

Bank Supervisor Independence and the Health of Banking Systems Evidence from OECD Countries

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Abstract

This paper aims to measure the independence of bank supervisory agencies and its effects on banking system soundness. Building on a new dataset, it first examines legal bank supervisor independence across OECD countries. Central-bank supervisors tend to be more independent than separate supervisory agencies. Moreover, the higher bank supervisor independence, the less integrated financial sector supervisors. The empirical analysis then suggests that independent bank supervisors have a higher credibility in banking markets, and market reaction to higher independence is reflected in higher ratings of banking system soundness. The effect strengthens at high levels of adherence to the rule of law. In contrast, legal independence from industry is found positively but not robustly related to the health of banking systems, suggesting that supervisory capture is not necessarily destabilising.

JEL Classification: G21, G28, K23, L50

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1 Introduction

Over the past two decades there have been over a hundred full blown systemic banking crises affecting almost a hundred countries. Advanced economies have not been immune to banking disruptions, as twenty-four countries of the Organisation for Economic Co-operation and Development (OECD) experienced some form of banking sector distress (Demirgüç-Kunt and Detragiache 2005). So as to reduce their exposure and vulnerability to banking crises, many countries undertook significant market reforms during the 1990s through bank consolidation, privatisation, and foreign entry. This transformation went hand in hand with usual policy prescriptions including pursuing stable macroeconomic policies, enhancing the regulatory and supervisory framework, and improving creditor rights and insolvency procedures. To ensure the credibility of reforms, governments decided to implement institutional changes in a highly visible way by establishing or enhancing authorities responsible for financial supervision.

Just as central bank independence is now fairly ubiquitous, financial supervisor independence has gained momentum, especially in the last decade. Elected officials in many countries apparently understood the incentives under which they operate and structured guarantees of independence for financial supervisors in a way that is comparable to monetary policymakers. First stressed in the Basel core principles for banking supervision (Basel Committee on Banking Supervision 1997), financial supervisor autonomy is now generally accepted as a standard institutional reform to achieve and maintain a credible policy regime. Credibility premium can be achieved by delegating authority over financial supervision to an autonomous agency with clearly defined objectives and sufficient authority to achieve those mandated objectives, while at the same time remaining accountable to the government to ensure checks and balances (Quintyn and Taylor 2002; Hüpkes, Quintyn and Taylor 2005). Be that as it may, legal independence in financial supervision implies that the supervisory agency is able to resist the hidden hand of government *and* industry.

Why is legal independence conducive to banking system quality? Financial supervisory policy, like other public policies, mostly operates through expectations. What notably governs the health of the financial system is the *ex ante* expectations of market participants, which anticipate disciplinary action in cases of non-compliance with prudential standards and thus adopt appropriate risk-adjusted capital cushion and management systems. Yet, on one level,

political interference generates time-inconsistent policy-making, including case-by-case exemptions from prudential requirements, delayed resolution of problem banks and repeated public bailouts, which dilutes incentives to behave prudently. On a second level, supervisory capture leads supervisory agencies to relax prudential standards and/or enforcement. Delegation of authority to independent supervisory agencies is a commitment device to convince market participants that discretionary policy would not yield to opportunism. Legal financial supervisor autonomy enhances policy credibility by ensuring financial supervisors abide by legal requirements. Such a commitment device is no exclusive solution to credibility problems, however. Policy-makers may build up a reputation for supervisory discipline by acting promptly and consistently over time (for a discussion, see, e.g., Goodhart et al. 1998).

The case for more effective governance arrangements for financial supervisors has remained virtually unquestioned until recently. A small body of research has investigated the impact of organisational structure, but most of that work has been conceptual, as opposed to empirical (Abrams and Taylor 2000; Quintyn and Taylor 2002). What is more, the rare empirical evidence is rather inconclusive. While Das, Quintyn and Chenard (2004) and Podpiera (2004) give empirical support to the claim that good regulatory governance positively impacts financial system soundness, another strand of research on the efficacy of bank supervisory framework reaches ambiguous findings (Barth et al. 2003; Barth, Caprio and Levine 2004). Although the premises for financial supervision autonomy have been fully acknowledged in international standards and codes, empirical support is not compelling. This paper tries to remedy this situation.

Using a new dataset on legal bank supervisor independence across OECD countries, this paper examines the effects on banking system quality of delegation in banking supervision. Its main goal is to get cross-country indications of the credibility-enhancing effect of institutional reforms that strengthen bank supervisor independence. The paper focuses on prudential supervisors of banks for reasons of data availability. Limiting the analysis to the banking system is not a major drawback, since banking sector soundness has a predominant impact on the financial system (for a similar stance, see, e.g., Das, Quintyn and Chenard 2004). The remainder of the paper is organised as follows. Indexes of legal independence from both government and industry are presented in Sections 2 and 3 with practical references to the governance of supervisory agencies in OECD countries. Section 4 proposes an analytical framework for classifying agencies according to their legal autonomy. The empirical

relationships between legal independence and the health of banking systems are investigated in Section 5. The final section concludes.

2 Legal Independence from Government

Industrial countries have made different choices about the most appropriate institutional organisation of banking supervision. The trend toward integrated financial supervision has been prominent in the past decade (Eihák and Podpiera 2006). A majority of OECD countries today vests responsibilities for banking supervision in separate administrative agencies, fourteen of which are integrated (see Table 1). At the same time, central banks continue to undertake bank supervisory functions in ten countries. There are some hybrid cases. The Irish Financial Services Regulatory Authority was established in 2003 as an autonomous and separately accountable authority within the Central Bank and Financial Services Authority of Ireland. By contrast, the *Commission Bancaire*, albeit a state service, is placed under the tutelage of the Bank of France and chaired by the Governor. The United States has a multiple-supervisor framework whereby banks are primarily supervised by one of four distinct federal agencies: the Office of the Comptroller of the Currency (OCC), the Federal Reserve System (Fed), the Federal Deposit Insurance Corporation (FDIC), and the Office of Thrift Supervision (OTS).¹

Legal bank supervisor independence is a spectrum. Supervisory agencies operate at varying arm's length from government across countries. At one end of the spectrum, the government chooses policies directly. An example was the Austrian Federal Finance Ministry, which had discharged banking supervision responsibilities until 2002. At the opposite extreme, a law gives government ministers no power to intervene in and direct on the supervisory agency's decision-making. Agencies may combine many of the features typically associated with autonomous administrative bodies, such as commissioners with fixed terms and funding kept at arm's-length from the government's general budget process. A case in point is the Financial Market Authority, the Austrian Ministry's successor as integrated supervisor, whose

¹ The OCC has authority over national banks; the Fed is responsible for state member banks, i.e. state banks that are members of one of the twelve Federal Reserve Banks, and for bank holding companies; the FDIC supervises state banks that are not members of the Federal Reserve System; the OTS supervises savings institutions. As the OCC supervises up to 80% of the top 50 commercial banks' assets (see, e.g., Petschnigg 2005), legal indexes of independence are primarily based on the OCC.

independence is established by constitutional provision. In reality, most cases fall between these extremes. Full independence is a rare phenomenon, and purposely so. Supervisory agencies exercise disciplinary powers and allocate property rights, they are typically not independent from public accountability mechanisms. Nor do they exercise their powers in a legislative vacuum. Provisions to make supervisory activities transparent further guard against bureaucratic 'drift', i.e. supervisors pursuing narrow, private goals rather than mandated ones.

In the spirit of Cukierman (1992), the selection of variables of legal bank supervisor independence was driven by three main considerations: earlier literature on central bank independence, the specificity of prudential supervision and tractability (Table A-1). It accommodates cross-country differences in the institutional organisation of banking supervision, as undertaken in separate agencies and/or central banks. The set of sixteen legal variables ranges over four components of personnel, goal, instrument, and budgetary independence, namely (i) the appointing procedures, terms of office and dismissal of the agency head; (ii) the policy goals of the agency; (iii) its range of policy instruments available to achieve policy goals; and (iv) its source of and control over funding. Based on national supervisory agency/central bank laws and/or banking laws, each variable is coded on a scale from 0 to 1, with higher scores reflecting higher level of independence. The summary index is aggregated in two steps. The component indexes are calculated as a mean of their underlying indicators, before being aggregated with equal weights into a single index.²

Figure 1 ranks OECD countries according to the summary index. Data refer to the situation at year-end 2004. The legal independence of supervisory agencies varies noticeably between countries with the index ranging from 0.32 to 0.79. Finland, Greece, and Poland have the highest legal independence from government, while Japan, Mexico, and Norway have the lowest scores. The presumption that central-bank supervisors are likely to be more independent than their counterparts operating from separate agencies is empirically grounded (Goodhart et al. 1998: 55). Analyses of variance suggest that central-bank supervisors have higher average independence when compared to separate bodies (average index of 0.69 against 0.58) and the difference is statistically significant. Above all, this pattern is due to personnel

² It is hard to see how the construction of the variables and the aggregation of the index could be best done. For robustness, though, the summary index was also calculated using weighted averages. The index and ranking of countries are robust to these changes with slight variations (cf. Section 5.5).

and budgetary independence components, which score systematically higher for central banks (average indexes of 0.52 and 0.93 against 0.38 and 0.72 respectively).³

Banking supervision undertaken in-house in central banks indirectly benefits from many of the institutional features typically associated with independent central banks, such as governing board members with fixed and long terms and the nominal ability to manage revenues and expenditures without directions from the government. On the other hand, the physical location of supervisors is neither related to goal nor to instrument independence. Indeed, central bank does not perform better in terms of formal autonomy in the formulation and execution of supervisory policy. One must notice that while central-bank supervisors derive their autonomy from the legislative framework of central banks, supervision and monetary policy functions do not necessarily enjoy similar degrees of independence. The Bank of England, when it was the bank supervisor, was accorded greater autonomy in the supervisory field than for the execution of monetary policy. In contrast, the Bank of France or the Bank of Spain were granted lower autonomy with respect to the conduct of banking supervision than for monetary policy, the latter of which was inherent in the move to the Economic and Monetary Union.

The various components offer further contrasts. Firstly, central banks, which are ranked among the most personnel-independent supervisors, collect the widest possible spectrum of institutional safeguards designed to protect their senior officials from harsh, short-term political retaliations. Most of them gain points in the ranking because of the long duration of their head's term of office, from five-year to lifetime mandate, as in the case of the Bank of Italy.⁴ Typically, the reasons for a possible dismissal are strictly specified and restricted to non-policy concerns such as serious misconduct. In contrast, appointing procedures often remain highly political, regardless of the institutional set-up of supervision. Parliamentary approval of presidential or government appointees is required in a few cases only, e.g., the National Bank

³ Results are robust even though the groups of central banks and separate agencies are not homogeneous in variances. Brown-Forsythe F-tests assuming heterogeneity of variances yield qualitatively similar results.

⁴ Following the resignation of the then Governor, Antonio Fazio, over a banking scandal in December 2005, recent legislative reforms have reduced *de jure* personnel independence. Once-renewable, six-year terms for the Bank's governorship have been entrenched. Nominating procedures have also been changed, with the government now putting forward its candidate to the President of Italy following consultations with the Bank's Board of Directors. Previously, the Governor was nominated by the Board and officially appointed by the President. The political acceptability of full personnel independence, this example suggests, is rather limited.

of Poland's Commission for Banking Supervision and the OCC. Secondly, most bank supervisors have legislative mandates and therefore do not have full goal independence. Conversely, a goal-*dependent* bank supervisor is a rare occurrence, due to the multiplicity of policy targets, of which most are non-measurable. The Danish Financial Supervisory Authority, although being personnel-dependent, is ranked among the most goal-dependent supervisors, since the interpretation of legislation rests exclusively with the agency. Conversely, the Bank of Italy, in the performance of its supervisory functions, shall comply with the bank supervisory resolutions of the Inter-Ministerial Committee on Credit and Savings, which retains discretion to set, and pursue shifts in, the policy targets.

Thirdly, legal provisions that confer and protect full instrument independence abound. The Irish Financial Services Regulatory Authority "has power to do whatever is necessary for or in connection with, or reasonably incidental to, the performance of its functions". In performing its duties, the Austrian Financial Market Authority "shall not be bound by any instructions". Conversely, provisions of instrument dependence also exist. In Australia, "the Minister may give [the Australian Prudential Regulation Authority] a written direction about policies it should pursue, or priorities it should follow, in performing or exercising any of its functions or powers". While the bulk of supervisory agencies perform ongoing prudential supervision with ultimate authority, they do not necessarily have hands-on involvement in authorisation and enforcement. One-third of agencies are simultaneously authorisers, supervisors, and enforcers. Authorisation, however, is subject to political intervention in no less than one-third of cases. Fourthly, a majority of supervisory agencies derive revenue independently from the government's general budget process, either through levies paid by industry or via central bank's budget process. Hybrid cases abound, though. The Korean Financial Supervisory Commission is funded through assessments paid by supervised institutions, levies on securities trading activities, and contributions from the central bank. The OCC funds its operations by assessments on national banks and revenues from its investment income. Japan's Financial Services Agency and the Swedish Financial Supervisory Authority, whose running costs form part of the government budget, are close to having no budgetary independence.

3 Legal Independence from Industry

In the aftermath of widely publicised bank failures in the United Kingdom, the Treasury Committee of the House of Commons expressed its serious concerns “as to whether the Bank [of England], as [the then] supervisor, [was] sufficiently divorced from the culture of the banking industry to enable it to operate as a genuinely independent supervisor and regulator” (Treasury and Civil Service Committee 1995: para. 108). In fact, some governments resist hand over discretionary powers to supervisory agencies precisely on the grounds that supervisory capture needs to be contained. Since the banking industry has a strong interest in prudential supervisory policy given distributional implications, the supervisory system may be especially susceptible to capture. Banks attempt to influence prudential rule-making and enforcement through a variety of courses of action, including public statements, lobbying, and warnings of non-compliance. There is some evidence that capture has influenced supervisory decisions affecting banks (for evidence, see, e.g., Hardy 2006). This section examines the extent to which specific statutory provisions enables bank supervisors to resist the entreaties of outside pressure, regardless of the degree of independence from government (Table A-2). The six legal variables cutting across both components of personnel and operational independence are aggregated in a similar fashion as the sister summary index of independence from government. Figure 2 ranks industrial countries according to the summary index.

Legal independence is not uniform across countries, with the summary index ranging from 0.25 to 0.92. The difference of means between central banks and separate agencies (0.63 against 0.66) is not significant. Alternatively, the level of collusion-proof provisions is found to be significantly different between the legal origins of countries, with the six common law countries outperforming any other legal origin sub-groups (0.82 against 0.61 and 0.57 for French and German legal traditions respectively).⁵ The most pronounced differences are found in the component index of instrument independence. The Anglo-Saxon legal and bureaucratic tradition, whereby substantial importance is placed on transparency in public life and individual supervisors are given the widest possible statutory protection, finds no equivalent under any other jurisdictions. A caveat remains that this summary index is subject to qualifications and interpretational limitations. Provisions (and hence legal indicators) designed to resist industry

⁵ Countries are classified according to their predominant English, French, German, Scandinavian or Socialist legal origin. For a set of dummy variables representing differences in legal origins, see, e.g., La Porta et al. (1998).

capture are far less sophisticated and comprehensive in scope than the battery of protections against political intrusion.

Firstly, personnel independence guarantees aim at closing the 'revolving door'. It is almost established that the supervisory agency's head and board members are prohibited from holding an interest, either directly or indirectly, in any supervised institution during the time they are in office, that is, as shareholder, director, manager or officer. In most countries, this requirement is also understood to apply to all officers. In the United States, OCC examiners are prohibited from holding a position in a bank and OCC ethics policies extend this prohibition to all covered employees. At the same time, pecuniary incentives are designed to minimise risks of accommodative stance. Ten countries have decoupled the rate of pay in the agency from those on offer in the rest of the public administration. Finally, a strong minority of countries (27%) have enacted provisions regarding subsequent service. In Spain, the Governors may not be employed in a financial institution within two years after their term of office expires. These requirements sometimes extend to covering all officers. For example, Japanese supervisors are not allowed to work for institutions with which they have had a supervisory relationship for two years after leaving the service.

Secondly, notwithstanding informal avenues through which pressure groups may affect policy outcomes, a variety of operational buffers against undue interference from industry have been implemented in laws. Legal protection for supervisory agencies and individual supervisors for actions taken in good faith in the course of performing supervisory duties is in force in nineteen countries. Conversely, the agencies and their staff in Italy, Mexico and the Netherlands do not enjoy any form of legal protection. In connection with the adoption of prudential rule-making, standardised and transparent consultation procedures, which enable interest parties, including consumers, to contribute by means of public discussion, are entrenched in ten countries. The United Kingdom's Financial Services Authority (FSA) is required to formally consult practitioners and consumers when making policy or rules; moreover, any proposed rule must be published in a proposed form and be subject to open consultation. In France, even though consultation is organised through a consultative body, the process is not public. Anglo-Saxon jurisdictions also feature the most comprehensive

procedural mechanisms in connection with rule enforcement, including justifications of decisions, opportunities for judicial reviews, and venues for appeal.⁶

4 How Independent Are Bank Supervisors?

Based on data description, this section summarises some properties of both summary indexes. To start with, how do indexes relate to the level of economic development? With respect to independence from government, a cross-country comparison indicates that the most independent supervisors have not been established in the more advanced economies (Figure 3). This is not surprising since many of the less advanced OECD countries experienced significant institutional reforms to implement good practices in monetary and financial policies. These changes notably place central-bank supervisors in transitional countries (Poland, Slovak and Czech Republics) among the top ten authorities in terms of legal independence. Incidentally, these reforms illustrate the strategy, as recommended by Abrams and Taylor (2000), of concentrating supervisory powers in the hands of central bankers in countries where financial expertise might be sparsely available and where central banks offer stronger guarantees of independence. As to independence from industry, the level of institutional safeguards is, by contrast, positively related to cross-country differences in GDP per capita. This is a characteristic that arguably goes beyond banking supervision. Countries which rank high in wealth tend to have better institutions, including predictable, inclusive and transparent decision-making processes.

Remarkably, central-bank supervisors cluster in countries which rank lower in GDP per capita. Average GDP per capita of countries where banking supervision is undertaken in-house in central banks is indeed significantly different and lower than the average wealth of countries, which allocates supervisory responsibilities to separate agencies (about USD 12,000 against 22,000). Quite clearly, there has been some recent trend towards hiving off banking supervision to separate agencies and this was initiated in the more advanced economies. Last but not least, the higher bank supervisor independence, the less unified financial sector

⁶ In British law, the taking of an action requires the servicing of formal warning and final decision notices setting out reasons for the action; the disclosure of relevant evidence by the FSA; and the allowing of a period for representations to the institution and third parties concerned.

supervision.⁷ The degree of integration of supervisors is negatively and significantly related to legal independence from government. This suggests that policy-makers arbitrage financial supervision integration and independence. Unsurprisingly, they fear the creation of overly powerful ('leviathan'), integrated agencies and retain, if need be, the authority to influence, control and /or rescind agency decisions.

How do component and summary indexes relate to each other? As regards independence from government, it may be useful to distinguish between personnel independence, on the one hand, and goals, instrument, and budget independence, on the other (Table 4). As could have been expected, delegation of decision-making powers over goal, policy, and budget formulation co-vary positively. Personnel independence, however, exhibits slightly positive but non-significant correlation coefficients with other component indexes. Importantly, this suggests that the potential trade-off between bank supervisor independence and accountability may be circumvented by playing an individual trait of independence against another. Delegation arrangements involve political decisions over the appropriate mix of factors of independence, the interplay of which may be summarised in a 2×2 matrix (Table 5). A popular compromise aims at ensuring that the supervisory agency is independent in making supervisory decisions but nonetheless responsive to an elected administration's policy goals. Accountability is facilitated – though independence is proportionally discounted – through the terms and conditions appointees are subject to. The executive branch may, for example, monopolise appointment procedures and arrange short and renewable terms. Austria and Denmark fall into this category (Quadrant I).

The reverse model combines high personnel independence and low decision-making autonomy (Quadrant III). The nominal ability to make decisions is generally subject to approval from and override by the government and/or the legislature. Accountability is not achieved through the appointment process, but through regular oversight by another arm of the state. The appointment of top supervisors endowed with long terms and no possibility of reappointment remains an intangible contributor to independence. Ireland and Korea fit within this quadrant. Whether such an arrangement may translate into higher aggregate

⁷ Masciandaro (2004) developed a measure of financial authorities' concentration (FAC) ranging countries on a seven-point scale from maximum unification ('megaregulators') to maximum decentralisation (atomised supervisory agencies in banking, insurance and securities markets).

independence than quadrant I outcome is disputable, however.⁸ Finally, the strongest (weakest, respectively) possible regimes combine high (low) scores on each component. In Quadrant IV, the arsenal of institutional safeguards to protect the supervisor from political interference or retaliation is almost complete. Full independence, however, is not possible or even desirable. Even the most benign accountability mechanisms interfere with independence. At the extreme, full independence may be just unconstitutional. Japan's Financial Services Agency, for example, would have no direct powers in public law if it was not placed under a central government department.⁹

Independence from industry may provide a third dimension to the 2×2 matrix. Table 4 shows that there are slightly positive yet not significant relationships between both summary indexes and between most pairs of component indexes. Only the correlation coefficient between both indexes of personnel independence is statistically significant. This relationship, however, is in line with what one would probably expect: high personnel independence from political meddling is granted against strong assurances of independence from market interests. Overall, it turns out that the consistency of independence from both government and industry is not seriously compromised. Though not robust, the correlation coefficient between both summary indexes is positive in sign. With inverse summary indexes (0.36 and 0.83 for LBSIG and LBSII respectively), only Japan strictly goes against the tide. The FSA's enhanced level of independence from industry, which was prompted by a series of corruption scandals in the late 1990s (see, e.g., Amyx 2004), is discounted by the relative lack of political independence. While this delegation arrangement provides the industry with an alternative avenue to lobby at high political levels, an upfront advantage is that private pressures are mediated through democratic institutions.

It should be emphasised that our discussion covers only institutional safeguards found in statutes and, therefore, leaves open the question of whether countries have consistent practices. Formal independence, as important as the concept is, does not effectively convey the

⁸ It is clear, though, that the summary index, given that it is calculated as the unweighted average of the four component indexes, under-weighs the contribution of personnel independence. Arguably, further investigation in this context should draw on detailed comparative case studies.

⁹ The Japanese government argued that "further independence from the Cabinet means that the JFSA should transcend democratic control based on the Constitution" (International Monetary Fund 2003). The JFSA was hence formed as an 'external agency' of the Prime Minister's office.

full richness of the relationship of the supervisory agency with politicians and market participants. After all, informal relationships have much to do with personalities, institutional history and traditions. Even where the law clearly allocates decision rights, imperfect compliance with the law lessens the effectiveness of legal protections. An example is the chairmanship of the Korean FSC, which have been politicised almost by tradition. The FSC has had five chairmen in a row since its inauguration in 1998, even though the law offers a strict security of tenure in the form of a three-year term. As shown in the field of central banking (for a review of evidence, see, e.g., Eijffinger and de Haan 1996), legal measures of agency independence is not a good proxy for actual independence in developing and emerging countries where the rule of law is not as established as in the more advanced economies.

On the other hand, even if the door is being left wide open to external interference, it is impossible to state categorically that a low level of legal independence will inevitably lead to politicisation or lobbying at high levels. An agency may be behaviourally independent and treated as such by society and government, although its statute does not ascribe it as much legal independence as other agencies. The Monetary Authority of Singapore is a case in point. Beside the hardly measurable effect of capable, respected and politically astute personalities, this paper considers, in the empirical section, two factors that are likely to bear on the effectiveness of legal independence. First, effective independence may be higher depending on the 'age' of the supervisory agency, particularly for the first few years. Institutional maturity contributes to the development of a sense of purpose and operational capacity within the organisation. Second, central banks and, to some extent, 'megaregulators' may achieve a higher level of prestige in comparison to other administrative agencies. Institutional prestige derived from the underlying organisational structure enhances the capacity to resist political pressure or sectoral influence.

5 Empirical Relationships

5.1 Methodology

To get a sense for the patterns in the data, this section first examines bivariate correlations among indexes of legal bank supervisor independence and banking system soundness, as measured by Fitch's system average individual rating (SAIR) and Moody's average bank financial strength index (ABFSI). It then estimates various multivariate regressions to explore

whether higher legal independence is related to banking system soundness. It regresses banking system soundness indexes on legal bank supervisor independence variables, after controlling for relevant macroeconomic, market and institutional factors suggested by existing literature. It refines cross-sectional results by testing whether effects of bank supervisor independence are robust to using different samples of countries. Given the heterogeneity among countries, we notably use a sub-sample of high-income countries, which results in transitional and emerging economies dropping out of the full sample.¹⁰ Acknowledging the scarcity of observations, this separation allows finding potential differences in the role of our objective variables in differentiated groups. It finally assesses the robustness of results to conditioning on additional country specific traits.

Since indicators of banking system soundness are converted into numerical ratings, the parameters of interest can be most simply estimated using ordinary least squares (OLS) regressions with robust standard errors. An ordered probit could provide an alternative model to estimate the parameters of interest. Yet, due to the small number of observations, this method is not applicable. To minimize this problem in the OLS regressions, to the extent possible given the characteristics of the study, we include the fewest control variables. There are further issues to take into account in such cross-sectional regressions. The first is heteroscedasticity, given the structural differences between countries. We regress with robust standard errors to minimise this problem. Collinearity problems do not seem too large on the basis of relatively low correlations between regressors. Endogeneity is another potential problem, which is particularly difficult to tackle. To mitigate possible simultaneity biases, we measure right-hand-side variables at dates earlier than the dependent variable. Also, to reduce measurement error, we average control variables over 1993-2002 or 1998-2002 according to data availability. Table 2 provides details of the variables and their data source.

5.2 Banking system strength

There is no single, standardised way to assess the strength of banking systems. The bulk of the research has focused on three set of indicators of banking conditions, namely financial

¹⁰ Following the World Bank (2005), high-income OECD economies are those in which 2004 GNI per capita was USD 10,066 or more (that is, 24 countries in total). The Czech and Slovak Republics, Hungary, Poland, Mexico, and Turkey drop out of the sample.

statement information, market data and financial strength ratings. Indicators based on bank financial statements, including bank profitability, asset quality, and capital adequacy, are a starting point for the analysis of the ability of banking sectors to withstand possible disturbances. High values of non-performing loans to total loans (NPLs) or to equity capital reflect the aggregate low quality of bank loans. Bank regulatory capital to risk-weighted assets (henceforth capital adequacy ratios, CARs) close to required minimums together with low profitability signal severe weakness in the banking sector and point to low ability to absorb adverse shocks. Although CARs and whether they meets or exceeds the 8% Basel minimum have become important information of capital strength, they do not provide by themselves the full picture of the health of banks, their past and long-term prospects. Banks with sustained earnings streams and advanced risk management systems may operate prudently with significantly less capital for a given level of risks.¹¹ Above all, there is still plenty of scope for the convergence of national definitions with prudential indicators, which considerably hampers cross-country comparisons.

Further insights on conditions in the banking industry can be gained by using financial market information. Most recent advances rely on interest rate spreads on bank debt, the issuance of banking-related debt, stock return, and expected default frequencies. While the aggregation of these indicators and their dispersion provide forward-looking signals of banking sector fragility, the research focus has been mainly on internationally active banks operating in the most advanced financial markets.¹² Unfortunately, these indicators are not applicable for a wide cross-section of countries. Given the shortcomings of market signals and financial ratios, the empirical analysis opts for system-wide financial strength ratings developed by the major rating agencies (Fitch Ratings and Moody's Investors Service). These ratings are designed to assess the intrinsic strength of individual banks, excluding a possible external support. For example, in rating banks' financial strength, Fitch (2004) considers a range of factors including profitability, equity capital and capital adequacy, franchise, management, operating

¹¹ CARs may even provide misleading information about the 'true' capital adequacy of banks relative to their risks, especially in countries that have experienced banking problems (see, e.g., Lindgren 2003). For example, Turkey had an average CAR of 30% over 2002-2004, even though restructuring of state banks, recapitalisation of private banks, and resolution of intervened banks were ongoing.

¹² For a methodological review, see Mörntinen et al. (2005). For empirical evidence, see, e.g., Avesani (2005); Chan-Lau and Gravelle (2005); Gropp et al. (2004); and Hartmann et al. (2005).

environment, and prospects.¹³ Fitch's system average individual rating (SAIR) and Moody's average bank financial strength index (ABFSI), both of which are asset-weighted averages of individual bank ratings, provide an assessment of system-wide bank soundness.¹⁴

5.3 Bivariate correlations

Before conducting the regressions, we briefly look at the correlation matrix between financial strength ratings and legal independence indexes (Table 6). Most objective variables are positively correlated, although in some cases with very low coefficients. While there is no robust pattern in the full sample, correlation coefficients are clearly higher in the more advanced countries. The exclusion of transitional and emerging countries from the sample indeed yields positive and significant correlation, in particular with respect to the summary index of legal independence from government. Independence from government interference is positively related to banking system soundness in more advanced economies.¹⁵ This finding echoes empirical evidence from the literature on central bank independence. The relationship between indicators of central bank independence, based on central bank laws, and inflation is quite robust for industrial countries, whereas the situation is less clear with respect to emerging and developing countries (e.g., Berger, de Haan and Eijffinger 2000). The rule of law is arguably a good proxy to measure the degree of implementation of a country's legal framework, including the possibility of independent institutions to take action. Since law enforcement is tighter in advanced countries than in emerging ones, legal indexes of independence are likely to provide a better proxy for effective independence in the first than in the second group of countries. We shall return to qualify these assumptions below.

¹³ In a similar vein, Moody's (2004) relies on a 'seven pillars' analysis, evaluating operating environment, ownership and governance, franchise value, earning power, risk profile, economic capital analysis, and management priorities and strategies. Standard & Poor's does not assign individual ratings measuring stand-alone financial strength.

¹⁴ Fitch (2005), for example, argues that SAIR is an indication of the average risk of a systemically important bank failing. The author is grateful to Lionel Price (Fitch Ratings) and Pierre Cailleteau (Moody's) for having made ratings and related documentation available.

¹⁵ Although deliberately left outside the scope of the analysis, the entry of CARs yields similar results (Table 6).

5.4 Multivariate regressions

To verify the impact of legal independence on banking system strength, we estimate the correlation between the two variables using a multivariate cross-sectional analysis. Legal independence indexes act as explanatory variables along with a set of control variables. Consistent with recent policy and academic work on the determinants of bank soundness, control variables are used to account for macroeconomic activity, banking system structure, and the broader institutional and governance environment. First, macroeconomic factors that may affect the quality of bank assets and bank profitability include real economic activity (GDP growth) and the rate of inflation (inflation). To condition on additional country characteristics, we include the level of real GDP per capita (GDP per capita) as basic control variable. GDP per capita controls for any country characteristics associated with the level of economic development. Second, two variables capture aspects of banking system structure, the market share of state-owned banks (state ownership) and market concentration (concentration). Last, the broader institutional and governance environment is controlled for by using an index of institutional quality (rule of law).

Table 7 presents cross-sectional regression results for the full sample (columns 1-6) and the sub-sample composed of more advanced economies (columns 7-9). It reports standardised coefficients so that the estimated effects of those variables can be compared directly. The reference dependent variable is SAIR. Overall, results suggest that, once sample and country characteristics are controlled for, differences in legal independence from government always add explanatory power to the regressions. Higher legal independence tend to strengthen banking systems at any given level of economic development, and does so the more prevailing is the rule of law. In contrast, the multivariate analysis confirms the positive but not significant association between legal independence from industry and bank strength found in the bivariate correlations.

Column (1) presents our baseline specification for the full sample. The coefficient of the summary index of legal independence from government is positive and significant once the level of economic development is controlled for. GDP per capita enters positively and significantly throughout, confirming that higher levels of economic development notably results in higher asset quality in banks. The positive relationship between legal independence and bank soundness is robust to the addition of macroeconomic and banking market control

variables, as indicated in columns (3)-(4). State ownership makes banking systems more fragile.¹⁶ The coefficient on market concentration is slightly positive but not significant, suggesting that there is no particularly robust relation between market structure and the health of banking systems.¹⁷ Real GDP growth and inflation are found statistically insignificant. We also explore possible threshold effects by interacting legal independence with a measure of institutional quality. Column (5) controls for each country's possibilities to apply the law by interacting the rule of law with the index of legal independence. Because the index of rule of law is highly correlated with the level of development, the regression does not include GDP per capita so as to avoid collinearity problems. The interaction term is positive and statistically significant, indicating that an increase in legal independence has a stronger impact on bank soundness at high levels of rule of law, i.e. in all high-income countries.

Cross-country regressions for the sub-sample (column 7) clearly confirm that legal independence is associated with bank strength in the most advanced countries. Moving to control variables, real GDP growth now enters positively and significantly (column 9). This suggests that benign macroeconomic conditions contribute to banking system strength in high-income economies. The results found for the other control variables are consistent with those reported for the full sample. The relationship between legal independence and bank strength is quite robust for advanced countries, also if various control variables are included. Legal measures of bank supervisor independence may be a better proxy for actual independence in the more advanced economies than in others. Regulations allowing for independent decision-making play almost no role in determining bank soundness outcomes in countries with weak law enforcement. Adding legal independence in column (9) explains an additional 13% of the variation, with the R-squared rising from 0.36 to 0.49. Based on the regression in column (7), an increase in legal independence by one standard deviation, 0.12, leads to an increase in banking system strength of 0.80, a non-trivial increase, which corresponds to 0.62 of a notch at Fitch.

¹⁶ This finding is consistent with earlier research, e.g., Beck et al. (2005); Caprio and Martinez-Peria (2000).

¹⁷ Cross-country examinations yield conflicting findings. De Nicolo et al. (2003) find a positive relationship between banking system concentration and the fragility of the five largest banks in a country, while others document that banking system concentration does not increase the fragility of banks, on the contrary (see, e.g., Beck, Demirgüç-Kunt and Levine 2005). Some studies, e.g., Das et al. (2004), are inconclusive.

The situation for legal independence from industry is less clear. In columns (2) and (8), the relationship between the legal index and bank soundness is found positive but not robust. Legal independence from industry has no significant impact on banking system quality when it enters linearly in either sample. This implies that some degree of supervisory capture by banks is not necessarily destabilising.¹⁸ Since the supervisory agency, as principal, delegates the implementation of standards to agents, banks, it has strong incentives to adopt a cooperative stance, negotiate compliance and avoid burdensome enforcement actions. This finding should be taken with care due to the limited reliability of legal measures, which only imperfectly gauge effective independence from industry capture. However, there is some evidence that the effect of higher independence from industry is conditional on public governance quality. Specification (6) finds that the interaction term of legal independence with the rule of law enters positively and significantly, and the fit of the model improve slightly. The results show that an increase in legal independence is expected to be beneficial only at high levels of rule of law (that is, in high-income countries, excluding Greece, Italy, and Korea). This tighter condition contributes to explain why even regression in column (8) on high-income countries is found non-performing. This finding confirms the complementary nature of various aspects of institutional quality.

Summing up, the results are consistent with the argument that delegation of banking supervision responsibilities to legally independent agencies helps strengthen a country's banking system. Legal independence from government is a statistically significant determinant of banking system strength. The relationship is robust to conditioning on different country characteristics, including indicators of macroeconomic and banking market environments. Given the lack of a robust relationship, we do not draw the conclusion that (the linear inclusion of) legal independence from industry contributes to bank soundness. There is yet no evidence that either form of legal bank supervisor independence increases banking sector fragility. Moreover, since the degree of commitment to statutory independence is conditional upon law enforcement, the higher a country's law enforcement capacity, the more positive the effect of delegation and independence on the health of banking systems.

¹⁸ Heinmann and Schüler (2002) and Hardy (2006) reach similar conclusions.

5.5 Additional specifications

There are many institutional features that, by reducing the possibility of the principal to interfere with the agency's decisions, contribute to the making of an independent agent. Is the role played by policy targets different from the role played by the length of the terms of the agency's head in achieving a total level of legal independence? In the absence of a theory, we choose to assign equal weights, even though one may expect some features to matter more than others. For robustness, precisely to overcome potentially biased estimates, one may wish to rely on alternative weighting procedures for aggregating indexes of legal independence, the summary index was hence calculated using different weighted averages. Although the analysis is not shown here, the summary index and ranking of countries are robust to these changes with slight variations and yield similar results in baseline regressions. As regards left-hand-side variables, we test whether the results are robust to using alternative measures of banking system strength. Specifications (1)-(2) and (5)-(6) in Table 8 show that results hold and are qualitatively similar to those discussed above when using Moody's average bank financial strength index, reflecting the close relationship between the two indexes. Using Moody's index even slightly improves the performance of regression models.

We now turn to additional sensitivity tests regarding the dimension of legal independence from government. An important issue which might have a bearing with our empirical analysis is the locus of banking supervision responsibilities. The institutional organisation of the supervision of banks and other financial institutions has been a subject of intense theoretical debates (Abrams and Taylor 2000; Goodhart 2000). The rare cross-country investigations (e.g., Goodhart and Schoemaker 1995) found that countries where central banks are involved in supervision have significantly fewer bank failures. To control for location of banking supervision, we introduce a dummy variable that takes the value of one if the bank supervisor does not coincide with the central bank and zero otherwise. Column (3) indicates that the organisational structure of banking supervision is not significant in itself: the location dummy enters negatively but not significantly, and the coefficient of legal independence and its standard error remain broadly unchanged. Notwithstanding their high degree, on average, of legal independence, central banks do not appear systematically superior to separate agencies in delivering banking system soundness. The significance of this result should be taken with a grain of salt, however. In particular, the small number of central-bank observations limits the

potential to reliably estimate the impact of institutional organisation. Moreover, Eastern European countries, which have set up highly independent central-bank supervisors, are still in the transition towards market-oriented banking systems.

In line with the preceding, it should be emphasised that the effects of bank supervisor reform on banking system strength may not be immediate. The implementation of a new institutional environment usually requires the enactment of more specific prudential regulations, a series of disciplinary and enforcement actions, and, over time, the build-up of reputation, all of which are crucial for the formation of market participants' expectations and, in due course, their prudential behaviour. As suggested above, extreme cases in point are transitional countries where obstacles to banking system soundness are so pervasive that higher formal independence may not instantly translate into any clear improvement of banking conditions. Checking for the possibility of lagged effects associated with changes in bank supervisor legislation would require the regressions to be computed with lags for the indexes of legal independence. Yet, the empirical investigation is limited to cross-section analysis because legal independence indexes have no time variation. The future research agenda includes introducing a time series component, considering both assessments back in the past decades and future updates of the indexes.

Despite the cross-sectional constraint, a final test consists of controlling for the 'age' of supervisory agencies. One may expect the soundness of banking systems to increase with the age of supervisory agencies, particularly for the first few years. This is done by incorporating an age dummy in the baseline equation, which takes on the value of one when the bank supervisor is aged over five years and zero otherwise.¹⁹ Column (4) shows that the age dummy enters positively and significantly throughout and the coefficient on legal independence from government remains basically the same as in the baseline. In addition, the R-squared of the regressions improves quite a bit when the age dummy is introduced.²⁰ This result suggests that, irrespective of the degree of formal independence, mature supervisory agencies are associated

¹⁹ See Table 2 for variable definition. At year-end 2004, for example, BaFin, the German Federal Financial Supervisory Authority, which was set up in May 2002, was two years old. 11 (37%) agencies were above 10 years old, 6 (20%) were below three years.

²⁰ We also run parallel regressions using dummies with different age cut-off. The positive coefficients on age dummies become significant only above the five-year limit. The age-dummy with a six-year cut-off even yields slightly higher significance levels. The results are available upon request.

with stronger banking systems. Seniority brings with it certain privileges, including a banking supervision track-record. Reputation acquired over time potentially serves as a complementary commitment device to formal independence. Countries where supervisors have no real track-record because of their recent advent may still convey commitment by granting them higher independence.

Finally, it should be noted that the results obtained through OLS regressions may suffer from potential endogeneity problems. Institutions drive banking sector conditions, but at the same time banking sector conditions can affect institutions. For example, the weaker the banking system, the less likely delegation to an independent supervisory agency. Japan's financial crisis of the 1990s is a case in point whereby the government commanded supervisory forbearance even after having established the Financial Supervisory Agency in 1998 (see, e.g., Hall 1998). It is hard to resolve this important question on the basis of existing evidence. Our gut feeling is that the relationship between legal independence and banking system conditions is, in many cases, one of two-way causality. An appropriate treatment to account for the possible endogeneity of bank supervisor reform would require the use of instrumental variables. Finding an instrument that satisfies the two properties of being highly correlated with legal independence and uncorrelated with banking system strength is not trivial, however. A thorough discussion of instruments for independence is proposed as a direction for future research.

6 Conclusions

This paper describes indexes of bank supervisor independence based on national laws. The summary indexes aggregate measures of personnel, goal, instrument, and budgetary independence. Independence refers to the manoeuvring room the supervisory agency has in formulating and implementing prudential policy. The cross-country comparison of legal independence from government indicates that the most independent authorities have not been set up in the more advanced economies. On the contrary, central-bank supervisors, which, on average, perform better in terms of formal independence, are located in countries which rank lower in GDP per capita. It is also found that the higher bank supervisor independence, the less unified financial sector supervision. It may be useful to distinguish between personnel independence on the one hand and goal, instrument and budgetary independence on the other

hand, both of which are not significantly interrelated. Both sets are further not significantly related to components of independence from industry. This suggests that legal independence is rarely complete and that the potential trade-off between bank supervisor independence and accountability may be circumvented by playing an individual trait of independence against another.

An independent bank supervisor is not a necessary condition for banking system soundness. Policy-makers' reputation is an alternative way, albeit not exclusive, to credibly commit in a discretionary policy environment. Yet, legal independence from political and market interferences allows supervisory agencies to enhance discipline and consistency in prudential decision-making and minimise moral hazard. The analysis shows that, holding all else constant, a country with an independent bank supervisor tends to have a stronger banking system than does a country where politicians can steer the supervisory agency's course of action. Independent bank supervisors have a higher credibility in banking markets, and market reaction to higher independence is reflected in higher ratings of banking system strength. The effect strengthens at high levels of acceptance of the rule of law. As regards independence from industry, the relationship between legal independence and bank soundness is found positive but not robust, suggesting that stringent barriers to supervisory capture are not necessarily credibility-enhancing. This should be taken with care due to the limited reliability of legal measures, which only imperfectly grasp the effective degree of independence from industry capture. Introducing non-legal measures of bank supervisor independence is proposed as a direction for future research.

Appendix

Table A-1: Variables for legal bank supervisor independence from government (LBSIG)

Component	Variable	Coding
Personnel Independence (PI_g)	1. Term of office of the head of bank supervisor (HBS) in years	
	1.1 6 or more	1.00
	1.2 5	0.75
	1.3 4	0.50
	1.4 less than 4	0.25
	1.5 no fixed term or at the discretion of the appointer	0.00
	2. Who appoints HBS?	
	2.1 board of bank supervisor (BS)	1.00
	2.2 the legislature	0.75
	2.3 board of BS or another special committee making a recommendation to the executive	0.50
	2.4 the executive at large (e.g., PM, President)	0.25
	2.5 one member of the executive (e.g., Minister of Finance)	0.00
	3. Provisions for dismissal of HBS	
	3.1 only for non-policy reasons (e.g., a court decision for incapability or serious misconduct)	1.00
	3.2 at BS board's discretion	0.75
	3.3 for non-policy/policy reasons approved by the legislature	0.50
	3.4 for non-policy/policy reasons at the executive's discretion	0.25
	3.5 unspecified	0.00
	4. To whom is HBS individually accountable?	
	4.1 BS board	1.00
	4.2 no specific provision	0.75
	4.3 the legislature	0.50
	4.4 the executive at large (e.g., PM, President)	0.25
	4.5 one member of the executive (e.g., Minister of Finance)	0.00
	5. Is appointment renewable?	
	5.1 non-renewable	1.00
	5.2 renewable, once	0.50
	5.3 renewable, more than once (or unspecified)	0.00
6. Is non-partisanship (i.e. no official political affiliation) a formal requirement for the appointment?		
6.1 yes	1.00	
6.2 no (or unspecified)	0.00	

Table A-1 (continued)

Component	Variable	Coding
Goal Independence (GI _f)	7. How constrained is BS to set out its primary objectives of prudential regulation and supervision?	
	7.1 BS mandate does not contain any objectives, and BS has final authority to determine its primary objectives	1.00
	7.2 BS mandate contains broadly drawn objectives. In case of conflict, BS has final authority to specify them for itself (e.g., definition of targets and of time horizon)	0.66
	7.3 BS mandate contains broadly drawn objectives. In case of conflict, the government has final authority to specify them (e.g., definition of targets and of time horizon)	0.33
	7.4 BS mandate contains narrowly defined objectives to be followed, and the government has final authority to specify these objectives	0.00
Operational Independence (OI _f)	8. Who is in charge of setting and issuing prudential regulations, especially licensing (grant, modification, and withdrawal)?	
	8.1 BS has full authority	1.00
	8.2 BS and the legislature (e.g., relevant committee) have joint authority	0.66
	8.3 BS and the executive (e.g., Ministry of Finance) have joint authority	0.33
	8.4 BS has an advisory/consultative role	0.00
	9. Who is in charge of the continuing supervision of authorised institutions?	
	9.1 BS has full authority	1.00
	9.2 BS and other administrative agencies have joint authority	0.66
	9.3 BS and the executive (e.g., Ministry of Finance) have joint authority	0.33
	9.4 BS has an advisory/consultative role	0.00
	10. Who is in charge of closure policies, as including, inter alia, restructuring internal organisation; superseding shareholder rights; removing directors; and initiating insolvency procedures?	
	10.1 BS has full authority	1.00
	10.2 BS and other administrative agencies have joint authority	0.66
	10.3 BS and the executive (e.g., Ministry of Finance) have joint authority	0.33
10.4 BS has an advisory/consultative role	0.00	
11. To what extent BS may engage in forbearance when confronted with violations of regulations and/or imprudent behaviours by banks?		
11.1 BS can forbear certain prudential regulations (regarding, e.g., bank restructuring and reorganisation)	1.00	
11.2 BS cannot forbear	0.00	
12. To whom is BS subject to reporting requirements?		
12.1 none	1.00	
12.2 to the legislature, by submitting an annual report for information purpose only	0.75	
12.3 to the legislature, by submitting an annual report for approval and/or by being subject to hearings	0.50	
12.4 to the executive at large	0.25	
12.5 to the responsible minister (e.g., Minister of Finance)	0.00	

Table A-1 (concluded)

Component	Variable	Coding
O _{I_g} (continued)	13. Who can override BS decision where it has exclusive competency?	
	13.1 none	1.00
	13.2 a court	0.75
	13.3 a specialised body (e.g., legislative committee)	0.50
	13.4 the executive, with qualifications	0.25
	13.5 the executive, unconditionally	0.00
Budgetary Independence (BI _g)	14. Where does BS budget come from?	
	14.1 from non-government funding (e.g., levy on regulated institutions, central bank's budget process)	1.00
	14.2 from non-government funding (e.g., levy on regulated institutions) but subject to government budget process	0.66
	14.3 from government funding subject to the legislature's approval (i.e. through the government's general budget process)	0.33
	14.4 from the ministry, which the BS is administratively linked to	0.00
	15. Who holds direct budgetary control?	
	15.1 BS	1.00
	15.2 BS and government jointly	0.50
	15.3 government	0.00
	16. Who decides on BS internal organisation, especially personnel policy?	
16.1 BS	1.00	
16.2 BS and government jointly	0.50	
16.3 government	0.00	

Note: The higher the code, the more legally independent the bank supervisor from government influence.

Source: Author's elaboration based on national supervisory agency/central bank laws and/or banking laws.

Table A-2: Variables for legal bank supervisor independence from industry (LBSII)

Component	Variable	Coding
Personnel Independence (PI _i)	1. Is HBS (respectively, member of BS board, if any) authorised to occupy a position as shareholder, director, manager or officer with a financial institution regulated by BS?	
	1.1 no, without qualification	1.0
	1.2 no, but provisions restrict to HBS only	0.5
	1.3 yes (or unspecified)	0.0
	2. Has BS achieved staffing autonomy, especially exemption from civil service salary (i.e., to match the level offered by the private sector) and recruitment rules?	
	2.1 yes, BS board determines salary allowances and benefits of regulators	1.0
	2.2 yes, but with qualifications (e.g., government is given the right to veto)	0.5
	2.3 no	0.0
	3. Does BS law include provisions regarding subsequent service of HBS (respectively, member of BS board, if any), e.g., position in a financial institution within two years after the term has expired?	
	3.1 yes	1.0
	3.2 yes, but provisions restrict to HBS only	0.5
	3.3 no (or unspecified)	0.0
Operational Independence (OI _i)	4. Are supervisors legally liable for their actions?	
	4.1 no action, suit, prosecution or other proceedings may be brought against individual supervisors in respect of any actions taken in good faith in pursuance of BS law	1.0
	4.2 liability exists for certain actions, such as decisions breaching legal provisions	0.5
	4.3 yes	0.0
	5. As regards prudential standard-setting, is BS subject to procedural requirements, including opportunities for all concerned parties (including consumers) to be heard through public consultations?	
	5.1 yes (e.g., any proposed rule must be published in draft form and be subject to open consultation)	1.0
	5.2 public consultation is not compulsory, but is recommended	0.5
	5.3 no	0.0
	6. As regards prudential supervision and enforcement, is BS subject to procedural requirements, including (i.) justifications of decisions; (ii.) judicial reviews of decisions; and (iii.) venues for appeal for all concerned parties?	
	6.1 yes	1.0
	6.2 mechanisms of public (i.) and judicial control (ii. and iii.) are partly available	0.5
	6.3 no	0.0

Note The higher the code, the more formally independent the bank supervisor from industry capture.

Source Author's elaboration based on national supervisory agency/central bank laws and/or banking laws.

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Tables

Table 1: Bank prudential supervisors in OECD countries, 2004

Country	Supervisory agency	Type
Australia	Australian Prudential Regulation Authority (APRA)	U
Austria	Financial Market Authority (FMA)	U
Belgium	Banking, Finance and Insurance Commission (CBFA)	U
Canada	Office of the Superintendent of Financial Institutions (OSFI)	BI*
Czech Rep.	Czech National Bank (CNB)	B
Denmark	Danish Financial Supervisory Authority (DFSA)	U
Finland	Finnish Financial Supervisory Authority (FIN-FSA)	BS
France	Commission Bancaire	B
Germany	Federal Financial Supervisory Authority (BaFin)	U**
Greece	Bank of Greece (BOG)	B
Hungary	Hungarian Financial Supervisory Authority (HFSA)	U
Iceland	Financial Supervisory Authority (FME)	U
Ireland	Irish Financial Services Regulatory Authority (IFSRA)	U
Italy	Bank of Italy (BOI)	B
Japan	Japan's Financial Services Agency (JFSA)	U
Korea, Rep. of	Financial Supervisory Commission (FSC)	U
Luxembourg	Commission de Surveillance du Secteur Financier (CSSF)	BS
Mexico	National Banking and Securities Commission (CNBV)	BS
Netherlands	De Nederlandsche Bank (DNB)	U
New Zealand	Reserve Bank of New Zealand (RBNZ)	B
Norway	The Financial Supervisory Authority of Norway	U
Poland	National Bank of Poland's (NBP) Commission for Banking Supervision	B
Portugal	Bank of Portugal (BOP)	B
Slovak Rep.	National Bank of Slovakia (NBS)	B***
Spain	Bank of Spain (BOS)	B
Sweden	Swedish Financial Supervisory Authority (SFSA)	U
Switzerland	Swiss Federal Banking Commission (SFBC)	BS
Turkey	Banking Regulation and Supervision Agency (BRSA)	B
United Kingdom	Financial Services Authority (FSA)	U
United States	Office of the Comptroller of Currency (OCC)	B****

Note: Integrated (or universal) supervisor is denoted by U; bank supervisor by B; bank and insurance supervisor by BI; bank and securities market supervisor by BS. * OSFI is the primary supervisor of banks. Provincial authorities have residual responsibilities for provincially incorporated financial institutions. ** The Bundesbank still performs some banking supervision functions. *** A new Financial Market Supervision Act (FMSA) was enacted in December 2004. It provides that integrated financial supervision will be taken over by the NBS from January 2006 onwards. **** On the federal level, there are three other bank supervisors, namely the Fed (responsible for state banks that are members of the Federal Reserve System and for bank holding companies), the FDIC (other state banks), and the OTS (savings institutions).

Source: Courtis (2001; 2005); national agencies.

Table 2: Variable definitions and sources

Variable	Definition	Source
<i>Dependent variables</i>		
SAIR	'System Average Individual Rating' measures banking system stand alone strength derived from Fitch's individual bank ratings. The 9-graduation scale is converted into numerical ratings from A=1 to E=0. Data refer to 2005	Fitch through Price (2005)
ABFSI	'Average Bank Financial Strength Index' measures Moody's weighted average bank ratings by country. The 13-graduation scale is converted into numerical ratings from A=1 to E=0. Data refer to 2005	Moody's through Cailleteau (2005)
CAR	Bank regulatory capital to risk-weighted assets. Averaged over 2002-2005	IMF (2006)
NPL	Bank non-performing loans to total loans. Averaged over 2002-2005	
<i>Objective variables</i>		
PI	Component index of personnel independence, calculated as a mean of their underlying indicators. Data refer to 2004	Author's elaboration based on national laws
GI	Component index of goal independence, calculated as a mean of their underlying indicators. Data refer to 2004	
OI	Component index of operational independence, calculated as a mean of their underlying indicators. Data refer to 2004	
BI	Component index of budgetary independence, calculated as a mean of their underlying indicators. Data refer to 2004	
LBSIG	Summary index of legal bank supervisor independence from government, aggregating PI_g , GI_g , OI_g and BI_g component indexes with equal weights	
LBSII	Summary index of legal bank supervisor independence from industry, aggregating PI_i and OI_i component indexes with equal weights	
Type	This dummy takes the value of one if the bank supervisor does not coincide with the central bank and zero otherwise. Data refer to 2004	
Age	This dummy variable takes on the value of one when the bank supervisor is aged over five years and zero otherwise. 'Age' is defined as the number of full years from the establishment of the supervisory agency (or the most recent institutional change) to 2004	
<i>Macroeconomic variables</i>		
GDP per capita	GDP per capita expressed in constant 2000 USD. Averaged over 1993-2002	World Bank (2005)
GDP growth	GDP growth (annual % change). Averaged over 1993-2002	
Inflation	Consumer price index (annual % change). Averaged over 1993-2002	
<i>Institutional variables</i>		
Checks	Number of veto players. Averaged over 1998-2002	Beck et al. (2001)
Rule of law	Institutional quality indicator reflecting of a country's adherence to law. The index ranges from -2.5 to 2.5. Rescaled to a range from 0 to 1. Averaged over 1998-2002	Kaufmann et al. (2005)
<i>Banking market variables</i>		
Concentration	Fraction of assets held by the three largest banks. Averaged over 1998-2002	Beck et al. (2000)
Private credit	A broad measure of financial intermediary development. Private credit by deposit money banks to GDP. Averaged over 1998-2002	
State ownership	Fraction of banking system's assets in banks that 50% or more government owned. Data refer to 2001	Barth et al. (2001)
Foreign ownership	Fraction of banking system's assets in banks that 50% or more foreign owned. Data refer to 2001	

Table 3: Summary statistics of dependent and objective variables

Variable	N	Min	Max	Mean	Std. Dev.
SAIR	30	.25	.88	.64	.20
ABFSI	29	.18	.85	.59	.21
CAR	30	10.00	28.00	13.50	3.48
NPL	29	.20	18.90	3.32	3.74
PI _g	30	.04	.67	.42	.14
GI _g	30	.33	.66	.55	.16
OI _g	30	.19	.88	.69	.16
BI _g	30	.28	1.00	.79	.22
PI _i	30	.00	.83	.55	.24
OI _i	30	.17	1.00	.74	.23
LBSIG	30	.32	.79	.62	.12
LBSII	30	.25	.92	.65	.17
Type	30	.00	1.00	.67	.48
Age	30	.00	1.00	.73	.48

Source: Author's calculation.

Table 4: Correlations among legal independence indexes

	PI _g	GI _g	OI _g	BI _g	LBSIG	PI _i	OI _i	LBSII
Type	-.454**	-.200	-.072	-.471***	-.422**	-.147	.285	.084
PI _g		.062	.172	.262	.483***	.339*	-.107	.174
GI _g			.518***	.570***	.768***	.097	.234	.224
OI _g				.409**	.731***	.103	.165	.182
BI _g					.834***	.156	-.012	.103
LBSIG						.233	.087	.225
PI _i							.039	.746***
OI _i								.695***

Note: Significance levels of 1, 5, and 10 percent are indicated by ***, ** and *.

Source: Author's calculation.

Table 5: A typology of delegation arrangements

	Low personnel Independence	High personnel independence
Low goal, policy, and budget independence	[Quadrant II] Japan Norway Mexico	[Quadrant III] Ireland Korea Spain
High goal, policy, and budget independence	[Quadrant I] Austria Denmark Germany	[Quadrant IV] Belgium Finland Poland

Source: Author's elaboration.

Table 6: Correlation between legal independence and bank soundness

	SAIR	ABFSI	CAR
PI _g	-.120 (.029)	-.160 (-.104)	.161 (.202)
GI _g	.047 (.326)	.112 (.375*)	.314* (.287)
OI _g	-.017 (.136)	.051 (.173)	.158 (.117)
BI _g	.270 (.437**)	.280 (.441**)	.135 (.351*)
LBSIG	.090 (.367*)	.125 (.355*)	.271 (.374*)
PI _i	.182 (.136)	.177 (.147)	.101 (.014)
OI _i	.188 (.220)	.278 (.282)	-.089 (.165)
LBSII	.259 (.252)	.312 (.295)	.012 (.117)

Note Coefficients for the sub-sample of high-income countries (24) are reported in parentheses. Significance levels of 1, 5, and 10 percent are indicated by ***, ** and *.

Source Author's calculation.

Table 7: Main specifications

	OECD countries					High-income OECD countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LBSIG	.255*		.244*	.257*	-1.348**		.367*		.420*
	(1.739)		(1.683)	(1.753)	(-2.238)		(1.850)		(1.932)
LBSII		.113				-1.467**		.252	
		(.738)				(-2.053)		(1.220)	
GDP per capita	.691***	.600***	.598***	.520***					
	(4.706)	(3.918)	(3.164)	(3.303)					
GDP growth			.197						.370*
			(1.400)						(1.714)
Inflation			-.177						-.139
			(-.969)						(-.597)
Concentration				.093					.161
				(.634)					(.747)
State ownership				-.398**					-.440*
				(-2.522)					(-2.054)
Rule of law					-.497		-.152		
					(-1.028)		(-.386)		
LBSIG × Rule of law					1.854**				
					(2.432)				
LBSII × Rule of law						1.946**			
						(2.133)			
N	30	30	30	30	30	30	24	24	24
R ²	.454***	.405***	.512***	.570***	.516***	.489***	.135*	.063	.493*

Note The dependent variable is SAIR. Regressions are estimated with OLS and include a constant, which is not reported for brevity. Standardised regression coefficients are reported. Robust t-statistics are in parentheses. Significance levels of 1, 5, and 10 percent are indicated by ***, ** and *.

Source Author's calculation.

Table 8: Additional specifications

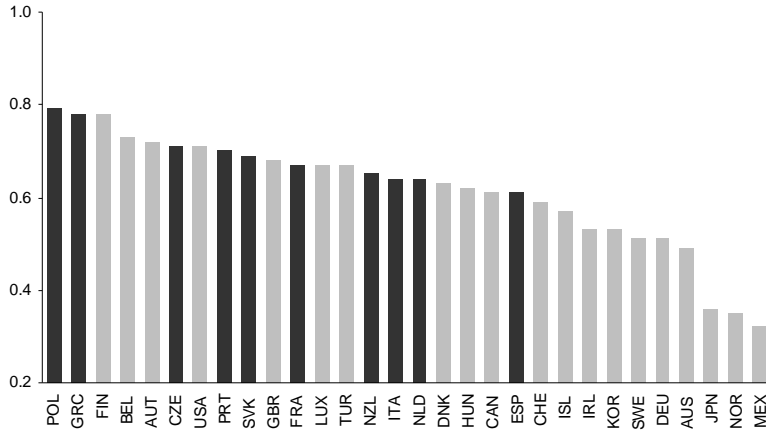
	OECD countries			High-income OECD countries		
	(1)	(2)	(3)	(4)	(5)	(6)
LBSIG	.294** (2.071)		.262* (1.696)	.234* (1.653)	.355* (1.738)	
LBSII		.159 (1.055)				.295 (1.413)
GDP per capita	.720*** (5.078)	.612*** (4.065)	.749*** (4.884)	.782*** (5.155)		
Location dummy			-.090 (-.546)			
Age dummy				.258* (1.732)		
N	29	29	30	30	23	23
R ²	.506***	.448***	.475***	.510***	.126*	.087

Note: The dependent variable is ABFSI in specifications (1)-(2) and (5)-(6), SAIR in remaining others. Regressions are estimated with OLS and include a constant, which is not reported for brevity. Standardised regression coefficients are reported. Robust t-statistics are in parentheses. Significance levels of 1, 5, and 10 percent are indicated by ***, ** and *.

Source: Author's calculation.

Figures

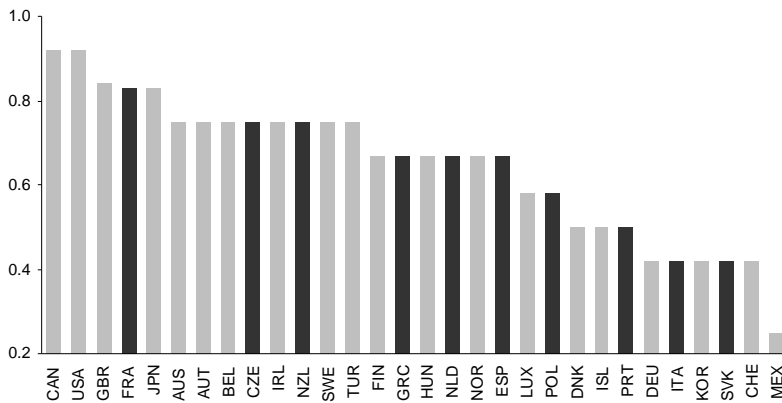
Figure 1: Summary index of legal independence from government (LBSIG), 2004



Note LBSIG takes a value in the range from 0 to 1, with higher scores reflecting higher legal independence from government. Black-tinted bars indicate central-bank supervisors.

Source Author's calculation based on national laws.

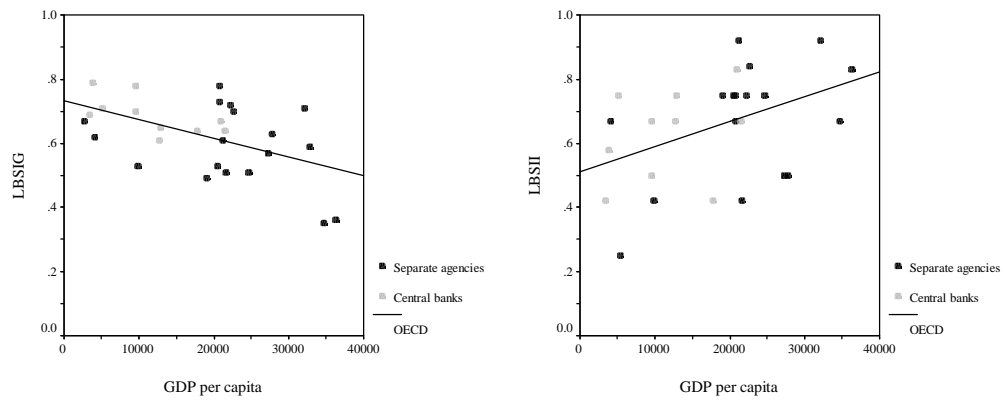
Figure 2: Summary index of legal independence from industry (LBSII), 2004



Note LBSII takes a value in the range from 0 to 1, with higher scores reflecting higher legal independence from industry. Black-tinted bars indicate central-bank supervisors.

Source Author's calculation based on national laws.

Figure 3: Economic development and legal independence



Source: World Bank (2005); author's calculation.