6. Financial Supervision Unification, Monetary Commitment and Central Bank Independence

Each country has its degree of unification of powers with respect to financial supervision. The respective index reaches its maximum level in cases where there is a single authority and the minimum when there are more than three supervisors. The analysis conducted in the preceding pages claims that the degree of central bank involvement in supervision may condition the policymaker in his/her decision to alter the supervision concentration, according to an inverse relationship: the result is the central bank fragmentation effect.

How do we econometrically test the robustness of the fragmentation effect? How can we evaluate the possible role of the monetary commitment or the influence of the central bank independence? In order to assess these relationships, we can estimate a model of the probability of different regime decisions as a function of these variables, controlling for other structural variables.

The supervision regimes can be viewed as resulting from an unobserved variable: the optimal degree of financial supervision concentration, consistent with the policymaker utility. Each regime corresponds to a specific range of the optimal financial supervision concentration, with higher discrete FAC Index values corresponding to a higher range of financial concentration values. Since the FAC Index is a qualitative variable, the estimation of a model for such a dependent variable requires the use of a specific technique.

Our qualitative dependent variable can be classified into more than two categories, given that the FAC Index is a multinomial variable. But the FAC Index is also an ordinal variable, given that it reflects a ranking. Then the ordered probit and ordered logit models

are appropriate estimators, given the ordered nature of the policymaker's alternative; see Maddala (1983), Greene (1997), Wooldrige (2002).

Let *y* be the policymaker's ordered choices, taking the values (0,1,2,..,7). The ordered model for *y*, conditional on a set of *K* explanatory variables *x*, can be derived from a latent variable model (Equation 1). In order to test this relationship, let us assume that the unobserved variable vector, the optimal degree of financial supervision concentration y^*, is determined by:

$$y^* = \beta' x + \varepsilon \quad (1)$$

where ε is a random disturbance uncorrelated with the regressors, and β is a 1 x *K* regressors' vector.

The latent variable y^* is unobserved. What is observed is the choice of each national policymaker to maintain or to reform the financial supervisory architecture: this choice is summarized in the value of the FAC Index, which represents the threshold values. For our dependent variable there are seven threshold values. Estimation is carried out by means of maximum likelihood techniques, assuming that ε is normally distributed across country observations, and the mean and variance of ε are normalized. This model can be estimated with an ordered Probit model or with an ordered Logit model[4].

Which economic model can be tested? First of all, given the recent empirical analyses (Masciandaro 2005 and 2006), the choice of the optimal level of financial supervision concentration could depend on the role of the central bank in the supervision architecture.

[4] The Logit model differs from the Probit model only in the cumulative distribution function that is used to define choice probabilities. The maximum likelihood estimations were carried out by a packaged-ordered Probit and ordered Logit commands in STATA. To be complete we present both the Logit and the Probit results, given that, as usual, there is little basis for choosing between Probit and Logit models.

The expected sign of the relationship between central bank involvement and financial supervision consolidation is negative.

Secondly, we can control for the potential role of the monetary commitment and the influence of the central bank independence. In fact, the central bank involvement variable may hide the role of the overall monetary commitment, that enforces the general reputation endowment of the central bank, or the influence of the central bank's degree of independence, that strengthened its bureaucratic power. Therefore, both monetary institutional variables can capture the following effect: does monetary commitment and/or central bank independence matter in defining the level of financial supervision consolidation, instead of the central bank involvement in supervision? The expected sign of the two relationships is negative.

How can other control variables be chosen? Following Masciandaro (2005, 2006) we shall test the more general hypotheses:

First, the policymaker chooses to maintain or reform the degree of supervisory concentration in response to the structure of the financial system. In the modern debate on financial structure, it is usual to compare the equity dominance model (or *market-based regime*) with the bank dominance model (or *bank-based regime*). Furthermore, recent literature pointed out the close relationship between the financial structure model and the corporate governance model in every country, with particular attention to the relative political determinants; see Pagano and Volpin (2000), Perotti and Von Thadden (2003). Therefore, the control variables must capture the following effect: does the financial structure model (*financial factor*) matter in defining the policymaker's choices in the area of supervisory consolidation?

The expected sign of the relationship between the degree of supervision unification and the financial factor is undetermined (i.e. it can be either positive or negative). In section two we stressed the importance of the blurring process for banking and financial markets worldwide. In a bank-based regime, if we think that the policymakers' choices depend on the features of their own regime, we can suppose a positive relationship between the kind of regime and the degree of financial supervision consolidation, exactly in face of the financial conglomerates effect. The rationale for the creation of a single financial supervisory authority is the blurring of confines between banks, insurers and financial service providers. The increasing importance of financial conglomerates requires the unification of supervisory functions. At the same time, however, the blurring effect also means potential changes in the nature and dimensions of the financial markets (*the securitisation effect*). Therefore, in a market-based regime we can also expect a positive relationship between the kind of regime and the degree of financial supervision consolidation, this time in the face of the securitisation effect. Therefore the relationship between the financial factor and the degree of supervision concentration remains an empirical question.

Second, the political and institutional environment can determine the ability of the policymakers to implement their choices. Furthermore, we pointed out that the financial structure itself could be influenced by political factors. Then the control variables must capture a possible second relevant effect: does the quality of public governance (*political factor*) matter in defining the policymaker's choices on the level of supervisory concentration? The expected sign of the relationship between the degree of supervision unification and the political factor is also undetermined. In section two we noted that, whatever the financial regime of his/her country, a policymaker may choose a higher

degree of supervision in order to improve the capacity to face the challenges of the blurring process. Then we can suppose a positive relationship between good governance indicators and supervision unification. But a policymaker may prefer a single authority in order to increase the probability of capturing the financial supervisory structure. Therefore, at the same time we might expect a positive relationship between bad governance indicators and supervision consolidation. Again, the relationship between the political factor and the degree of supervision concentration remains an empirical question.

However, we must note that the relationship between the degree of supervision consolidation and the characteristics of the banking and financial markets might "obscure" the importance of other variables, which are themselves determinants in explaining the characteristics of the banking and financial markets; for example, in Demirgüç-Kunt, Laeven and Levine (2003) regulation becomes non-significant in explaining banking performance when checking for institutional indicators. Recently, the structure of financial markets was explained with three different institutional approaches (*legal factors*): the "legal approach" - La Porta et al. (1998) - the "economic approach" - Rajan and Zingales (2000) - the "political economy approach" - Pagano and Volpin (2000), Perotti and von Thadden (2003). Then we have to include control variables related to the legal-financial view and the endowment view, while the political-financial view was already represented by the indicator of governance.

Finally, as the above descriptive analysis pointed out, the concentration of powers seems more peculiar of developed countries, particularly in the European context. Moreover, we asked ourselves whether the choices of policymakers to increase the degree of consolidation of supervisory powers might depend on the level of development in their respective countries (*economic factor*). Furthermore, the *geographical factor* might also be

important, in terms of location in Europe. Then we could expect a positive relationship between European location and OECD membership, as well as the levels of economic growth, on one hand, and financial supervision concentration, on the other.

The general specification is represented by equation (2):

$$
\begin{aligned}
(FAC)_{\mathrm{i}} = {} & \beta_1 (CBFA)_{\mathrm{i}} + \beta_2 (MCB) + \beta_3 (CBFAMCB) + \beta_4 (MvB)_{\mathrm{i}} \\
& + \beta_5 (mcap)_{\mathrm{i}} + \beta_6 (goodgov)_{\mathrm{i}} + \beta_7 (gdp) + \beta_8 (OECD) \\
& + \beta_9 (Europe) + \beta_{10} (AnglosaxonL) + \beta_{10} (FrenchL) + \beta_{11} (GermanScandL) + \\
& \beta_{12} (Latitude) + \varepsilon_t
\end{aligned}
$$

with country $i = 1 \ldots 48$.

The independent variables are the following[5]:

1. CBFA Index is the index of involvement of the central bank in supervision, defined in section four;

2. MCB Index is a monetary institutional variable: we use first the MOC Index (monetary commitment), then the CBI Index (central bank independence); both variables were defined in section five;

3. CBFAMCB factor is the composite effect of CBFA Index and MCB Index;

4. MvB Index = Market vs Bank Index: binary variable for the private governance factor. It is a dummy that expresses the financial system of a given country, market-based (1) versus bank-based[6] (0);

5. mcap = Market capitalization/GDP: quantitative variable for the private governance factor. It shows a measure of the securities market size, relative to GDP[7];

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5 The correlation matrix for the variables is in Table 2.

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

7 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

6. goodgov = Good Governance: quantitative variable for the public governance factor. It shows the structural capacity of the government to formulate and implement sound policies. Furthermore the index can represent the control variable for the politics and finance view[8];

6. gdp = Gross Domestic Product: quantitative variable for the economic size factor[9];

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

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

9-11. AnglosaxonL, FrenchL, GermanScandL = binary variables for the law factor. They are dummies that indicate the legal root of a given country, representing the control variables for the law and finance view[10];

12. **Latitude** = quantitative variable for the endowment view. The variable is calculated as the absolute value of the latitude of the country, scaled to take values between 0 and 1 [11].

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 Single Authority model and the "pure" Multi-supervisory model - is unequivocal: if β_j is

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regime variable (MvB) and the market capitalization variable (mcap) is high, but their influence on the dependent variable is very low.

8 The index is built using all the indicators proposed by Kaufmann, Kraay and Mastruzzi (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.

9 World Bank, 2003, *World Development Indicators*. For each variable we calculate the mean of four time values: 1996, 1998, 2000, 2002.

10 Beck, Demirgüç-Kunt and Levine (2001). The legal roots are five: Anglo-Saxon Law (=Common Law), French, German and Scandinavian Laws (=Civil Laws), Socialist Law (Others) ; we skip one root – choosing the Socialist Laws, as the least significant from an economic point of view – to avoid multicollinearity problems.

11 La Porta et al. (1999). On the endowment view, also see Beck, Demirgüç-Kunt and Levine (2001).

positive, for example, an increase in the value of *xj* increases the probability of having the Single Authority model, while it decreases the probability of having the "pure" Multi-supervisory model.

Tables 2 and 3 show the Logit and Probit estimates of the general specification, using the sample of 48 countries[12]. The result of all the estimates confirm the robustness of the role of the central bank involvement, and also the monetary commitment (Table 2) and the central bank independence (Table 3) are inversely related to the supervision consolidation. The monetary institutional indexes do not substitute the central bank involvement effect, but they also influence the supervision unification. Therefore, both the central bank's role as supervisor and its monetary legal status matter in explaining the supervisory architectures. However the two factors – central bank involvement and central bank monetary status – are independent; the composite factor is never significant (Table 2 and 3).

Another possible proxy of the reputation endowment effect and/or the bureaucracy effect could be the age of the central bank. We employ an index of central bank age (CBAGE Index) utilizing the information provided on the central bank web sites. For each central bank the value of the index is simply equal to the years between the central bank establishment and today. If a relationship between age and reputation and/or bureaucratic power holds, the higher CBAGE Index, the higher the reputation endowment and/or the specific bureaucratic power of the central bank.

Table 4 shows the Logit and Probit estimates of the general specification with the new variable – CBAGE Index – using the same sample. The central bank age does not matter: the

[12] The country sample depends on the availability of institutional data. Given the 267 world countries (UN members are 180), our 48 countries represent 54 percent of world GDP and 30 percent of the world population.

probability of a more consolidated supervision is not linked with the age of the monetary authorities.

Finally, it is crucial to test the robustness of the hypothesis that the central bank involvement can be considered an independent variable, rejecting any reverse causality. In other words, we had to reject the hypothesis that central bank involvement is endogenous, i.e. that the policymaker jointly determines the financial supervision level and the central bank involvement, based on the same explicative model. We then considered central bank involvement as dependant variable (Table 5). Our conclusion is that the variables that could explain the degree of central bank involvement in financial supervision do not coincide with those that we use to analyse the degree of consolidation. In fact, if one performs Logit and Probit regressions using CBFA as dependent variable and the same vector of financial and institutional variables, the results are not significant at all.

Furthermore, to test the robustness of the institutional factor, we tried changing the index of central bank involvement, making it perfectly symmetrical with the index of financial supervision level[13] (Table 6). As expected, all the results are confirmed.

Finally, looking at the control variables, the probability that a country will move towards a Single Authority model is higher: 1) the smaller the overall size of the economy; 2) the higher the goodness of public governance; 3) when the jurisdiction adopt the Civil Law, particularly if the legal framework is characterized by German and Scandinavian roots[14].

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[13] The different levels of central bank involvement can be measured using the identical scale of the FAC Index (labelled CBFA Two Index): 1 = the central bank has responsibility in no sector; 3 = the central bank has responsibility in one sector; 5 = the central bank has responsibility in two sectors; 7 = the central bank has responsibility in all three sectors.

[14] We contrast the empirical results of Masciandaro (2005), who claimed that - given a different sample of countries (68) – also the financial variables are significant. In Masciandaro (2006) – with a data set of 89

First of all, the choice of the degree of supervisory unification is influenced by the dimension of the economic systems. More specifically, the lower the overall economic size, the more likely it seems that the probability of consolidation will increase, confirming the hypothesis of policymakers conditioned by the "small country" situation[15]. The small country effect captures the fact that with relatively few people the expertise in financial supervision is likely to be in short supply, and then this expertise might be more effectively utilized if it is concentrated with a single financial agency.

Secondly, the legal factor matters. This law effect is puzzling. The law and finance literature claims the existence of a strong relationship between market oriented financial systems and the British law jurisdictions. Here, we do not find that financial supervision unification is directly correlated with a market-based regime, while a link exists with the Civil Law root, in particular with the German and Scandinavian legal systems. This suggests a sort of "legal neighbour" effect.

Thirdly, the choice of policymakers to establish the concentration of supervisory powers could be facilitated by an institutional environment characterized by good governance. The relationship between good governance and the supervision concentration process can be explained, if we suppose that a policymaker who cares about soundness and efficiency would prefer the single financial authority as the optimal one in the face of the blurring challenges.

7. Conclusions

countries – the good governance coefficient is weakly significant. Therefore, the financial and political factors seem to be sample sensitive explanatory variables.

[15] It has been noted that the small country effect holds. Notwithstanding, we do not include in our sample the eight very small countries (Bahrain, Bermuda, Cayman Islands, Gibraltar, Maldives, Netherlands Antilles, Singapore and United Arab Emirates) that introduce the unified financial authorities.