Allocating supervisory responsibilities to central bankers: does national culture matter?

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Abstract

Central banks play an important role in the economy. They are responsible for the conduct of monetary policy, and in several countries, they get involved in the supervision of the financial sector. We derive a simple theoretical model to illustrate how culture may influence a politician's choice of regulatory architecture and the assignment of responsibilities when anticipating the impact of that regime on the regulatory agencies' incentives to cooperate. Using a sample of around 70 countries during the period 1996-2013 we confirm that the extent of supervisory duties that are allocated to the central bank are influenced by national culture. More specifically, consistent with the theoretical predictions, we find that individualism is positively associated, and power distance is negatively associated, with the likelihood of higher central bank involvement in supervision.

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1. Introduction

Central banks around the world have a special role in both the economy and the public administration domain, which usually is the outcome of a government act establishing the central bank as the government's main bank. Additionally, the responsibilities that have been assigned to central banks over time provide them with structural power and freedom that few other public authorities and institutions have (Blinder, 2004; Dyson, 2009; McPhilemy and Moschella, 2019). Therefore, it is not surprising that central banking has received a lot of interest from various disciplines, like law (Zhou and Li, 2006; Masciandaro and Quintyn, 2009; Staikouras and Triantopoulos, 2016), economics (Kim and Kim, 2007; Bholat et al., 2019), political science (Masciandaro, 2007; Hayat and Farvaque, 2012), and public administration (McPhilemy and Moschella, 2019; Moschella and Pinto, 2019).

In recent years, one topic that has attracted the attention of scholars from almost all the above disciplines is the architecture of the financial supervisory system. This includes questions like whether there should be one or more regulatory agencies, how to allocate powers among different agencies, and whether and to what extent the central bank should be involved in supervision. The importance of these issues lies in the fact that the regulatory agencies are the ones that must design and implement the laws that govern the stability and efficiency of the financial sector.

In general, studies in this field fall into four broad categories. First, there are both law and economics studies that discuss theoretically the advantages and disadvantages of central bank involvement in the supervision of financial firms (Goodhart 2000; Beck and Gros, 2012; Staikouras and Triantopoulos, 2016). Second, there are empirical studies that propose indices to quantify the extent of central bank involvement in supervision (Masciandaro, 2004; Masciandaro and Quintyn, 2009). Third, there are studies that examine the impact of central bank supervision on various outcomes like bank efficiency (Gaganis and Pasiouras, 2013), bank soundness (Doumpos et al., 2015), firms' financial constraints (Mertzanis, 2020) and economic growth (Masciandaro et al., 2013). Fourth, there are studies that investigate the driving factors - i.e., the determinants - of central bank involvement in supervision (Masciandaro, 2006, 2009; Masciandaro and Romelli, 2018).

The present study falls into the last strand of the aforementioned literature. Previous studies have mainly focused on economic and formal institutional factors, like

the country-level governance (i.e., regulatory quality, rule of law, etc.), legal origins, market capitalization, past banking crises, and banking sector size (Masciandaro, 2006, 2007, 2009; Masciandaro and Romelli, 2018).   There is no doubt that these factors play an important role. However, we hypothesize that informal institutions, like deep-rooted cultural factors, also drive lawmakers' decisions of whether (or not) to grant supervisory powers to the central bank.

The starting point for our analysis is Masciandaro (2009) who proposes a theoretical model that considers the politician's objective function in determining the level of unification of the financial supervision regime. First, he assumes that the society assigns to an elected lawmaker the task of designing the institutional regime that guarantees the effectiveness of financial supervision. Then he shows that the decision to grant supervisory powers will depend upon the politician's objective to maximize the difference between political gain and political cost of action. Within this context, we assert that this policymaker should consider the potential conflicts of interests and coordination issues when the supervisory arrangements bring together different authorities under a cooperative agreement, in contrast to a unified approach where one institution (Central Bank) has multiple mandates and the instruments to achieve them (Lombardi and Siklos, 2016). For example, the literature suggests that regulatory agencies with overlapping or conflicting mandates may engage in turf wars or bureaucratic stand-offs (Taylor, 2016) as well as that independent central banks may not welcome a coordinating policy (Lombardi and Siklos, 2016). Most importantly, Carmichael (2015) highlights that such difficulties in achieving cooperation and information sharing between regulatory agencies because of the inherently territorial human nature. Consequently, a lawmaker who wants to guarantee the effectiveness of the supervisory architecture will consider the expected human values and beliefs about cooperation that are embedded in one's culture, as these should characterize the individuals in the different regulatory agencies, and subsequently the organizational culture of the agencies.

As we discuss in more detail in Section 2, in the present study we examine the role of two national culture dimensions that appear to be particularly relevant to our work. The first is the dimension of individualism versus collectivism, which relates to group cohesion and ties between individuals, and has apparent implications for conflict handling styles. The second is the dimension of power distance, which refers to the

cultural attitude toward power inequalities amongst members of society. In Section 3, we present a simple theoretical model that shows how these two dimensions could shape the willingness of the authorities to cooperate and to avoid turf wars, with implications for the government's final decision as for the allocation of supervisory power and the adoption of a certain supervisory architecture. We combine these cultural data with information on central bank involvement in supervision from Masciandaro and Romelli (2018) over the period 1996-2013, and we estimate an extended ordered probit model that accounts for the potential endogeneity of national culture with an instrumental variable approach (Wooldridge, 2010). Controlling for other country-level economic and political attributes proposed in the literature, we find that a national culture of individualism (power distance) is positively (negatively) associated with the decision to grant more supervisory responsibilities to the central bank.

The rest of the paper is as follows. Section 2 provides a background discussion on national culture and regulatory decision making. Section 3 presents a simple theoretical model of delegation and regulatory competition. Section 4 presents the data and methodology. Section 5 discusses the empirical results, and Section 6 concludes.

2. National culture and regulatory decision making

National culture has attracted the attention of scholars from various disciplines, and they all seem to agree that cultural characteristics influence personal attitudes, preferences, and decision making. Most importantly, Gunkel et al. (2016) point out that cultural values are relevant to the formation of preferences for styles of handling conflicts, as well as that these preferences are relatively stable across different situations. As discussed in Section 1, we believe that the elected politicians that aim to facilitate the effectiveness of the financial supervision policy will consider such attributes and their impact on expected behaviour of the agencies when deciding how to allocate supervisory powers to them.

Hofstede (1980, 2001) and Hofstede et al. (2010) identify six specific dimensions of national culture that have been used in hundreds of empirical studies across various disciplines. Among these, the dimensions of individualism–collectivism and of power distance seem to be the most relevant ones when linking conflict behavior with culture (Kaushal and Kwantes, 2006), and are therefore the ones that we consider in the present study.

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Hofstede et al. (2010, p. 92) define the dimension of individualism versus collectivism by distinguishing between societies in which "*ties between individuals are loose*" and members "*look after him- or herself and his or her immediate family*" only (individualism), as opposed to those whose members " *are integrated into strong, cohesive in-groups*", which "*protect them in exchange for unquestioning loyalty*". They also point out that persons from an individualistic culture would be expected to act according to their own interests and have a preference for low-context communication, while others relate a culture of individualism to overconfidence and attribution bias (Chui et al., 2010; Ferris et al., 2013; Blomkvist et al., 2018). Therefore, it is not surprising that upon reviewing numerous studies, Gunkel et al. (2016) conclude that the individualism/collectivism dimension is the dimension of cultural value that has been examined most often in the context of styles of conflict handling. Their empirical findings also reveal that collectivism has a direct negative effect on the preference for a dominating style. Along the same lines, the results of a meta-analysis by Holt and DeVore (2005) indicate that: (i) individualistic cultures choose forcing as a conflict style more than collectivistic cultures, and (ii) collectivistic cultures prefer the styles of withdrawing, compromising, and problem-solving more than individualistic cultures. Finally, Gelfand et al. (2004) also refer to various studies that point to the fact that collectivism is related to cooperation.

Turning to the power distance dimension, Hofstede et al. (2010) define it as "*the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally*" (p.61). As they discuss, in countries with a high power distance index (PDI), people accept a hierarchical order in which everybody has a place, and which needs no further justification. In contrast, in countries with a low PDI, people strive to equalise the distribution of power and demand justification for inequalities of power. While mentioning that the relationship between conflict and power distance is not as clear, Kaushal and Kwantes (2006) refer to existing research showing that collectivistic cultures tend to emphasize hierarchy (high power distance) more so than individualistic cultures, which tend to place less of an emphasis on hierarchy (low power distance). Hofstede et al. (2010) seem to agree with this, mentioning that power distance and individualism appear to be negatively correlated. In our context, it is expected that a low power distance environment will

exhibit a constant pressure and demand from different agencies to equalise the distribution of powers, leading to higher conflicts and turf wars.

In Section 3 that follows, we will use these definitions of individualism and of power distance to analyse the impact of national culture on the choice of regulatory regime within a theoretical model of political decision-making.

3. A simple theory of delegation and regulatory competition

3.1 The Politician's Problem

In this section, we will use a theoretical model to illustrate our idea of how culture may influence a country's choice of whether to allocate supervisory responsibilities of the financial sector to the central bank or to a separate regulatory agency. The model analyses a politician's choice of regulatory regime when anticipating the impact of that regime on the regulatory agencies' incentives to cooperate. Intuitively, the model will illustrate how two competing agencies may engage in wasteful turf wars and that this problem is more pronounced in an individualist, low power-distance society. Anticipating that such a turf war would reduce the government's performance and, therefore, the probability of being reelected, a politician will be more likely to allocate both tasks of safeguarding monetary and financial stability to one single agency.

When modelling the politician's problem, we follow Masciandaro's (2009) model in which rational voters delegate a decision a to a politician. Citizens' utility is linear in the welfare outcome $\hat{y}$ of the politician's decisions

$$U = \hat{y} = y(a) + \Omega$$

where Ω denotes the politician's ability, which is assumed to be revealed to the politician only after the decision a has been made. Ex-ante, Ω is distributed with cumulative distribution function $H(\Omega)$ with mean Ω'. In line with Masciandaro (2009), we assume that the politician's objective is to maximize the difference between political gain and political cost of action a,

$$R(a)-c(a).$$

The political gain is the politician's benefit β from being reelected, which will happen if voters deem the politician's performance to be above average, $\hat{y}=y(a)+\Omega \geq y(a^e)+\Omega':=\bar{y}.$, where a^e denotes the average rival politician's choice of a.[1] Therefore, the expected political gain from action a is

$$R(a)=\beta(1-H(\bar{y}-y(a))).$$

In our application of this model, we let a denote the politician's choice of whether to allocate the task of financial supervision to the central bank ($a=C$) or to a separate authority ($a=S$). The politician needs to delegate two tasks, safeguarding monetary stability (task M) and financial stability (task F). Masciandaro (2009) argues that delegating both tasks to a monopolistic central bank comes at enhanced political costs for the regulator, i.e., $c(S)<c(C)$.[2] Therefore, the politician will delegate both tasks to the central bank if and only if this yields a higher political gain $R(C)$, and this higher gain is enough to offset the higher political costs of a monopolistic central bank / financial regulator, $R(C)-c(C)\geq R(S)-c(S)$, which is equivalent to:

$$c(C)-c(S)\leq\beta[H(\bar{y}-y(S))-H(\bar{y}-y(C))]. \tag{1}$$

Clearly, if the aforementioned additional political costs of a monopolistic central bank are higher, the politician is less likely to delegate both tasks to the central bank. This shows how the allocation of the task of financial regulation depends on the government's preferences. On the other hand, however, as H is a cumulative distribution function and, therefore, an increasing function, we can conclude that the politician is less likely to delegate both tasks to a monopolistic central bank if $y(S)$ is higher and $y(C)$ is lower.

In the following subsection, we will use a model of relative competition between regulatory agencies to show that $y(S)$ is higher if the national culture is collectivist rather than individualist, and if it has a high rather than a low power distance index.

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[1] That is to say, we focus on the version of Masciandaro's (2009) model that assumes a 'helping-hand' type politician.

[2] Masciandaro (2009) cites moral hazard, a conflict of interest between transparency and stability and the more difficult interaction with a more powerful bureaucratic entity as the reasons for these enhanced political costs.

This exercise will highlight the importance of national culture for the decision on whether to allocate the task of financial regulation to the central bank given by (1).

3.2 Regulatory Competition and Performance

Due to the close relationship between both tasks of achieving monetary and financial stability, and the attractiveness of being tasked with financial stability for either regulator, some commentators are concerned that the central bank and a separate financial regulator might get caught up in a wasteful turf war (see Čihák and Podpiera, 2006, Garicano and Lastra, 2010, and, for a presumed real-world example, Anderlini, 2014). The aim of this Subsection is to study such a turf war in a simple model of interaction between two regulators who have been assigned different but related tasks. This part of the model is based on the following stylized facts: First, each regulatory agency is more likely to achieve their goal of being assigned the task of financial stability if their own performance is higher and the other agency's performance is lower.[3] Therefore, a model of relative competition is suitable to study the strategic interaction between both agencies.

Second, each agency can take costly actions that reduce the other agency's performance: They may withhold, or under-invest in the generation of, information that is crucial for the other agency to fulfil its task. They may deviate from the course of action that is optimal with regards to their own task where this deviation harms the other agency more than themselves. Such deviation may take the form of inefficiency in coordination with other regulatory agencies (Agarwal et al., 2014) or more direct attempts to compete for banks under their charter e.g. by means of reduction of regulatory standards (White, 2011; Agarwal et al., 2014; Wack, 2019) or marketing efforts to promote differences in their regulatory services (Mullin, 2019). In other words, each agency may divert some of its resources towards sabotage of the other

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[3] It has been argued that performance played a role in the transfer of bank supervisory powers from the Bank of England to the FSA in the 1990s following the failure of Barings (Ferran, 2011; Froud et al., 2012) and in the reverse direction following the Financial Crisis (HM Treasury, 2010). In the US, the Securities and Exchange Commission (SEC) attempted to extend its supervisory role at the expense of the weakly performing Commodity Futures Trading Commission (CFTC) in 1978 (Coffee, 1995), while the post-crisis reconstruction of the US regulatory system in the latter part of 2009 was characterized by a competition for control of regulatory turf of the property rights that matter to regulators, with the Fed struggling to emerge as the dominant institution (Froud et al., 2012). The discussions in Coffee (1995) and Petschnigg (2005) also reveal that the Fed has been traditionally a powerful player in regulatory turf wars, as well as an opponent of rent-seeking attempts by any others.

agency. Therefore, the analysis in this subsection will be based on Lazear's (1989) model of relative competition with the possibility of sabotage.

Third, taking a deliberate action to harm the other agency may cause some preference costs for a decision maker who values cooperation in itself. As we have explained above in Section 2, a collectivist culture and a high power distance index are associated with more cooperation and less conflict. Therefore, we assume that the costs of sabotage effort is increasing in collectivist culture and the power distance index.[4]

Consider two regulatory agencies, a central bank M that is tasked with maintaining monetary stability, and a financial regulation authority F tasked with maintaining financial stability. Let q_i, $i \in \{M, F\}$ be the performance at task i. We assume that each agency's payoff is increasing in the difference between the agency's own and the other agency's performance, less costs Γ_i of the effort e_i towards the own task and the sabotage effort s_i:

$$\pi_i(e_i, s_i) = W_i + \rho g(q_i - q_j) - \Gamma_i(e_i, s_i), \tag{2}$$

where $i \neq j$, W_i is assumed to be some constant, and $g(.)$ is an increasing function.

In Lazear (1989), relative competition comes in the form of a contest, where two identical players compete for a prize given to the player with the higher performance, which, in turn, is the sum of a deterministic function of a player's own effort and the other player's sabotage effort, and some random variable. Our general setup (2) captures this case if W_i is interpreted as the second prize, ρ the difference between the first and the second prize, $g(.)$ the distribution function of the difference between the random components of both players' performances, and q_i the deterministic part of player i's performance. In this model, Lazear (1989) shows that, unless the cross derivative of the cost function is too negative, the players' equilibrium net performance is increasing in the cost of sabotage.

To illustrate that result within a straightforward example, assume $q_i = e_i - s_j$, $i \neq j$, and $g(x) = x$ to be linear, and $\Gamma_i := \gamma e_i^2 + \sigma s_i^2$ to consist of quadratic summands. In order to capture the relationship between national culture and cooperation, we assume that σ

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[4] Lazear (1989) also distinguishes between hawks and doves in his model, where the latter type of player has higher costs of sabotaging the other player. In this sense, a collectivist culture and a higher power distance index moves decision makers in this country more towards the 'dove' type.

is higher in the case of collectivist culture and a high power distance index. The first-order conditions are

$$e_M = e_F = \rho/(2\gamma)$$
$$s_M = s_F = \rho/(2\sigma).$$

What we are interested in is $y(S)$, the outcome of delegating both tasks to separate regulatory agencies. This can be measured by adding up both agencies' net performances. In our specific example, this is

$$y(S) = q_M + q_F - \gamma(e_M^2 + e_F^2) - \sigma(s_M^2 + s_F^2) = \rho[(1-(\rho/2))/\gamma - (1+(\rho/2))/\sigma]$$

Clearly, $y(S)$ is increasing in σ and, therefore, is higher in the case of collectivist culture and a high power distance index.

3.3 Conclusion and Main Hypothesis

Our analysis of relative competition between regulatory agencies has shown that, if collectivism and a high power distance index foster cooperation and reduce conflict, then these cultural circumstances will imply a higher $y(S)$, which, as equation (1) shows, makes politicians less likely to allocate both tasks to the central bank. At the same time, all other determinants of the politician's choice in (1) are unaffected by these considerations. Therefore, our main hypotheses are:

Hypothesis (a): *All else being equal, a national culture of individualism will be positively associated with the decision to grant more supervisory responsibilities to the central bank.*

Hypothesis (b): *All else being equal, a national culture of power distance will be negatively associated with the decision to grant more supervisory responsibilities to the central bank.*

It needs to be emphasized that our model has only highlighted one possible way in which the willingness to cooperate and avoid conflict in line with the individualist-collectivist and power distance dimensions of national culture can influence politicians'

choice of regulatory regime. On top of the issue of sabotage in a turf war between agencies, one might also think of positive externalities reducing the performance of two separate agencies vis-a-vis both tasks being delegated to the central bank. In such a case, it would be reasonable to assume that a culture of collectivism and a high power distance index will make an agency more likely to reflect the beneficial effect of its action on the other agency's performance, and the resulting hypotheses would remain the same. Similarly, rather than focusing on political gains, one might also argue that a politician's political costs of dealing with two agencies that are engaged in a turf war are higher, so that $c(S)$ is higher if the culture is individualist and has a low power-distance index. Again, our qualitative results would remain the same.

4. Data and methodology

4.1. Variables

4.1.1 Dependent variable

The dependent variable that we use in the present study is the consolidated index of central bank involvement in supervision (CBIS) from Masciandaro and Romelli (2018). This index takes the maximum score of six (6) in countries where all supervisory responsibilities are assigned to the central bank, and the minimum score of one (1) in countries where no supervisory responsibilities are granted to the central bank. In more detail, CBIS distinguishes among the following levels of unification: (i) A unified supervision of the entire financial sector inside the central bank (CBIS = 6), (ii) A unified supervision of the banking and securities markets sectors inside the central bank (CBIS = 5), (iii) A unified supervision of the banking and insurance sectors inside the central bank (CBIS = 4), (iv) Only banking supervision is in the hands of the central bank (CBIS = 3), (v) Banking supervision is shared between the central bank and another authority (CBIS = 2), (vi) The central bank is not involved in supervision (CBIS = 1).

As discussed in Masciandaro and Romelli (2018), the aggregation approach is based on previous indices of financial sector supervision (Masciandaro, 2006, 2009; Melecky and Podpiera, 2013); however, CBIS extends earlier indices in two ways. First, CBIS considers that in general, central banks are either involved in banking supervision and some or none of the other sectors, or have not supervisory

responsibilities at all, therefore placing the banking supervisory function of the central bank at the centre of the index. Second, CBIS offers a higher level of detail than earlier indices by considering all possible levels of integration of financial sector supervision.

4.1.2 Indicators of culture

As we mention in earlier sections, we consider two indicators from Hofstede Insights, individualism (INDIV) and power distance (PDI). In theory, both indices may take values between 0 and 100, with 50 as a mid-level. The rule of thumb is that if a value is under (over) 50 the culture scores relatively low (high) on that dimension.

In the case of individualism, higher values denote that people´s self-image is defined in terms of "I" rather than "We" or, in other words, a society where people are supposed to look after themselves and their direct family only. To be more precise, taking into account the scale of Hofstede Insights, a country with a score above 50 could be described as "Individualist" and one with an INDIV below 50 would be characterized as "Collectivist". Other than that, in all cases, the country scores on the dimensions are relative, with societies being compared with one another. For example, Hofstede Insights clarifies that a country that scores 43 is more individualistic than a society that scores 28, but less individualistic than a society that scores 64. Turning to the power distance index, values closer to 100 (0) show that less powerful members of institutions and organisations within a country are more (less) likely to expect and accept that power is distributed unequally.

4.1.3. Control variables

In the estimations that we present in Tables 3 to 6, we consider various control variables used in earlier studies (e.g. Melecky and Podpiera, 2013; Masciandaro and Romelli, 2018).

First, we control for the (lagged) cumulative number of financial crises in a country since 1970 (CRISES), since past experiences with banking crises may have an impact on the decision to involve the central bank into the supervision of the financial sector. To construct this variable, we use information from the database of Laeven and Valencia (2018).

Second, we use information on the degree of central bank independence (CBI) from Garriga (2016). This index of CBI is based on the framework of Cukierman et al.

(1992) and captures several dimensions of central bank legislation over the four main components of CEO's characteristics, central bank objective, policy formulation, and central bank lending.

To control for the quality of governance (GOVQ), we use information from the Worldwide Governance Indicators, and we take the average over the following six dimensions: (i) voice and accountability, (ii) political stability and absence of violence, (iii) government effectiveness, (iv) regulatory quality, (v) rule of law, (vi) control of corruption. The individual indicators, and hence the aggregate index, range from -2.5 to 2.5, with higher figures indicating higher governance quality.

To account for broad differences in the legal system, we also use a variable to distinguish between common law and civil law (CIVIL). Following Masciandaro and Romelli (2018) we assign the value of 1 in the case of France, Germany and Scandinavian countries, and the value of 0 otherwise. La Porta et al. (2008) argue that common law stands for the strategy of social control that seeks to support private market outcomes, whereas civil law seeks to replace such outcomes with state-desired allocations. Apparently, these characteristics could have implications for the allocation of power to central banks, with Masciandaro and Romelli (2018) documenting a negative association between civil law and the degree of central banks involvement in financial sector supervision.

Additionally, we control for trade openness (OPENESS). Melecky and Podpiera (2013) suggest that a country's openness might be positively related to the probability of integrating prudential supervision, since increased capital flows in and out of the country need a holistic monitoring and managing of exposures to capital flow reversals. Indeed, their results, as well as Masciandaro and Romelli's (2018), document that trade openness positively impacts prudential integration; however, at the same time Melecky and Podpiera (2013) report a negative association between trade openness and business conduct integration.

Furthermore, as in Melecky and Podpiera (2013) and Masciandaro and Romelli (2018), we control for various characteristics of the financial sector. These are: (i) private credit by deposit money banks to GDP (CRGDP), (ii) Stock market capitalization to GDP (STGDP), (iii) Non-life insurance premium volume to GDP (INSGDP), (iv) Number of publicly listed companies per 10,000 of population (LISTED), (v) Assets of three largest commercial banks as a share of total commercial

banking assets (CONC), (vi) Total costs as a share of total income of all commercial banks (COSTINC). The underlying idea is that the development and size of the various market segments will have implications for the complexity of supervision, and consequently the decision as for the powers that will be granted to the central bank.

Following Melecky and Podpiera (2013) and Masciandaro and Romelli (2018) we also include general country characteristics like latitude (LATIT), population (POPUL), GDP per capita (GDPCAP). Despite being used in past studies, we have no a priori reason to expect that these country-level demographic variables are systematically correlated with central bank supervision.[5] So, the idea here is to ensure that the effect of culture is not confounded by these factors. Finally, our regressions also include year dummies to account for time effects.

4.2. Methodology

Given that the CBIS index takes six discrete values that are of an ordinal nature, we use an ordered probit model. However, the use of a standard probit model could lead to potential susceptibility that the results are possibly driven by endogeneity. In more detail, reverse causality is unlikely to be an issue in our setting (i.e. CBIS influencing culture); however, one could argue in favor of endogeneity because of a spurious relationship due to omitted variable bias and/or measurement error.[6] Therefore, to overcome endogeneity problems in the estimation of cultural effects we rely on an extended ordered probit model that accommodates continuous endogenous covariates (Wooldridge, 2010).[7]

The ordered probit regression of y_i on exogenous covariates $\mathbf{x}_i$ and C continuous endogenous covariates $\mathbf{w}_{ci}$ has the form:

$$y_i = v_h \text{ iff } \kappa_{h-1} < \mathrm{x}_i\beta + \mathrm{w}_{ci}\beta_C + \epsilon_i \leq \kappa_h$$
$$\mathrm{w}_{ci} = \mathrm{z}_{ci}\mathrm{A_c} + \epsilon_{ci}$$

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[5] For example, Melecky and Podpiera (2013) find that real GDP per capita (population) is positively (negatively) associated with prudential supervision. However, Masciandaro and Romelli (2018) report that they are both insignificant.

[6] A spurious relationship occurs when a third variable creates the appearance of relationship between two other variables, but this relationship disappears when that third variable is included in the analysis.

[7] The model is estimated with the Stata command eoprobit. For further details see Wooldridge (2010) and StataCorp, (2017).

The values $v_1, \ldots, v_H$ are real numbers such that $v_h < v_m$ for h < m. κ_o is taken as $-\infty$ and κ_H is taken as $+\infty$. The vector $\mathbf{z}_{ci}$ contains variables from $\mathbf{x}_i$ and other covariates that affect $\mathbf{w}_{ci}$, while ϵ_i and ϵ_{ci} are multivariate normal unobserved errors. The computations of the model, which is also known as instrumental variables (IV) ordered probit, are based on maximum likelihood estimators (Wooldridge, 2010; White, 1996).

This IV ordered probit approach allows us to separate the effect of culture from other institutional and economic factors that influence preferences and behavioural outcomes when it comes to the selection of an appropriate structure for the supervision of financial services. We select two instruments that are: (i) unlikely to have a direct influence on the CBIS, therefore satisfying the exogeneity requirement of an instrument; (ii) correlated with national culture, therefore satisfying the relevance requirement of an instrument.

The first instrument is the index of human leukocyte antigen (HLA) heterozygosity by Cook (2015). This is a country-level metric of genetic diversity for the system of genes associated with the recognition and disposal of foreign pathogens, and therefore, it might serve as an indicator of genetically determined resistance to infectious diseases. The underlying idea in earlier studies in economics and finance is that parents transmit culture together with genetics to their offspring, making genetic characteristics a suitable instrument for cultural differences (Gorodnichenko and Roland, 2017; Zheng et al., 2012; Boubakri and Saffar, 2016).

In general, the literature associates genetics with individualism/collectivism (Thornhilll and Fincher 2014; Jha and Panda 2017). For example, Fincher et al. (2008) show that the regional prevalence of pathogens has a strong positive (negative) correlation with cultural indicators of collectivism (individualism). They attribute this to particular forms of social behaviour (and the specific psychological mechanisms underlying this behaviour) that, in the case of collectivism (versus individualism), serve an antipathogen defence function, making it more likely for collectivism to emerge and persist within populations that historically have been characterized by a greater prevalence of pathogens. Along the same lines, Way et al. (2010) suggest that collectivism may have developed and persevered in populations with a high proportion of putative social sensitivity alleles because it was more compatible with such groups. Nash and Patel (2019) refer to several studies from the fields of economics and finance that use genetic characteristics as instruments of individualism/collectivism.

However, as discussed in Pasiouras et al. (2020) there are also reasons for which genetic diversity might be related to a culture of power distance. For example, they refer to the "parasite stress" hypothesis which asserts that authoritarian governments are more likely to emerge in regions with a high prevalence of disease-causing pathogens (Murray et al., 2013).[8] Thornhill and Fincher (2014) discuss that past natural selection for defence against morbidity and mortality from infectious diseases, influences the psychology that manifests today as regional political behaviour. Murray et al. (2013) report a positive association between parasite stress and autocracy across numerous aboriginal societies, and Thornhill et al. (2009) provide similar evidence in a cross-country setting, hence providing support to the aforementioned arguments.

The second instrument that we use is the State History index (STATEHIST), taken from Borcan et al. (2018). Following Bockstette et al. (2002), they construct the index as follows. Initially, they establish the duration of state existence for each territory defined by modern-day country borders. Then, they divide this duration into 50-year periods. Finally, for each half-century from the state emergence onwards, they assign scores to reflect three dimensions of state presence, based on the following questions: (i) Is there a government above the tribal level? (ii) Is this government foreign or locally based? (iii) How much of the territory of the modern country was ruled by this government?[9] Therefore, as they discuss, "state experience" refers not only to duration of presence of macro polities, but also to the degree of unity, territorial coverage, and locally rather than externally based rule. As in Borcan et al. (2018) we use the normalised aggregate state history score calculated for the period 3500 BCE - 1500 CE, discounted using a 1% rate.[10] There are various reasons for which this indicator of state existence might be associate with a culture of collectivism (vs individualism) and beliefs towards power distance in the society. For instance, Borcan et al. (2018) discuss that state experience is conducive to the rise of extractive institutions and powerful

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[8] As discussed in Thornhill and Fincher (2014), authoritarian political systems are characterized by (i) socially powerful resource-holders' unwillingness to share with others, and (ii) an acceptance of low status by those with few resources because of their respect for and obedience to those in power. This leads to disproportionate control of social power and other resources.

[9] For example, as it concerns the first question, they assign the score of 1 if the answer is yes, the score of 0.75 if the government can at best be described as a paramount chiefdom, and the score of 0 if there is no government present. They follow a similar coding in the case of the other two questions, and we refer readers interested in the exact calculations to Borcan et al. (2018) and Bockstette et al. (2002).

[10] Borcan et al. (2018) point out that the 1% discounted (extended) Statehist index at 2000 CE (covering the full period beginning from 3500 BCE) has a 0.93 correlation with the 1–1950 CE 1% discounted Statehist index and 0.89 correlation with the 1–1950 CE 5% discounted Statehist index.

elites as well as that older and more autonomous states are more predisposed to maintain overly centralised, often abusive power structures. Additionally, they point to various other studies mentioning that the first states developed naturally from the basic need to sustain collective action in large communities, particularly in response to attacks by predators.

4.3. Data

Our sample includes data from 69 countries over the period 1996-2013, resulting in up to 1,168 country-year observations in the baseline regressions. We collect data from various sources. Information on the supervisory arrangements is from Masciandaro and Romelli (2018). Data for the cultural indices of individualism and power distance are from Hofstede Insights. As already mentioned, we obtain additional data from World Bank databases, like the Worldwide Governance Indicators (WGI) project, the World Development Indicators, the Financial Structure database, as well as from La Porta et al. (1999), Laeven and Valencia (2018), Garriga (2016), and Borcan et al. (2018). Further information about the source of each variable is available in Appendix I. Table 1 presents descriptive statistics, and Table 2 presents the correlation coefficients of the variables.

[Insert Tables 1 and 2 Around Here]

5. Empirical results

5.1. Main results

Table 3 presents a baseline specification that controls for the financial crisis and central bank independence, as in Masciandaro and Romelli (2018). First of all, the nonzero correlation between the errors (e.INDIV and e.CBIS, and e.PDI and e.CBIS) indicates that INVID and PDI are indeed endogenous.[11] Additionally, the results in Panel B confirm that the two instruments (LNHLAH and STATEHIST) have a statistically significant association with the endogenous variable. It should be noted here that to conserve space, in Panel B we report only the coefficient estimates for the two

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[11] The correlations between e.INDIV and e.CBIS in columns 1 and 3 are -0.454 (p = 0.000) and -0.824 (p = 0.000), respectively. The corresponding figures for e.PDI and e.CBIS in columns 2 and 4 are 0.588 (p =0.000) and 0.949 (p =0.000), respectively.

instruments, while omitting the estimates on other control variables included in the endogenous covariate equation (i.e. same control variables that are included in Panel A).

Turning to the main results of interest, Column 1 presents the results with the use of the instrumented cultural index for individualism (INDIV). Consistent with Hypothesis (a), INDIV enters the regression with a negative and statistically significant coefficient. Hence, on an all other things being equal basis, the more individualistic the culture of a society, the more likely it is to have a central banker that will be involved in the supervision of banking and other financial services. In column 2, we report the results for the instrumented power distance index (PDI). Consistent with Hypothesis (b), on an all other things being equal basis, we find that countries with lower power distance culture are more likely to have central banks supervising banks and other financial services. Following Masciandaro and Romelli (2018), in columns 3 and 4, we introduce additional variables that control for the quality of governance, civil law, and a country's latitude. Consistent with their findings, we observe that all three control variables enter the regressions with a negative and statistically significant coefficient. This does not alter our main findings. We continue to find that individualism and power distance exercise a statistically significant impact on the decision to have the central bank involved in the supervision of the financial sector.

[Insert Table 3 Around Here]

In Table 4 we augment the model to control for other country-specific and financial sector specific characteristics. As in Masciandaro and Romelli (2018), in addition to financial crises, central bank independence and governance quality, we also include GDP per capita, population, openness to trade, private credit to GDP, and stock market capitalization to GDP. We present these estimations in columns 1 and 2. Then, we extend this model further by adding control variables for the non-life insurance premium volume to GDP, the number of listed companies, concentration in the banking sector, and the bank cost to income ratio. Consistent with the findings of Melecky and Podpiera (2013) and Masciandaro and Romelli (2018), our results reveal that the degree of supervisory integration is influenced by an array of characteristics across all the financial sectors, i.e., banks (e.g. credit to GDP, concentration), stock market (stock

market capitalization, number of listed firms), and insurance (insurance premium to GDP).[12] The inclusion of all these variables in the regressions does not alter our main findings.

[Insert Table 4 Around Here]

5.2. Further analysis

5.2.1. Restricting the sample to countries without change in CBIS

As this point, it should be mentioned that the cultural indicators of Hofstede are based on surveys conducted back in the 1970s and they do not change over the period of our analysis. However, our approach is consistent with a very large number of studies that rely on these indicators to examine current phenomena, ranging from the choice of exchange rate regimes (Cao et al., 2020) to central bank transparency (Makrychoriti and Pasiouras, 2021) and to the quality of government (Porcher, 2021). The literature outlines various reasons that justify this approach. First, national culture remains stable over long time periods (Hofstede, 2001, 2011; Hofstede et al., 2010). Second, Hofstede et al. (2010) mention that the scores of the cultural indicators are calculated in such a way that they represent relative, rather than absolute, positions of the countries. Third, while there can be some changes in the scores of individual dimensions of culture over time, such changes are absolute rather than relative (Beugelsdijk et al., 2015). In more detail, Beugelsdijk et al. (2015) show that countries have moved along the same path with the differences in the values among countries staying more or less the same, concluding in favour of the use of Hofstede's data in current international research.[13]

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[12] In some regressions in Table 3 to 5, we also find that the cumulative number of financial crises in a country since 1970 has a negative effect on the likelihood to have the unified supervision of the entire financial sector inside the central bank. This contradicts the results in some earlier studies who find that the cumulative number of financial crises increased the incentives to integrate prudential supervision (Melecky and Podpiera, 2013; Masciandaro and Romelli, 2018). While we agree that policy makers may have incentives to introduce changes in the supervisory structure after a crisis, there are no theoretical reasons as for the direction of the change. For example, a country that experience a crisis under a unified supervisor may change to sectoral supervision, and vice versa. Therefore, to examine this issue further we replace the cumulative number of financial crises by a dummy variable that takes the value one if a systemic banking crisis occurred in any of the previous two years (CRISIS_LAST_2Y =1) and the value of zero otherwise (CRISIS_LAST_2Y =0). This variable enters with a statistically significant coefficient (at the 10% level) in only one out of the twelve regressions of Tables 3 to 5. In all the cases, the main results hold. To conserve space, we do not tabulate these estimations, which are available in the online Appendix.

[13] In more detail, Beugelsdijk et al. (2015) use data for two birth cohorts from the World Value Survey to replicate the dimensions of Hofstede. They conclude that the countries' scores on the Hofstede

Having said that, given that a certain number of reforms in financial supervision occurred during the period of our analysis (Masciandaro and Romelli, 2018), one may still question the ability of the time invariant dimensions of culture in explaining CBIND. Therefore, we also perform some regressions while restricting the sample to the countries that did not experience changes in the CBIND score over the period of our analysis. The main results hold.[14]

5.2.2. Using a restricted version of CBIS

In Table 5 we re-estimate the specifications of Table 4 while using a slightly different version of the CBIS index that ranges from 1 to 4. In this restricted version, Masciandaro and Romelli (2018) assign: (i) the value of 1 when the central bank has no responsibility for financial sector supervision, (ii) the value of 2 when the central bank is the sole supervisor of the banking sector, (iii) the value of 3 when the central bank has supervisory responsibility in (any) two sectors, and (iv) the value of 4 when the central bank is the sole institution responsible for supervision in the banking, insurance and securities markets sectors. The aim of this aggregation is to test the robustness of the results when using an alternative ranking for the different levels of central bank involvement in supervision. The results do not change.

[Insert Table 5 Around Here]

5.2.3. Replacing CBIS by a supervisory integration index (SII)

The analysis presented so far has paid attention to the role of the central bank in the supervision of financial services. The rationale for this is that the central bank has been traditionally the lender of last resort and the monetary policy maker with responsibility for price stability, and therefore it can never disappear completely from the supervisory arena (Ferran, 2011). Consequently, it is the natural starting point to be considered when the politicians assign regulatory responsibilities to a supervisory agency. However, there are also cases where the supervision of the financial services is assigned to a unified regulator outside the central bank, like a Financial Supervision Authority,

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dimensions relative to the scores of other countries have not changed very much over time, with cultural differences between country pairs being generally stable

[14] The sample is restricted to 46 countries. These results are available in the online Appendix.

Financial Services Authority, or Financial Services Agency (FSA). The data in Masciandaro and Romelli (2018) do not allow for distinguishing between cases where the central bank is not involved in supervision but there exist many regulators, and those cases where the central bank is not involved in supervision but there is a single unified FSA that supervises all the financial sectors.

To account for this issue, we resort on another dataset by Melecky and Podpiera (2013) that provides information on the institutional structures of the prudential supervision of financial services over the period 1999 - 2010. Following Melecky and Podpiera (2013) we construct a supervisory integration index (SII) that orders the prudential supervisory structures into four groups. Group 1 corresponds to cases when supervision of each financial subsector is delegated to a separate supervisor. Furthermore, the microprudential supervision of banks, the most systemically important financial subsector, is assigned to a government agency outside of the central bank. Group 2 corresponds also to fragmented microprudential supervision, but banks are supervised by the central bank. Group 3 includes countries with integrated microprudential supervision outside of the central bank. Group 4 consists of countries where the central bank is the integrated microprudential supervisor. Therefore, SII takes: (i) the values of 1 when there is sectoral supervision, with the banking sector supervised by an agency outside of the central bank (SII =1); (ii) the value of 2 when there is sectoral supervision, with the central bank supervising the banking sector (SII = 2); (iii) the value of 3 when there is unified supervision in a FSA (SII = 3); and (iv) the value of 4 when there is unified supervision in the central bank (SII = 4). Therefore, the index distinguishes between sectoral supervision and fully integrated supervision, while accounting for the proximity of microprudential supervision to the central bank (Melecky and Podpiera, 2013).

In Table 6, we re-estimate the extended specifications of Table 4 while replacing CBIND by SII.[15] The positive (negative) coefficient of INDIV (PDI) indicates that in countries characterized by a culture of high individualism (power distance) there is a higher (lower) probability to have a single unified authority like the FSA or the Central Bank. Thus, these results are consistent with the ones obtained in the case of the CBIND.

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[15] The only difference compared to Table 4 is that we dropped the time dummies as the model would otherwise fail to converge.

For a graphical illustration of the results, Figure 1 presents the plots of the predicted margins of the extended specifications presented in Columns 3 (INDIV) and 4 (PDI) of Table 6.[16] Thus the Figure illustrates how the probabilities (y-axis) of being classified into each CBIND status (SII = 1, SII = 2, SII = 3, SII = 4) change across different cultural values for INDIV and PDI (x-axis). In the case of INDIV, the long-dash-short-dash line with the diamond markers that starts at the bottom left shows that the predicted probability of having unified supervision in the central bank (i.e. SII =4) is around 1.4% for countries with INDIV equal to 10 and around 10.4% for countries with INDIV equal to 80. At the other end, the short-dash line with the square markers shows that the probability of having sectoral supervision without the involvement of the central bank (SII =1) is around 36.2% for countries with INDIV equal to 10 and around 6.5% for countries with INDIV equal to 80. The tight-dot line with the triangle markers that corresponds to the case of the FSA follows a similar trend with the one of the central bank. It shows that the probability of having a unified supervision in a FSA (i.e. SII =3) is around 9% for countries with INDIV equal to 10 and around 35.5% for countries with INDIV equal to 80. At the same time, the dash line with the circle markers that corresponds to sectoral supervision with the central bank supervising the banking sector (SII = 2), follows a similar trend with the line for SII = 1, albeit being flatter. In this case, the probability is around 53.4% when INDIV equals 10 and drops to around 47.6% when INDIV equals 80.

Turning to PDI, the predicted probability of having a unified supervision in the central bank (i.e. SII =4) is around 6.3% for countries with PDI equal to 25 and around 3.7% for countries with PDI equal to 95. As in the case of INVID, the line that corresponds to the case of the FSA follows a similar trend. The probability to be classified as SII = 3 is around 25.8% when PDI equals 25 and it is around 18.5% when PDI equals 95. At the other end, the probability of having sectoral supervision without the involvement of the central bank (SII =1) is around 15.3% for countries with PDI

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[16] The values of the range of the INDIV and PDI for the calculation of the margins were set close to the 5th and 95th percentile of each one of the two variables in the sample that was actually used in the estimations (i.e. the 5th and 95th percentile for INDIV were 13 and 84, and for PDI they were 28 and 95).

equal to 25 and around 23.4% for countries with PDI equal to 95. Finally, the line that corresponds to sectoral supervision with the central bank supervising the banking sector (SII = 2), shows that the predicted probability is almost flat across changes in PDI, ranging from 52.6% (for PDI = 25) to 54.5% (for PDI = 95).

[Insert Figure 1 Around Here]

6. Conclusions

Central banks play an important role in the economy, which is further enhanced when they are involved in the supervision of the financial sector and become responsible for the design and implementation of the laws that govern the efficient operation of the financial sector. The present study aims to extend our knowledge as for the determinants of central bank involvement in the supervision of the financial sector. Earlier studies in the field have primarily focused on economic, financial, and formal institutional drivers of this decision. Motivated by many studies that highlight the role of culture on economics and policy making we examine the role of the cultural dimensions of individualism and power distance on the decision to grant supervisory powers to central banks.

First, we derive a simple theoretical model to illustrate how culture may influence a politician's choice of regulatory architecture and the assignment of responsibilities when anticipating the impact of that regime on the regulatory agencies' incentives to cooperate. The underlying idea is that in a society characterized by high individualism, where the chance of conflicts and unwillingness to cooperate is high, the elected policymaker will opt for the allocation of all supervisory powers to the central bank. Similarly, in a low power distance society, whether there exists a constant pressure and demand from difference agencies to equalize the distribution of powers, the policymaker may decide to allocate all the powers to the central bank and avoid such ongoing conflicts.

Then, we provide empirical evidence with the use of a sample of around 70 countries over the period 1996-2013. Consistent with the theoretical predictions, we find that individualism is positively associated, and power distance is negatively associated with the likelihood of higher central bank involvement in supervision. These

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results hold while controlling for various country-specific characteristics, and while using an instrumental variables approach that addresses endogeneity concerns.

One important implication of these findings is that culture appears to be an important omitted variable in studies that examine cross-country differences in the institutional arrangements of financial supervision. Also, our findings provide support to earlier studies discussing that culture influences not only the decisions of individuals and an array of economic outcomes (Guiso et al., 2006), but also public policy decisions (Daniell, 2014), the quality of government (Porcher, 2021), and central bank transparency (Makrychoriti and Pasiouras, 2021). Furthermore, our results imply that there is no "one size fits all" approach, and that the justification of selected regulatory architectures or the transfer of practices from one country to another should be considered in the light of national culture. In more detail, the incentives of the politician to avoid conflicts and turf wars might be an important factor shaping the final outcome.

As any empirical study, our work is not without its limitations. For example, it should be acknowledged that the cultural indicators that we use do not consider differences between groups within countries. Additionally, assigning a label of national culture does not mean that every person within that country is mentally programmed in the same way (Kwok and Tadesse, 2006; Porcher 2021). In contrast, national culture refers to the average pattern of beliefs and values of a person that differentiate it from individuals in other countries (Kwok and Tadesse, 2006).

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Table 1 – Descriptive Statistics

	Obs.	Mean	Std. Dev.	Min	Max
CBIS	1,168	2.438	1.409	1.000	6.000
CBIS2	1,168	1.805	0.816	1.000	4.000
SII	714	2.144	0.773	1.000	4.000
CRISES	1,168	0.881	0.769	0.000	4.000
CRISIS_LAST_2Y	1,168	0.164	0.370	0.000	1.000
CBI	1,168	0.605	0.199	0.077	0.879
GOVQ	1,168	0.554	0.831	-1.178	1.970
CIVIL	1,168	0.659	0.474	0.000	1.000
LATIT	1,168	0.384	0.199	0.0135	0.722
GDPCAP	1,065	20,973.54	19,879.70	470.275	91,617.30
POPUL	1,065	7.287	0.688	5.443	9.146
OPENESS	1,065	82.656	53.734	15.636	437.327
CRGDP	1,065	65.197	42.407	6.701	260.701
STGDP	1,065	54.925	51.007	0.026	263.747
INSGDP	1,027	1.550	0.760	0.002	5.431
LISTED	1,027	19.606	24.990	0.732	230.730
CONC	1,027	65.330	19.074	20.186	100.000
COSTINC	1,027	58.564	13.516	19.895	139.468
INDIV	1,168	44.146	24.041	6.000	91.000
PDI	1,168	58.995	21.205	11.000	100.000
LNHLAH	1,168	-1.128	0.062	-1.328	-1.0415
STATEHIST	1,168	0.193	0.177	0.000	0.760

Notes: CBIS = Index of central bank involvement in supervision, CBIS2 = Restricted index of central bank involvement in supervision, SII = Supervisory Integration Index, CRISES = The (lagged) cumulative number of crises in a country since 1970, CRISIS_LAST_2Y = Dummy variable indicating if a systemic banking crisis occurred in any of the previous two years, CBI = Central Bank independence index, GOVQ = Indicator of overall governance quality, CIVIL = Dummy that takes the value of 1 in the case of civil law legal origins and 0 otherwise, LATIT = Geographic Latitude, GDPCAP = GDP per capita, POPUL = Logarithm of population, OPENESS= Degree of Trade Openness, CRGDP = Private credit by deposit money banks (% GDP), STGDP = Stock market capitalization (% GDP), INSGDP = Non-life insurance premium volume (% GDP); LISTED = Number of publicly listed companies (per 10K population), CONC = Assets of three largest commercial banks (% total commercial banking assets), CONSTINC = Total costs to total income, INDIV = National culture indicator of individualism, PDI = National culture indicator of power distance, LNHLAH = Country-level index of the human leukocyte antigen heterozygosity, STATEHIST = Index of Duration of state existence as well as degree of unity, territorial coverage, and locally rather than externally based rule for each territory defined by modern-day country borders. Further information about the variables is available in Appendix I. In all the cases the number of observations corresponds to the maximum number used across the estimated specifications.

Table 2: Correlation coefficients of variables

	CBIS	CBIS2	SII	CRISES	CRISIS_LAST_2Y	CBI	GOVQ	CIVIL	LATIT	GDPCAP	POPUL
CBIS	1.000										
CBIS2	0.980	1.000									
SII	0.378	0.401	1.000								
CRISES	-0.083	-0.083	-0.183	1.000							
CRISIS_LAST_2Y	0.040	0.049	0.063	0.330	1.000						
CBI	0.004	0.005	-0.051	0.168	0.106	1.000					
GOVQ	-0.052	0.011	0.395	-0.316	0.026	0.046	1.000				
CIVIL	-0.087	-0.103	-0.221	0.309	0.098	0.562	-0.227	1.000			
LATIT	-0.056	-0.058	0.297	-0.197	0.074	0.269	0.633	0.002	1.000		
GDPCAP	-0.112	-0.054	0.352	-0.324	0.036	-0.042	0.840	-0.293	0.566	1.000	
POPUL	-0.061	-0.062	-0.227	0.171	0.009	-0.148	-0.351	0.047	-0.248	-0.165	1.000
OPENESS	0.328	0.363	0.320	-0.171	0.015	-0.003	0.253	-0.118	-0.037	0.135	-0.429
CRGDP	-0.086	-0.040	0.272	-0.313	0.121	-0.080	0.621	-0.226	0.342	0.633	-0.066
STGDP	-0.026	0.025	0.094	-0.342	-0.148	-0.230	0.396	-0.362	0.034	0.431	0.054
INSGDP	-0.119	-0.082	0.196	-0.269	0.053	-0.005	0.657	-0.168	0.431	0.573	-0.213
LISTED	-0.063	-0.048	0.230	-0.330	-0.090	-0.146	0.484	-0.330	0.234	0.435	-0.327
CONC	0.000	-0.008	0.184	-0.340	-0.054	0.015	0.330	-0.217	0.237	0.316	-0.490
COSTINC	-0.126	-0.136	-0.121	0.084	0.153	0.147	0.064	0.250	0.063	0.032	-0.031
INDIV	-0.049	-0.023	0.354	-0.230	0.074	0.039	0.740	-0.248	0.709	0.686	-0.060
PDI	0.188	0.159	-0.244	0.192	-0.042	-0.001	-0.706	0.284	-0.544	-0.641	0.279
LNHLAH	0.185	0.173	0.339	-0.307	0.040	0.043	0.558	-0.166	0.624	0.551	-0.152
STATEHIST	0.039	0.008	-0.084	-0.228	-0.040	0.112	-0.213	0.204	0.110	-0.041	0.391

Table 2: Correlation coefficients of variables (cont.)

	OPENESS	CRGDP	STGDP	INSGDP	LISTED	CONC	COSTINC	INDIV	PDI	LNHLAH	STATEHIST
OPENESS	1.000										
CRGDP	0.220	1.000									
STGDP	0.290	0.465	1.000								
INSGDP	0.062	0.473	0.304	1.000							
LISTED	0.291	0.390	0.411	0.351	1.000						
CONC	0.278	0.194	0.200	0.122	0.267	1.000					
COSTINC	-0.240	-0.128	-0.148	0.099	-0.110	0.025	1.000				
INDIV	-0.021	0.415	0.288	0.561	0.265	0.131	0.098	1.000			
PDI	0.083	-0.410	-0.172	-0.526	-0.264	-0.326	-0.155	-0.664	1.000		
LNHLAH	-0.002	0.346	0.182	0.494	0.269	0.229	0.058	0.640	-0.511	1.000	
STATEHIST	-0.146	0.076	-0.074	-0.209	-0.150	-0.082	-0.059	-0.110	0.177	0.094	1.000

Notes: CBIS = Index of central bank involvement in supervision, CBIS2 = Restricted index of central bank involvement in supervision, SII = Supervisory Integration Index, CRISES = The (lagged) cumulative number of crises in a country since 1970, CRISIS_LAST_2Y = Dummy variable indicating if a systemic banking crisis occurred in any of the previous two years, CBI = Central Bank independence index, GOVQ = Indicator of overall governance quality, CIVIL = Dummy that takes the value of 1 in the case of civil law legal origins and 0 otherwise, LATIT = Geographic Latitude, GDPCAP = GDP per capita, POPUL = Logarithm of population, OPENESS= Degree of Trade Openness, CRGDP = Private credit by deposit money banks (% GDP), STGDP = Stock market capitalization (% GDP), INSGDP = Non-life insurance premium volume (% GDP); LISTED = Number of publicly listed companies (per 10K population), CONC = Assets of three largest commercial banks (% total commercial banking assets), CONSTINC = Total costs to total income, INDIV = National culture indicator of individualism, PDI = National culture indicator of power distance, LNHLAH = Country-level index of the human leukocyte antigen heterozygosity, STATEHIST = Index of Duration of state existence as well as degree of unity, territorial coverage, and locally rather than externally based rule for each territory defined by modern-day country borders. Further information about the variables is available in Appendix I.

Table 3: Regression results for ordered probit model with endogenous covariates (dependent variable: index of central bank involvement in supervision)

	(1)	(2)	(3)	(4)
	Panel A- Results for dependent variable CBIS with instrumented INDIV and PDI			
CRISES	-0.038	-0.045	-0.181***	-0.198***
	(0.046)	(0.046)	(0.045)	(0.043)
CBI	-0.124	-0.065	0.527***	0.032
	(0.167)	(0.165)	(0.205)	(0.202)
GOVQ			-0.848***	-0.918***
			(0.061)	(0.060)
CIVIL			0.229**	0.418***
			(0.095)	(0.096)
LATIT			-3.149***	-1.309***
			(0.274)	(0.213)
INDIV_instrumented	0.011***		0.057***	
	(0.002)		(0.003)	
PDI_instrumented		-0.013***		-0.060***
		(0.003)		(0.003)
Year Dummies	YES	YES	YES	YES

	Panel B- Results for endogenous covariate equation			
	INDIV	PDI	INDIV	PDI
LNHLAH	245.005***	-177.244***	79.112***	-44.491***
	(8.774)	(8.354)	(8.648)	(9.186)
STATEHIST	-22.964***	24.666***	-3.378**	1.788*
	(2.868)	(2.703)	(1.680)	(1.083)
Constant	325.521***	-148.309***	116.267***	18.369*
	(10.297)	(9.855)	(10.470)	(11.120)
Observations	1,168	1,168	1,168	1,168
Countries	69	69	69	69
Wald X^2	44.16	42.48	387.52	465.93
Log likelihood	-6,432.32	-6,358.72	-6,064.74	-6,086.785
Prob X^2	0.001	0.002	0.000	0.000

Notes: Estimates obtained from an extended ordered probit regression with endogenous covariates (STATA command eoprobit) with LNHLAH and STATEHIST as instrumental variables for INDIV and PDI; Robust standard errors in parentheses; In Panel A the dependent variable is the Index of Central Bank Involvement in supervision (CBIS) with the endogenous variables INDIV and PDI being instrumented; In Panel B, showing the results for the endogenous covariate equation, the table reports only the coefficient estimates for the two instruments and omits the estimates on other control variables included in the regression (same control variables as the ones included in Panel A); CRISES = The (lagged) cumulative number of crises in a country since 1970, CBI = Central Bank independence index, GOVQ = Indicator of overall governance quality, CIVIL = Dummy that takes the value of 1 in the case of civil law legal origins and 0 otherwise, LATIT = Geographic Latitude, INDIV = National culture indicator of individualism, PDI = National culture indicator of power distance, LNHLAH = Country-level index of the human leukocyte antigen heterozygosity, STATEHIST = Index of Duration of state existence as well as degree of unity, territorial coverage, and locally rather than externally based rule for each territory defined by modern-day country borders; Further information about the variables is available in Appendix I; ***Statistically significant at the 1% level, **Statistically significant at the 5% level, *Statistically significant at the 10% level

Table 4: Regression results for ordered probit model with endogenous covariates – controlling for various country specific characteristics (dependent variable: index of central bank involvement in supervision)

	(1)	(2)	(3)	(4)
	Panel A - Results for dependent variable CBIS with instrumented INDIV and PDI			
CRISES	-0.095*	-0.120**	-0.045	-0.165***
	(0.054)	(0.051)	(0.057)	(0.053)
CBI	0.001	0.298*	0.057	0.364**
	(0.180)	(0.168)	(0.185)	(0.174)
GOVQ	-1.055***	-0.928***	-1.016***	-0.905***
	(0.115)	(0.096)	(0.115)	(0.107)
GDPCAP	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
POPUL	-0.000	0.540***	-0.039	0.388***
	(0.071)	(0.063)	(0.079)	(0.074)
OPENESS	0.011***	0.012***	0.010***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)
CRGDP	0.002	-0.001	0.003**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
STGDP	-0.002***	-0.000	-0.002**	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
INSGDP			-0.250***	-0.113*
			(0.063)	(0.059)
LISTED			0.001	0.002
			(0.002)	(0.002)
CONC			0.001	-0.013***
			(0.002)	(0.002)
COSTINC			-0.004	-0.004
			(0.003)	(0.003)
INDIV_instrumented	0.054***		0.058***	
	(0.003)		(0.003)	
PDI_instrumented		-0.071***		-0.072***
		(0.002)		(0.002)
Year Dummies	YES	YES	YES	YES

	Panel B- Results for endogenous covariate equation			
	INDIV	PDI	INDIV	PDI
LNHLAH	122.927***	-36.417***	117.107***	-34.081***
	(8.758)	(8.535)	(9.105)	(8.731)
STATEHIST	-12.200***	1.835**	-9.783***	1.712*
	(2.334)	(0.921)	(2.175)	(0.910)
Constant	133.947***	-26.719**	139.595***	3.384
	(11.546)	(11.419)	(13.827)	(13.435)
Observations	1,065	1,065	1,027	1,027
Countries	65	65	65	65
Wald X^2	638.69	1,343.97	805.93	1,313.96

Log likelihood	-5,421.748	-5,380.406	-5,206.655	-4,918.282
Prob X^2	0.000	0.000	0.000	0.000

Notes: Estimates obtained from an extended ordered probit regression with endogenous covariates (STATA command eoprobit) with LNHLAH and STATEHIST as instrumental variables for INDIV and PDI; Robust standard errors in parentheses; In Panel A the dependent variable is the Index of Central Bank Involvement in supervision (CBIS) with the endogenous variables INDIV and PDI being instrumented; In Panel B, showing the results for the endogenous covariate equation, the table reports only the coefficient estimates for the two instruments and omits the estimates on other control variables included in the regression (same control variables as the ones included in Panel A); CRISES = The (lagged) cumulative number of crises in a country since 1970, CBI = Central Bank independence index, GOVQ = Indicator of overall governance quality, GDPCAP = GDP per capita, POPUL = Logarithm of population, OPENESS= Degree of Trade Openness, CRGDP = Private credit by deposit money banks (% GDP), STGDP = Stock market capitalization (% GDP), INSGDP = Non-life insurance premium volume (% GDP); LISTED = Number of publicly listed companies (per 10K population), CONC = Assets of three largest commercial banks (% total commercial banking assets), COSTINC = Total costs to total income, INDIV = National culture indicator of individualism, PDI = National culture indicator of power distance, LNHLAH = Country-level index of the human leukocyte antigen heterozygosity, STATEHIST = Index of Duration of state existence as well as degree of unity, territorial coverage, and locally rather than externally based rule for each territory defined by modern-day country borders. Further information about the variables is available in Appendix I, ***Statistically significant at the 1% level, **Statistically significant at the 5% level, *Statistically significant at the 10% level

Table 5 - Regression results for ordered probit model with endogenous covariates (dependent variable: restricted index of central bank involvement in supervision)

	(1)	(2)	(3)	(4)
	Panel A - Results for dependent variable CBIS with instrumented INDIV and PDI			
CRISES	-0.090*	-0.117**	-0.052	-0.165***
	(0.055)	(0.050)	(0.058)	(0.053)
CBI	0.030	0.305*	0.075	0.364**
	(0.185)	(0.169)	(0.119)	(0.174)
GOVQ	-0.912***	-0.882***	-0.884***	-0.947***
	(0.124)	(0.102)	(0.124)	(0.101)
GDPCAP	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
POPUL	0.099	0.569***	0.029	0.369***
	(0.076)	(0.065)	(0.083)	(0.074)
OPENESS	0.011***	0.013***	0.010***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)
CRGDP	0.002	-0.001	0.003**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
STGDP	-0.002**	-0.000	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
INSGDP			-0.236***	-0.116**
			(0.064)	(0.059)
LISTED			-0.001	0.003*
			(0.002)	(0.002)
CONC			-0.001	-0.013***
			(0.002)	(0.002)
COSTINC			-0.004	-0.004
			(0.003)	(0.003)
INDIV_instrumented	0.050***		0.055***	
	(0.003)		(0.003)	
PDI_instrumented		-0.070***		-0.073***
		(0.003)		(0.002)
Year Dummies	YES	YES	YES	YES

	INDIV	PDI	INDIV	PDI
	Panel B- Results for endogenous covariate equation			
LNHLAH	122.907***	-36.341***	117.242***	-34.103***
	(8.733)	(8.550)	(9.094)	(8.731)
STATEHIST	-13.261***	2.022**	-10.433***	1.674**
	(2.440)	(1.015)	(2.294)	(0.836)
Constant	133.261***	-26.516**	139.412***	3.337
	(11.538)	(11.422)	(13.819)	(13.655)
Observations	1,065	1,065	1,027	1,027
Countries	65	65	65	65
Wald X^2	582.97	1,221.50	699.79	1,409.95

Log likelihood	-5,181.324	-5,139.623	-4,968.229	-5,157.040
Prob X^2	0.000	0.000	0.000	0.000

Notes: Estimates obtained from an extended ordered probit regression with endogenous covariates (STATA command eoprobit) with LNHLAH and STATEHIST as instrumental variables for INDIV and PDI; Robust standard errors in parentheses; In Panel A the dependent variable is the restricted Index of Central Bank Involvement in supervision (CBIS2) with the endogenous variables PDI and INDIV being instrumented; In Panel B, showing the results for the endogenous covariate equation, the table reports only the coefficient estimates for the two instruments and omits the estimates on other control variables included in the regression (same control variables as the ones included in Panel A); CRISES = The (lagged) cumulative number of crises in a country since 1970, CBI = Central bank independence index, GOVQ = Indicator of overall governance quality, GDPCAP = GDP per capita, POPUL = Logarithm of population, OPENESS= Degree of trade openness, CRGDP = Private credit by deposit money banks (% GDP), STGDP = Stock market capitalization (% GDP), INSGDP = Non-life insurance premium volume (% GDP); LISTED = Number of publicly listed companies (per 10K population), CONC = Assets of three largest commercial banks (% total commercial banking assets), COSTINC = Total costs to total income, INDIV = National culture indicator of individualism, PDI = National culture indicator of power distance, LNHLAH = Country-level index of the human leukocyte antigen heterozygosity, STATEHIST = Index of Duration of state existence as well as degree of unity, territorial coverage, and locally rather than externally based rule for each territory defined by modern-day country borders. Further information about the variables is available in Appendix I. ***Statistically significant at the 1% level, **Statistically significant at the 5% level, *Statistically significant at the 10% level

Table 6: Regression results for ordered probit model with endogenous covariates – controlling for various country specific characteristics (dependent variable: supervisory integration index)

	(1)	(2)	(3)	(4)
	Panel A - Results for dependent variable SII with instrumented INDIV and PDI			
CRICES	0.105	-0.061	0.177***	-0.111*
	(0.066)	(0.058)	(0.067)	(0.060)
CBI	-0.567**	0.029	-0.346	0.124
	(0.221)	(0.215)	(0.226)	(0.218)
GOVQ	-0.969***	-0.840***	-1.071***	-0.874***
	(0.179)	(0.125)	(0.165)	(0.127)
GDPCAP	0.000	-0.000**	0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
POPUL	-0.278***	0.464***	-0.339***	0.372***
	(0.083)	(0.072)	(0.095)	(0.084)
OPENESS	0.011***	0.012***	0.010***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)
CRGDP	0.005***	-0.001	0.006***	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
STGDP	-0.005***	-0.002	-0.005***	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)
INSGDP			-0.540***	-0.104
			(0.084)	(0.073)
LISTED			0.005***	0.006***
			(0.002)	(0.002)
CONC			0.001	-0.011***
			(0.003)	(0.003)
COSTINC			-0.006	-0.003
			(0.003)	(0.003)
INDIV_instrumented	0.056***		0.069***	
	(0.005)		(0.004)	
PDI_instrumented		-0.072***		-0.074***
		(0.003)		(0.002)

	Panel B- Results for endogenous covariate equation			
	INDIV	PDI	INDIV	PDI
LNHLAH	114.603***	-34.095***	96.200***	-33.281***
	(10.426)	(10.844)	(11.148)	(11.519)
STATEHIST	-14.631***	2.952*	-10.276***	3.930**
	(3.322)	(1.588)	(3.017)	(1.724)
Constant	122.589***	-23.424*	105.143***	-1.444
	(13.493)	(14.009)	(16.566)	(17.028)
Observations	714	714	693	693
Countries	62	62	62	62
Wald X^2	436.74	1120.35	643.41	1199.89
Log likelihood	-3505.790	-3538.683	-3378.327	-3415.255
Prob X^2	0.000	0.000	0.000	0.000

Notes: Estimates obtained from an extended ordered probit regression with endogenous covariates (STATA command eoprobit) with LNHLAH and STATEHIST as instrumental variables for INDIV and PDI; Robust standard errors in parentheses; In Panel A the dependent variable is the supervisory integration index (SII) with the endogenous variables INDIV and PDII being instrumented; In Panel B, showing the results for the endogenous covariate equation, the table reports only the coefficient estimates for the two instruments and omits the estimates on other control variables included in the regression (same control variables as the ones included in Panel A); CRISES = The (lagged) cumulative number of crises in a country since 1970, CBI = Central Bank independence index, GOVQ = Indicator of overall governance quality, GDPCAP = GDP per capita, POPUL = Logarithm of population, OPENESS= Degree of Trade Openness, CRGDP = Private credit by deposit money banks (% GDP), STGDP = Stock market capitalization (% GDP), INSGDP = Non-life insurance premium volume (% GDP); LISTED = Number of publicly listed companies (per 10K population), CONC = Assets of three largest commercial banks (% total commercial banking assets), COSTINC = Total costs to total income, INDIV = National culture indicator of individualism, PDI = National culture indicator of power distance, LNHLAH = Country-level index of the human leukocyte antigen heterozygosity, STATEHIST = Index of Duration of state existence as well as degree of unity, territorial coverage, and locally rather than externally based rule for each territory defined by modern-day country borders. Further information about the variables is available in Appendix I, ***Statistically significant at the 1% level, **Statistically significant at the 5% level, *Statistically significant at the 10% level
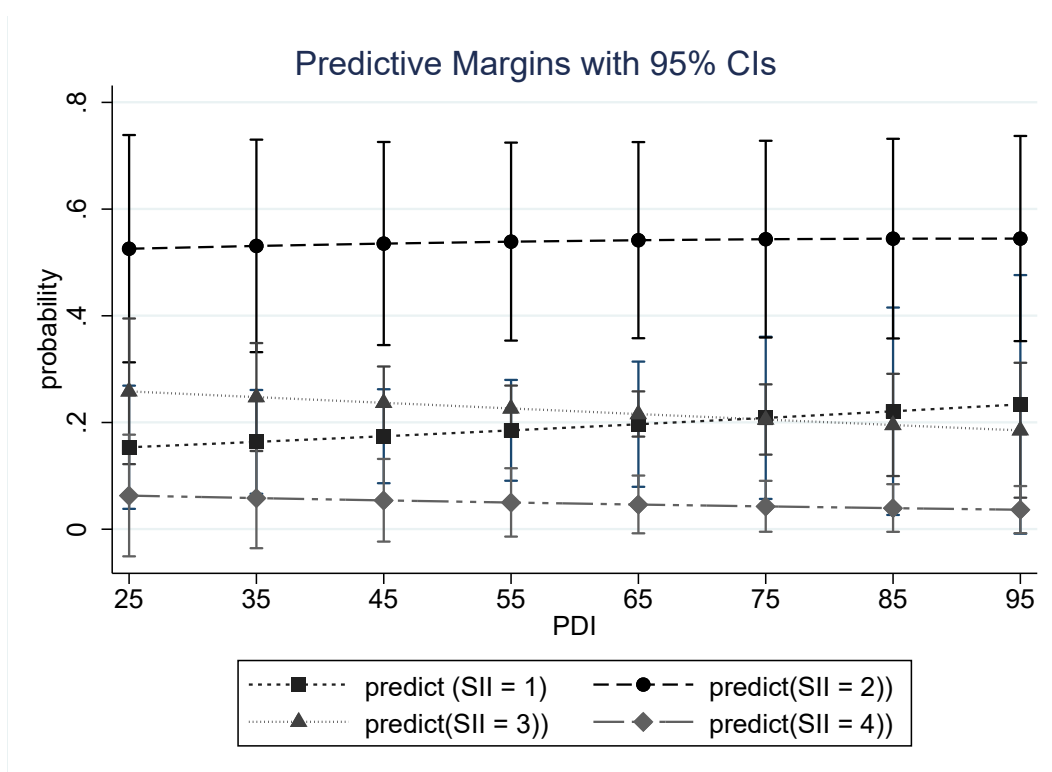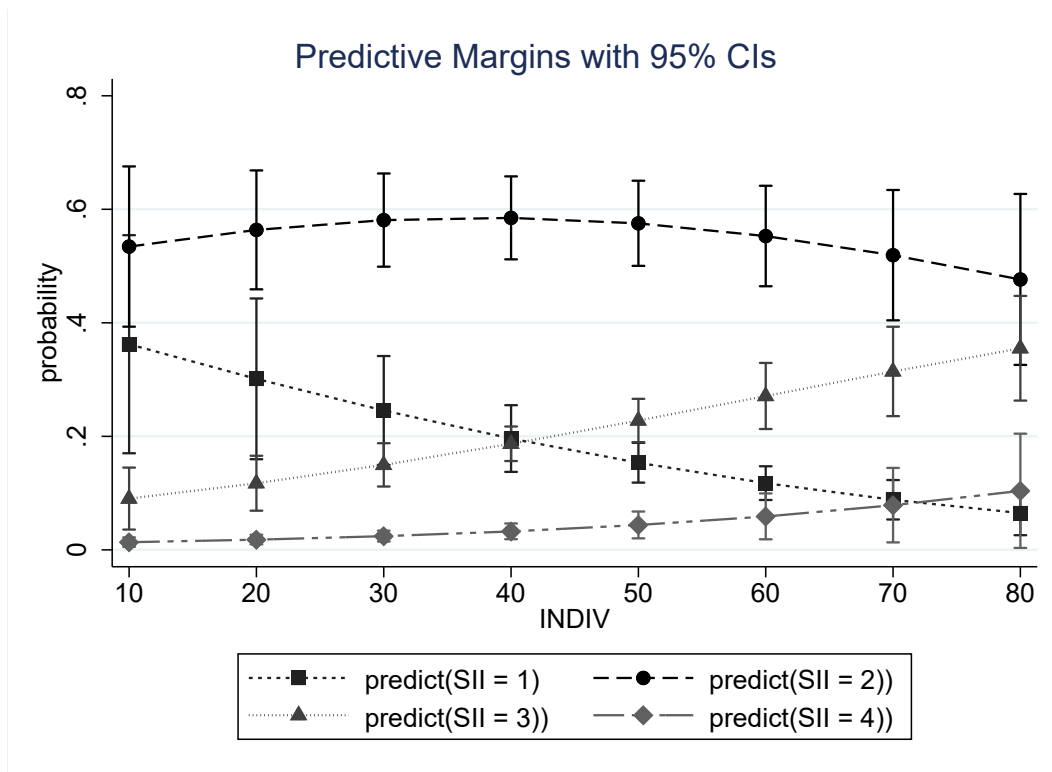
Figure 1 – Predictive Margins

The figure shows the plots of the predicted margins of the specifications presented in Columns 3 (INDIV) and 4 (PDI) of Table 6. The lines show how the probabilities (y-axis) of being classified into each CBIND status (SII = 1, SII = 2, SII = 3, SII = 4) change across different cultural values for INDIV and PDI (x-axis).

Appendix I – Description of variables

Variable	Definition and Source
CBIS	Index of Central Bank Involvement in Supervision. It ranges from 1 to 6, with higher values indicates a higher concentration of supervisory powers in the hand of the central bank. The variable takes the value of 6 when there is a unified supervision of the entire financial sector inside the central bank, the value of 5 when there is a unified supervision of the banking and securities markets sectors inside the central bank, the value of 4 when there is a unified supervision of the banking and insurance sectors inside the central bank, the value of 3 when there is only banking supervision is in the hands of the central bank, the value of 2 when there the banking supervision is shared between the central bank and another authority, and the value of 1 when the central bank is not involved in supervision. (Source: Masciandaro and Romelli, 2018).
CBIS2	Restricted index of Central Bank Involvement in Supervision. This index is a restricted version of the CBIS Index, ranging from 1 to 4. A higher value indicates a higher concentration of supervisory powers in the hand of the central banks. The variable takes the value of: (i) 4 if the central bank has full responsibilities for the supervision of the entire financial system, (ii) 3 if the central bank has supervisory responsibility in any two sectors, (iii) 2 if the central bank has the main (or sole) responsibility for banking supervision, (iv) 1 if the central bank is not involved in supervision. (Source: Masciandaro and Romelli, 2018).
SII	Supervisory Integration Index. It takes: (i) the values of 1 when there is sectoral supervision, with the banking sector supervised by an agency outside of the central bank (SII =1); (ii) the value of 2 when there is sectoral supervision, with the central bank supervising the banking sector (SII = 2); (iii) the value of 3 when there is unified supervision in a FSA (SII = 3); and (iv) the value of 4 when there is unified supervision in the central bank (SII = 4). (Source: Authors' estimations based on data from Melecky and Podpiera, 2013).
CRISES	The (lagged) cumulative number of crises in a country since 1970. (Source: Authors' estimations based on data from Laeven and Valencia, 2018)
CRISIS_LAST_2Y	Dummy variable that takes the value one if a systemic banking crisis occurred in any of the previous two years and the value of zero otherwise. (Source: Constructed by the authors based on data from Laeven and Valencia, 2018)
CBI	Central Bank independence index. The index is based on the framework of Cukierman (1992) and Cukierman et al. (1992) to code central bank legislation. Each piece of legislation was coded on 16 dimensions related to four components of CBI, on a country-year basis: (i) CEO's characteristics (appointment, dismissal, and terms of office), (ii) Central Bank objectives (formulation of monetary policy, ~~G~~government directives and resolution of conflicts), (iii) Policy formulation (role of central bank and), (iv) Central bank lending (e.g. Limitations on securitized lending, active role in formulation of government's budget). These 16 components are also combined into a single weighted index, ranging from 0 (lowest) to 1 (highest). (Source: Garriga, 2016).
GOVQ	Indicator of overall governance quality. Average of the scores over the following 6 dimensions: (i) Voice and accountability, that captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media, (ii) Political stability and absence of violence/terrorism, that captures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism, (iii) Government effectiveness, that captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies, (iv) Regulatory quality, that captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development, (v) Rule of law, that captures perceptions of the extent to which agents confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property

rights, the police, and the courts, as well as the likelihood of crime and violence, (vi) Control of corruption, that captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The individual indicators, and hence the aggregate index, range from -2.5 to 2.5, with higher figures indicating higher governance quality. (Source: (Source: Authors' estimations based on data from the Worldwide Governance Indicators project)

CIVIL	Dummy that takes the value of 1 in the case of the French, Germany and Scandinavian civil law legal origins, and the value of 0 otherwise. (Source: Authors' estimations based on data from La Porta et al.1999).
LATIT	Absolute value of the latitude of the capital city, divided by 90 (to take values between 0 and 1) (Source: La Porta et al., 1999).
GDPCAP	GDP per capita, constant 2005 USD (Source: World Development Indicators, World Bank)
POPUL	Logarithm of population (Source: World Development Indicators, World Bank)
OPENESS	Degree of Trade Openness, calculated as Exports + Imports of goods and services as a percentage of GDP. (Source: World Development Indicators, World Bank)
CRGDP	Private credit by deposit money banks to GDP (Source: Financial Structure Database, World Bank)
STGDP	Stock market capitalization to GDP (Source: Financial Structure Database, World Bank).
INSGDP	Non-life insurance premium volume to GDP (Source: Financial Structure Database, World Bank)
LISTED	Number of publicly listed companies per 10K population (Source: Financial Structure Database, World Bank)
CONC	Assets of three largest commercial banks as a share of total commercial banking assets (Source: Financial Structure Database, World Bank)
COSTINC	Total costs as a share of total income of all commercial banks (Source: Financial Structure Database, World Bank).
INDIV	National Culture Indicator of individualism versus collectivism. On the one side of this dimension is Individualism, defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. On the opposite side is Collectivism, representing a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular ingroup to look after them in exchange for unquestioning loyalty (Source: Hofstede Insights)
PDI	National Culture Indicator of the extent to which the less powerful members of institutions and organizations within a country expect and that power is distributed unequally. (Source: Hofstede Insights)
LNHLAH	Logarithm of the country-level index of the human leukocyte antigen heterozygosity. (Source: Cook, 2015)
STATEHIST	Normalized aggregate state history score. This is constructed by Borcan, et al. (2018) as follows: Initially, they establish the duration of state existence for each territory defined by modern-day country borders. Then, they divide this duration into 50-year periods. Finally, for each half-century from the state emergence onwards, they assign scores to reflect three dimensions of state presence, based on the following questions: (i) Is there a government above the tribal level? (ii) Is this government foreign or locally based? (iii) How much of the territory of the modern country was ruled by this government? Therefore, as they discuss "state experience" refers not only to duration of presence of macro polities, but also to the degree of unity, territorial coverage, and locally rather than externally based rule. As in Borcan et al. (2018) we use the normalized aggregate state history score calculated for the period 3500 BCE - 1500 CE, discounted using 1% rate (Source: Borcan, et al. 2018)