See section 3.4 in chapter 3 of Hastie et al. (2009) for a detailed description of the Lasso. We performed this regression in Stata with the `plogit` procedure.

⁸ We used using Stata's `linktest`. The results are available from authors upon request.

We confirm the results from earlier studies that countries with greater financial deepening and countries taking greater aggregate liquidity risk (ratio of private credit to deposits) are significantly more prone to banking crises. Demirgüç-Kunt and Detragiache (2005), Gourinchas and Obstfeld (2012), Schularick and Taylor (2012), and Babecky et al. (2012) find, as we do, that the credit-to-GDP ratio is a consistent predictor of banking crises. In addition, Lane and Milesi-Ferretti (2011) find that the credit-to-GDP ratio and its change over 2004–07 could also help explain the intensity of the 2008–09 global recession.⁹ The alternative specification, including the deposits-to-GDP ratio (column 6), reconfirms the positive effect of high financial depth on the probability of banking crises found in the literature. Our finding that high aggregate liquidity risk increases the tendency toward banking crises confirms earlier results from Caprio et al. (2014).¹⁰

To examine a hypothesis that effects from placing bank supervision in the central bank materialize only in certain country circumstances, we interact BPSCB with the variables that enter the parsimonious regressions. Columns (7)–(12) show the results, including the individual interactive terms. They show a significant and negative coefficient on the BPSCB’s interaction with the ratios of private credit to GDP and deposits to GDP, respectively. The marginal effects suggest that placing bank supervision in the central bank can help reduce the positive effect of a greater financial deepening on the probability of crises by more than a half. In countries with greater financial depth it might be more beneficial to house bank supervision under one roof with financial stability, and eventually macroprudential supervision, so that knowledge of the microsources of macroprudential risks could be more readily available for taking informed and timely policy action to mitigate systemic risk. Therefore, it is the countries with deeper banking sectors that could benefit the most from the crisis-mitigating effect of placing bank supervision in the central bank.

2.4. Robustness tests

The results survive several robustness tests of alternative definitions of the dependent variable, an alternative construction of our explanatory variables of interest, and an alternative estimation model, with a different functional form. We used an alternative definition of banking crises by Reinhart and Rogoff (2011) and Reinhart (2010). We also consider a separate class of borderline crises identified by Laeven and Valencia (2013). For an alternative construction of our explanatory variable of interest, we average the annual 1/0 dummies indicating whether bank supervision was or was not in the central bank over different time spans. In addition, we test the robustness of our baseline results against the assumed curvature of the cumulative distribution function in the logit model by estimating a probit model. All robustness tests support and, on occasions, reinforce our baseline results. Interestingly, when we use the Reinhart and Rogoff (2011) definition of *banking crises*, placing bank supervision in the central bank appears to mitigate the likelihood of crises irrespective of the country context.

⁹ This literature brings supporting evidence for Rajan’s (2005) claim that larger, more complex financial systems may be inherently more risky.

¹⁰ Berkmen et al. (2009) find that higher aggregate liquidity risk can explain a larger variation in the growth forecast revisions during the global crisis period, also a possible indicator of macrofinancial stability.

3. Conclusion

The global financial crisis prompted a wave of changes in institutional structures of banking supervision, with more countries giving the central banks the authority for banking supervision. This contrasted the 2000-10 trend of prudential integration in agencies outside of the central banks, which led to diminished involvement of central bank in banking supervision. Our analysis provides evidence that countries with deeper financial markets and countries undergoing rapid financial deepening can benefit from having bank supervision in the central bank to maintain financial stability. This results hold regardless of whether rapid financial deepening occurs because of domestic credit policies influenced by the risk appetite of domestic policy makers for taking systemic risk or because of exogenous factors such as capital inflows after liberalization of external financial accounts. Especially in these circumstances, our results suggest that policy makers can benefit from having a good knowledge of the financial system's microstructure when safeguarding the stability of the financial system as a whole. Indeed, countries like the Netherlands, Hungary or the UK, have moved bank supervision into the central bank to reap these benefits. Other countries, such as Poland, Turkey, and several countries in Latin America, could find support in our results to implement similar reforms.

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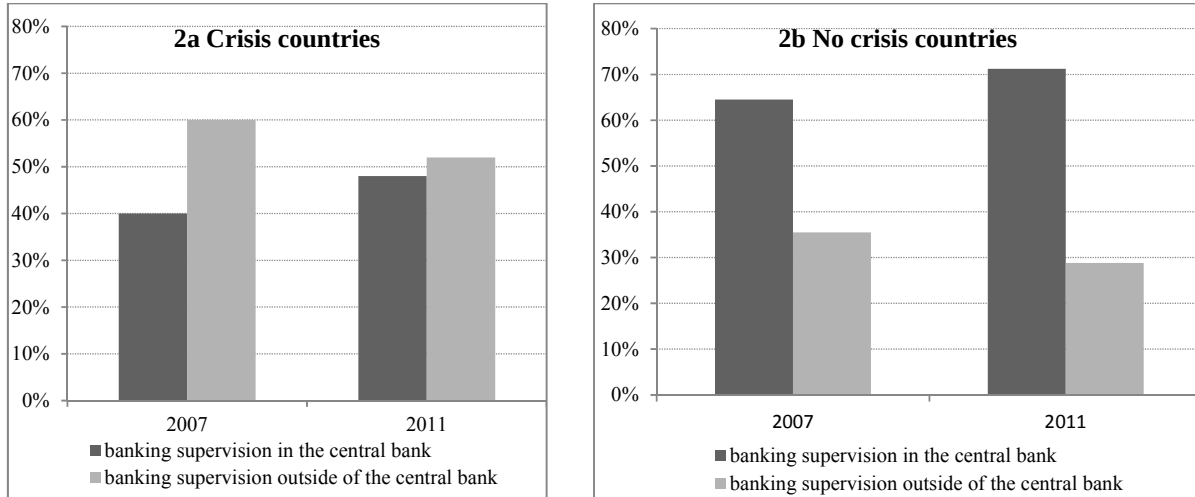
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Tables and figures in the main text

Figure 2. Involvement of central bank in bank supervision by crisis experience



Source: The proportions of countries are calculated based on Melecky and Podpiera (2013), World Bank's Bank Regulation and Supervision Surveys, and Laeven and Valencia (2013).

Note: "Crisis countries" are those that experienced a financial crisis in 2008; "no-crisis countries" are those that did not. The sample contains 25 crisis countries and 122 no-crisis countries.

Table 1. Summary statistics for crisis and no-crisis countries

	Crisis countries		No-crisis countries		Difference		
	Mean	Std. err.	Mean	Std. err.	Mean	Std. err.	t-stat
a. Macroeconomic variables							
GDP per capita	27277.72	2961.12	10944.51	1331.63	-16333.2	3017.5	-5.33
Real GDP gap	0.241	0.089	-0.173	0.076	-0.42	0.160	-2.58
Real interest rate	0.011	0.558	0.632	0.41	0.62	0.86	0.7
Real exchange rate change	-4.01	1.08	1.56	1.05	5.57	2.17	2.56
Inflation	4.14	0.65	6.01	0.506	1.87	1.069	1.75
b. Financial variables							
Real private credit gap	-1.96	0.75	-2.3	0.382	-0.33	0.85	-0.4
Private credit to GDP	101.04	11.16	41.02	3.41	-60.02	8.8	-6.8
Private credit to deposit	134.44	11.29	85.44	3.29	-48.99	8.65	-5.66
Deposits to GDP ratio	82.15	13.04	49.6	4.15	-32.56	10.5	-3.08
Financial openness	1.77	0.25	0.53	0.152	-1.23	0.335	-3.68

Source: Authors' calculations based on World Bank's FinStats database and Chinn and Ito (2007).

Note: "Crisis countries" are those that experienced a financial crisis after 2007; "no-crisis countries" are those that did not. Std. err. = standard error; GDP = gross domestic product.

Table 2: Estimated determinants of the probability of banking crisis

Explanatory variables:		Dependent variable: Binary crisis measures (0/1 dummy)											
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Supervisory Block	Number of previous crises	-1.44 (1.24)	-178 (1.24)	-1.3 (0.82)	-1.553** (0.68)	-0.97* (0.56)	-1.206** (0.560)	-1.531* (0.895)	-1.002 (0.644)	-0.977 (0.638)	-1.144* (0.62)	-1.076 (0.661)	-1.408** (0.593)
	BPSCB	-1.18 (1.06)	-1.18 (0.99)	-0.808 (0.76)	-0.823 (0.772)								
	Quality supervision	0.011 (0.224)	0.012 (0.23)										
	Length of FSR publication	-0.84 (1.24)	-0.51 (1.12)										
	GDP per capita	9.3e-05 (5.7-05)	9.3e-05 (5.8-05)	2.4e-05 (3e-05)	2.7e-05 (2.2e-05)								
Macro-financial block	GDP gap	-0.59 (1.24)	-0.85 (1.12)	1.19** (0.586)	1.096* (0.569)	1.15** (0.45)	1.008** (0.432)	1.09** (0.517)	1.531 (1.084)	1.18** (0.534)	1.25** (0.51)	1.21** (0.529)	1.102** (0.481)
	Inflation	0.71* (0.41)	0.71* (0.41)	0.373 (0.24)	0.391* (0.18)								
	Real interest rate	-0.54* (0.31) (	-0.53* (0.29)	-0.173 (0.138)	-0.187 (0.167)	-0.3*** (0.09)	-0.26*** (0.088)	-0.25*** (0.0912)	-0.24*** (0.0935)	-0.200 (0.26)	- 0.265***	-0.26*** (0.0925)	-0.27*** (0.097)
	Change in real exchange rate	-0.243 (0.15)	-0.25* (0.15)	-0.161 (0.113)	-0.182* (0.085)								
	Real private credit gap	-0.27 (0.21)	-0.26 (0.204)	-0.166 (0.121)	-0.158 (0.133)								
	Private credit-to-GDP ratio	0.016 (0.016))		0.015* (0.08)		0.02*** (0.007)		0.02*** (0.008)	0.022*** (0.008)	0.02*** (0.008)	0.028*** (0.008)	0.022*** (0.008)	
	Private credit-to-deposit ratio	-0.027 (0.18)9	-0.036* (0.014)	0.02* (0.011)	0.03*** (0.009)	0.022** (0.008)	0.04*** (0.009)	0.024** (0.01)	0.021** (0.01)	0.022** (0.009)	0.022** (0.007)	0.023** (0.01)	0.037*** (0.01)
	Deposit-to-GDP ratio		0.007 (0.014)		0.0084 (0.007)		0.016** (0.005)						0.021*** (0.007)
	Financial openness	1.27 (0.5)	1.38** (0.5)	0.45 (0.335)	0.486* (0.25)								
	BPSCB*nr of prev crises		-1.44 1.24)					1.091 (1.035)					
Interactive terms	BPSCB*GDP gap								-0.483 (1.185)				
	BPSCB*real interest rate									-0.06 (0.289)			
	BPSCB*private credit to GDP										-0.012* (0.007)		
	BPSCB*private credit to deposits											-0.004 (0.006)	
	BPSCB*deposits to GDP												-0.013** (0.006)
	Observations	68	70	121	121	124	124	124	124	124	124	124	
	Pseudo R-squared	0.58	0.245	0.474	0.466	0.404	0.395	0.413	0.406	0.405	0.428	0.408	

Notes: (1) The shaded columns present the results of the estimation including deposit to GDP ratio. (2) Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

