



IMF Working Paper

The Economic Crisis:

Did Financial Supervision Matter?

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Abstract

The Asian financial crisis marked the beginning of worldwide efforts to improve the effectiveness of financial supervision. However, the crisis that started in 2007–08 was a crude awakening: several of these improvements seemed unable to avoid or mitigate the crisis. This paper brings the first systematic analysis of the role of two of these efforts—modifications in the architecture of financial supervision and in supervisory governance—and concludes that they were negatively correlated with economic resilience. Using the emerging distinction between macro- and micro-prudential supervision, we explore to what extent two separate institutions would allow for more checks and balances to improve supervisory governance and, thus, reduce the probability of supervisory failure.

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I. INTRODUCTION

In the aftermath of the Asian financial crisis, international financial institutions (IFI), national stakeholders and academia devoted a great deal of energy at improving the quality of the regulatory and supervisory framework for finance. It was hoped that a combination of stronger regulatory frameworks and more effective supervision would help to avoid, or at least mitigate the effects of, a possible next crisis. Emerging initiatives, such as the Basel Core Principles for Effective Bank Supervision (BCP), were reinforced and new initiatives, such as the IMF-World Bank Financial Sector Assessment Programs (FSAP), were implemented. In the same period, work on the Basel II regulatory framework saw the light of day. These international efforts were complemented by revisions, by several national authorities, of their supervisory architecture in order to enhance the effectiveness of supervision. This wave of revisions was inspired by the unification of all financial supervisors into the Financial Services Authority (FSA) in the UK in 1997. Crisis mitigation brought additional arguments to the table for revising the national supervisory architecture. Finally, work was also undertaken to strengthen governance of supervisory agencies.

Several studies on the pre-2007 years showed some, albeit not conclusive, evidence that the implementation of the BCPs, better supervisory governance and supervisory unification were generating a positive impact on financial sector stability and soundness. So, hope was growing that these improvements would mitigate the impact of any possible future financial crisis.

However, the financial and economic crisis that started in 2008 pricked this balloon of hope. Supervisory failure was mentioned by several scholars and policymakers as one of the main contributing factors, besides macroeconomic factors, regulatory failures, and failures in other parts of the governance of the financial system (such as rating agencies, accounting practices, transparency).

The objective of this paper is twofold. First we will empirically test the impact on the resilience of the economy to the crisis of two types of efforts at strengthening supervision which were high on many countries' agendas: changes in their supervisory architecture (often in the direction of unification) and in supervisory governance. We limit ourselves to these two aspects of supervision because research on their role has not been undertaken so far in a systematic way. The main empirical findings can be summarized as follows: (i) the two types of modifications introduced in supervision (unification and better governance arrangements) are negatively associated with economic resilience; (ii) we also find that the quality of public sector governance and the degree of financial liberalization are negatively associated with economic resilience in this crisis. In fact, these associations are even stronger than those of the supervisory features that we analyze; and finally (iii) the degree of involvement of the central bank in supervision did not have any significant impact on resilience.

Second, arriving at the conclusion that the drive for unified supervision across sectors and better governance arrangements are both negatively associated with economic resilience, we will review the proposals that so far have been offered for improving the effectiveness of supervision. While certainly valuable, a common weakness of most of them is that they do not really tackle the underlying problem of incentives-misalignment of supervisors. We

therefore add our own proposal to the discussion. We argue that conducting supervision through two separate agencies (one for macro- and one for micro-prudential supervision) could introduce the necessary checks and balances in the supervisory process that could potentially strengthen governance.

The paper is structured as follows. Section II sets out the conceptual framework and reviews the related literature. Section III presents the empirical evidence on the impact of supervisory architecture and governance on financial and economic resilience. Section IV presents a proposal as to how architecture could be combined with supervisory governance to better align supervisory incentives. Section V concludes.

II. BACKGROUND AND CONCEPTUAL FRAMEWORK

Since the mid-1990s, international financial institutions (BIS, IMF, World Bank), academics and national authorities have started to pay attention to the quality of supervision, as a complement to the long-standing interest in financial regulation.¹ For the purpose of this paper we focus on two areas that received a great deal of attention: revisions of the supervisory architecture—mainly in the direction of unification of supervisory agencies—and improvements in supervisory governance. Before focusing exclusively on these two, it is useful to put them in the broader context of all the initiatives that were taken to improve the effectiveness of supervision. We divide them into four groupings.

As a first initiative, the Basel Core Principles for Effective Banking Supervision (BCP) were issued in 1996 (Basel Committee, 1996), more or less at the eve of the Asian financial crisis. The objective of the BCPs was to promote best practices in the content of the regulatory framework, as well as in bank supervision. The BCPs were complemented a few years later by similar codes for the supervision of securities operations (IOSCO) and insurance supervision (IAIS). Work on the BCPs intensified greatly in response to the Asian crisis. This crisis had indeed brought to the surface a number of major flaws in the supervisory process (see Lindgren et al., 1999), in addition to regulatory flaws. Thus, the BCPs were used for peer reviews as part of the FSAPs jointly conducted by IMF and World Bank. The principles themselves were subject to a major revision in 2006.

A second development with respect to supervision was the search by national authorities for that architecture that would make supervision as effective and efficient as possible. Although it was obvious from the start that the supervisory architecture was a second order issue, and that the quality of regulation and supervision were of predominant importance, a great deal of attention went to the architecture. Unifying all sector supervisors under one roof was increasingly considered the most effective solution, given the blurring of demarcation lines between several types of financial institutions and the formation of all-encompassing financial conglomerates (Abrams and Taylor, 2000 and Llewellyn, 2006). While the Scandinavian countries were the forerunners in the early 1990s, the real start of the “reform

¹ Supervision (the focus of this paper) concerns the implementation, monitoring and enforcement of the regulatory framework.

hype” came with the establishment of the FSA in UK in 1997. Since then, many countries have reformed their supervisory architecture. As it turned out, there is certainly no “one size fits all” solution. So, not all countries opted for unification, but several configurations emerged, with varying roles for the central banks in the supervisory process (for an overview, see Masciandaro and Quintyn 2009).

In an effort to distinguish trends in the new supervisory landscape, Masciandaro and Quintyn (2009) came to the conclusion that before the 2008 crisis the trend in the changes in supervisory structures seemed to be characterized by two intertwined features: consolidation (or unification) of supervision goes hand in hand with the specialization of the central bank in pursuing its monetary policy mandate, and vice versa: where several authorities are present, the central bank is likely to be deeply involved in supervision.

A third development concentrated on the need for principles of good supervisory governance in order to withstand the various sources of capture (political, industry and self-capture) that supervisors are facing. Das and Quintyn (2002) and Quintyn (2007) proposed a governance framework consisting of four reinforcing pillars (independence, accountability, transparency and integrity). Additional work on supervisory independence (Quintyn and Taylor, 2002) and accountability (Hüpkes, Quintyn and Taylor, 2005) spelled out the necessary operational components of these governance pillars. Ponce (2009) developed a theoretical model showing that supervisory independence had a positive impact on financial sector soundness.² The bottom line of the governance work was that independent supervisors need an elaborate set of accountability arrangements to offset the fact that for financial supervision a very specific contract (in the principal-agent sense) is impossible, given the great range of contingencies that can occur in supervision (see also Schuler, 2003, Majone, 2005 and Dijkstra, 2010).

Finally, several scholars argued that financial sector governance could benefit from more reliance on market discipline, as it would introduce additional checks on the supervisory process. Calomiris (1999a and 1999b) argued that requiring banks to maintain a minimal proportion of subordinated debt finance would reduce the moral hazard typically created by government safety nets (which include supervision). In the same vein, Barth, Caprio and Levine (2006) argue that the supervisors’ incentive structure can never be perfectly aligned, mainly because of political and bureaucratic capture. Therefore, mechanisms and incentives need to be created to foster market discipline as an additional check on the supervisory system *and* on financial institutions governance.

Empirical evidence gathered before the crisis on the impact of these initiatives at enhancing supervisory effectiveness on financial sector soundness raised expectations, although not unequivocally so. The main findings are reviewed in the order as before: BCPs, supervisory

² In a way, the work on supervisory governance complemented the BCPs which contain some of these elements, but are mainly focused on the necessary components of the regulatory and supervisory frameworks. The 2006 BCP revision took on board more elements of operational independence, accountability and transparency as best practices.

architecture and supervisory governance (market discipline is mentioned among these three where applicable).

The earliest attempt to assess the impact of compliance with BCPs on the soundness of the financial system was Sundararajan, Marston and Basu (2001) who could not identify a direct impact. Indirectly, compliance seemed to have an impact on bank soundness via interactive effects with relevant macro variables. Podpiera (2006) in contrast, working with a larger sample, showed that higher degrees of BCP compliance had positive effects on the quality of bank assets and also tended to lower the net interest margin. The work of Demirgüç-Kunt, Detragiache, and Tressel (2006) comes in general to the same conclusions. However, they also dissect the BCP assessments in an effort to find out whether various parts of the BCP framework have a different impact on bank soundness. The conclusion is that compliance with those principles that have a bearing on disclosure and transparency—in particular principle 21—has the most significant impact on financial sector soundness.³ This is in line with the findings of Beck, et al. (2003). A later paper (Demirgüç-Kunt, Detragiache, 2010) concludes that compliance with BCPs or its individual components is in no way robustly associated with bank soundness indicators such as Z-scores or a system-wide Z-score.

The supervisory architecture literature addressed two main questions: is a single supervisor to be preferred to multiple authorities? Should the central bank be involved in supervision? Barth, Nolle, Phumiwasana and Yago (2002) use a difference of means test to ascertain whether differences in the supervisory architecture correlate in a significant way with key differences in banking industry structure. For a sample of 133 countries, for the period 1996-1999, they found no correlation between the number of supervisory authorities and any of the key features of a banking system.

Čihák and Podpiera, (2007) suggested that the unified regime is associated with higher quality and consistency of supervision across supervised institutions, measured by the degree of compliance with BCP, IOSCO, and IAIS standards. Whether the unified supervisor is located inside or outside the central bank does not have a significant impact on the quality of supervision.

Arnone and Gambini (2007) used the degree of compliance with the BCPs to investigate the possible relationship between the compliance capacity of each country and the way these countries have organized their supervisory architecture, with particular reference to the two fundamental issues: the supervisory model and the role of the central bank. Two econometric tests based on an OLS specification with heteroskedasticity-robust standard errors show that a higher degree of compliance is achieved by those countries applying a unified supervisory model, with some evidence in favor of those established inside the central bank.

³ Principle 21 states that “Each bank must maintain adequate records that enable the supervisor to obtain a true and fair view of the financial condition of the bank, and must publish on a regular basis financial statements that fairly reflect this condition.”

Eichengreen and Dincer (2011) find, for a sample of 140 countries for the period 1998-2006, that the presence of independent supervisors located outside the central bank is associated with fewer nonperforming loans as a share of GDP, and that those countries are less prone to systemic banking crises.⁴

Finally, the impact of the quality of supervisory governance on financial soundness has, to our knowledge, only been empirically analyzed by one study. Das, Quintyn and Chenard (2004) show that the quality of governance matters for banking soundness. The results also indicate that good public sector governance amplifies the impact of supervisory governance on financial system soundness.

III. THE 2008–09 ECONOMIC CRISIS: WHAT ROLE FOR SUPERVISION?

A. The narrative: supervisory flaws as a contributing factor

Macroeconomic imbalances, macroeconomic policy failures, as well as regulatory failures in all segments of the financial systems have drawn most attention as contributing factors to the crisis that started in 2007 and became full-blown in 2008 (see among others, Allen and Carletti (2009), Brunnemeier et al. (2009), Buiters (2008) and Roubini (2008)). Some of these studies mention, rather in passing, supervisory failures as well. However, we need to go to more specialized studies to find a more complete account of the contribution of supervisory failures to the crisis. The most representative insights are summarized in Table 1. We attempted to regroup the references according to failures attributable to the supervisory architecture on the one hand, and supervisory governance on the other.

Failures attributable to supervisory architectures as such are only mentioned in two specific cases. For the United States, some authors have pointed at the fragmented US supervisory system as a major contributor to the crisis (e.g., Leijonhufvud, 2009). The other one is the United Kingdom where at the time of the Northern Rock episode, the Bank of England was reported to be without information on the state of the bank and therefore failed to intervene timely through its lender of last resort facility (Buiters, 2008 and FSA, 2009).⁵ The other generally heard claim is that, in any of the countries stricken by the crisis, no institution was in charge of macro-prudential or systemic supervision, which is now generally recognized as an architectural failure. Finally (not listed in the table), there are also the counterfactuals: in the wake of the crisis several countries revamped their supervisory architecture (for instance, Belgium, Germany, Ireland) which could serve as an indication that flaws in the architecture were blamed in part for the crisis in these countries.

In contrast, flaws in supervisory governance are well-documented. Most authors identify more or less the same issues, often named somewhat differently, with Palmer and Cerutti

⁴ However, when they include the 2008-09 crisis, their results become insignificant.

⁵ However, this could be interpreted as a coordination failure, rather than an architecture failure.

(2009) presenting the most thorough and complete account. Thus, authors identify weak supervisory independence and accountability, industry or political capture, wrong incentive structures provided by the political establishment, lack of audacity to probe or to take matters to their conclusion and to be intrusive. Several authors also point at a general lack of skills to understand the risks related to the new and sophisticated financial products and underlying operations. At the international level (with respect to cross-border supervision) some point at a misalignment of incentives for supervisors to voluntarily cooperate, a lack of binding coordinating mechanisms, and differences in levels of supervisory quality (see D’Hulster, 2011, for an in-depth treatment of this issue).

In sum, the narrative account of the role of supervision—or lack thereof—in the financial crisis indicates that several of the hoped-for improvements in the incentive structure for supervision have not been effective. The same behaviors, documented during previous crises, such as the “not on my watch” approach and the “sweeping of problems under the carpet” have occurred again, sometimes at massive scales.

B. The empirical evidence

This section empirically analyzes the role that two features of supervision (architecture and governance) have played with respect to a country’s ability to resist shocks in the crisis. The effects of the recent economic downturn on countries’ performance have been diverse and perhaps depended mostly on their institutional and economic characteristics. The empirical analysis will employ a new and complex database on supervisory architecture and governance for 102 countries, which will allow us to disentangle the relative effects of these dimensions of supervision on resilience.

Related Literature

Our work is complementary to two ongoing strands in the empirical literature. The first one focuses on the drivers of macro resilience. The second strand is related to the analysis of the effects of supervision as discussed in the previous section.

Recent cross-country studies produced predictions on resilience by analyzing the potential causes of the economic and financial downturn (Berkmen et al. 2011, Caprio et al. 2010, Giannone et al. 2010, and Rose and Spiegel 2010). The recent crisis was a synchronized shock for almost all countries around the world. At the same time, the depth of the recession varied significantly from country to country. As Giannone et al. (2010) pointed out, the global nature of the crisis and the cross country heterogeneity of the impact represent a unique opportunity to shed light on the relationships—if any—between the institutional features of the national systems and their resilience with respect to relevant economic and financial shocks. We focus our attention on the supervisory features.

In this respect, the study closest to ours is Caprio et al. 2010, which, among other indicators, uses an index of supervisory practices to assess its relationship with the probability of a crisis. The index measures the degree to which the country’s bank supervisors have the authority to take specific actions, and is not significant. Our analysis differs in several

dimensions, given our aim to focus in a systematic way on architecture and governance regimes and the role they played in affecting country performances.

Quantifying our two Dimensions of Supervision

Supervisory architecture

To measure the features of the supervisory regimes, we need to transform qualitative information in quantitative. For supervisory architectures, we introduce two indicators that evaluate the two main characteristics highlighted in the literature: the degree of supervisory consolidation (or unification) and of central bank involvement in supervision.

We propose the Financial Supervision Herfindahl Hirschman (FSHH) Index. The FSHH is a measure of the level of consolidation of the supervisory powers that we derive by applying in this novel field the classical index proposed by Herfindahl and Hirschman (Hirschman, 1964). The robustness of the application of the FSHH to analyze the degree of concentration of power in financial supervision depends on the following three crucial hypotheses (Masciandaro and Quintyn 2011).

First of all, it must be possible to define both the geographical and institutional dimension of each supervisory market: therefore in each country (geographical dimension) we can identify different sectors to be supervised (institutional dimension). In every country each financial market is assumed to form a distinct market for supervision. So far it is still possible to identify separate markets notwithstanding the fact that the blurring of the traditional boundaries between banking, securities and insurance activities and the formation of large conglomerates is diluting the definition of the intermediaries. Then, in each sector we can define without ambiguity the distribution of the supervisory powers among different authorities—that is, if more than one agency is present—and consequently their shares. For each sector, the degree of supervisory consolidation falls with the number of authorities involved in supervision.

Secondly, we consider the supervision power as a whole, i.e., given different kinds of supervisory activity (banking supervision, securities markets supervision, insurance supervision) we assume perfect substitutability among them in terms of supervisory power and/or supervisory skills. The supervisory power is a feature of each authority as agency, irrespective of where this supervisory power is exercised (agency dimension). Therefore, in each country and for each authority, we can sum the share of the supervisory power it enjoys in one sector with the share it owns in another one (if any). For each authority the degree of supervisory power increases, the greater the number of sectors over which that agency exercises monitoring responsibility. All three dimensions—geographical, institutional and agency—have both legal foundations and economic meaning.

We prefer to adopt the HH Index rather than the classic Gini Index to emphasize that the overall number of authorities matters. In general, the use of the HH index is also preferred compared to other indices of concentration—such the entropy index—because it gives more weight to the influence of the unified authorities, which is, as we stressed above, the main feature of the recent evolution among the supervisory architectures. We calculate the FSHH

Index by summing up the squares of the supervisory shares of all the regulators of a country. For each country the FSHH Index is equal to:

$$H = \sum_{i=1}^n s_i^2$$

where s_i is the share of supervisory power of the authority i and N is the total number of authorities in a given country. For each authority i , we consider that in each country there are three sectors to supervise (each sector has the same importance) and that in each sector we can have more than one authority (each authority has the same importance). We use the following formula

$$s_i = \sum_{j=1}^m s_{ij}; \quad \text{and} \quad s_{ij} = \frac{1}{m} \frac{1}{q_j}$$

where m reflects the number of sectors where the authority i is present as supervisor and q_j is the number of authorities involved in supervision in each sector j . In other words if in one sector there is more than one authority, the supervisory power is equally divided among the incumbent supervisors.

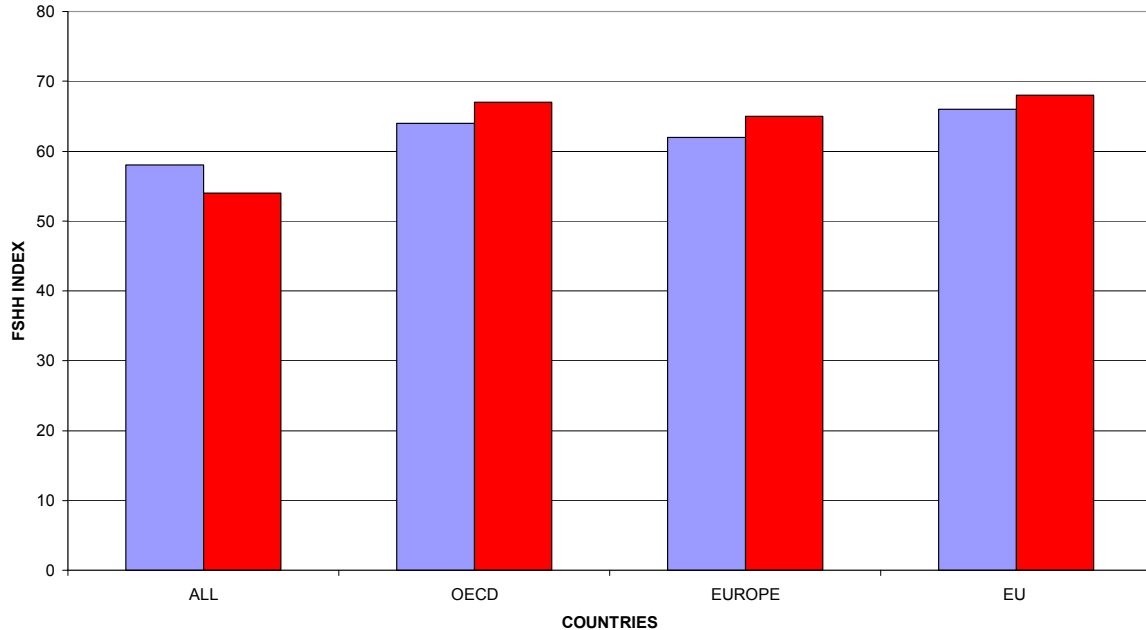
Using the FSHH index, Figure 1 presents the situation before and after the recent crisis for groups of countries. Before the crisis—2007, blue bars—the degree of consolidation was on average greater in the European Union (EU) than in the industrial countries as a whole, or Europe; these three groups score higher than the overall country sample. The consolidation process in the above three groupings of countries has continued during the crisis—2009, red bars—while for the entire sample, we notice a slight reduction in the degree of consolidation. In sum, during the crisis supervisory reforms in the advanced countries continued to be driven by a general tendency to reduce the number of agencies to reach the unified model or the so-called peak model – which dominated the trends in the two decades 1986-2006 (Masciandaro and Quintyn, 2009).

The new methodology can also be used to construct the index of central bank involvement in supervision: the Central Bank as Financial Supervisor (CBFS) Index. The intuition is quite simple: central bank involvement in supervision is likely to be at its maximum when the central bank is the unified supervisor in charge, while the involvement is likely to be low the smaller the number of sectors where the central bank has supervisory responsibilities. To construct the CBFS index we simply have to take the share of the central bank in each country which can range from 0 to 1.

Figure 2 presents the changes in the CBSS Index before and after the crisis. Two facts emerge. Before the crisis—2007, yellow bars—the advanced countries show on average a lower level of central bank involvement in supervision than the entire sample. In turn, among the advanced countries, the European countries and the EU members demonstrate higher degrees of central bank involvement in supervision. However, during the crisis we witness a sort of “Great Reversal”: the 2009 data (green bars) show that in the advanced, European and

EU countries central bank involvement has increased, while it decreased slightly for the entire sample.

FIGURE 1 FINANCIAL SUPERVISION UNIFICATION



Source: own calculations

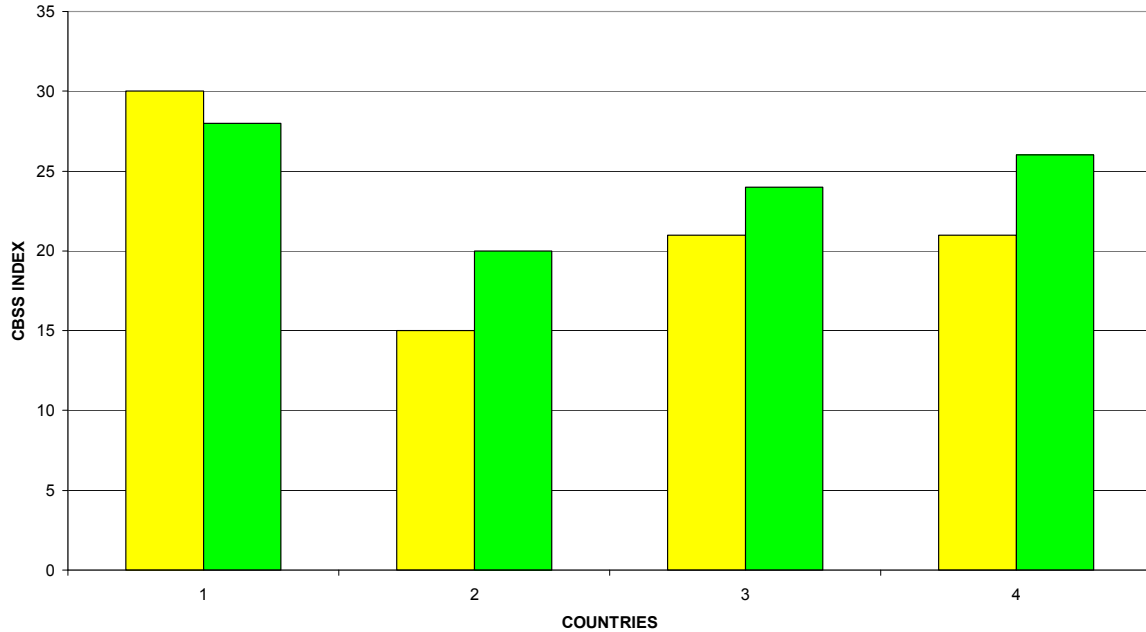
Two explanations can be offered for this new trend. First, in some countries central banks want to be more involved in supervision because the monetary policy responsibilities are not completely in their hands. This is in particular the case for central banks in countries belonging to EMU, who have chosen the route of specialization in surveillance. The most emblematic cases are Belgium, Czech Republic, Germany, Ireland, the Netherlands and the Slovak Republic. In that context, Herring and Carmassi (2008) note that the central banks of EMU members have predominantly become financial stability agencies.

The second explanation, not totally disconnected from the first one, finds its origin in the growing attention to macroprudential supervision in the wake of the crisis. The neglect or lack of understanding, of systemic risks in the financial system in the run-up to the crisis has made it clear that it is crucial to monitor and assess the threats to financial stability arising from macroeconomic as well as macrofinancial developments. This increasing emphasis on macro supervision forces policymakers to identify specific agencies responsible for macro supervision.

To carry out macro prudential tasks, information on the economic and financial system as a whole is required. The current turmoil has stressed the role of the central banks in the prevention, management and resolution of financial crisis. Therefore the view is gaining momentum that central banks are in the best position to collect and analyze this kind of

information, given their role in managing monetary policy in normal times and the lender of last resort function in exceptional times.

FIGURE 2 CENTRAL BANK INVOLVEMENT IN SUPERVISION



Source: own calculations

Therefore, from the policymakers' point of view the involvement of the central bank in macro supervision involves potential benefits in terms of information gathering and sharing (Cecchetti, 2008). At the same time they can postulate that the potential costs of the involvement in macroprudential supervision are smaller than with respect to micro supervision. Central bank involvement in microprudential supervision has traditionally been considered costly at least for two different reasons. First, there is the classical moral hazard risk (moral hazard effect, see Masciandaro 2009)—banks become less risk averse if the lender of last resort function is also with the supervisor. This moral hazard argument is weaker if the central bank is not the microprudential supervisor. Secondly, if the central bank is the macro- and microprudential supervisor, the government might fear that the bureaucratic powers of the central bank become too big (the bureaucracy effect, see Masciandaro 2009). Thus, if the overall supervisory powers are split between micro and macro, the risks to face too powerful a bureaucracy are smaller. In other words, the separation between micro- and macroprudential supervision can be used to reduce the fear of too much central bank involvement.

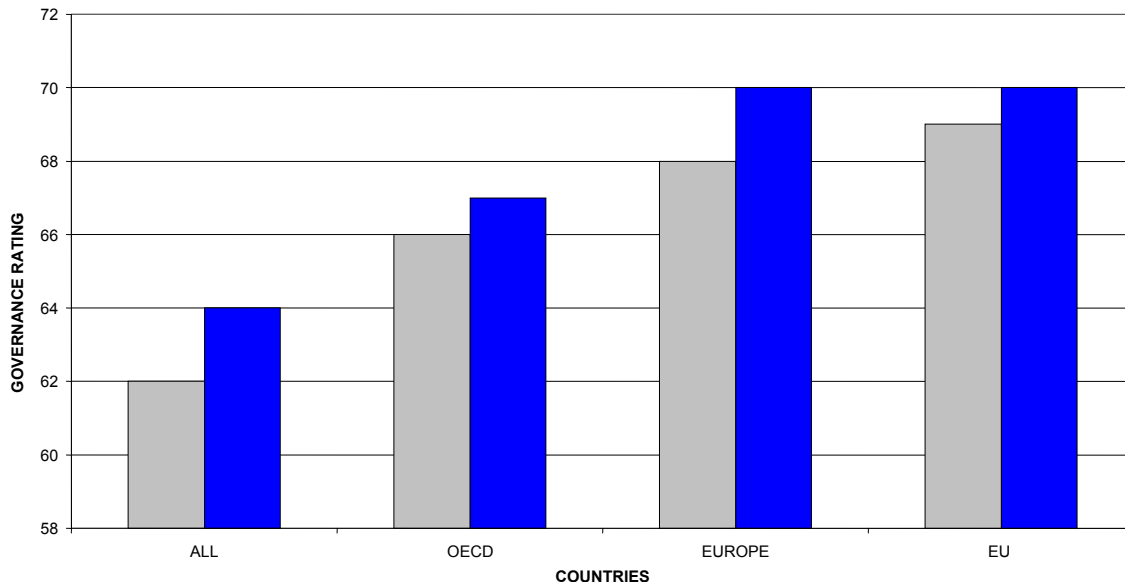
Supervisory governance

Passing to the governance indicators, we build on the earlier work by Quintyn, Ramirez and Taylor (2007) on the computation of independence and accountability ratings for bank supervision agencies. We refer to that paper for the justification of the criteria. A rating of

“2” is given if the legal framework satisfies the criteria; a “1” is given for partial compliance, and a “0” for noncompliance. In some cases a “-1” is given for what are considered practices that undermine both independence and accountability (such as for instance a minister chairing the policy board, or legal provisions giving the minister the right to intervene in the supervisory process). The individual ratings are summed and normalized between 0 and 1.⁶

Figure 3 presents the ratings for independence and accountability, taken together. Before the crisis—2007, grey bars—the quality of governance arrangements was rated the highest in the EU, followed by Europe and finally the industrial countries. These three groupings score significantly higher than the overall country sample. In the wake of the crisis – 2009, blue bars – all the groupings show further increases in the governance quality.

FIGURE 3 SUPERVISORY GOVERNANCE RATINGS



Source: own calculations

Supervision and Economic Resilience: the Evidence

This section will analyze how the indicators, as computed before the crisis, are associated with the cross-country variation in macroeconomic performance during the crisis. The pre-crisis trends towards supervisory unification and stronger governance arrangements were expected to positively influence the soundness of the financial system. In turn financial soundness should have positive effect on macroeconomic stability: less financial sector

⁶ The ratings are based on a review of the individual countries’ legal documents, supplemented by assessments of the “Basel Core Principles for Effective Banking Supervision” and of the “IMF code on Transparency of Monetary and Financial Policies” published in the IMF’s Financial Sector Stability Assessments (FSSA) where needed. In some cases clarifications were obtained from interviews with country officials. So, this is a “de jure” approach to the quality of supervisory governance and we are aware of the fact that “de facto” situations may differ from “de jure” findings.

disturbances can mean less related losses in the real economy (Cecchetti et al. 2009). Episodes of financial turmoil are often associated with economic downturns, which have tended to be more severe in the recent years; banking crises in particular tend to lead to greater effects on economic activity (Cardarelli et al. 2011). The effect of the third indicator (degree of central bank involvement) is a priori unknown.

We estimate different specifications of the following general equation:

$$GDP_i = \alpha + \sum_{n=1}^3 \beta_n SUP_{ni} + \sum_{m=1}^3 \delta_m x_{mi} + \sum_{p=1}^6 \gamma_p z_{pi} + \varepsilon_i \quad (1)$$

where i identifies the country. The dependent variable is the average real output growth in the years 2008–09. SUP_n is a set of three variables describing the key aspects of the supervisory architecture in each country: the degree of supervision unification (*FSHHI 2007*), the degree of central bank involvement (*CBSS 2007*) and supervisory governance (*GOVRATING07*), all calculated for 2007. Furthermore, x_m represents a set of three macro standard control variables: (i) the log level of income per capita 1996–2006, meant to control for the relationship between structural richness and crisis (richness effect), which seems to have characterized the crisis (*log GDP/POP*); (ii) the average growth rate of GDP in the 2004–2006 period, to control for the cross country heterogeneity (heterogeneity effect) (*GDP growth 0406*); and (iii) the log of population in 1996–2006, which captures the structural size effect (size effect) (*log POP*).⁷ Finally, z_p represents a number of other control variables, used to test the robustness of our findings and identify other linkages to economic resilience. These include, in this order, the role of public sector governance, the impact of financial liberalization and a set of variables reflecting the size, depth and performance of the banking and financial industry. Data description and summary statistics are presented in Appendix 1 and 2. All right-hand side variables are dated before 2008, to eliminate endogeneity.

Table 2 shows the first set of results with only the variables listed above. Regressions I and II include the two aspects of supervisory architecture: degree of supervision unification and central bank involvement. The results are essentially three. First, more unification (consolidation) is correlated with less resilience: the unification effect is negative. Secondly a deeper involvement of the central bank in the supervision increases resilience: the central bank effect is positive. These results are confirmed if we consider the two variables together (Regression III), and the overall regression significance increases slightly. Thirdly, regression IV shows that the quality of the governance is also negatively related to economic resilience.⁸ Considering the three indicators jointly (Regression V) we obtain the same

⁷ Compared to Giannone, we prefer to consider a longer horizon for the structural macro variables, in order to take into account the longer term macro evolution before the crisis.

⁸ The set of data on supervisory governance is more limited than on architectures, so the sample in this regression is smaller than in regressions I and II.

results, with the exception of the central bank effect, which is now not significant. Thus, supervisory unification and good supervisory governance are negatively associated with economic resilience, while central bank involvement is weakly positive.

In the next steps we will include a number of crucial control variables to test the robustness of our findings and identify other linkages to economic resilience. We will first evaluate the role of public sector governance, followed by the impact of financial liberalization.

Both strands of the literature reviewed above highlighted the potential role of the quality of public sector regulation in financial and economic resilience. (Das et al. 2004) found that in normal times good public governance reinforced the effectiveness of supervisory governance in achieving financial stability. For the recent crisis, however, Giannone et al. (2010) found that the indicators of the quality of public sector regulations—which proxy the “market friendliness” of the economy—are negatively correlated with economic growth: countries which scored the highest in terms of quality of regulation have also been the least resilient to the global recession. In direct relation to this, the degree of banking regulation seems to be particularly significant: more banking deregulation is negatively correlated with countries’ economic resilience (Giannone et al. 2010). The same seems to be true when considering financial resilience, as Caprio et al. (2010) do. They find that, other things being equal, more restrictions on bank activities seem to have reduced the likelihood of suffering the recent financial crisis.

A priori it is not clear what the impact of financial deregulation (or liberalization) on economic resilience will be. The premise is that financial liberalization spurs financial development which, in turn, should foster economic growth and development. However, the relationship turns out to be more complex than that. The early liberalization literature (see e.g., Diaz-Alejandro, 1985) observed that in the case of Latin America, liberalization in many cases led to financial crises. He pointed out that lax prudential supervision in a liberalized environment contributed to this outcome. Gradually, a strand in the literature started to produce evidence that financial deepening led to economic growth (e.g., Beck, Levine, and Loayza, 2000, and Rajan and Zingales, 1998). At the same time others showed evidence that financial liberalization produced financial deepening, but at the cost of more output volatility (Easterly, Islam, and Stiglitz, 2000). Their analysis implied that there could be a threshold in the path of financial deepening above which output becomes more volatile. In other words, financial deepening leads to faster growth, but it could come at a price in terms of more output volatility (Ranci ere, Tornell, and Westermann, 2008). Faced with the 2008 financial and economic crisis, the question whether some financial systems have become too big and therefore are starting to generate a negative impact on economic growth has become very relevant (see e.g., Arcand, Berkes, and Panizza, 2011).

The quality of the public sector regulation (overall regulation effect) is measured by the corresponding sub-component of the Worldwide Governance Index—quality of regulation—computed by the World Bank, calculated for 1996–2006. As a proxy for banking regulation/liberalization (banking regulation effect) we use the index computed by the Frazer Institute, calculated for 2004–06.

Table 3 shows the results with the overall quality of regulation (*regqua*) as an additional right-hand variable. This variable is negative and highly significant. Its inclusion does not change significantly the impact of the other variables. More consolidation and governance quality are still correlated with less resilience, while the central bank effect does not matter. So, the general features of the public sector regulation matter.

Table 4 introduces banking regulation as control variable (*CreditmktReg_0406*). The significantly negative coefficients indicate that the countries that liberalized their financial systems the most, were most affected by the banking and economic crisis. These results are in line with Giannone (2010) and Caprio (2011). The supervisory variables confirm the already tested negative correlations for both the unification effect and the governance effect.

To test the robustness of our findings, we use another indicator for the regulatory variable: the index of financial liberalization from Abiad et al. (2008). This index considers more dimensions of banking and financial regulation; its main shortcoming concerns the reduction of the country sample (from 91 to 71 in our database). Table 5 confirms that the countries hit the most by the crisis are those that liberalized their financial systems the farthest. No changes occur in the signs of the coefficients of the supervisory variables, but only the first one is significant.

Finally, if we consider the main regulatory quality variables jointly (Table 6), we notice that both supervisory unification and supervisory governance are still negatively correlated with output growth. The coefficient of central bank involvement is not significant. Among the two control variables, the overall regulation seems to be consistently the more significant variable.

To find out how the regulatory variables affects the relationships between the supervisory variables and the economic resilience we interact regulatory quality with the degree of unification (Table 7, columns I and II) and then with supervisory governance (columns III and IV). The signs of the interaction variables are all negative but not significant; the same is true for most of the independent variables. So, this test does not reveal new insights.

Finally, we control for indicators of the size, depth and performance of the financial and banking industry. Giannone et al. (2010) and Caprio et al. (2010) pointed out that variables which captured the size and the efficiency of the financial and banking industry may have an impact on resilience as well. The selection of the indicators has been guided by these two papers. So we test sequentially for the size of the financial and banking system (Tables 8 and 9); its performances (Table 10), and structural features of the banking industry such as the degree of concentration, internationalization and conglomeration (Table 11). All these variables are calculated for the period 2004–06.

Tables 8 and 9 show that by including various types of indicators of financial and banking sector size (respectively deposit money banks assets/GDP (*com bank assets*), liquid liabilities (*com bank liq liabs*), central bank assets/GDP (*CB assets*), bank credit to the private sector/GDP (*com bank credit*), bank deposits/GDP (*com bank deposits*) and financial system

deposits/GDP (*fin sys deposits*)), the negative correlation of unification and governance survives, but only unification remains significant. These regressions also confirm the stronger role of the public sector regulatory quality, compared to banking regulation. We note that the variable banks assets has a negative and significant impact on resilience. Countries with larger banks are associated with less resilience. However, the effect disappears in the regression with supervisory governance.

Table 10 includes indicators of financial and banking performance (bank overhead costs/assets (*cost/assets*), net interest margin/assets (*net interest margin*) and bank credit/bank deposits (*bank credit/deposits*). Now the negative effect of governance survives, while unification becomes insignificant. Again it also confirms the stronger role of the overall regulatory quality. Among the selected control variables, only the ratio of bank credit over deposits is significant (and negative), confirming the Caprio et al. (2010) finding that when banks tend to finance credit from other sources than deposits, the system becomes less resilient because these financing sources are less stable than deposits.

Finally, Table 11 shows that, by including indicators of the structure of the banking industry (concentration, internationalization, and formation of conglomerates), the negative effects of both unification and governance are still present, but not in a significant way. The results in terms of significance of the two regulatory quality variables are mixed. The added variables themselves are in most cases not significant, implying that bank structure did not have a noteworthy impact on resilience.

In conclusion, our findings convincingly reveal that those features that were meant to strengthen supervision and, through it, financial and economic resilience—supervisory unification and better governance—have not really met those objectives. Across our regressions, both features are associated with weaker resilience. We also notice that the countries with the best ratings in terms of public sector regulatory framework, as well as those countries with the most far reaching financial deregulation were hit the hardest economically. Finally, the degree of involvement of the central bank in supervision did not seem to have had any significant impact on resilience.

IV. POLICY RECOMMENDATION: RELY ON ARCHITECTURE TO IMPROVE GOVERNANCE

A. Overview of recommendations

The preceding empirical analysis confirms that neither supervisory architecture nor improvements in supervisory governance have been able to prevent or mitigate the crisis, putting into question a large number of assertions that were made before the crisis. The question now is “where do we go from here?” Several authoritative voices have proposed modifications—paradigm shifts—aimed at remedying some of the ills.

On **supervisory architectures** (Table 12) we can be short: the foregone conclusion now is that (i) macroprudential supervision should be established as a supervisory activity distinct from microprudential supervision; and (ii) central banks should play a major role in this new field. Work in this area is evolving rapidly. Thus, the pre-crisis paradigm, supporting a trend towards supervisory unification and central bank specialization is being replaced by a twin-

peak model in supervision (macro – micro), with central bank involvement, at least in macro supervision.

On **supervisory governance**, the crucial question once again is, how can incentive structures for supervisors be better aligned in order to avoid a repeat of what happened in the run-up to the latest crisis? Nearly all recommendations go in the same direction (Table 13). Consistent with the failures identified in table 1, a consensus is emerging that supervision needs to be *more intrusive* (the new buzz word), *proactive, risk-based, and result-oriented*. This new supervisory approach should be achieved by improving the incentive structure for supervisors so that the capture traps are avoided. Most analysts converge on measures such as *clarifying the mandate for supervisors, having more independence and accountability, and bringing in more and higher skilled professionals that enjoy higher monetary compensation*, to achieve this objective. Higher skilled professionals with higher compensations are also needed to avoid that the profession falls behind the curve when it comes to new developments in the financial system.

While we concur in principle with this analysis and the proposed way forward to enhance governance, we would like to point out some of its limitations and potential pitfalls. It is beyond doubt that financial supervision needs indeed to have the qualities listed above. Palmer and Cerutti (2009) show that those countries (such as Australia and Canada for instance), where supervisors had these qualities, fared on average better in the crisis (other factors also contributed to their relative success).

These new accents in the supervisory approach can indeed be fostered by more solid governance arrangements. It is beyond doubt that supervisory governance needs further improvements to provide the right incentives to cope with three types of capture: political, industry and self-capture (Masciandaro, Quintyn and Taylor, 2010 and Dijkstra, 2010). As discussed elsewhere, levels of supervisory independence and accountability vary widely across the world (see rankings in Figure 3 in this paper, and for more detailed country-by-country rankings, see e.g., Quintyn, Ramirez, and Taylor, 2007). Independence is on average much lower than for central banks as monetary policy agents. Accountability arrangements—the indispensable complement to independence—are often poorly developed. Hence, improvements are desirable, and, as Figure 3 shows, several countries have already taken action.

However, experience of the last two decades also points in the direction of some critical limitations with respect to the potential impact of supervisory governance. These limitations stem from the fact that, by the nature of the supervisory work, the contract between the supervisor and society will *always* be radically incomplete given the great range of contingencies that can occur in regulation and supervision. Thus, it will be extremely difficult to precisely specify the agent's objectives (Goodhart, 2001, Schuler, 2003, and Quintyn and Taylor, 2007). Hence, it is misleading to believe that supervisory governance arrangements can be defined and implemented in such a way that each and every possibility of political, industry and self-capture can be eliminated. So, the first best solution, i.e., define the right governance arrangements to address the supervisors' incentive problems has its own limitations.

Moreover, recent experiences during the crisis have demonstrated that some of the more successful approaches to supervision are the result of long-established and long-fostered corporate cultures that have helped to brace the institution against various forms of capture. So, *de facto* independence seems at least as important as *de iure* independence. The crisis record (corroborated by the empirical findings in this paper) shows indeed that, on the one hand, several countries with strong (de iure) independence and accountability arrangements were most severely hit by the crisis, while others with relatively weaker arrangements on paper emerged relatively unscathed from the crisis. Take the example of Canada: the supervisory agency does not score very high on *de iure* independence. However, practice shows that its *de facto* independence is high, which, combined with a strong supervisory tradition (Palmer and Cerutti, 2009) has contributed to escaping from the crisis. Conversely, countries with higher governance ratings, either did not fully use them, or missed the proper supervisory culture as described above, and failed. So the bottom line is that improvements in supervisory governance per se, are not a panacea for all supervisory failures, as proven by our empirical analysis. Improvements in supervisory governance take time to change supervisory approaches and cultures.

Combining these two major points—governance arrangements will always have their limitations, because of the impossibility to write a contract (in the principal-agent sense) that fully aligns incentives, and governance arrangements do not *per se* lead to improvements in supervisory approach and culture—forces us to think about second-best solutions to align supervisory incentives.

The new financial architecture that is emerging in the wake of the crisis—separation of macro and micro prudential supervision—offers a great opportunity to conceive such a second-best solution that offsets some of the inherent weaknesses in our first-best approach: let us combine the new architecture with good governance practices to better align supervisory incentives.

B. Combining architecture and governance to address incentive issues

In the presence of limitations on a first-best solution to address the capture phenomenon, we suggest to resort to a second-best solution to complement the governance arrangements in addressing the incentive problems for supervision. This solution is being offered by one of the emerging answers to the current crisis: *use of the supervisory architecture to address the problem of supervisory incentives*.

Here is the reasoning: in response to the crisis, the new trend in several countries is to establish a separate function for macroprudential supervision. Although the institutional forms vary and are evolving, a common thread seems to be to assign this task to the central bank, or for the central bank to play a pivotal role. Based on a survey, Nier et al. (2011) report that in 19 out of 21 countries that have a formal mandate for macroprudential supervision, the central bank is the sole institution in charge, or plays a key role together with

one or more other institutions.⁹ So, the more fundamental movement seems now to go in the direction of a two peak model with one peak for macroprudential supervision, the other for microprudential supervision. However, these peaks are in the first place functional peaks. While there is a growing consensus on these functional peaks, the architecture is still largely under discussion. Some countries are assigning the tasks to two separate agencies, while others prefer to have micro- and macroprudential supervision under one roof.

The presence of two institutions involved in the same field of operation (but with a different mandate) would allow for check and balances to operate among both institutions. These checks and balance could reduce the likelihood of capture (of any type). The proposal to rely on checks and balances between two institutions involved in supervision is based on a model developed by Laffont and Martimort (1999) and a recent extension of their work by Boyer and Ponce (2010).

Laffont and Martimort's model starts from the idea that the *power* of a supervisory agency is its ability to use some piece of information it has learned on the supervised entity to improve social welfare. They show that, when benevolent supervisors are in charge of implementing the socially optimal contract, there is no reason for the separation of powers, i.e., for splitting authorities among different supervisory agencies. They always use their possible discretion, i.e., their power, to maximize social welfare.

However, non benevolent supervisors may use their power to pursue personal agendas, for example by colluding with the supervised entity. They show that in this case there is scope for separation. Separation of supervisors divides the information at their disposal and thus limits their discretion in engaging in socially wasteful activities. Instead of having a unique supervisor implementing the privately efficient collusive offer to the regulated firm, separation introduces a Bayesian-Nash behavior between partially informed supervisors. When this Bayesian-Nash behavior is such that the regulators offer safe bribes that can always be provided by the interest group, the outcome of this collusion game reduces the total collusive offers they make. As a result, the transaction costs of collusive activities increase and preventing collusion becomes easier. Separation improves social welfare.

Boyer and Ponce (2010) adapt this framework to analyze the implications of capture on the optimal allocation of micro and macroprudential supervision. They conclude from their model that concentration of both supervisory powers in one agency could be harmful because the monopoly of information acquisition may be a curse when capture is a concern. In other words, institutional separation of the micro and the macro pillar of supervision now offers a unique opportunity to create a system of checks and balances that should have a positive impact on the incentive structure of supervisors and—provided both agencies have good governance arrangements—would enhance effectiveness and responsiveness of supervision. While the two models start from industry capture as the main threat, Boyer and Ponce (2010) show that their results hold for any type of capture. In reality, the demarcation line between

⁹ These institutions include financial stability council, ministry of finance, bank supervisor, integrated supervisor, supervisor of other subsector or deposit insurance agency.

the three types of capture mentioned earlier is often hard to draw and capture is very often of a mixed nature.

A likely architecture would be to house macroprudential supervision in the central bank (for the reasons given in the literature) and microprudential supervision in an agency at arms' length from the central bank. The advantages of this architecture would be that (i) it provides checks and balances that would better align supervisors' incentives; (ii) not all power is concentrated in one agency; (iii) synergies are created because the analytical scope of macroprudential supervision is closer to the core focus of the central bank; (iv) there is a clear link between macro-prudential supervision and the central bank's function of liquidity provisioning (for a more in depth analysis of advantages and costs involved in this and other institutional models, see also Nier et al. 2011).

The proposed division of labor would also entail some costs: (i) in order to maintain the checks and balances, there would be a need for some double reporting by the financial sector; (ii) there is a need for general coordination between both agencies while maintaining the checks and balances; (iii) coordination is also needed when it comes to deciding who will take specific measures (against individual banks or groups of banks) and even more so when authority needs to be transferred to a resolution agency (see also Palmer and Cerutti, 2009, p. 3). Finally, these arrangements could potentially introduce some competition among supervisors but since their mandates would be different it would not be the type of competition that financial institutions could exploit. In any case, the models on which our proposal is founded indicate that these costs are lower than the potential benefits.

V. CONCLUSION

The end of the Asian systemic financial crisis marked the beginning of intense efforts on several fronts to improve the effectiveness of financial sector supervision. The BCPs were promulgated as best practices to frame and guide the supervisory process; attention went to arrangements to improve supervisory governance, both internally (integrity) and externally (independence, accountability, transparency); and supervisory architectures were revisited to enhance efficiency and effectiveness of supervisory processes. Finally, more reliance on market discipline was also promoted as a check on the supervisory process. During the "high tide" in the first years of the new millennium, empirical evidence on the positive impact of these new initiatives on bank soundness was not conclusive, but hope remained that a possible new crisis could be mitigated by these new arrangements and processes.

However, the financial and economic crisis that started in 2007–08 meant the great awakening from a dream: countries that were believed to be among those with the most solid supervisory systems were hit the hardest by the crisis. Several accounts by academia and policymakers now point at major failures in the supervisory systems in the run-up to the crisis.

This paper is the first one to undertake a systematic empirical analysis of the impact of various features of supervisory architecture and governance on economic resilience of a set of about 100 countries. Our findings leave little doubt: consolidation in supervision and good supervisory governance are negatively correlated with resilience; the degree of involvement

of the central bank in supervision did not have any significant impact on resilience. Finally, the impact on resilience of the supervisory regimes is deeply intertwined with the quality of public sector regulation in general, and with the degree of financial liberalization in particular. Each supervisory feature can have a different impact depending on the overall setting.

So, given this major defeat, the question is what to do next. Recommendations by several authors converge on promoting more intrusive and proactive supervision implemented by staff with higher skills. All scholars and policymakers agree that this new approach needs to be backed by better governance arrangements.

This paper points out that improvements in supervisory governance, while certainly needed, have their limitations. Better governance will never be able to completely align the supervisory incentive structure because the supervisory contract will, by its nature, always be incomplete. We therefore suggest (based on the Laffont and Martimort (1999) model) to exploit the opportunities offered by the newly emerging supervisory architecture, with one pillar in charge of macroprudential supervision and one in charge of microprudential supervision: if both pillars are institutionally separated, a system of checks and balances between both is created, which would reduce the opportunities for political, industry and self-capture. It seems that the benefits of such an arrangement would be greater than the costs it involves. Several countries are still in the (re)design phase of their supervisory architecture and this second-best mechanism can be used in conjunction with improvements in supervisory governance to better align supervisory incentives.

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Table 1 – What selected authors say about failures in the supervisory architecture and supervisory governance

On supervisory architecture	
Buiter (2009)	Coordination failures - Central bank had not enough info on the state of the banking system (UK specific)
Cecchetti (2008)	Supervision should be inside the central banks: the crisis showed that the separation between supervisors and the provider of liquidity to the system placed additional stress on the system
Claessens et al. (2010)	Lack of coordination among supervisors at the national and international level Lack of attention to systemic risks (no agency to monitor systemic risks)
de Larosiere et al. (2009)	Supranational level of supervision in Europe is not adequately structured to catch cross-border issues
Leijonhufvud, (2009)	Fragmented US supervisory structure was not capable of monitoring the integrated, interconnected and complex reality of US financial markets
On supervisory governance	
Buiter (2008)	Regulatory capture (FED in particular) Cognitive regulatory capture (by Wall Street)
Caprio et al (2008)	Contradicting political and bureaucratic incentives for supervisors Deficient oversight Not enough accountability for supervisors
Claessens et al. (2010)	Lack of supervisory resources Lack of attention to systemic risks
de Larosiere et al. (2009)	Supervisors did not insist enough on getting information on systemic linkages Inadequate processes and practices for challenging supervisory decisions in a cross-border setting (EU specific) Lack of frankness and cooperation among supervisors Uneven powers of supervisors across countries
Enriques and Hertig (2010)	Deficiencies in governance of supervisors
FSA (The Turner Review) (2009)	Supervision focused too much on individual banks, not on systemic risks Deficiencies in internal processes, management discipline and supervisory skills Deficiencies in supervision of cross-border banking
Palmer and Cerutti (2009)	Different policy choices in balancing innovation and soundness The “madness of crowds” Political and market pressure on supervisors A “race to the bottom” among supervisors to create institution-friendly regimes Weak supervisory governance models and inadequate mandates Weak supervisory cultures, along with inappropriate incentives within supervisory bodies An inadequate understanding within supervisory agencies of financial institutions and what drives their behaviors Inadequate supervisory/central bank mandates and “tripartite” arrangements Sub-optimal cooperation among supervisory bodies and ineffective consolidated supervision of large financial groups Absence of real, on-site supervision in some supervisory agencies
Tabellini (2008)	Bureaucratic inertia Poor judgment by supervisors Distorted incentives

Viñals et al (2010)	Supervisors constrained by regulatory framework Staying on sidelines and not intruding enough Not being proactive in dealing with emerging risks Not being comprehensive in scope Not taking matters to their conclusion
Weder di Mauro (2009)	<p>“huge incentive problems”:</p> <ul style="list-style-type: none"> • Supervisors typically do not enjoy the same degree of independence as central banks • Supervisors (with the exception of the FDIC) do not put the capital of their own institution at risk • Incentive for forbearance (the “not on my watch” syndrome) • Supervisors have tendency to protect the local industry or secure a competitive edge for local industry over other financial centers

Table 2 – Resilience, Supervisory Architecture and Governance

dependent variable: average real GDP growth 2008-09

	I	II	III	IV	V
FSHHI 2007	-2.296 (1.68)*		-2.93 (2.16)**		-5.1 (3.00)***
CBSS 2007		2.455 (2.08)**	2.936 (2.49)**		-0.002 (0.05)
GOVRATING07				-16.688 (3.52)***	-15.107 (3.42)***
GDP growth 0406 (annual %)	0.273 (1.75)	0.23 (1.47)	0.216 (1.41)	0.101 (0.51)	0.074 (0.41)
log POP	0.433 (0.37)	1.089 (0.95)	0.654 (0.57)	1.221 (0.65)	0.45 (0.26)
log GDP/POP	0.236 (0.24)	-0.021 (0.02)	0.137 (0.14)	0.229 (0.15)	0.4 (0.28)
Constant	0.311 (0.21)	-2.08 (1.80)	-0.095 (0.07)	8.546 (2.30)**	11.549 (3.25)***
Observations	96	96	96	49	49
R-squared	0.09	0.1	0.15	0.36	0.49

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

Table 3 – Resilience, Regulatory Quality, Supervisory Architecture and Governance

dependent variable: average real GDP growth 2008-09

	I	II	III	IV	V
FSHHI 2007	-2.209 (1.78)*		-2.484 (1.96)*		-3.976 (2.52)**
CBSS 2007		0.755 (0.64)	1.238 (1.05)		0.369 (0.22)
GOVRATING07				-10.84 (2.42)**	-10.579 (2.50)**
GDP growth 0406 (annual %)	0.037 (0.25)	0.038 (0.25)	0.035 (0.23)	-0.295 (1.43)	-0.257 (1.32)
log POP	-0.543 (0.50)	-0.042 (0.04)	-0.359 (0.33)	0.906 (0.55)	0.326 (0.21)
log GDP/POP	0.704 (0.79)	0.508 (0.56)	0.619 (0.70)	-0.237 (0.17)	0.004 0.00
regqua	-2.061 (4.56)***	-1.959 (3.98)***	-1.872 (3.84)***	-3.302 (3.65)***	-2.802 (3.22)***
Constant	3.11 (2.10)**	1.142 -0.85	2.681 -1.74	10.106 (3.05)***	12.198 (3.78)***
Observations	96	96	96	49	49
R-squared	0.26	0.24	0.27	0.51	0.59

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

Table 4 – Resilience, Financial Regulatory Quality, Supervisory Architecture and Governance

dependent variable: average real GDP growth 2008-09

	I	II	III	IV	V
FSHHI 2007	-2.512 (1.94)*		-2.749 (2.11)**		-3.964 (2.22)**
CBSS 2007		1.347 (1.09)	1.687 (1.38)		-0.541 (0.29)
GOVRATING07				-9.558 (1.89)*	-10.639 (2.12)**
GDP growth 0406 (annual %)	0.167 (1.13)	0.18 (1.21)	0.159 (1.08)	-0.122 (0.61)	-0.066 (0.34)
log POP	0.389 (0.36)	0.842 (0.78)	0.521 (0.49)	2.068 (1.18)	1.218 (0.70)
log GDP/POP	-0.381 (0.43)	-0.501 (0.55)	-0.353 (0.40)	-1.267 (0.83)	-0.677 (0.44)
CreditMktReg_0406	-1.387 (3.44)***	-1.37 (3.27)**	-1.237 (2.98)***	-1.711 (2.86)***	-1.126 (1.73)*
Constant	12.931 (3.35)***	10.489 (2.55)*	11.188 (2.77)***	19.762 (3.79)***	18.28 (3.50)***
Observations	91	91	91	49	49
R-squared	0.23	0.21	0.25	0.46	0.52

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

Table 5 – Resilience, Financial Regulatory Quality, Supervisory Architecture and Governance

dependent variable: average real GDP growth 2008-09

	I	II	III	IV	V
FSHHI 2007	-3.348 (2.41)**				
CBSS 2007			2.114 (1.57)		
GOVRATING07					-5.301 (1.08)
GDP growth 0406 (annual %)	-0.036 (0.23)		-0.032 (0.20)		-0.247 (1.17)
log POP	0.991 (0.84)		1.582 (1.32)		2.191 (1.25)
log GDP/POP	-0.952 (0.99)		-0.83 (0.84)		-0.752 (0.48)
Finreg7305	-13.73 (4.96)***		-13.865 (4.88)** *		-14.491 (3.52)***
Constant	13.807 (4.37)***		10.615 (3.35)** *		14.743 (3.49)***
Observations	71		71		45
R-squared	0.41		0.38		0.51

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

Table 6 – Resilience. Regulatory Qualities, Supervisory Architecture and Governance

dependent variable: average real GDP growth 2008-09

	I	II	III	IV	V
FSHHI 2007	-2.12 (1.67)*		-2.313 (1.8)*		-3.776 (2.26)**
CBSS 2007		0.84 (0.69)	1.18 (0.97)		0.214 (0.12)
GOVRATING07				-8.301 (1.74)*	-9.799 (2.08)**
GDP growth 0406 (annual %)	0.068 (0.46)	0.077 (0.51)	0.07 (0.47)	-0.329 (1.60)	-0.269 (1.35)
log POP	-0.321 (0.30)	0.005 0.00	-0.177 (0.16)	1.424 (0.85)	0.52 (0.31)
log GDP/POP	0.196 (0.22)	0.114 (0.13)	0.174 (0.19)	-0.933 (0.64)	-0.23 (0.16)
regqua	-1.384 (2.51)**	-1.434 (2.55)**	-1.284 (2.29)**	-2.594 (2.53)**	-2.617 (2.62)**
CreditMktReg_0406	-0.976 (2.30)**	-0.971 (2.23)**	-0.9 (2.09)**	-0.91 -1.41	-0.272 -0.39
Constant	10.816 (2.82)***	9.006 (2.24)**	9.749 (2.44)**	15.736 (3.05)***	13.782 (2.67)**
Observations	91	91	91	49	49
R-squared	0.28	0.27	0.29	0.54	0.59

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%,5%,1% level

Table 7 – Resilience, Supervisory Unification, Governance and Interaction Variables

dependent variable: average real GDP growth 2008-09

	I	II	III	IV
GDP growth 0406 (annual %)	0.057 (0.36)	-0.127 (0.78)	-0.342 (1.59)	-0.249 (1.16)
log POP	-0.519 (0.48)	0.631 (0.53)	0.726 (0.43)	2.213 (1.24)
log GDP/POP	0.702 (0.79)	-0.581 (0.59)	-0.242 (0.18)	-0.774 (0.49)
FSHH 2007	-1.937 (1.43)	-2.702 (1.88)		
regqua9606	-1.53 (1.35)		-7.514 (1.50)	
Finreg7305		-9.576 (2.50)*		-12.708 (1.21)
FSHH *regq	-0.71 (0.51)			
FSHH * finreg		-1.407 (1.55)		
GOVRATING07			-13.527 (2.47)*	-3.37 (0.29)
GOVRAT*regqua			-6.184 (0.86)	
GOVRAT*finreg				-2.6 (0.19)
Constant	2.788 (1.72)	11.337 (3.23)**	12.334 (2.92)**	13.412 (1.60)
Observations	96	71	49	45
R-squared	0.26	0.43	0.52	0.51

Absolute value of t-statistics in parentheses

* significant at 5% level; ** significant at 1% level

Table 8 – Supervisory Architecture and Financial Sector Size

dependent variable: average real GDP growth 2008-09

	com bank assets	com bank liq liabs	CB assets	com bank credit	com bank deposits	fin sys deposits
FSHHI 2007	-2.918 (2.20)**	-2.518 (1.93)*	-2.643 (2.08)**	-2.445 (1.93)*	-2.33 (1.85)*	-2.334 (1.85)*
size indicator 1/	-7.325 (2.22)**	0.769 -0.87	13.243 (2.24)**	0.404 -0.39	0.825 -0.94	0.901 -1.04
GDP growth 0406 (annual %)	0.143 (0.93)	0.017 (0.11)	0.033 (0.22)	0.005 (0.03)	0.015 (0.10)	0.017 (0.11)
log POP	0.134 (0.12)	-0.454 (0.39)	-0.268 (0.24)	-0.646 (0.55)	-0.609 (0.54)	-0.621 (0.55)
log GDP/POP	-0.02 (0.02)	0.193 (0.20)	0.152 (0.16)	0.3 (0.31)	0.33 (0.34)	0.346 (0.36)
Regqua	-0.754 (1.16)	-2.195 (3.29)***	-1.757 (2.93)***	-2.11 (2.66)***	-2.208 (3.26)***	-2.237 (3.31)***
CreditMktReg_0406	-0.806 (-.84)*	-0.629 (1.41)	-0.361 (0.78)	-0.698 (1.58)	-0.645 (1.46)	-0.64 (1.45)
Constant	15.509 (3.41)***	8.491 (2.11)**	5.772 (1.40)	9.455 (2.47)**	8.65 (2.20)**	8.564 (2.18)**
Observations	86	81	80	84	84	84
R-squared	0.33	0.34	0.37	0.33	0.33	0.33

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

1/ name of size indicator is indicated at the top of each row

Table 9 – Supervisory Governance and Financial Sector Size

dependent variable: average real GDP growth 2008-09

	com bank assets	com bank liq liabs	CB assets	com bank credit	com bank deposits	fin sys deposits
GOVRATING07	-7.417 (1.45)	-4.116 (0.82)	-4.562 (0.86)	-4.567 (0.90)	-4.987 (1.00)	-4.961 (0.99)
size indicator 1/	3.966 (0.79)	0.077 (0.05)	-2.45 (0.34)	0.716 (0.54)	0.827 (0.64)	0.83 (0.65)
GDP growth 0406 (annual %)	-0.395 (-1.75)*	-0.536 (2.13)**	-0.595 (2.36)**	-0.533 (2.16)**	-0.517 (2.05)**	-0.517 (2.06)**
log POP	1.352 (0.77)	1.927 (1.06)	1.165 (0.66)	0.984 (0.58)	0.924 (0.54)	0.899 (0.52)
log GDP/POP	-0.826 (0.55)	-1.557 (1.05)	-1.14 (0.75)	-1.131 (0.77)	-1.072 (0.73)	-1.049 (0.71)
regqua	-3.366 (2.60)**	-3.313 (2.68)**	-3.543 (2.87)***	-3.671 (2.62)**	-3.535 (2.86)***	-3.541 (2.87)***
CreditMktReg_0406	-0.709 (1.00)	-0.75 (1.11)	-0.764 (1.00)	-0.866 (1.33)	-0.779 (1.16)	-0.779 (1.16)
Constant	10.707 (1.55)	12.92 (2.28)**	14.68 (2.38)**	14.867 (2.80)***	14.25 (2.57)**	14.238 (2.58)**
Observations	46	45	44	47	47	47
R-squared	0.55	0.54	0.52	0.52	0.52	0.52

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

1/ name of size indicator is indicated at the top of each row

Table 10 – Supervisory Architecture, Governance and Financial Performances Variables

dependent variable: average real GDP growth 2008-09

	cost/assets		net interest margin		bank credit/deposits	
FSHHI 2007	-2.07		-2.057		-1.544	
	(1.59)		(1.58)		(1.23)	
GOVRATING07		-8.203		-8.43		-9.883
		(1.74)*		(1.81)*		(2.04)**
perf indic 1/	-0.961	-36.51	-6.166	-33.51	-1.769	-1.524
	(0.05)	(1.52)	(0.38)	(1.8)*	(2.48)**	(1.47)
GDP growth 0406 (annual %)	0.071	-0.381	0.069	-0.351	0.07	-0.268
	(0.47)	(1.86)	(0.46)	(-1.75)*	(0.49)	(1.29)
log POP	-0.418	1.472	-0.44	1.197	-0.047	0.603
	(0.37)	(0.89)	(0.39)	(0.73)	(0.04)	(0.35)
log GDP/POP	0.22	-0.874	0.239	-0.737	-0.094	-0.254
	(0.24)	(0.61)	(0.26)	(0.52)	(0.11)	(0.17)
regqua	-1.41	-3.085	-1.516	-3.494	-1.107	-2.005
	(2.36)**	(2.91)***	(2.33)**	(3.13)***	(2.03)**	-1.84
CreditMktReg_0406	-0.969	-0.722	-0.974	-0.788	-0.742	-0.681
	(2.22)**	(1.11)	(2.23)**	(1.25)	(1.76)	(1.04)
Constant	10.879	15.972	11.213	17.012	10.136	16.245
	(2.75)***	(3.14)***	(2.79)***	(3.35)**	(2.72)***	(3.18)***
Observations	89	49	89	49	91	49
R-squared	0.28	0.56	0.28	0.57	0.33	0.61

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

1/ name of performance indicator is at the top of each row

Table 11-- Supervisory Architecture, Governance and Financial Structure Variables

dependent variable: average real GDP growth 2008-09

	concentration		internationalization		conglomerates	
FSHHI 2007	-1.688 (1.19)		-1.548 (1.04)		-0.717 (0.34)	
GOVRATING07		-6.336 (1.28)		-5.032 (0.90)		-1.343 (0.21)
struct.var 1/	0.015 (0.74)	0.042 (1.71)*	0.007 (0.54)	0.002 (0.15)	-0.003 (0.25)	-0.008 (0.48)
GDP growth 0406 (annual %)	-0.062 (0.35)	-0.352 (1.69)*	-0.217 (1.17)	-0.574 (2.20)**	-0.009 (0.04)	-0.391 (1.32)
log POP	0.516 (0.43)	2.082 (1.17)	0.384 (0.32)	0.853 (0.46)	-0.234 (0.14)	0.841 (0.33)
log GDP/POP	-0.332 (0.36)	-0.907 (0.60)	-0.713 (0.75)	-0.953 (0.60)	-0.291 (0.23)	-1.058 (0.52)
regqua	-1.279 (1.8)*	-2.503 (2.39)**	-1.161 (1.54)	-3.206 (2.56)**	-1.079 (1.15)	-3.448 (2.30)**
CreditMktReg_0406	-1.475 (2.99)***	-0.975 (1.47)	-1.722 (3.17)***	-0.847 (1.17)	-1.449 (2.35)**	-0.65 (0.76)
Constant	13.633 (2.85)***	11.299 (1.96)	17.396 (3.79)***	15.302 (2.62)**	14.412 (2.63)**	11.465 (1.73)
Observations	76	47	72	43	48	29
R-squared	0.32	0.54	0.3	0.48	0.26	0.47

Absolute value of t-statistics in parentheses

*, **, *** significant at 10%, 5%, 1% level

1/ name of structure indicator is at the top of each row

Table 12 – Proposals addressing supervisory architecture

Author(s)	Proposed measures
Buiters (2009)	More central bank involvement in supervision because of connection with lender of last resort function
Cecchetti (2007)	Central banks should be involved in supervision (i) for reasons of efficiency in the production and use of timely information, and (ii) the ability to internalize the trade-offs.
Claessens et al. (2010)	Coordination among supervisory agencies Clear mandates Clear lines of communication and coordination among supervisors
De Grauwe (2007)	Central banks should be involved in supervision of all financial institutions that create credit and liquidity
De Grauwe (2008)	(EU specific) ECB should be responsible for supervision of SIBI
de Larosiere et al. (2009)	(EU specific) ECB should be involved in macro-prudential supervision at the European level
FSA (The Turner Review) (2009)	(UK specific) Both Bank of England and FSA should be extensively and collaboratively involved in macro-prudential supervision
Brunnemeier et al. (2009)	Twin peak model with macro-supervision in central bank, micro-supervision in another agency. Rationale based on traditional type of approach followed by both agencies

Table 13 – Proposals addressing supervisory failure

Author(s)	Proposed measures
Caprio et al (2008)	Oversight should be more “adaptive” to changes (innovations) and supervisors should be held accountable for their adaptiveness Regulators should disclose information on the value and measurement of potential claims that institutions make on the government’s safety net. Establishing right incentive structure for supervisors requires a chain of reforms (see p. 49 – 55)
Claessens et al. (2010)	Mitigation of systemic risks should be recognized as an explicit objective of all agencies involved in supervision in order to enhance accountability Clear mandates and tools commensurate with these mandates in order to preserve financial stability Sufficient resources Clear allocation of responsibilities among agencies Clear communications among agencies
de la Torre and Ize (2009)	Regarding innovation and uncertainty in the financial system, the supervisor needs to play an enlightened role. To keep financial innovation under control, the supervisor can no longer be a cop, but must be half scout, half moderator working in close contact and cooperation with supervised institutions and markets. This requires strong and independent supervisory agencies, populated by highly skilled civil servants.
Enriques and Hertig (2010)	Strengthening internal and external governance of supervisors: <ul style="list-style-type: none"> ● Strong CEO’s with boards and commissions’ powers limited to basic policy-making decisions and monitoring ● Increased line responsibilities for staff ● Subjecting supervisors to stronger disclosure requirements ● Increased line responsibilities for staff
FSA (The Turner Review) (2009)	Need for more intrusive supervision, more outcomes-oriented supervision, more risk-based supervision Need for more “systemic” supervision Need for international coordination of supervision
Brunnemeier et al (2009)	Need for more “prompt corrective action”-type of rules in order to facilitate “leaning against the wind”
Palmer and Cerutti (2009)	“Summoning the Will to Act” by: <ul style="list-style-type: none"> ● More leaning against the wind ● Strengthening the context of supervision (independence, leadership, accountability) ● Strengthening supervisory processes by making them more (i) intensive, (ii) result-oriented, (iii) risk-based, and (iv) proactive. ● Strengthening macro-prudential surveillance and mitigating pro-cyclicality ● Improving cross-border supervisory cooperation
Tabellini (2008)	Organization of supervision at the European level in order to overcome the deficiencies inherent in supervision at the national level.
Viñals et al (2010)	More intrusive supervision Skeptical but proactive supervision Comprehensive Adaptive Conclusive Through: (i) enabling legislation and budgetary resources; (ii) clear strategy; (iii) robust internal organization; (iv) effective coordination with other agencies; To be created through (i) clear mandate; (ii) independence and accountability; (iii) skilled staff; (iv) healthy relationship with industry; and (v) partnership with board.
Weder di Mauro (2009)	More independence and accountability for supervisors to address time-inconsistency issues Higher compensation levels for supervisors Supervision at supranational levels (Europe) to eliminate local industry capture
Wellinck (2011)	Need for “Intrusive supervision”

Appendix 1 – Data Description

Variables	Definition	Description	Source
Dependent variable			
GDP growth (annual %)	Annual Growth of Gross Domestic Product in current US dollars		World Development Indicators
Independent variables			
FSHH Index	Financial Supervision Herfindahl Hirschman Index	level of consolidation of the supervisory powers	our calculation
CBSS Index	Central Bank Supervisory Share Index	level of central bank involvement in supervision	our calculation
Govrating	Supervisory Governance	quality of supervisory governance	Quintyn et al. 2004
Macro variables			
GDP per capita (current US\$)	Gross per capita Domestic Product in current US dollars		World Development Indicators
log_GDP	Logarithmic transformation of GDP per capita		
Population, total	Population		World Development Indicators
log_pop	Logarithmic transformation of Population		
Regulatory Variables			
Reg Qua	Regulatory Quality	This is a sub-component of the Worldwide Governance Index computed by the World Bank. Regulatory quality is a measure of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. It is based on surveys of firms and industries and on the assessment of commercial risk rating agencies, non-governmental organizations and various multilateral aid agencies and public sector organizations. For example, it includes the assessment of the World Economic Forum global competitiveness report. It considers price liberalization, competition policies in various sectors, discriminatory taxes and tariffs, trade and exchange rate controls, access to capital markets.	Worldwide Governance Index, World Bank
CreditMktReg0406	Banking Regulation Quality	This includes ownership of banks (percentage of deposits held in privately owned banks), competition (the extent to which domestic banks face competition from foreign banks), extension of credit (percentage of credit extended to the private sector) and	Fraser Institute, Economic Freedom Network

		presence of interest rate controls.	
Finreg7305	Financial Regulation Quality	This includes seven different dimensions: credit controls and reserve requirements, interest rates controls, entry barriers, state ownership, policies on securities markets, banking regulations, capital account restrictions	Abiad et al. 2008
Financial Variables			
DepMoneyBankAssetsShare	DEPOSIT MONEY BANK ASSETS / (DEPOSIT MONEY + CENTRAL) BANK ASSETS	Ratio of deposit money bank claims on domestic nonfinancial real sector (as defined above) to the sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector (as defined above)	World Bank Financial Structure Dataset
LiqLiab/GDP	LIQUID LIABILITIES / GDP	Ratio of liquid liabilities to GDP, calculated using the following deflation method: $\{(0.5) * [F_t/P_{e,t} + F_{t-1}/P_{e,t-1}]\} / [GDP_t/P_{a,t}]$ where F is liquid liabilities, P_e is end-of period CPI, and P_a is average annual CPI	World Bank Financial Structure Dataset
CBAAssets	CENTRAL BANK ASSETS / GDP	Claims on domestic real nonfinancial sector by the Central Bank as a share of GDP, calculated using the following deflation method: $\{(0.5) * [F_t/P_{e,t} + F_{t-1}/P_{e,t-1}]\} / [GDP_t/P_{a,t}]$ where F is Central Bank claims, P_e is end-of period CPI, and P_a is average annual CPI	World Bank Financial Structure Dataset
DepMoneyBankAssetsGDP	DEPOSIT MONEY BANK ASSETS / GDP	Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP, calculated using the following deflation method: $\{(0.5) * [F_t/P_{e,t} + F_{t-1}/P_{e,t-1}]\} / [GDP_t/P_{a,t}]$ where F is deposit money bank claims, P_e is end-of period CPI, and P_a is average annual CPI	World Bank Financial Structure Dataset
PrivateCreditBanks	PRIVATE CREDIT BY DEPOSIT MONEY BANKS / GDP	Private credit by deposit money banks to GDP, calculated using the following deflation method: $\{(0.5) * [F_t/P_{e,t} + F_{t-1}/P_{e,t-1}]\} / [GDP_t/P_{a,t}]$ where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI	World Bank Financial Structure Dataset
PrivateCreditTotal	PRIVATE CREDIT BY DEPOSIT MONEY BANKS AND OTHER FINANCIAL INSTITUTIONS / GDP	Private credit by deposit money banks and other financial institutions to GDP, calculated using the following deflation method: $\{(0.5) * [F_t/P_{e,t} + F_{t-1}/P_{e,t-1}]\} / [GDP_t/P_{a,t}]$ where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI	World Bank Financial Structure Dataset
BankDep	BANK DEPOSITS / GDP	Demand, time and saving deposits in deposit money banks as a share of GDP, calculated using the following deflation method: $\{(0.5) * [F_t/P_{e,t} + F_{t-1}/P_{e,t-1}]\} / [GDP_t/P_{a,t}]$ where F is demand	World Bank Financial Structure Dataset

		and time and saving deposits, P_e is end-of period CPI, and P_a is average annual CPI	
FinSystemDep	FINANCIAL SYSTEM DEPOSITS / GDP	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP, calculated using the following deflation method: $\{(0.5) * [F/P_{et} + Ft-1/P_{et-1}] / [GDP/P_{at}]$ where F is demand and time and saving deposits, P_e is end-of period CPI, and P_a is average annual CPI	World Bank Financial Structure Dataset
BankCredit/Dep	BANK CREDIT / BANK DEPOSITS	Private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks.	World Bank Financial Structure Dataset
LiqLiab	LIQUID LIABILITIES (IN MIL. 2000 USD)	Absolute value of liquid liabilities in 2000 US dollars	World Bank Financial Structure Dataset
BankCosts/Assets	BANK OVERHEAD COSTS / TOTAL ASSETS	Accounting value of a bank's overhead costs as a share of its total assets.	World Bank Financial Structure Dataset
NetIntMargin	NET INTEREST MARGIN	Accounting value of bank's net interest revenue as a share of its interest-bearing (total earning) assets.	World Bank Financial Structure Dataset
Concentration	BANK CONCENTRATION INDEX	Assets of three largest banks as a share of assets of all commercial banks.	World Bank Financial Structure Dataset
Internationalization	BANK INTERNAZIONALIZATION INDEX		World Bank Financial Structure Dataset
Conglomerates	CONGLOMERATES INDEX		World Bank Financial Structure Dataset

Appendix 2 – Data Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
gdpg~9annual	99	1.196623	3.724454	-11.2834	9.35
gdpg~6annual	102	5.360026	2.63548	-4.7	12.82556
pop	102	48.42103	161.4267	0.281333	1260.827
logpop	102	1.04793	0.704866	-0.55078	3.100655
gdp	102	364.5169	1207.966	1.542372	10853.19
gdppop	102	24.10921	82.61692	0.03812	662.2144
loggdpop	102	0.618394	0.819486	-1.41885	2.820999
regqua9606	102	0.344608	0.84381	-1.84	1.85
bankreg0406	97	8.405155	1.032833	5.1	9.9
finreg7305	73	0.821507	0.142884	0.45	1
fshh2007	99	0.582424	0.284706	0.15	1
cbss2007	99	0.313535	0.321855	0	1
govrati~2007	50	0.63	0.105463	0.4	0.9
liqliab0406	87	0.622335	0.449431	0.146818	3.298681
fsdep_0406	91	0.587035	0.466316	0.082607	3.260568
priced~0406	91	0.629019	0.497358	0.055888	2.026815
cbasset0406	86	0.04596	0.061069	0.000134	0.396019
banksas~0406	96	0.902515	0.128048	0.38469	0.999917
bankdep0406	91	0.58012	0.463312	0.082607	3.260568
bankcos~0406	100	0.040384	0.022016	0.009241	0.111793
netintm~0406	100	0.04745	0.040204	0.007704	0.361475
bankcre~0406	102	1.042165	0.540537	0.26653	3.273302
concentrat~n	80	68.04188	19.30137	21	100
internazio~n	76	33.14303	29.52574	0	100