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Abstract

This article analyses the economics of financing banking supervision and attempts to respond to two questions: What are the most common financing practices? Can the differences in current financing practices be explained by country specific factors? We perform an empirical analysis that identifies the determinants of the financing structure of banks´ prudential supervision using a sample of 90 banking supervisors (central banks and financial authorities). We conclude that supervisors in central banks are more likely publicly funded, while financial authorities are more likely funded via a levy on the regulated banks. The financing rule is also explained by the structure of the financial systems. Public funding is more likely in bank oriented structures. Finally, the geographical factor is also significant: European bank supervisors are more oriented towards the private funding regime. In general, we do not find evidence of the role of the political factor, the size of the economy, the level of development and the legal tradition.

JEL Classification Numbers: D78, G21, G28, O17, P16.

Keywords: banking supervision, budgetary governance, central banks, financial authorities.

1 Introduction

Over the past decade, many countries have witnessed changes in the architecture of banking supervision.[1] Often the institutional change was triggered by a banking crisis, which harmed the reputation of the supervisor.[2] But also, policymakers were pressed to rethink the supervisory structures by changes in the structure of the financial industry brought about by mergers between banks, insurance companies and securities firms (conglomeration), internationalisation of the financial activity and the blurring of distinctions between various types of financial products.[3]

Nonetheless, in a number of countries, there is still an ongoing debate about whether the supervisory structure should be reformed, and if so, in what direction.[4] Recent literature argues that the responsibility for prudential supervision should be delegated to a specific independent agency, provided that this agency has defined clear objectives and political independence, it has the adequate supervisory instruments to achieve these objectives, and it is held accountable to ensure checks and balances.[5]

Supervisory independence has four dimensions: 1) regulatory independence, associated with a wide autonomy in setting prudential rules and regulations; 2) supervisory independence from political interference and industry intimidation; 3) institutional autonomy associated with the security of tenure of supervisors; and 4) budgetary (financial) independence.[6]

Three questions are particularly relevant in the analysis of budgetary independence. Is there any optimal financing model of supervision? Which are the most common financing practices? Can we explain differences in current financing practices by country specific factors?

The objective of this article is to respond to the second and third questions. To this end, we present the supervisors´ financing rules in a large number of countries and we attempt to identify the determinant factors, and explain the differences between countries. Given that the budget procedure has an important role in the overall banking supervision architecture, we wish to have a better understanding of the motives behind the choice of the financing practices. We will qualify the results *cum* anecdotal evidence on the budgetary practices.

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1. A review of the trend in supervisory architectures is performed in Masciandaro (2004).
2. The link between banking instability, supervisor's reputation failure and reform of the supervision architecture in the case of Estonia, Latvia, Korea and United Kingdom is described in Masciandaro (2005).
3. The role of the financial blurring effect in explaining the reform of the supervisory architecture is highlighted in Grunbichler (2005) for Austria, Schuler (2005) for Germany, Prast (2005) for The Netherlands. Masciandaro (2005 and 2006) and Masciandaro and Quintyn (2007) performed empirical analyses on the determinants of supervisory reforms, checking the robustness of the financial blurring effect.
4. In December 2005, the Italian Parliament confirmed the actual "hybrid" supervisory institutional setting, shortening the Governor´s time in office and implementing a reform of the antitrust responsibilities, which reduced the central bank involvement.
5. Quintyn and Taylor (2002, 2003 and 2004), Das, Quintyn and Chenard (2004) and Hüpkes, Quintyn and Taylor (2005). The Basel Committee on Banking Supervision recognized the importance of these principles in the "Core Principles for Effective Bank Supervision". See BIS (1997).
6. Quintyn and Taylor (2004). See also Bini Smaghi (2006) and Quintyn (2006).

Budgetary independence and accountability are the two pillars of financial governance. For the purpose of this paper, financial governance is the set of rules that defines how prudential supervision is financed, and the accountability arrangements related to the financial accounts as well as the supervisors activity. The recent economic literature on governance of supervision has paid little attention to the issue of financial governance.[7] To the best of our knowledge, there is a dearth of studies on this question. We will focus on the budgetary rules in this article.

Furthermore, we will focus on the study of prudential supervision of banks, although we realise that changes in the structure of the financial industry would also require the analysis of insurance and securities supervision. In fact, many countries have integrated financial supervision of the three sectors, including in some instances the supervision of pension funds. Being limited to banks´ prudential supervision, this article should therefore be regarded as a first contribution to the more comprehensive analysis of the budgetary governance of financial sector supervision. Moreover, by limiting ourselves to prudential supervision, we overlook conduct-of-business supervision, which, in some countries, is carried out by the same institution as the one responsible for prudential supervision.

In addition to the introduction, this article is divided in four parts. The second part proposes a simple framework to discuss the economics of financing banking supervision. Part three describes the overall supervisory architecture in a number of countries, paying particular attention to the financing rules. Our data consists on information about the financing of 90 banking supervisors (central banks, specialised supervisory agencies, single financial authorities). Part four presents the empirical analysis that identifies the determinant factors of the financing structure of banks´ prudential supervision. The conclusions are presented in part five.

7. Lastra and Shams (2001) present an analytical framework for understanding the notion of accountability in the financial sector. Lybek and Morris (2004) and Frisell, Roszbach and Spagnolo (2004) study the specific corporate governance issues of central banks. Arnone, Darbar and Gambini (2005) analyze the issue of public governance in banking supervision. Masciandaro, Nieto and Prast (2007) performed an empirical analysis, using data collected through a questionnaire sent out in 2005 to a large number of banking supervisors.

2 Economics of Financing Supervision

We claim that the principal-agent theory as proposed by Alesina and Tabellini (2004 and 2005) is the appropriate general analytical framework to analyse the financing of banking supervision.[8] Society is the main principal with an interest in the soundness of individual banks and the banking system as a whole and the prudential supervisor is the agent of the government.[9] However, this analytical framework does not discuss who should pay for supervision. Still, one might argue that if society is regarded as the principal this would automatically imply that the taxpayer should finance banking supervision. But the question is not so simple.

In addition to the principal - agent approach to the explicit contract between society (taxpayers) and the supervisor *(social contract),* two implicit contracts, with associated risks of capture, can be identified. These are the *government driven* and the *industry driven* contracts. These implicit contracts may be relevant for the analysis of the financing governance of supervision and, more specifically, its budgetary aspects.

An implicit contract between the government and the banking supervisor could exist within the framework of the grabbing hand theory.[10] According to this theory, the contract would be designed to extract short term political rent from supervision. For example, the government may put pressure on the supervisor not to close a bank, as bank closure comes at a political cost, with depositors and possibly taxpayers being harmed.[11] The supervisor's explicit contract should be designed so that an implicit government-driven contract is difficult to establish. Independence from the politicians is recognized as good practice in the first Basle Core Principles for Effective Bank Supervision.[12]

Another implicit contract may exist between the banking industry —as a vested interest group— or even between individual banks and the prudential supervisor. This implicit contract would serve the specific interests of the regulated firm(s), for example by softer prudential regulatory requirements, special accounting rules, and forbearance in general. The classic capture theory provides the analytical framework for the implicit contract between supervised institutions and their supervisors.[13]

Last but not least, there is the risk that the supervisors pursue its self interest, which may not be consistent with social welfare. This self interest may be its reputation, and it

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8. The delegation approach has been recently used to debate financial supervisory issues in Bjerre –Nielsen (2004). There are two theoretical models on banking supervision architecture –Repullo (2000) and Kahn and Santos (2004)– but without any explicit identification and discussion of the policymaker (lawmaker) objective function.

9. It should be stressed, however, that there may be trade offs between macro and micro stability. Thus, there is the possibility of a conflict between price stability and the stability of the financial system. Another potential conflict is that between the objectives of macro- and micro-prudential regulation, more precisely between stability of the banking system as a whole on the one hand, and the health and efficiency of individual banks on the other [see Crockett (2001)].

10. Shleifer and Vishy (1998). The risks of political capture can emerge, given an institutional delegation framework that attributes financial supervision tasks to independent un-elected bureaucrats. The institutional design problem is analysed in Alesina and Tabellini (2004) from a society' welfare maximization point of view, while Alesina and Tabellini (2005) investigate the politicians' point of view, which have to decide what to delegate to bureaucrats and what to retain for themselves.

11. Quintyn and Taylor (2002).

12. See Principle 1 of the Basle Core Principles for Effective Bank Supervision: BIS (1997).

13. Stigler (1971).

has been argued that this may result in regulatory forbearance (self bureaucrat capture).[14] The supervisor's behaviour could be consistent with the "career concern model" as presented by Alesina and Tabellini (2005).[15]

Obviously the interests of the government and /or the banking firms can capture the supervisor through the influence on its self interest, for example its career and financial reward. Alternatively, the banking industry capture could be an indirect case of political capture, or vice versa. In other words, the grabbing hand theory, the capture theory and the career concern theory can be deeply intertwined. Therefore there must be transparency and accountability procedures on the supervisor's activities.[16] Accountability reduces the risk that supervision is manipulated.[17]

Summing up, prudential supervisor independence has three dimensions: on the one hand freedom from political and regulated industry interference, on the other the avoidance of self bureaucratic interests.[18]

Against this background, this article focuses on the financing of prudential supervision as an instrument to avoid capture problems. The question we are ultimately interested in is what role the financing of supervision may play in discouraging political, industry and self bureaucrat captures at the expense of society.

In order to minimize the risks of distortions, the principal-agent theory suggests as first best solution that the budget of the supervisory agency (and the remunerations of its managers) should be linked to performance. However, it is difficult to find robust performance indicators for the performance of financial supervision.[19]

Given the difficulties of the performance based approach, a second best solution could be to invoke a more general principle: A financial independent supervisor is one that possesses the necessary resources to pursue its mandate, without any veto player interference.[20] The veto player could be a political body (political capture risk) or supervised institution (industry capture risk) or both.

The effectiveness of the second best solution depends on the existence of procedures for financial and general accountability. Supervisors have to follow those procedures aimed at explaining and justifying their actions in general and, more specifically,

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14. Kane (1990), Boot and Thakor (1993).

15. Alesina and Tabellini (2005) analyse the bureaucratic behaviour following the career concern model, and they point out that career concerns can be interpreted broadly (employment prospects in private sector, legacy, fame, recognition, etc.).

16. Lastra and Shams (2001) examine the interrelationship between accountability and transparency and provide a definition of the latter.

17. Quintyn and Taylor (2002).

18. Quintyn and Taylor (2002).

19. The Canadian Office of the Superintendent of Financial Institutions (OSFI) proposes a general framework that links its two strategic goals (to contribute to public confidence and to safeguard from undue loss) with different performance measurements (number of involuntary closures of financial institutions initiated by OSFI, OSFI's treatment of companies in difficulty, etc.) for accountability purposes [see OSFI (2005)]. In England the Financial Services Authority (FSA) presents a Business Plan, that explains its priorities and commits to allocate and use resources in an efficient way, setting the budgetary levels of expenditure and the relative plan for funding [see FSA (2004 and 2005)].

20. This is easiest if supervisory costs are paid out of seigniorage, in a contract where the profits of the central bank, after deduction of expenses, go to the treasury. In this fashion, supervisory costs are so to speak 'hidden' in the total expenses for monetary policy, the payment system, etc. Therefore it is to be expected that if supervision is taken care of by the central bank, it is more likely that financing will come at least partly from the taxpayer through seigniorage. If costs are not hidden, the budget may need approval. Finally, it could be that certain expenditures, at a discretionary basis, may be vetoed.

the use of their financial resources wherever they come from. In some instances, there might be a link between the supervisors' policy and its funding because of the capacity of the supervisor to impose penalties and fees on the supervised institutions. This requires special accountability provisions. Furthermore, given a particular budget constraint, the accountability provisions should ensure that the supervisor manages its resources in a cost-effective way.

In conclusion, so far an optimal model of financing prudential supervision does not exist in the literature[21]. But this assessment does not imply automatically that the features of the financial governance of supervision are random variables. We can test an alternative hypothesis: Are there any common determinants in the decision each country makes to maintain or reform its budgetary regimes in banking supervision? For these reasons, it is relevant to shed light on the general features and their determinants —if any— of the bank supervisors´ financing setting around the world.

21. In general an optimal model of supervision does not exist. The theoretical literature puts forward several arguments for and against the different supervision models, suggesting that the overall topic should be investigated using empirical tools. Arnone and Gambino (2006) and Cihàk and Podpiera (2006) carried out cross country analysis on the relationship between the type of the supervision regime and the quality of supervision itself.

3 Banking Supervisory Architectures and Financial Governance Models

The question of who pays for supervision is related to the question of who is the supervisor. This section first identifies the relevant banking authority and, secondly, it shows empirical data on the financing sources —public, private or mixed— of supervision.[22]

The reform of the financial supervisory architectures has taken place in the context of growing vertical, horizontal and international integration of the banking, securities and insurance industries (financial blurring effect). Until recently, in fact, it was easy to distinguish the three financial sectors in nearly every country, and the organization of supervision of financial intermediaries followed accordingly a "sectoral" model. The desegmentation of markets, instruments and providers of financial services (conglomeration) threw the "sectoral" model into crisis, revealing its risks in terms of effectiveness, due to the possibility of regulatory arbitrage, and efficiency, due to the costs of controls for the regulated entities and diseconomies for the regulators.

As a result of these phenomena, a wave of reforms of the financial supervision architectures has taken place since the second half of the 1990´s. Over the past decade, a change in the institutional model for supervision has been observed, from the traditional model based upon the sectoral activity (banking, insurance or securities) such as in the case of Greece, Portugal and Spain, towards two types of models: *one goal based model* or "twin peaks", adopted in Netherlands, where the organization of the regime is driven by what the organization is trying to achieve —e. g. stability on the one side and investor protection on the other side— independently of the type of activity of the financial firm;[23] or a *single financial authority (SFA) model,* in which the supervision of the three sectors is passed to a single authority responsible for complying with the aforementioned objectives (e. g. among others Austria, Germany, Japan, Sweden and UK). The distinct models of organization for the supervision of financial intermediaries have advantages and disadvantages, which have been recently examined in the academic literature.[24]

At present, the banking supervision design around the world seems to be characterized by polarization (Table 1). In the majority of countries (48 countries) of our sample (90 countries), the central bank is the unique supervisor (e.g. Spain, Greece and Portugal), while the main supervisor is the single financial authority in fewer countries (16 countries) (e. g. Japan, UK, Austria).

Furthermore, in some countries there is a specialized banking supervisor different from the central bank (7 countries) (e. g. Turkey). A small group of countries adopted a banking and insurance supervisor (6 countries) (e. g. Canada), while others a banking and securities authority (4 countries) (e. g. Luxemburg). Finally, only in a few countries (10 countries) the banking sector is supervised by more than one authority (e. g. France).

For the purpose of this paper, we have identified the principal banking supervisory authority (CB, single authority and specialized banking authorities —(S)FAs—) in the above

22. The BIS Governance network provided valuable information in this regard.
23. Taylor (1995). The Netherlands seems the most refined version of this model.
24. Taylor (1995); Abrams and Taylor (2000); Di Giorgo, di Noia and Piatti (2000), and Lannoo (2002). These references are usefully collected in Nieto and Peñalosa (2004).

mentioned sample of 90 countries, which includes the 25 countries of the European Union, Also, we gathered information on their financial governance rules, more specifically, on their financing arrangements of banking supervision.

The source of financing of banking supervision may come directly (budget assigned by government) or indirectly (seigniorage) from taxpayers *(public funding).* Also, supervised institutions may financially support totally *(private funding)* or in part *(mixed funding)* prudential supervision. Figures 1 and 2 show an overview of the financing sources of banking supervision in CBs and (S)FAs. Figure 1 shows that full public financing is the most common budgetary arrangement for central banks as banking supervisors. Figure 2 shows that (S)FAs and specialized banking authorities are most commonly financed by supervised entities.

Seigniorage is the sole source of financing of bank supervisors in some countries where central banks are responsible for supervision, such as Spain and Portugal. Although seigniorage is the typical source of financing of prudential supervisors in central banks, in some countries such as Hong-Kong, and Slovenia, supervision is fully financed by banks in spite of being located in the central bank. In Hong Kong, the expenses incurred by supervisors are funded primarily by license fees collected from supervised institutions. License fees take the form of an annual fee on the license as well as on each local or overseas branch. The Hong Kong Monetary Authority (HKMA) policy is to recover fully the cost of supervisory activities via the collection of such fees. The HKMA absorbs, if needed, the deficit not covered by the license fees. The budget is approved by government. In Slovenia, banks pay an annual fee based on risk weighted assets. In addition, banks pay penalty fees when on-site examinations reveal irregularities. Penalty fees are calculated as a multiple of the number of hours examiners have used to examine the penalized institution and the hourly fee for examiners´ work according to the tariffs of the Bank of Slovenia. The Bank of Slovenia informs to the national Assembly of the Republic of Slovenia about its annual financial statements and its financial plan.

On the contrary, supervised institutions are in general the sole source of financing of SFAs. In the UK, as an example, the Financial Services Authority (FSA) is financed by fees charged to the regulated community and the budget is decided upon the FSA. Those fees are of three types: First, application fees which are a contribution to the cost of processing applications of new firms seeking authorization or variations in their permission. Secondly, annual fees (most important source) based on the size of supervised firms and the costs of regulation. Thirdly, special project fees charged for regulatory work performed primarily for the benefit of a single firm or small group of firms.[25] The non-executive members of the FSA Governing Body form a committee with the responsibility of reviewing the efficiency and economy with which it uses its resources.[26] In Sweden, the cost distribution is primarily based on time spent on certain categories of institutions and secondly based on the size of institutions. The budget is proposed by the government and decided upon by the parliament. In other countries, the factors that affect the cost allocation among supervised institutions are revenue or type of activity. In contrast with the budgetary independence of most SFAs, in Japan, the Financial Services Authority has no budgetary independence and it is fully funded from the central government budget.[27]

25. FSA (2006).
26. Lastra and Shams (2001).
27. International Monetary Fund (2003).

Bank supervision may also be financed by both taxpayers and supervised institutions. This is the case in a number of countries such as Germany[28], Ireland and the Netherlands (all CBs). In Germany, the seigniorage amounts for 94% of the financing of the supervisory activities of the Bundesbank. While in Ireland, it amounts to 50% of the financing of the Irish Financial Services Authority. In the Netherlands, a separate budget is established for the supervisory branch within the central bank. Of this separate budget, 35% is funded by the government; the remainder is funded by the private sector.

Most CBs with prudential supervision do have budgeting processes for the supervisory activities which are exactly the same as those of the central bank. This is the case in Ireland where the Irish Financial Services Authority, in spite of being a separate body within the legal entity of the Central Bank of Ireland, shares the same budgeting process. On the contrary, The Netherlandsche Bank has a special budgetary approach applicable only to supervisory activities.[29]

28. Figure 3 does not consider the Bundesbank (as well as for example the Osterreichische Nationalbank, the central bank of Austria), given that it represents 53 central banks which are the main supervisor in their country. In Germany the main supervisor is the Bafin (as the FMA in Austria).

29. In the Netherlands, the organizational budget is split in two parts, one for the DNB as a central bank and one for DNB as a prudential supervisor. The budget for supervisory tasks of the DNB is drawn up by the DNB, and it is presented to the advisory panels of market participants. Subsequently, it is submitted for approval to the Supervisory Board and, eventually, submitted to the Minister of Finance.

4 What Drives Financial Governance?

Which are the determinants of the choice of a given budgetary regime? Some authors have reflected on whether the development of financial supervision architecture is designed or accidental. Goodhart (2004) defends that the design of supervision is essentially reactive, lagged behind innovation and evolving risks, and that the reasons for supervisory reforms are largely political. The economic literature, however, has paid little attention to the issue of financial governance and, more specifically to its budgetary aspects. In this regard, this paper tests the hypothesis that its evolution is not accidental, and, at the same time, attempts to identify the determinants of the different financing rules.

How do we identify the determinants of supervisors´ financing rules? In order to assess this relationship, we estimate a probability model of different financing rules´ decisions as a function of structural, economic and institutional variables[30].

Financing rules can be contemplated as resulting from an unobserved variable: the optimal degree of public financing consistent with the policymaker's utility. Each actual budgetary regime corresponds to a specific range of the optimal supervisor's public financing. The level of supervisor's public financing is maximized in the full public funding regime, while it is minimised in the private funding regime. Since the public financing is a qualitative ordinal variable, the estimation of a model for such dependent variable requires the use of a specific technique. The ordered model is an appropriate estimator, given the ordered nature of the policymaker alternative.[31]

Which economic model can be tested? Actually, to the best of our knowledge, there is no general theory on the optimal design of financing supervision, and then on the determinants of the policymaker's decision on the financing rule. In light of the results of the cross-country overview presented in part three, the choice of the budgetary regime could be a rule —driven path dependent variable. Rule-driven path dependence exists when, other conditions being equal, the choice of the financing rule depends on characteristics already existing or determined by the rules themselves.[32]

Against this background, we test the hypothesis that the policy maker's choice could depend on a specific existing rule: the nature of the financial authority (CB or (S)FA). In this framework, a given policymaker's choice of financing rule would depend on the nature of the agency involved in supervision (institutional factor: **Agency Nature CB).** Given that seigniorage is the typical source of financing when the supervisor is the central bank, the expected sign of the relationship between the role of central bank as supervisor and the choice of public funding is positive.

The choice of the budgetary regime could be also a time – dependent variable. As a result, there could be a relationship between the type of financing rule and the recent wave of financial supervision architecture reforms, which seems to be more oriented toward the

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30. The estimation methodology is described in Masciandaro, Nieto and Prast 2007.

31. See Maddala (1983) and Gourieroux (2000) for the ordered models. See also Cramer (2003).

32. The concept of rules driven path dependence has been recently used in the corporate governance literature: see, among others, Bebchuk and Roe (1999), Clark and Wojcik (2003), as well as in the financial supervision studies [Masciandaro (2005 and 2006)].

private funding regime. We use the age of the authorities as proxy of the degree of "modernity" of the supervisory setting. The age of the supervisory authorities is not coincident with their nature (age factor: **Year - Agency Establishment),** notwithstanding there is correlation between the CB nature and the authorities´ oldness (see Table 5). The expected sign of the relationship between the year of the establishment of the authority and the level of public funding is negative.

The political and institutional environment can explain the ability of the policymakers to implement their choices. The control variables must capture whether the quality of governance of political institutions (political factor: **Goodgov)** matters in defining the policymaker's choice of financing rule.

On the one hand, the expected sign of the relationship between the level of public funding and the political factor is likely to be negative, with policymakers that wish to give markets a larger role preferring the private funding model. On the other hand, the private funding could be a source of supervisory capture by the banking industry; therefore, the effectiveness of government in financial supervision —the signal of good political governance— could be better guaranteed using a public funding model.[33] Considering also the above mentioned non existence of a theoretical optimal financing rule, we can conclude that the expected sign of the relationship between the budgetary governance and the political factor is undetermined (i.e. it can be either positive or negative).

The relationship between the supervision financial governance and the characteristics of the banking and financial markets, mentioned above might "hide" the importance of other variables such as the legal tradition (legal factor: **CommonL),** which is a determinant in explaining the characteristics of the financing structure.[34] The law and finance literature stated the existence of a strong relationship between market-oriented financial systems and common law jurisdictions.

It has been claimed that the English law rules are a better support for the individual private operations, while French and German code are consistent with more State dominance.[35] Therefore in a common law country, the supervision would likely be characterized by a private funding model. Besides, the dynamic law and finance view emphasizes that legal traditions differ in terms of their abilities to adapt to changing environments, and that the common law is more dynamic.[36] If we share the view that "market oriented economies" and "private oriented regimes" are interchangeable concepts, we have one more reason to say that the expected sign of the relationship between the level of public funding and the common law variable is negative.

Furthermore, the policymakers´ choice of financing rule may depend on the size of their respective economies (economic size factor: **Gdp).** More specifically, the greater the size of the economy, and then, ceteris paribus, the possibility to give to the markets a larger role, the more likely seems to be the private funding rule. Following the same line of reasoning, the choice of the supervisory funding could depend on the level of economic development (economic development factor: **Oecd).** The expected sign of the relationship

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33. In general, considering the risk of state capture by private vested interests challenges the completeness of the traditional indicators of good governance; on this point see Kaufmann (2003).

34. For example, in Demirguc-Kunt, Laeven and Levine (2003) regulation become insignificant in explaining banking performance when checking for institutional indicators.

35. For a survey see Beck, Demirguc-Kunt and Levine (2001).

36. Beck, Demirguc-Kunt and Levine (2001).

between the level of public funding and the size of the economy —or the level of economic development— is negative.

The geographical factor **(Europe)** might be important in explaining the supervisors' financing rule. Europe has witnessed important reforms of the national financial architectures over the past decade. In general, the recent literature emphasizes the role of geography in shaping institutions.[37] In the equation, we test whether the policymaker's choices of financing rule depend on whether the country is located in Europe.[38] The expected sign of the relationship between the financing rule and the geographical factor is undetermined (i. e. can be either positive or negative).

Finally, the policymaker may choose the financing rule in response to the structure of the financial system. The recent literature on financial structure presents two opposite financial models: the equity model (or *market-based structure)* and the bank model (or *bank-based structure).* Therefore, the control variables must capture whether the financial structure (financial factor: **MvB Index** and **Mcap)** matters in defining the policymaker's choice of financing rules.

It could be argued that a market based structure would be more oriented toward private funding. In both structures, the policymaker can be motivated to establish a public funding regime in order to increase the probability of being the veto player. But in the bank based structure politicians have fewer incentives to promote a private funding regime structure in order to reduce the likelihood of capture by supervised firms. Therefore, one would expect more public financing in countries with a bank based structure. The expected sign of the relationship between the supervisor's public funding rule and the market base structure is negative.

Given the nature of the banking and financial industry, other features can influence the politicians.

First of all, we can claim that the degree of concentration in banking industry could be a variable influencing the financing rule in banking supervision. If the financial structure is more concentrated the regulatory capture can be more likely and therefore the politicians will prefer a public financed supervision. The expected sign of the relationship between the public funding and the degree of concentration of the banking system **(Conc)** is positive.

Secondly, we can argue that the degree of internationalisation of the banking industry could be a relevant variable. The openness of the banking system could incentive the policymakers to avoid the private funding of supervision, to avoid that foreign banks can capture the supervisor. The expected sign of the relationship between the public funding and the degree of internationalisation of the banking system **(Intern)** is positive.

The general specification is represented by equation (1):

37. Acemoglu, Johnson and Robinson (2001).

38. Masciandaro (2005 and 2006) tested a legal neighbour effect in explaining the overall supervision architectures, with different country sample.

$$(SBR)_i = \beta_1(AnatureCB) + \beta_2(Year)_i + \beta_3(MvB)_i + \beta_4(mcap)_i + \beta_5(goodgov) + \beta_6(gdp) + \beta_7(Oecd) + \beta_8(Europe) + \beta_9(CommonL) + \beta_{10}(Conc) + \beta_{11}(Intern) + \varepsilon_t$$

where subscripts $i = 1...90$ index the financial authorities of the sample presented in Table1.

The variables are the following:

SBR is the index of the supervisory financing rule, with the public funding regime = 2, the mix funding = 1 and the private funding regime = 0.

Anature CB is a binary variable for the agency nature (institutional factor). It is a dummy that expresses the nature of the supervisory agency, central bank (1) versus single financial authority (0).

Year of the agency establishment (variable for the agency age).

MvB Index binary variable for the financial factor. It is a dummy that represents the financial system of a given country, market-based (1) versus bank-based (0).[39]

Mcap quantitative variable for the financial factor. It is the ratio of the securities market size (capitalization) relative to GDP of each country.[40]

Goodgov quantitative variable for the public governance factor. It shows the structural capacity of the government to formulate and implement sound and market friendly policies.[41]

Gdp quantitative variable for the economic size factor (Gross Domestic Product).[42]

Oecd binary variable for the economic growth factor. It is a dummy that signals whether a given country is OECD member (1) or not (0).

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39. The index is calculated using different banking and financial variables: see Demigüç-Kunt and Levine (1999). For each variables we calculate the mean of four time values: 1996,1998, 2000, 2002.

40. World Bank, 2003, *World Development Indicators,* Stock Markets 5.3. For each variable we calculate the mean of four time values: 1996, 1998, 2000, 2002. Note that the correlation index between the financial regime variable (MvB) and the market capitalization variable (mcap) is high (0.50), but their specific influence on the dependent variable is relatively low (0.22 and 0.29 respectively); see Table 8.

41. The index is built using all the indicators proposed by Kaufmann et al. (2003). They define (public) governance as the exercise of authority through formal and informal traditions and institutions for the common good, thus encompassing: 1) the process of selecting, monitoring and replacing governments; 2) the capacity to formulate and implement sound policies and deliver public services; 3) the respect of citizens and the state for the institutions that govern economic and social interactions among them. Furthermore, for measurement and analysis purposes, these three dimensions of governance can be further unbundled to comprise two measurable concepts per each of the dimensions above for a total of six components: 1) voice and external accountability; 2) political stability and lack of violence; 3) government effectiveness; 4) lack of regulatory burden; 5) rule of law; 6) control of corruption. The authors present a set of estimates of these six dimensions of governance for four time periods: 1996, 1998, 2000, 2002. For every country, therefore, we first calculate the mean of the four time values for each dimension of governance; then we build up an index of global good governance in the period 1996-2002, calculating the mean of the six different dimensions.

42. World Bank, 2003, *World Development Indicators.* For each variable we calculate the mean of four time values: 1996, 1998, 2000, 2002. Note that the correlation index between the economic size variable (Gdp) and the economic growth (Oecd) is not so high (0.37), and their specific influence on the dependent variable is opposite (0.05 and -0.37 respectively); see Table 8.

Europe binary variable for the geographical factor. It is a dummy that signals whether a given country is European (1) or not (0).

CommonL binary variable for the law factor. It is a dummy that indicates that Common Law is the legal root (1) or not (0) of each country, representing the control variables for the law and finance view.[43]

Conc a quantitative continuous variable. It measures the degree of concentration of the banking industry.[44]

Intern a quantitative continuous variable. It measures the degree of internationalisation of the banking system.[45]

Tables 2 and 3 show the Logit and Probit estimates of Equation (2), without considering the concentration effect and the internationalisation effect. In the multinomial ordered models, the impact of a change in an explanatory variable on the estimated probabilities of the highest and lowest of the order classifications—in our case the public funding model and the private funding model— is unequivocal: If β_j is positive, for example, an increase in the value of x_j increases the probability of having the public funding model, while it decreases the probability of having the private model.

The results of the estimates confirm the robustness of the role of agency nature in explaining the financing rule. The probability of a public funding rule is always directly and significantly related to the central banks' presence as banking supervisor. If the banking supervisor is the central bank, the seignorage tradition is dominant, and therefore the probability of public funding is higher.

Secondly, we find a significant role of the financial structure of a country, measured by whether it is predominantly market or bank oriented. In the latter case, public funding seems more likely. A possible interpretation is that in a bank oriented financial system policymakers wish to have a firmer grip on the supervisor and/or prefer to reduce the risk of supervisory capture by banks.

Finally, we find that the probability that a financing rule follows a public finance model is lower in European countries, confirming that the recent wave of supervisory reforms in Europe increased the likelihood of private funding.

Tables 4 and 5 show the Logit and Probit estimates of Equation (2) considering both the concentration effect and the internationalisation effect. Given the data availability the country sample is smaller.

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43. Beck, Demirguc-Kunt and Levine (2001).

44. The variable is constructed as the percentage of total deposits hold by the five major banks of the country at the end of 2001. The variable is derived as answer to the question 2.6.2 from the new database about bank regulation and supervision constructed by Caprio-Levine (2003). The dataset is based on a survey sent to national bank regulatory and supervisory authorities of 107 countries. It is organised in 12 parts with 175 question s covering different aspect of financial supervision like: entry into banking; ownership; capital; activities; external auditing requirements; internal management/organizational requirement; liquidity and diversification requirements; depositor protection schemes; provisioning requirements; accounting/information disclosure requirements; discipline/problem institutions/exit and supervision.

45. The variable is constructed as the percentage of banking sector's assets hold 50% or more by foreign institutions or firms at the end of 2001. The variable is derived from the database contained in Caprio-Levine (2003) and corresponds to the question 3.8.2 (for a description of the database, see footnote 14).

It is interesting to compare the magnitude of the different effect using both Table 2 and Table4. The results contained in Table 4 confirm the robustness of the role of agency nature in explaining the budgetary governance regime. The coefficient related to the nature of the supervisory agency is positive and highly significant: where the supervisory authority is represented by the Central Bank, the probability to have a public funding rule is higher with respect to regimes with a different financial supervisory authority.

All other variable significantly influencing the type of financing rule in supervision keep being significant: the financial structure of a country continues to have a significant role with public funding positively correlated with a more bank oriented system. The variable representing European countries is still significant and shows that public funding model is progressively being sunbstituted by a more private funding scheme.

There are two factors that can be underline when comparing the results with and without variables indicating the degree of concentration and of internationalisation of the banking industry. All the significant effects become more robust, both in the case of the logit than of the probit model. However, only the effect of concentration in banking sector on the financing rules is found to be weakly significant, but with the wrong sign.

In addition, we test the hypothesis that the policymaker decides between two extreme financial rules of supervision: full public funding or not. The dependent variable (PUF)[46] is a binary variable to be estimated with Logit and Probit models, according to the following probability model:

$$(PUF)_i = \beta_1(AnatureCB) + \beta_2(Year)_i + \beta_3(MvB)_i + \beta_4(mcap)_i + \beta_5(goodgov) + \beta_6(gdp) + \beta_7(Oecd) + \beta_8(Europe) + \beta_9(CommonL) + \beta_{10}(Conc) + \beta_{11}(Intern) + \varepsilon_t$$

Tables 2,3,4 and 5 show the Logit and Probit estimates. The results confirm the robustness of the effect of the institutional, financial and geographical factors.

46. We use the binary index PUF according to the following scale: 1 = Public funding ; 0 = Otherwise (Private Funding and Mix Funding).

5 Conclusions

This paper analyses the financial governance of banking supervision in a sample of 90 countries worldwide. The empirical analysis focuses on the financing rules and attempts to identify factors that explain the differences between supervisory authorities.

From the methodological point of view, the fact that no theoretical optimal financing model has been developed may lead to two different views. It could be argued that society believes that financing rules do not matter and that these rules are chosen or have developed randomly. The alternative is that the financing model of supervision depends on country specific circumstances.

This paper makes an initial attempt to verify whether the empirical evidence favours the second view. Our findings show that the financing rule of banking supervision is related to the type of supervisory authority: if the supervisor is a central bank, public funding is more likely. Furthermore, the country's financial structure seems to be a significant factor. We find that private financing by supervised entities is more likely in countries that have market as compared to bank structures. Third, European banking supervisors are more likely to be privately funded as compared to supervisors in other countries. This may be a response to developments in the financial sector in European countries, it may be related to the development towards the European Monetary Union, and it may be a result of peer group pressure.

Future research on the subject should consider additional factors that may affect the financing structure of banking supervision. Potential candidates are the degree of concentration, conglomeration and internationalisation of the financial system. Of course, there may be a correlation between these additional potentially explanatory variables and the measure of market versus bank orientation of the financial system structure. The history of both the institutional development of supervision and that of financial stability may also play a role. For example, in those instances in which insurance supervision was traditionally developed and therefore financed by the supervised firms, it is more likely that a conglomerated financial sector will have at least some private funding of supervision. Moreover, it could be that countries with a largely internationalized financial sector are more subject to peer group pressure to choose a particular type of financing rule of supervision. Finally, large scale financial scandals may have affected the monitoring of supervisory activities by the government, including budgetary monitoring and the financing rule. In this context, the study of the relation between the financing rules and the accountability arrangements seems the natural follow-up of this paper.

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7. Tables and Figures

Table 1 Supervisory Authorities in 90 countries
Source: Masciandaro 2005

	Countries	Banking Sector (b)	Securities Sector (s)	Insurance Sector (i)
1	Albania	CB	S	I
2	Argentina	CB	S	I
3	Australia	BI,S	BI,S	BI,S
4	Austria	U	U	U
5	Bahamas	CB	S	I
6	Belarus	CB	S	I
7	Belgium	U	U	U
8	Bolivia	B	SI	SI
9	Bosnia	CB,B1,B2	S	I
10	Botswana	CB	S	I
11	Brazil	CB	S	CB,I
12	Bulgaria	CB	S	I
13	Cameroon	CB	S	I
14	Canada	BI	Ss(**)	BI
15	Chile	B	SI	SI
16	China	B	S	I
17	Colombia	BI	S	BI
18	Costa Rica	B	S	I
19	Croatia	CB	S	I
20	Cyprus	CB	S	I
21	Czech Republic	CB	S	I
22	Denmark	U	U	U
23	Ecuador	BI	S	BI
24	Egypt	CB	S	I
25	El Salvador	BI	S	BI
26	Estonia	U	U	U
27	Finland	BS	BS	I
28	France	BC,B1,B2,B3	CB,S	I
29	Georgia	CB	S	I
30	Germany	U	U	U
31	Greece	CB	S	I
32	Guatemala	BI	S	BI
33	Hong Kong	CB	S	I
34	Hungary	U	U	U
35	Iceland	U	U	U
36	India	CB,B	S	I
37	Iran	CB	CB	I
38	Ireland	CB	CB	CB
39	Israel	CB	S,I	I
40	Italy	CB,S	CB,S	I
41	Jamaica	CB	SI	SI
42	Japan	U	U	U
43	Jordan	CB	S	I
44	Kazakhstan	U	U	U
45	Kenya	CB	S1, S2	I
46	Korea	U	U	U
47	Latvia	U	U	U
48	Lebanon	CB,B	CB	I
49	Libya	CB	SI	SI
50	Lithuania	CB	S	I
51	Luxembourg	BS	BS	I
52	Macedonia	CB	S	-
53	Malaysia	CB	S	CB

54	Malta	U	U	U
62	Norway	U	U	U
63	Pakistan	CB	SI	SI
64	Panama	B	S	I
65	Peru	BI	S	BI
66	Philippines	CB	CB,S	I
67	Poland	CB	BC,S	I1,I2
68	Portugal	CB	CB,S	I
69	Romania	CB	S	I
70	Russia	CB	S	I
71	Saudi Arabia	CB	CB	CB
72	Slovak Republic	CB	SI	SI
73	Slovenia	CB	S	I
74	South Africa	CB	SI	SI
75	Spain	CB	CB,S	I
76	Sri Lanka	CB	S	I
77	Sweden	U	U	U
78	Switzerland	BS	BS	I
79	Thailand	CB	S	I
80	Trinidad Tobago	CB	S	I
81	Tunisia	CB	S	I
82	Turkey	B	S	I
83	Ukraine	CB	S	-
84	UAE	CB	S	I
85	UK	U	U	U
86	USA	CB,B	S,Ss**	I,Is(**)
87	Uruguay	BS, CB	BS, BC	I, BC
88	Venezuela	B	S	I
89	Vietnam	CB	S	I
90	Zimbabwe	CB	S	I

The initials have the following meaning: B = authority specialized in the banking sector; BI = authority specialized in the banking sector and insurance sector; CB = central bank; G= government; I = authority specialized in the insurance sector; S = authority specialized in the securities markets; U = single authority for all sectors ; BS = authority specialized in the banking sector and securities markets;; SI = authority specialized in the insurance sector and securities markets.

(**) = state or regional agencies.

Figure 1
Financing Supervision: 53 Central Banks

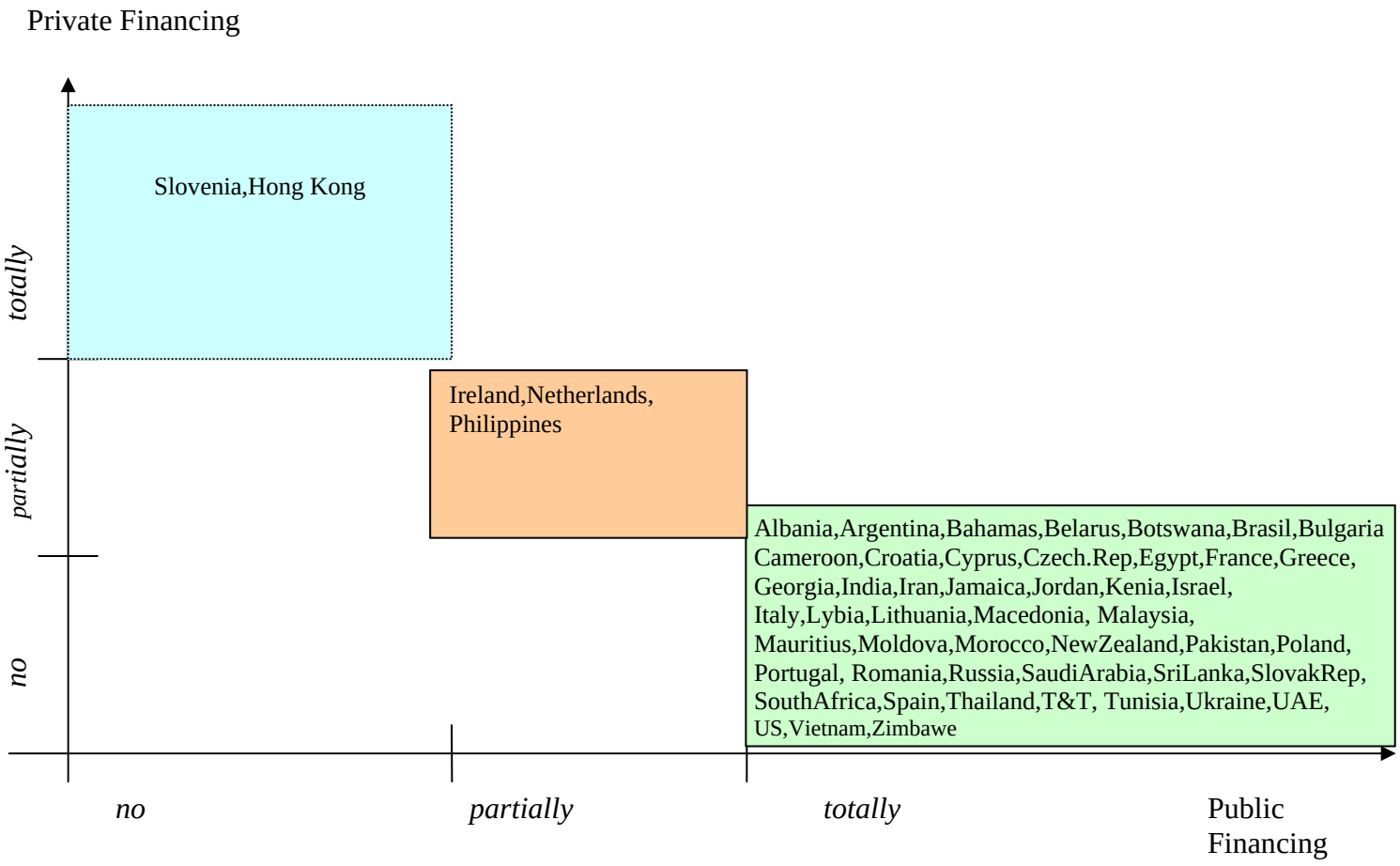

Figure2
Financing Supervision: 37 (S)Fas

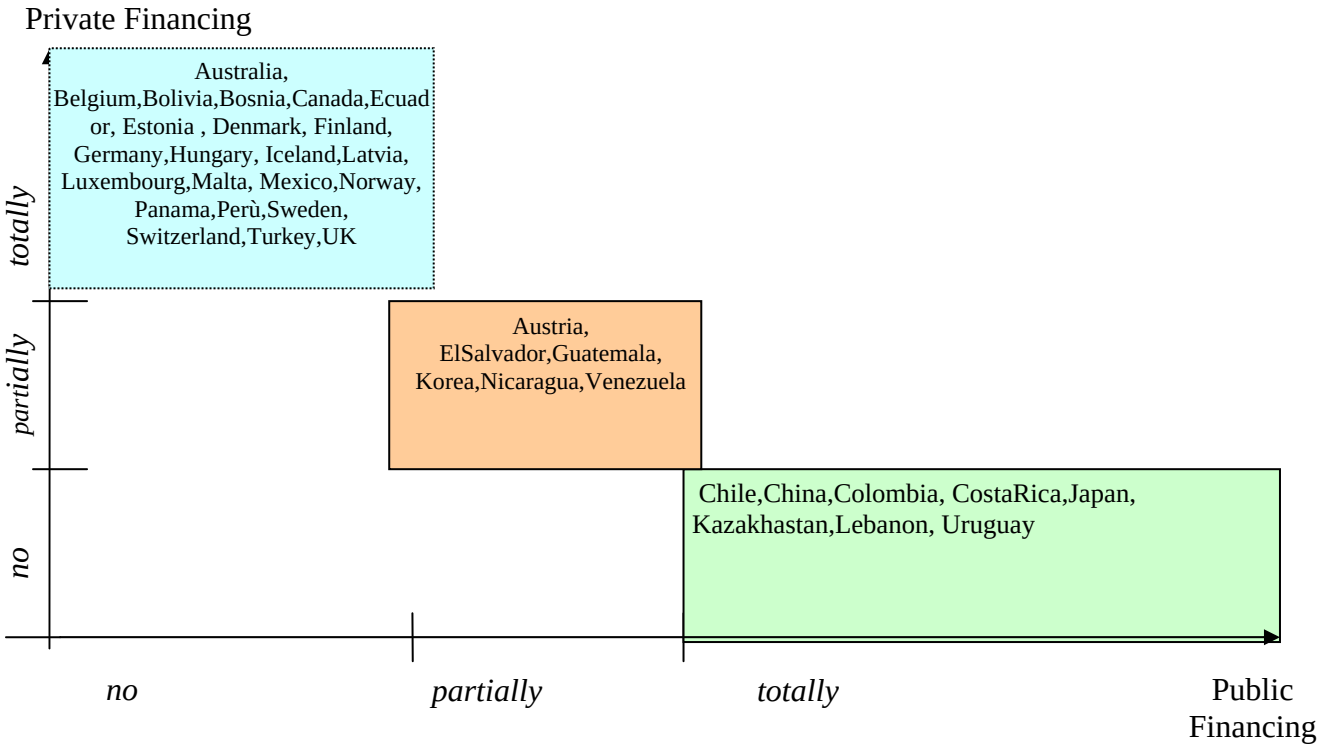

Table 2 Logit Estimates

VARIABLES	OLogit	Logit
DEPENDENT VARIABLE	**SBR**	**PUF**
Agency Nature CB		
Coefficient β1	5.23	5.37
Std. Error	1.12	1.41
P >z	0.00 ***	0.00 ***
Year - Agency Establishment	-0.006	-0.009
Coefficient β2	0.007	0.008
Std. Error	0.35	0.27
P >z		
MvB		
Coefficient β3	-2.21	-3.25
Std. Error	1.07	1.42
P >z	0.04 **	0.02 **
Mcap		
Coefficient β4	-1.70	-0.92
Std. Error	1.05	1.14
P >z	0.11	0.42
Goodgov		
Coefficient β5	-0.024	-0.32
Std. Error	0.837	0.92
P >z	0.97	0.72
Gdp		
Coefficient β6	0.001	0.001
Std. Error	0.0008	0.001
P >z	0.11	0.11
Oecd		
Coefficient β7	0.24	-1.05
Std. Error	1.31	1.65
P >z	0.85	0.52
Europe		
Coefficient β8	-2.86	-2.34
Std. Error	1.08	1.33
P >z	0.00 ***	0.07 *
Common Law		
Coefficient β9	-0.148	0.07
Std. Error	1.216	1.43
P >z	0.90	0.95
Constant		
Coefficient		18.22
Std. Error		16.97
P >z		0.28
No of observations	**90**	**90**
LR chi2(9)(8)	84.05	72.13
Prob>chi2	0.000	0.000
Pseudo R2	0.51	0.59
Log Likelihood	-39.05	-24.07

Note: *** indicates statistical significance at 1 percent; ** indicates statistical significance at 5 percent; * indicates statistical significance at 10 percent.

Table 3 Probit Estimates

VARIABLES	OProbit	Probit
DEPENDENT VARIABLE	**SBR**	**PUF**
Agency Nature CB		
Coefficient β1	2.99	3.06
Std. Error	0.59	0.76
P >z	0.00 ***	0.00 ***
Year - Agency Establishment	-0.004	- 0.005
Coefficient β2	0.004	0.005
Std. Error	0.25	0.27
P >z		
MvB		
Coefficient β3	-1.39	-1.88
Std. Error	0.59	0.80
P >z	0.02 **	0.01 ***
mcap		
Coefficient β4	-0.89	-0.52
Std. Error	0.59	0.66
P >z	0.13	0.42
goodgov		
Coefficient β5	-0.14	-0.26
Std. Error	0.44	0.49
P >z	0.73	0.59
Oecd		
Coefficient β7	0.31	-0.46
Std. Error	0.71	0.88
P >z	0.66	0.59
Gdp		
Coefficient β6	0.0006	0.001
Std. Error	0.0004	0.0007
P >z	0.18	0.13
Europe		
Coefficient β8	-1.65	-1.35
Std. Error	0.60	0.72
P >z	0.00 ***	0.06 *
Common Law		
Coefficient β9	-0.01	0.12
Std. Error	0.65	0.78
P >z	0.97	0.87
Constant		
Coefficient		10.76
Std. Error		10.03
P >z		0.28
No of observations	**89 (+)**	**90**
LR chi2(8)	84.17	72.93
Prob>chi2	0.00	0.000
Pseudo R2	0.52	0.60
Log Likelihood	-38.50	-23.67

Note: *** indicates statistical significance at 1 percent; ** indicates statistical significance at 5 percent; * indicates statistical significance at 10 percent; (+) one observation dropped.

Table 4 Logit Estimates with Concentration Effect and Internationalisation Effect

VARIABLES	OLogit	Logit
DEPENDENT VARIABLE	**SBR**	**PUF**
Agency Nature CB		
Coefficient β1		
Std. Error	6.12	8.26
P >z	1.40	2.81
	0.00 ***	0.00 ***
Year - Agency Establishment		
Coefficient β2	-0.015	-0.01
Std. Error	0.01	0.013
P >z	0.14	0.16
MvB		
Coefficient β3		
Std. Error	-3.26	-5.81
P >z	1.27	2.55
	0.01 ***	0.02 **
Mcap		
Coefficient β4		
Std. Error	-1.55	-1.18
P >z	1.58	2.50
	0.32	0.63
Goodgov		
Coefficient β5		
Std. Error	0.15	0.31
P >z	0.99	1.21
	0.87	0.79
Oecd		
Coefficient β7	1.84	1.93
Std. Error	1.51	1.86
P >z	0.22	0.29
Europe		
Coefficient β8	-3.69	-5.97
Std. Error	1.46	2.83
P >z	0.01 ***	0.03 **
Common Law		
Coefficient β9	2.10	3.73
Std. Error	0.023	3.00
P >z	0.18	0.21
Conc		
Coefficient β9	-0.04	-0.04
Std. Error	0.023	0.02
P >z	0.092 *	0.15
Intern		
Coefficient β9	0.11	0.19
Std. Error	0.016	0.02
P >z	0.48	0.42
Constant		
Coefficient		24.98
Std. Error		17.62
P >z		0.15
No of observations	**76**	**76**
LR chi2(9)(8)	74.49	69.97
Prob>chi2	0.000	0.000
Pseudo R2	0.53	0.68
Log Likelihood	-31.83	-16.39

Note: *** indicates statistical significance at 1 percent; ** indicates statistical significance at 5 percent; * indicates statistical significance at 10 percent.

Table 5 Probit Estimates with Concentration Effect and Internationalisation Effect

VARIABLES	OProbit	Probit
DEPENDENT VARIABLE	**SBR**	**PUF**
Agency Nature CB		
Coefficient β1		
Std. Error	3.57	4.61
P >z	0.77	1.50
	0.00 ***	0.00 ***
Year - Agency Establishment		
Coefficient β2	-0.00	- 0.009
Std. Error	0.006	0.007
P >z	0.13	0.20
MvB		
Coefficient β3		
Std. Error	-1.89	-3.21
P >z	0.72	1.40
	0.00 ***	0.02 **
mcap		
Coefficient β4		
Std. Error	-0.82	-0.62
P >z	0.88	1.33
	0.35	0.64
goodgov		
Coefficient β5		
Std. Error	-0.02	0.12
P >z	0.52	0.66
	0.96	0.85
Oecd		
Coefficient β7	1.08	1.09
Std. Error	0.82	1.06
P >z	0.18	0.30
Europe		
Coefficient β8	-2.18	-3.22
Std. Error	0.82	1.53
P >z	0.00***	0.03 **
Common Law		
Coefficient β9	1.18	2.04
Std. Error	0.92	1.55
P >z	0.20	0.18
Conc		
Coefficient β9	-0.022	-0.02
Std. Error	0.013	0.01
P >z	0.087 *	0.15
Intern		
Coefficient β9	0.00	0.00
Std. Error	0.009	0.01
P >z	0.47	0.46
Constant		
Coefficient		19.50
Std. Error		14.93
P >z		0.19
No of observations	**76**	**76**
LR chi2(8)	75.65	70.29
Prob>chi2	0.00	0.000
Pseudo R2	0.54	0.68
Log Likelihood	-41.77	-16.23

Note: *** indicates statistical significance at 1 percent; ** indicates statistical significance at 5 percent; * indicates statistical significance at 10 percent.

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