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Central Banks' Supervisory Guidance on Corporate Governance and Bank Stability: Evidence from African Countries *

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Abstract

This paper focuses on the identification of the causal relationship between central banks' supervisory guidance and individual bank stability. We propose and test the hypothesis that this causal relationship is mediated by the degree to which banks comply with their central bank's corporate governance recommendations. Specifically, we exploit the fact that there is considerable cross-country heterogeneity in providing supervisory guidance. Our recursive two-equation system is equivalent to an endogenous treatment effect model in which the treatment is the provision of supervisory guidance. We find that institutional factors, in particular the legal family of origin, political stability, contract enforcement and strength of investor protection promote provision of supervisory guidance. If a central bank has published supervisory guidance, local banks show better internal governance and higher stability.

Key Words: African banks, Central bank, supervisory guidance, corporate governance, legal systems, institutions, bank stability

JEL codes: G21,G28,G30,G32,G38

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1 Introduction

Banks play an important role in all economies by providing financial intermediation through deposit mobilization, money transfers and lending to firms and households. In African countries, banks are by far the most important contributors to their financial system development, since alternative sources of finance provided by capital markets are limited. Thus, bank governance and stability are crucial factors for African countries' economic and social well-being. Central banks in developing and emerging economies have been always considered themselves as a major player in monitoring and securing bank stability (Buiter et al., 2014). In Africa a large number of central banks have published guidance on the corporate governance of banks. The stark social, political and economic differences across African countries make Africa a good laboratory for empirical research on the link between country characteristics, central banks supervisory guidance and banks' governance and stability. Surprisingly, however, so far we know relative little about this link.

Previous studies have examined how differences in countries' domestic regulations and supervisory strengths influence bank stability (Anginer, Demirguc-Kunt, & Zhu, 2014; Barth, Caprio Jr, & Ross, 2004; Demirgüç-Kunt & Detragiache, 2002; Laeven & Levine, 2009). However, these studies focus primarily on hard regulations, specifically the Basel compliance principles. Evidence dealing with how the supervisory guidance of central banks affects bank governance, and consequently banks' stability, is scarce in general, and completely absent for African banks. Our paper addresses this research gap. Specifically, we exploit the fact that central banks in some African countries have published bank-specific corporate governance guidelines to complement hard banking regulation, while central banks in other African countries did not. Accordingly, in the difference-in-difference (DiD) approach, banks from countries which have introduced central bank guidance are taken as the treatment group while the control group consists of banks located in countries without such guidance.

Beck, Maimbo, Faye, and Triki (2011) show that African economies are characterized by a large informal sector. Information about individuals and firms is scarce and difficult to obtain. The near absence of credit bureaus and credit registries create severe information asymmetries between borrowers and lenders. Accordingly, African banks face, on average, a high risk of suffering from non-performing loans and capital-reducing losses. In such an environment, quality of institutions and good internal governance are likely to be particularly important for bank stability. Several indicators from the World Bank show that the quality of institutions across African countries is highly diverse (see Table 7). For instance, in our sample of 44 African countries, the index measuring control of corruption ranges between -1.4 (South Sudan) and 0.9 (Botswana). In principle, it can

take on values between -2.5 (weak control of corruption) and +2.5 (strong control). High levels of corruption may adversely affect enforcement of loan repayment. Weak discipline in serving debt has less impact on bank stability if contracts are terminated and collateral is collected in a short time period. The respective cross-country differences in this regard are also large. The number of days it takes, on average, to enforce contracts ranges from 228 in South Sudan to 1300 in Liberia.

We use a specified recursive two-equation system that allows us to assess the impact of central banks' guidance on individual banks, and due to the stark institutional heterogeneity among countries, we can also identify the factors promoting the provision of guidance ([Roodman, 2011](#)). Our empirical results show that – mediated via central banks' supervisory guidance – good institutions at the country level improve banks' internal governance, increase return figures and strengthen resilience. In particular, banks operating in common law countries and in countries with high political stability and strong procedures to protect investors have a higher likelihood of receiving supervisory guidance and, thus, of outperforming their peers from weaker countries in both quality of internal governance and stability. Our results are robust to using alternative indicators for governance and stability.

Successful banks may have superior governance and lobby for a better governance system in the banking sector. In this case, bank-level governance and performance would be an important driver for central bank guidance on corporate governance and not the other way round. We address this potential endogeneity problem in different ways. The two-equation model of bank-level outcomes and central banks' publication of governance guidance includes a number of instrumental variables at country level and allows for correlation between the regression residuals. We also include bank fixed effects to control for omitted variables. This approach makes us confident that we are able to identify a causal relationship between central banks' guidance and bank governance and stability and not vice versa.

Our study contributes to the literature in several ways. First, we add to the literature on the role of central banks in securing financial stability. In contrast to many central banks in advanced economies central banks in emerging or developing countries tend to consider prevention of financial crises and safeguarding bank and financial stability an essential part of their mandate ([Buiter et al., 2014](#)). To the best of our knowledge we are the first who provide evidence about the channels through which African central banks' supervisory guidance on corporate governance influences commercial bank's governance and stability.

Second, we complement the research examining how differences across countries in strengths of creditor rights, information sharing on borrowers and contract enforcement

affect bank lending and risk taking ([Ashraf, 2017](#); [Cole & Turk-Ariss, 2013](#); [Essid, 2014](#); [Fang, Hasan, & Fang, 2014](#); [Haselmann & Wachtel, 2010](#); [Houston, Lin, Lin, & Ma, 2010](#); [Qian, Cao, & Cao, 2018](#); [Zhang, Wang, & Qu, 2012](#)). These studies explore the emerging economies of Europe and Asia, and focus on the question of whether institutions have first-order effects on bank performance. In contrast, we show that in African countries institutions have second-order effects. The quality of institutions affects the likelihood of governance guidance by central banks. Via this channel, it also influences both the local banks' propensity to comply with corporate governance regulation and their stability. Finally, we add to the rare but much needed research on the institution-finance nexus in Africa. So far, only [Andrianova, Baltagi, Demetriades, and Fielding \(2015\)](#) have shed some light on this nexus by assessing the influence of institutions on bank lending across 32 African countries.

The remainder of this paper is organized as follows. Section 2 reviews the previous literature on the links between country-level institutions, corporate governance regulation and bank-level governance and stability, and derives testable hypotheses. Section 3 presents the methodology and data including data sources and operationalization of variables. Section 4 analyzes and discusses the results. Section 5 concludes.

2 Literature review and research hypotheses development

2.1 The effect of supervisory guidance on bank governance and stability

Subsequent to a number of banking crises, most African countries initiated a series of financial reforms in the 1980s and 90s supported by the Bank for International Settlements and the IMF ([Triki, Kouki, Dhaou, & Calice, 2017](#)). When the Basel Committee on Banking Supervision (BCBS) published the revised global capital framework (Basel II) in 2004, many central banks in African countries began to provide supervisory guidance on the structure, composition and functioning of their boards, being aware of the special nature of corporate governance in banks ([Adams & Mehran, 2003](#); [de Andres & Vallelado, 2008](#)). International regulators have added to the perception that boards can play an important role in mitigating banks' potential misbehavior. After the Lehman insolvency, in particular the Bank for International Settlement (BIS) has emphasized how important independent boards are for protecting the interest of shareholders, depositors and other relevant stakeholders ([BCBS, 2010](#)). By 2015, 23 out of 44 African central banks had published supervisory guidance on corporate governance (Table 4). These corporate governance regulations aim not only to enhance the stability of banks and the entire

financial system,¹ but also to protect investors from expropriation by shareholders with a controlling block. This is a severe threat in many developing countries where the majority of banks are closely held.

In the advanced economies the important role of central banks for the stability of the banking sector has been rediscovered only when the financial crisis started in August 2007 (Buiter et al., 2014; Di Giorgio, 2014). In contrast, central banks in developing and emerging economies have been always considered themselves as a major player in monitoring and securing bank stability. The large number of central banks that have published guidance on corporate governance confirms the high priority that African central banks assign to their stability mandate (Buiter et al., 2014). Central banks' guidance can include rules for the functioning and composition of boards, the separation of roles of chairpersons and banks' CEOs, and for disclosures of corporate governance and remuneration information in the banks' annual reports. Most of the published guidance found in our sample is rule based, only six countries have principle-based guidance. Regardless of this heterogeneity, most guidance is published as a part of each country's banking act. This is a clear indication that central banks expect commercial banks to comply with the guidance, and that compliance will improve both internal governance and stability. However, little is known about whether African commercial banks live up to those expectations. Empirical studies examining the effect of corporate governance provisions on internal governance arrangements and banks' risk-taking usually focus on regions other than Africa.² We focus on this blank spot. Specifically, for examining the impact of supervisory guidance from African central banks we explore two hypotheses:

1. Central banks' corresponding supervisory guidance improves African banks internal corporate governance arrangements.
2. Central banks' supervisory guidance increases bank stability.

¹Bank stability is just one but a crucially important element of financial stability. Financial stability also covers other elements of the financial system such as the stability of non-bank financial institutions and the stability of the payment system. Using recently designed indicators of financial stability such as *CoVar* (Adrian & Brunnermeier, 2016) requires market-based data for the banks' total assets which are not available for the vast majority of banks in our sample.

²Akhigbe and Martin (2006) and Akhigbe and Martin (2008) show that financial institutions in the US that complied with SOX provisions in terms of board independence and expertise, audit committee independence, financial expertise and financial reporting increased the company's value and were less exposed to unsystematic risk in the long-run. In another US study, Pathan (2009) argues that independent directors reduce bank risk taking as they pay more attention to reducing potentially loss-making investments that could spoil their reputation. Ellul and Yerramilli (2013) find that US bank holding companies with an independent risk management were associated with lower ratios of non-performing loans during the crisis period. Lingel and Sheedy (2012) obtain similar results for those banks that established the position of a risk management officer in senior management.

2.2 Legal systems and supervisory guidance on corporate governance

National corporate governance reforms do not unfold in a vacuum, rather they are a reflection of the country's legal system and its historical development. [LaPorta, de Silanes, Shleifer, and Vishny \(1998\)](#) emphasize that legal origins affect corporate governance through rules that protect investors against exploitation by managers and inside owners. They argue that investor protection is higher in common law countries because of specific shareholder rights. Investor protection is beneficial for firm performance ([La Porta, Lopez-De-Silanes, & Shleifer, 2002](#)). In African countries, laws and regulations are drafted according to legal traditions that are, for the most part, inherited from former colonial rulers ([Mutarindwa, Schäfer, & Stephan, 2020](#); [Osemeke & Adegbite, 2016](#)). For instance, previous evidence shows that, despite corporate governance reforms in most African countries, the pace in launching new governance rules differs widely across countries. The codes' introduction suffers in particular from a weak institutional environment that fosters corruption ([Kaufmann, Kraay, & Mastruzzi, 2009](#); [Okike, 2007](#); [Wanyama, Burton, & Helliard, 2009](#)), as well as from the weak enforcement of laws ([Okpara, 2011](#)). Accordingly, we propose the following hypothesis:

3. The inherited legal system and the quality of institutions therein determine the likelihood of central banks providing supervisory guidance on corporate governance.

2.3 Institutional development and bank stability

There is a growing literature exploring the question of how the institutions in a country affect bank stability. The law and finance literature emphasizes the importance of legal origin and the institutional environment for bank behavior ([LaPorta et al., 1998](#); [Levine, 2005](#)). Banks operating in legal systems with strong loan contract enforcement and well-developed information sharing on borrowers are associated with higher lending ([Demirgüç-Kunt & Detragiache, 2002](#)). Micro-level bank evidence confirms this finding. [Houston et al. \(2010\)](#) show that banks operating in environments with better creditor rights are prepared to take on more lending risk as probabilities of defaults are reduced. Similar evidence is reported in [Cole and Turk-Ariss \(2013\)](#). They show that banks in common law countries have higher exposure to loan risks than banks in civil law countries, and that creditors are better protected under common law. In contrast, banks operating in poor institutional environments tend to avoid high, poorly protected risk exposure and to lend only cautiously.

[Berger and Udell \(2006\)](#) argue that well-developed legal and information infrastructures support lending to Small and Medium Enterprises (SMEs). In [Haselmann and Wachtel \(2016\)](#)'s examination of transition countries, they report that banks lend to SMEs in

favorable environments, but in unfavorable environments prefer to lend only to large firms and government agencies. [Fang et al. \(2014\)](#) study how institutional reforms in transition countries influence bank stability. They find that bank stability increases only if countries improve their legal institutions and conduct reforms in both the banking sector and other industries. [Ranasinghe and Restuccia \(2018\)](#) examine how countries' institutional and financial development differences affect firms' operations and aggregate outputs in poor and developing countries. Their findings suggest that a weak rule of law and a low level of financial development increases the probability of crime and reduces firms' chances to obtain credit.

[Honohan and Beck \(2007\)](#) and [Beck and Cull \(2014\)](#) note that, compared to other parts of the world, African countries have few collateral and credit registries which makes it difficult for banks to obtain information about the borrowers. [Andrianova et al. \(2015\)](#) find that private loan defaults and non-performing loan rates are comparably high for banks located in African countries where contract enforcement is more costly and in which borrowers are particularly difficult to screen. [Moyo, Nandwa, Council, Oduor, and Simpasa \(2014\)](#) examine how bank-level and country-level variables determine bank survival in Sub-Saharan Africa. Their findings suggest that institutional factors play an important role for bank survival. [Ozili \(2018\)](#) confirms the importance of institutional quality for regulation and stability of African banks. In a study on the role of foreign banks in Sub-Saharan African countries, [Sulemana, Dramani, and Oteng-Abayie \(2018\)](#) also find indications that domestic economic and political conditions matter for stability. [Honohan and Beck \(2007\)](#) argue that weak corporate governance and legal systems in combination with poor contract enforcement may render a country's regulatory reforms focusing on bank stability ineffective. In line with this literature, we expect that African banks have better governance and are more stable if their home countries possess strong legal systems and institutions. However, we hypothesize that a mediating factor is necessary to link legal systems and institutions to bank governance and stability:

4. Central bank's guidance on corporate governance is the mediating factor that links the home countries' legal systems and institutions to bank governance and stability.

3 Data and variable description

Our dataset for evaluating these hypotheses is a mixed country-level bank-level dataset. The information about supervisory guidance on corporate governance is taken from the websites of the countries' central banks. Bank-level data are taken from Bankscope and are hand collected from the banks' annual reports. After excluding missing observations, the final panel sample includes 2,375 bank-year observations for 216 commercial banks

across 44 African countries from 2000 to 2015. Country-level data on the quality of institutions and the macro economy are taken from World Bank databases (Doing Business Reports, World Development Indicators) and from World Governance Indicators (WGI) compiled by [Kaufmann and Kraay \(2008\)](#). Data pertaining to legal origins are obtained from [LaPorta et al. \(1998\)](#). Table 1 summarizes the list of variables, their definitions and sources.

[Table 1 here]

3.1 Measurement of banks' corporate governance

To assess the degree to which individual banks' comply with the central bank's supervisory guidance we employ 6 bank-level indicators as dependent variables that are commonly used in the literature to represent good governance ([Adams & Mehran, 2003](#); [Andres, Romero-Merino, Santamaría, & Vallelado, 2012](#); [Pathan, 2009](#); [Song & Li, 2012](#)). *Board size* is the number of board members in each bank. Neither extremely large nor extremely small boards are desirable. For example, in their cross-country study, [Aggarwal, Erel, Stulz, and Williamson \(2008\)](#) define the appropriate board size in the range between more than five and less than 16 members. To account for the disadvantage of extreme board sizes we use the squared deviation of the bank's *Board size* from the average to construct the variable *Logboard size*. *Indepent* indicates the share of independent directors in the board. Independent directors are those with no executive position and no stake in the bank. *CEO duality* is a dummy variable that takes the value of 1 if the Chief Executive Officer (CEO) is the chairperson of the board of directors of the same bank and 0 otherwise. The variable *Sharewomen* represents the share of women board members relative to the entire board of each bank. *UsingBig4* is a dummy variable taking the value of 1 if a bank is audited by Deloitte, Ernst & Young, KPMG or PricewaterhouseCoopers and 0 otherwise. *Disclosure* is a dummy variable taking the value of 1 if a bank discloses the directors' salaries in its annual reports and 0 otherwise.

3.2 Measurement of bank stability

In a first step we use the ratio of nonperforming loans over gross loans (*NPL ratio*) as indicator for bank stability. *NPLs* are loans for which the borrower fails to pay principal and interest over a longer period, and therefore violates the terms and conditions of the loan contract. The *NPL ratio* is a proxy for asset quality and banks' financial health ([Berger, Klapper, & Turk-Ariss, 2009](#); [Ghosh, 2015](#); [Goetz, 2017](#); [Griffith-Jones & Karwowski, 2015](#)). This ratio also indicates the bank's success in screening and monitoring their bor-

rowers. As a robustness check for the standard NPL-estimation, we employ as dependent variable the *LLP ratio* defined as loan loss provisions over NPLs.

In line with the literature (e.g. [Beck, De Jonghe, & Schepens, 2013](#); [Fang et al., 2014](#); [Köhler, 2015](#) and [Goetz, 2017](#)), the Z-score is our main indicator of bank stability,

$$\text{Z-score} = \frac{ROAA + \text{capital ratio}}{\sigma(ROAA)}$$

where *ROAA* is the return on average assets, *capital ratio* is equity to total assets and $\sigma(ROAA)$ is the standard deviation of *ROAA*. The Z-score indicates how many standard deviations of the *ROAA* the bank is away from zero bank capital and, thus, from bankruptcy. A high Z-score signals that the bank is stable and the probability of bankruptcy is low. $Z\text{-score}_1$ is based on the constant standard deviation $\sigma(ROAA)$ over the complete sample period. Alternatively, as a robustness check for the standard estimation, we employ $Z\text{-score}_2$. Here, $\sigma(ROAA)$ is calculated using a 4-year rolling window.

3.3 Supervisory guidance, institutions and legal systems

Supervisory guidance on corporate governance provided by central banks is our main variable of interest. The corresponding variable *CGcode* is the main regressor in our DiD estimation, and the dependent variable in the probit model. It takes the value of 1 in the year and following years when a central bank has published such guidance, and is 0 otherwise.

The explanatory variables representing the performance of a country's institutions are *Control of corruption*, *Governance effectiveness*, *Political stability*, *Regulatory quality*, *Rule of Law* and *Voice and accountability* ([Kaufmann & Kraay, 2008](#)). The respective values range from -2.5 (weak) to +2.5 (strong institutional performance). *Ease of shareholder suits index*, *Extent of director liability index* and *Strengths of investor protection index* measure the level of shareholder and creditor protection in a country. They range from 0 to 10, where 0 represents weak investor protection rights and 10 the highest level. The variable *Enforcing contracts* indicates the average number of days it takes to enforce credit contracts in a country.

The classification of the country's legal system is taken from *Legal family of origin* classification of [LaPorta et al. \(1998\)](#) and [Shleifer and Vishny \(1997\)](#). In African countries only two legal origins are present: civil law and common law. Countries that were colonized by Great Britain belong to the common law tradition and those colonized by either France, Germany, Italy or Portugal are classified as civil law countries. A dummy variable with a value of 0 indicates that the banks are located in a civil law country, and 1 if the banks belong to a common law country.

3.4 Bank-level and macro-economic control variables

At the bank-level we control for firm size, denoted as *Log (Total assets)* and ownership concentration (*Percentage of ownership* of the controlling shareholder). We also account for government blockholding of at least 10% of equity ownership (*Government ownership*) and for the blockholding of institutional owners (*Institutional ownership*).

In addition, we control for macro-economic conditions. We use the logarithm of GDP per capita (*Log (GDPpercapita)*) to account for differences in the countries' income levels and economic development. This measure has been widely used in cross-country studies on corporate governance (e.g. [Aggarwal et al., 2008](#)) and bank stability ([Hasan & Xie, 2013](#) and [Berger et al., 2009](#)). The variable is highly skewed and using the log of GDP per capita allows for a more symmetrical distribution so that extreme observations will have less influence on results. Another advantage of using the log is that coefficients can be interpreted as semi-elasticity. *Inflation* serves as a proxy for macro-economic risk ([Fang et al., 2014](#)) expected to affect both a bank's corporate governance arrangements and stability. The global financial crisis has again highlighted that macro-economic risk affects internal governance as it determines the need for efficient internal risk management arrangements ([Adams & Mehran, 2012](#); [OECD, 2014](#)). Inflation influences bank stability primarily through the balance sheet channel. Low inflation or even deflation periods cause the real value of debt to rise thereby weakening the banks' balance sheets ([Woodford, 2012](#)). On the other hand, expansive monetary policy, induced by below-target inflation, promotes aggregate demand, increases profit and income and improves borrowers' debt service capacity ([Pfiffer, 2018](#)), thereby strengthening balance sheets. The opposite effects occur with high inflation ([Fazio, Silva, Tabak, & Cajueiro, 2018](#); [Fazio, Tabak, & Cajueiro, 2015](#); [Wongwachara, Jindarak, Nookhwun, Tunyavetchakit, & Klungjaturavet, 2018](#)). Accordingly, the direction of the influence of inflation is a priori unknown.

4 Empirical analysis

4.1 Descriptive results

Table 2 reports the distribution of banks across countries at the beginning and end of the observation period.

[Table 2 here]

Table 3 reports the descriptive statistics of bank characteristics. Banks have, on average, nine board members. Five of them are, on average, independent non-executive directors, the rest are inside directors. Female directors comprise only 11% of bank boards. About

95% of the banks in our sample have chairpersons with no dual CEO appointment. About 75% use either Deloitte, Ernst & Young, KPMG or PricewaterhouseCoopers as their auditors. About 16% disclose information on directors' remuneration in their annual reports. A majority of the banks are closely-held as proxied by the total percentage owned by the first largest shareholder(s) (68%). About 80% of the banks are controlled by institutional investors, while 9.2% have governments as their controlling owners. The average return on assets (*ROAA*) is 1.80%. Non-performing loans account for 7.6% of total loans. The average Z-score is 18.38. (*Z-score*₁) for the entire period, and 36.45 (*Z-score*₂) when computed using a rolling window over four years.

[Table 3 here]

Table 4 summarizes the provision of supervisory guidance. In 23 out of 44 countries central banks have published supervisory guidance on banks' corporate governance. The guidelines basically describe the functioning and composition of boards, the separation of the roles of chairpersons and CEOs, and the requirements for disclosures of governance and remuneration information in the banks' annual reports.³ The majority of the central banks' guidelines is rule-based, only six are principle-based. In addition, the six principle-based guidelines are for the most part implemented together or are provided within the countries' banking acts/laws.⁴ Accordingly, in most countries the guidelines are binding for banks.

[Table 4 here]

Table 5 reports the descriptive statistics of the main country-level regressors. About 61% of the countries belong to the civil law family and 39% to the common law tradition. The standard deviations of the country-level variables reveal considerable heterogeneity among countries in the same year. Strong differences among countries are also observable across years.

[Table 5 here]

³For example, the supervisory guidance of the central bank of Malawi – published in 2010 – requires banks to elaborate on the roles and composition of boards, on the separation of the chairperson role from the CEO role, and also to disclose remuneration and ownership structures in their annual reports.

⁴This is the case for Mauritius (sections 50 and 100 of the Banking Act of Mauritius, 2004), Zambia (Section 125 of the Banking and Financial services Act, chapter 387 of the law of Zambia) and Zimbabwe (issued under authority of section 45 of the Banking Act, chapter 24:20). For Nigeria, banks complying with these guidelines are subject to supervision and monitoring by then central bank and are supposed to submit quarterly reports on the status of implementation of the code. For Malawi, the Reserve Bank of Malawi (RBM) requires banks' boards to periodically review how effective banks are in implementing the guidelines.

Table 6 reports the means of both regressors of interest and control variables by legal origin. On average, central banks in countries with a common law tradition have published supervisory guidance on banks' corporate governance more often (55%) compared to those with a civil law tradition (28%). Banks from common law countries are superior to their peers from the civil law countries in adjusting bank-internal corporate governance. Those banks have, on average, larger bank boards with higher proportions of independent directors and more women, as well as lower levels of CEO dualities. In addition, banks in common law countries disclose their directors' pay more often, and are more likely to use the Big4 as auditors. In terms of stability, banks in common law countries have, on average, lower credit risk (lower NPL ratios) and a higher return on average assets. The mean Z-score is either higher or lower in common law than in civil law countries, depending on how the score is specified. African common law countries show higher levels in the indices measuring institutional performance (*Control of corruption, Governance effectiveness, Political stability, Regulatory quality, Rule of Law and Voice and accountability*) and higher index levels with respect to shareholder and creditor protection. It also takes fewer days to enforce contracts in common law countries. In terms of ownership structures, banks from civil law countries are, on average, more closely held by governments (*Government ownership*) while in common law countries institutional owners as the largest group of shareholders *Institutional ownership* occurs more frequently.

[Table 6 here]

4.2 Empirical model

We use a DiD approach to test Hypothesis 1 and 2, that is, to examine how a central bank's supervisory guidance on corporate governance affects the individual bank's compliance and influences bank stability. The DiD approach allows us to compare the relative impact of supervisory guidance (Angrist & Pischke, 2009). DiD estimates can be obtained by using a fixed effects panel model in which the incidence that central banks have published bank-specific corporate governance guidelines is modeled as the treatment dummy variable that takes a value of 0 before publication and a value of 1 in the year of publication and the following years. The DiD approach estimates the average treatment effect on the treated and those countries in which central banks have introduced supervisory guidance during the sample period enable us to identify the causal treatment effect on banks (Lechner, 2011).

One could, nevertheless, argue that the publication of supervisory guidance is not an exogenous event but is itself dependent on a number of country-specific institutional characteristics and the country's level of economic development. To take these considerations

into account, we use a two-equation system in which *CGcode* is also a dependent variable,

$$\begin{aligned} \text{Bank governance/stability}_{it} = & f(\text{CGcode}_{kt}, \text{bank controls}_{it}, \text{macro controls}_{kt}, \mu_i, \lambda_t) \\ & + \epsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{CGcode}_{kt} = & f(\text{institutional characteristics}_{kt}, \text{macro controls}_{kt}, \gamma_t) \\ & + \varepsilon_{kt} \end{aligned} \quad (2)$$

where μ_i are bank-specific fixed effects, λ_t and γ_t are year effects, ϵ_{it} and ε_{kt} are the error terms of Equations (1) and (2) that are allowed to be correlated. The first equation is a fixed effects model with year dummies that describes the individual bank's outcome in terms of governance and stability depending on a number of bank-specific controls and macro indicators. The second equation represents a probit model with the central bank's supervisory guidance on corporate governance (*CGcode*) in country k and year t as dependent dummy variable and institutional characteristics as well as macro-economic variables as regressors.

In fact, our main assumption is that using country level variables to explain the introduction of *CGcode* is exogenous for bank-level outcomes. As previous studies in the law and finance strand (e.g. [Caprio, Laeven, & Levine, 2007](#); [La Porta, Lopez-de Silanes, & Shleifer, 2006](#)) have done, we also rely on the exogeneity of the legal family as an instrumental variable. These and other studies (e.g. [de Andres, Romero-Merino, Santa-maría, & Vallelado, 2012](#)) suggest that laws protecting shareholders (e.g. the existence of supervisory guidance on corporate governance in our study) vary across countries due to differences in countries' legal traditions. Note that many of the country level explanatory variables are not related to the banking sector, e.g. *Political stability* or *Voice and accountability*. Thus, this renders the exclusion restriction more plausible.

The bank-level control variables in Equation (1) are total assets and ownership indicators (*Percentage of ownership*, *Institutional ownership* and *Government ownership*). The macro-economic indicators are the same in both equations. *Inflation* is a proxy for the country's macro-economic stability, and *GDPpercapita* represents the level of economic development. As Equations (1) and (2) constitute a recursive system, we estimate them simultaneously by utilizing the (*cmp*, conditional mixed processes) procedure developed by [Roodman \(2011\)](#). By doing so, we capture the possibility that the introduction of supervisory guidance is not exogenous at the country level, but might be triggered by better institutional development. The *cmp* procedure can handle equations with differently scaled dependent variables.⁵ Two outcomes are of particular interest in response to the

⁵Models such as Heckman's selection or the treatment effect model or can be specified as specific cases in the *cmp* procedure, see *cmp* help file. In fact, the estimated models with *cmp* gives very comparable results to Stata's *etregress* command, which are available from the authors upon request. In comparison

central bank’s supervisory guidance. First, the degree to which banks comply with the published governance regulation and, second, the stability of banks.

One important condition for the validity of the DiD approach is that the common (parallel) trend assumption of treated and control group holds prior to treatment (Mora & Reggio, 2019). Therefore we performed tests using the interaction term between group and time trend before treatment.⁶ These tests show that the common trend assumption holds for all outcome variables at a 5% significance level.

4.3 Estimation results

4.3.1 Central bank guidance and bank compliance

Table 8 reports the regression results for Equation (1) and (2) with bank governance indicators as dependent variables in the fixed effect model. The coefficients for *CGcode* in the DiD regressions are statistically significant in all specifications from Columns 1 to 6, thus, confirming Hypothesis 1. The publication of supervisory guidance on corporate governance by central banks supports banks in implementing own governance improvements. That is, banks, on average, comply with the corporate governance regulation. Banks from countries in which central banks published the guidance have less extreme board sizes than those from countries with no such guidance. They use the services of the Big4 auditors significantly more often than banks from non-publishing countries. There is also a significant negative relationship between supervisory guidance and CEO duality, implying that local banks respond to supervisory guidance by reducing the chairperson’s dual roles. In addition, banks significantly increase disclosure of directors’ compensations. Finally, they increase the number of female directors and expand the proportion of non-executive independent directors in response to guidance publication.

[Table 8 here]

In line with Hypothesis 3 the results of the probit model in Table 8 show that the provision of central bank guidance is contingent on the quality of the countries’ institutions. Having a common law legal tradition increases the likelihood of supervisory guidance, and via this channel, positively affects the likelihood for: Big4 involvement, having a CEO without dual roles, disclosure of directors’ pay, and a higher share of female and independent directors. The coefficient for *Legal family of origin* is positive and highly significant in all models. Political stability is the second positive and strongly significant driver of supervisory guidance as a mediator for improved bank-internal governance. Domestic

to *etregress*, *cmp* allows for even greater modelling flexibility, such as systems of equations and random coefficients/effects models.

⁶Due to space constraints we do not report the tests but those are available from the authors upon request.

creditor and investor rights are the third driver. A higher level of the investor protection index significantly increases the likelihood of supervisory guidance.

In line with a priori expectations, we find that a lower number of days for contract enforcement, most likely also reflecting a higher degree of institutional quality in those countries, is associated with a higher likelihood of supervisory guidance. The institutional variable *Voice and accountability* captures perceptions of a country's citizens as to what extent they can participate in selecting the government and enjoy freedom of expression, freedom of association, and a free media. Contrary to expectations a low level of this indicator increases the likelihood for central bank guidance. A possible explanation for this result could be that a low Voice and accountability score indicates an oppressive institutional environment and central banks feel a particular need to have a stabilizing and controlling framework in place.

4.3.2 Central bank guidance and bank stability

Table 9 reports the estimation results on the effects of supervisory guidance on bank stability (Hypothesis 2). Higher *NPL ratios* indicate more defaults, on average, among borrowers. Contrary to our expectation, the *NPL ratio* (Column 1) increases when central banks have published corporate governance recommendations. The explanation for this finding might be that supervisory guidance on corporate governance promotes disclosure on loan defaults while weaker banks in countries without such guidance may tend to hide loan defaults. The coefficient on *CGcode* in Column 2 is positive and significant indicating that supervisory guidance on corporate governance is associated with a higher *Z-score* and, therefore, higher bank stability. In contrast to the strong impact of *CGcode*, the direct impact of bank-internal governance characteristics on bank stability is weak. The coefficient of the indicators *UsingBig4*, *CEO duality* and *Disclosure* are significant only in the rolling *Z-score* model (Column 3) which serves as a robustness check for the main specification in Column 2.

[Table 9 here]

The probit model in Table 9 shows that supervisory guidance occurs and, subsequently, improves bank stability in those countries that are politically stable, are less corrupt and where investors are more strongly protected. Overall, the findings confirm the hypothesis that institutions and legal systems of African countries significantly affect the likelihood that central banks provide corporate governance guidance for banks and, via this channel, influence bank stability.

4.3.3 Control variables

Bank characteristics and macro controls influence bank stability to some extent. By and large, an increase in the *Percentage of ownership* of controlling shareholders is, to some extent, associated with better internal governance (Table 8). The government as controlling shareholder (*Government ownership*) promotes CEO duality and has a weakly significant positive impact on the share of independent board members. Larger banks have larger boards, more information disclosures related to directors' pay and a higher proportion of female board members. Their risk of suffering from non-performing loans (Table 9) is lower. Log (GDP per capita) and inflation influence banks' corporate governance (Table 8), but have no significant impact on bank stability (Table 9).

4.4 Robustness checks

In the first robustness check, we evaluate whether the results on the *Z-score* depend on our definition of $\sigma(ROAA)$. Despite a lower number of observations, supervisory guidance has a stronger impact on *Z-score*₂ calculated on the basis of a rolling window over 4 years (see column (4) in Table 9). Including loan loss provision over non performing loans (*LLP ratio*) as an additional indicator for bank stability, reveals that our *CGcode* variable shows a similar response to both *LLP* and *NPL ratio* (see column (5) in Table 9 below). The *LLP ratio* increases if the central bank has published supervisory guidance. Thus, both robustness checks confirm basically the results of the main regression.

In order to gain a clearer understanding of the positive effect of supervisory guidance on the *NPL ratio*, we test to see if the positive and significant effect of *CGcode* on both *NPL ratio* and *LLP ratio* is time sensitive. We construct six dummy variables *CGcode1* to *CGcode6*, where *CGcode1* represents the publication year each subsequent variable represents the number of years post publication. Table 10 shows the results. The effect of supervisory guidance on both ratios is significant only until the 4th year after publication, after which it becomes insignificant. This observation supports the proposition that supervisory guidance provides incentives for banks to be more transparent about NPLs.

In addition, we split the overall sample into two sub-samples, banks with *NPL ratios* equal to and below the median *NPL ratio*, and banks above the 50%-threshold. Table 11 shows the results. The banks with better loan quality – below-median banks – respond to supervisory guidance with a decrease of the *NPL ratio*. The results in the overall sample are driven by banks in the above-median NPL group. Those banks respond to the publication of supervisory guidance with a strong increase in the *NPL ratio*. These findings are a further hint that supervisory guidance provides incentives for banks to increase their disclosure of bad loans.

In our sample, we have more banks from countries with larger banking sectors. This may imply that the results of the probit models in Tables 8 and 9 could be influenced by bank-level effects as well. To evaluate this conjecture we separately measure the influence of different groups of country-level variables on the introduction of corporate governance codes in each country using a probit model. In the first regression model, only minority investor protection rights variables are used as explanatory variables. The second regression uses only macroeconomic variables as explanatory regressors. The third model includes country governance indicators as main regressors and the fourth specification combines the first three models. We include the legal family as the explanatory variable in all models. Table 12 reports the results.

Common law countries have a significantly higher probability that central banks publish corporate governance guidance. This result is robust across all model specifications. The large model in Column 4 confirms, by and large, the results for Equation 2 in Table 8 and 9. The economic and statistical significance of the explanatory variables, *Legal family of origin*, *Political stability*, *Voice and accountability*, *Enforcing contracts* and *Strengths of investor protection index* is maintained. Therefore, we can exclude that the findings in Table 8 and 9 are reversely influenced by bank-level effects.

[Table 12 here]

4.5 Endogeneity concerns

Potential endogeneity in the bank-level governance-performance relationship is a concern in many empirical studies as it could bias the estimates. To address this concern, many econometric studies used instrumental variables. Note that in contrast to pure bank-level studies, our empirical approach is more robust with respect to endogeneity of supervisory guidance on corporate governance because the main variable of interest, *CGcode*, is determined at the country level while the outcome variables of interest, bank governance and stability, are determined at the bank-level. However, a possibility exists that omitted variables at the country level might affect both the likelihood of *CGcode*, and also the outcomes of certain bank-level variables. To address this issue, we use two sets of country-level variables that we assume to be exogenous to the bank-level outcomes: institutional performance indicators and macro-economic variables reflecting a country's economic conditions. As the recursive system allows for correlation between both equations our approach is equivalent to an endogenous treatment effect model where the treatment effect is the provision of supervisory guidance at the country level. The fixed effects model also avoids biased estimates due to omitted time invariant variables.

5 Conclusions

In this paper, we add to the rare but much needed research on the institution-finance nexus in African countries. Using a sample of 216 banks from 44 African countries observed between 2000 and 2015, we investigate the determinants of central banks' supervisory guidance on corporate governance and its impact on bank governance and stability. In particular, we explore whether the provision of supervisory guidance is conditioned by countries' institutions and legal systems. We establish two main results. First, supervisory guidance improves governance and stability of local banks. Second, institutions matter. Specifically, a common law origin, political stability, and strong procedures to protect investors increase the likelihood that an African country's central bank provides supervisory guidance. Overall, the results highlight how important corporate governance regulation and the central banks' supervisory guidance are for the stability of African banks.

Our findings have important policy implications, not only for policymakers and regulators in African countries, but also for international agencies involved in promoting economic growth and development in these very countries. Since banks are the major source of credit in African economies, their governance and stability determine the prospects for economic growth and development. Central banks can and need to play an active role in supporting banks to develop and maintain good governance. Enhancing the quality of institutions supports central banks in playing this active role. As well-governed banks are less fragile such activities of central banks are supportive for the economy, too. Future research on this topic could expand on our main findings by exploring the role of central banks in African countries not only for bank but also for economic stability in general.

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Appendix

Tables

Table 1: Description of variables

Variable	Descriptions	Source
Board size	Number of members on the bank's board.	(b)
CEO duality	A dummy variable that takes the value of 1 if the banks' CEO is a chairperson of the board of the same bank and 0 otherwise.	(b)
CGcode	A dummy variable that takes the value of 1 if the country's central bank has published supervisory guidance on corporate governance in a particular year and 0 otherwise.	(d2)
Control of corruption	Index for control of corruption, ranging from -2.5 (weak) to 2.5 (strong).	(c2)
Disclosure	A dummy variable taking the value of 1 if a bank discloses directors' compensation and pay in its annual reports and 0 otherwise.	(b)
Ease of shareholder suits index	Measured from zero to 10. This variable captures the extent to which minority shareholders can access internal corporate documents and use it during trials and to which they can recover legal expenses from their companies.	(c3)
Enforcing contracts	Measured in number of days it takes to enforce contracts.	(c3)

Table 1: Description of variables

Variable	Descriptions	Source
Extent of director liability index	Measured from zero to 10. This variable captures the extent to which the minority shareholders can sue and hold directors accountable for related party transactions and if they can get legal remedies.	(c3)
Governance effectiveness	Ranging from -2.5 (weak) to 2.5 (strong). This variable measures the quality of policies, services, independence and governments' commitment to quality policies.	(c2)
Government ownership	A dummy variable that takes the value of 1 if the state is the largest shareholder and 0 otherwise.	(b)
Indepent	Share of non-executive independent directors in each bank to total board size.	(b)
Inflation	Expressed in percentage terms.	(c1)
Institutional ownership	A dummy variable that takes the value of 1 if institutional investors are the largest shareholders and 0 otherwise.	(b)
Legal family of origin	A dummy variable that equals 0 if banks belong to civil-law legal countries and 1 for banks that belong to common-law countries.	(d1)
LLP ratio	Loan loss provisions over non performing loans.	(a)
Log (GDPPercapita)	Logarithm of GDP per capita expressed in US Dollars.	(c1)
Log (Total assets)	Natural logarithm of a bank's total assets. This variable measures the size of the bank.	(a)
NPL ratio	The ratio of non performing loans to gross loans. This variable is an indicator of bank stability.	(a)
Percentage of ownership	Measured as percentage of shares owned by the controlling shareholder(s).	(b)
Political stability	Measured on a scale from -2.5 (unstable) to 2.5 (highly stable). This variable captures peoples' perception of the likelihood that governments will be destabilized or overthrown through violent means.	(c2)
Regulatory quality	Measured on the scale from -2.5 (low) to 2.5 (high). This variable represents governments' capacity to design and implement policies which are pro-private development.	(c2)
ROAA	After tax net income (profits) divided by average total assets of bank.	(a)
Rule of Law	Measured on the scale from -2.5 (weak) to 2.5 (strong). This variable captures the extent to which leaders respect institutions and the rules governing the society.	(c2)
Sharewomen	Number of female directors on the bank board to total number of board members.	(b)
Strengths of investor protection index	Ranging from 0 to 10. This variable represents the extent to which investors are protected against exploitation.	(c3)
UsingBig4	A dummy variable that takes the value of 1 if a bank is audited by the big 4 auditing companies (Deloitte & Touché, KPMG, Ernest & Young, PricewatershouseCoopers) and 0 otherwise.	(b)

Table 1: Description of variables

Variable	Descriptions	Source
Voice and accountability	Measured on the scale from -2.5 (weak) to 2.5 (strong). This variable captures the extent to which citizens can participate in electing their governments and enjoy freedom of expression, association and media.	(c2)
Z-score ₁	Sum of return on assets plus equity/total assets divided by the standard deviation of return on average assets over the complete sample period.	(a)
Z-score ₂	Sum of return on assets plus equity/total assets divided by the standard deviation of return on average assets calculated on the basis of a 4-year rolling window.	(a)

Sources: (a) Bankscope (BvD) database, (b) Hand-collected from the banks' annual reports plus Bankscope, (c1) World bank Development Indicators (WDI), (c2) World Bank Governance Indicators (WGI), (c3) World Bank-Doing Business report, (d1) [LaPorta et al. \(1998\)](#), (d2) Own search on the website of Countries' central banks.

Table 2: Number of banks across countries in sample (years 2005 and 2015)

Country	2005	2015
Algeria	6	6
Angola	11	11
Benin	3	3
Botswana	5	5
Burkina Faso	4	4
Burundi	3	3
Cameroon	4	4
Cape Verde	–	4
Central African Republic	1	1
Chad	1	1
Congo-Brazzaville	1	1
Côte d’Ivoire	3	3
DRC	4	1
Djibouti	–	1
Egypt	8	8
Ethiopia	5	5
Gabon	1	1
Gambia	–	2
Ghana	11	11
Guinea	1	1
Kenya	17	17
Liberia	1	–
Madagascar	1	1
Malawi	3	3
Mali	2	2
Mauritius	4	4
Morocco	4	4
Mozambique	4	4
Namibia	6	6
Nigeria	–	12
Rwanda	5	5
Senegal	3	4
Sieraleone	2	2
South Africa	21	21
South Sudan	–	1
Swaziland	1	–
Togo	3	3
Tunisia	9	9
Uganda	7	7
United Rep of Tanzania	9	9
Zambia	8	8
Zimbabwe	7	7
Total	189	205

Table 3: Descriptive statistics of bank-level variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Board size	1,345	9.533	3.564	3	23
CEO duality	1,324	0.056	0.300	0	1
Disclosure	1,348	0.159	0.366	0	1
Government ownership	1,305	0.093	0.290	0	1
Indepent	1,238	0.534	0.253	0	1
Institutional ownership	1,308	0.80	0.400	0	1
LLP ratio* (%)	823	105.57	445.1	-270.0	3664.1
Log (Total assets)	2,080	12.78	2.026	2.283	18.67
NPL ratio (%)	1,146	7.553	9.363	0	93.07
Percentage of ownership	1,304	67.90	31.51	1	100
ROAA (%)*	2,109	1.767	4.089	-54.73	41.32
Sharewomen	1,173	0.105	0.107	0	.556
UsingBig4	1,348	0.751	0.433	0	1
Z-score ₁	2,052	18.38	19.99	-7.74	329.9
Z-score ₂	1,423	36.45	56.09	-9.00	1616.6

Notes: Z-score₁ is measured based on bank-specific time-invariant $\sigma(ROA)$, Z-score₂ is measured based on rolling window for calculating $\sigma(ROA)$, see Section 3.2. *Winsorized at 1%.

Table 4: Supervisory guidance on corporate governance

CGcode = 1	Country	Year	Type	Source document
Yes	Angola	2015	Rule	Financial Institutions Law 2015
Yes	Cameroon	2004	Rule	Lettre circulaire LC-COB-04 portant attributions des presidents des Conseils d'Administration et des Directeurs Generaux.
Yes	CAR*	2004	Rule	Lettre circulaire LC-COB-04 portant attributions des presidents des Conseils d'Administration et des Directeurs Generaux.
Yes	Chad	2004	Rule	Lettre circulaire LC-COB-04 portant attributions des presidents des Conseils d'Administration et des Directeurs Generaux.
Yes	Congo Republic	2004	Rule	Lettre circulaire LC-COB-04 portant attributions des presidents des Conseils d'Administration et des Directeurs Generaux.
Yes	Egypt	2011	Rule	Corporate governance regulation 2011
Yes	Gabon	2004	Rule	Lettre circulaire LC-COB-04 portant attributions des presidents des Conseils d'Administration et des Directeurs Generaux.
Yes	Gambia	2009	Rule	Banking Act. 2009
Yes	Ghana**	1963	Rule	Companies Act 1963
Yes	Guinea	2013	Rule	Loi Portant reglementation Bancaire
Yes	Kenya	2012	Rule	Prudential guidelines for institutions licensed under the banking act (CBK/PG/02 Corporate governance) 2012
Yes	Malawi	2010	Principle	Corporate governance for Malawian banks 2010
Yes	Mauritius	2014	Principle	Guidelines for corporate governance for banks 2014
Yes	Morocco	2010	Principle	Code for banks/credit institutions 2010
Yes	Namibia	2010	Rule	Banking Institutions Amendment act, 2010
Yes	Nigeria	2014	Principle	Corporate governance of banks and discount houses in Nigeria 2014
Yes	Rwanda	2006	Rule	Code of corporate governance on banks 2006
Yes	South Africa	2012	Rule	Regulations relating to banks (Chapter III Corporate governance) 2012
Yes	Tanzania	2008	Rule	Guidelines for boards of directors in banks and financial institutions 2008
Yes	Tunisia	2011	Rule	Circulaire aux etablisements de credits No. 2011-06 du Mai 2011-Regles de bonne gouvernance dans les etablisement de credit
Yes	Uganda	2005	Rule	Financial institutions (corporate governance) regulations 2005
Yes	Zambia	2006	Principle	Banking and Financial Services (Corporate Governance) Guidelines 2006
Yes	Zimbabwe	2004	Principle	Reserve bank of Zimbabwe Guideline No. 01-2004/BSB corporate governance 2004

Notes: * CAR = Central African Republic.

**In 1963, Ghana had already enacted the Companies Act, which applied to banks as well. In 2016 the legislation was complemented by the Specialised Deposit Taking Institutions Act.

Table 5: Descriptive statistics of institutional and macro-economic country-level variables

Variable	Obs	Mean	SD	Min	Max
CGcode	688	0.285	0.452	0	1
Control of corruption	638	-0.239	1.337	-1.712	7
Ease of shareholder suits index	375	4.498	2.269	0	10
Enforcing contracts	473	670	237	228	1300
Extent of director liability index	420	3.279	2.593	0	9
Governance effectiveness	637	-0.679	0.587	-2.171	1.036
Inflation (%)	658	8.32	20	-35.83	302.1
Legal family of origin	677	0.387	0.487	0	1
Log (GDPPercapita)	662	7.052	1.091	4.726	9.978
Political stability	637	-0.549	0.873	-2.687	1.183
Regulatory quality	637	-0.594	0.585	-2.237	1.123
Rule of Law	637	-0.641	0.620	-2.11	1.06
Strength of investor protection index	375	4.186	1.488	1.7	8
Voice and accountability	636	-0.602	0.688	-1.936	0.99

Notes: *Inflation rate is winsorized at 1%.

Table 6: Descriptive statistics by Legal family of origin

Variable	Obs.	Civil	Common	Total	<i>t</i> -test
Board size	1,338	8.595	10.38	9.516	-9.477***
CEO duality	1,317	0.116	0	0.056	9.401***
CGcode	677	0.234	0.378	0.30	-4.070***
Control of corruption	637	-0.345	-0.069	-0.238	-2.548
Disclosure	1,341	0.035	0.279	0.160	-12.92***
Ease of shareholder suits index	375	3.388	6.301	4.499	-15.44***
Enforcing contracts	470	719.7	596	672	5.736***
Extent of director liability index	420	2.205	4.988	3.279	-12.54***
Governance effectiveness	637	-0.809	-0.472	-0.679	-7.358***
Government ownership	1,305	0.121	0.067	0.093	3.371***
Independent	1,231	0.479	0.581	0.534	-7.232***
Inflation (%)	656	6.063	11.99	8.339	-3.740***
Institutional ownership	1,308	0.780	0.818	0.80	-1.688
Log (GDPPercapita)	659	6.964	7.183	7.051	-2.528
LLP ratio* (%)	825	71.41	123.8	105.6	-1.612
Log (Total assets)	2,068	12.93	12.63	12.78	3.370***
NPL ratio (%)	1,167	8.825	6.891	7.579	3.33***
Percentage of ownership	1,304	68.95	66.82	67.86	1.224
Political stability	637	-0.692	-0.325	-0.549	-5.273***
Regulatory quality	637	-0.725	-0.387	-0.594	-7.396***
Rule of law	637	-0.768	-0.442	-0.641	-6.666***
Sharewomen	1,166	0.080	0.127	0.105	-7.701***
Strengths of investor protection index	375	3.511	5.293	4.186	-13.81***
UsingBig4	1,341	0.570	0.92	0.749	-16.13***
Voice and accountability	636	-0.777	-0.326	-0.601	-8.503***
Z-score ₁	2,085	17.96	20.61	19.27	-2.620
Z-score ₂	1,785	66.72	78.32	72.42	-1.293

Notes: *t*-test on difference of means for bank-level and country-level variables. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The number of observations is less than in the previous Tables due to a missing legal family of origin classification. **Inflation* and *LLP ratio* are winsorized at 1%.

Table 7: Sample means of main country-level regressors

Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Algeria	0.00	0	-0.141	-0.565	-1.277	-0.873	-0.967	7.853	3.233	630	3.000
Angola	0.06	0	-0.789	-1.172	-0.726	-1.154	-1.195	7.555	6.975	1165	5.300
Benin	0.00	0	-0.391	-0.482	0.368	-0.428	0.213	6.460	3.959	811	3.300
Botswana	0.00	1	1.164	0.537	0.987	0.582	0.522	7.921	7.725	846	5.433
Burkina Faso	0.00	0	0.005	-0.612	-0.237	-0.227	-0.349	6.337	5.067	446	3.300
Burundi	0.00	0	-0.747	-1.213	-1.691	-1.097	-0.997	5.684	3.702	739	3.700
Cameroon	0.75	0	-0.561	-0.811	-0.566	-0.814	-1.054	6.877	4.303	800	3.700
Cape Verde	0.00	0	0.767	0.062	0.826	-0.136	0.818	7.368	3.151	—	4.000
Central African Rep.	1.00	0	-1.030	-1.536	-1.946	-1.250	-1.170	5.995	-0.577	660	4.000
Chad	0.75	0	-0.889	-1.320	-1.471	-1.031	-1.300	6.716	5.337	743	3.300
Congo-Republic	0.75	0	-0.665	-1.223	-0.762	-1.217	-1.097	7.526	4.347	560	3.300
Côte d'Ivoire	0.00	0	-0.457	-1.067	-1.574	-0.778	-1.067	6.823	4.872	734	3.300
DRC	0.00	0	-0.869	-1.661	-2.199	-1.484	-1.496	5.868	5.457	637	2.344
Djibouti	0.00	0	-0.156	-0.919	-0.164	-0.626	-1.141	7.230	4.606	1025	2.300
Egypt	0.31	0	-0.071	-0.481	-0.905	-0.439	-1.050	7.318	4.809	1010	3.567
Ethiopia	0.00	0	-0.624	-0.612	-1.483	-1.025	-1.219	6.546	9.038	610	1.700
Gabon	0.75	0	-0.276	-0.734	0.273	-0.487	-0.839	8.332	3.467	1070	3.270
Gambia	0.44	1	-0.252	-0.627	0.141	-0.387	-0.995	6.355	4.005	474	2.700
Ghana	1.00	1	-0.069	-0.063	0.034	0.024	0.427	7.096	4.893	545	6.300
Guinea	0.69	0	-0.596	-1.092	-1.470	-1.023	-1.155	6.579	3.986	279	3.300
Kenya	0.25	1	-0.498	-0.532	-1.244	-0.229	-0.311	6.973	5.679	465	4.933
Liberia	0.00	1	-0.351	-1.391	-1.158	-1.317	-0.570	6.036	6.023	1300	3.700
Libya	0.00	0	-0.810	-1.219	-0.414	-1.527	-1.619	8.378	-0.817	690	2.700
Madagascar	0.00	0	0.040	-0.770	-0.311	-0.433	-0.399	6.236	3.260	871	5.700
Malawi	0.38	1	-0.173	-0.590	-0.031	-0.554	-0.276	6.234	4.251	432	5.300
Mali	0.00	0	-0.207	-0.789	-0.398	-0.435	0.050	6.705	4.223	666	3.300
Mauritius	0.13	1	0.714	0.767	0.856	0.748	0.858	8.340	4.277	678	8.000
Morocco	0.38	0	0.084	-0.111	-0.419	-0.159	-0.691	7.613	4.887	510	3.400
Mozambique	0.00	0	-0.129	-0.552	0.115	-0.439	-0.146	6.521	5.940	975	5.011
Namibia	0.38	1	0.563	0.136	0.671	0.122	0.382	8.143	4.715	493	5.300
Niger	0.00	0	-0.343	-0.745	-0.697	-0.565	-0.357	7.036	5.934	545	3.300
Nigeria	0.13	1	-0.552	-1.019	-1.903	-0.865	-0.714	7.559	6.092	510	5.300
Rwanda	0.63	0.4	0.356	-0.307	-0.641	-0.408	-1.268	6.642	6.721	287	4.744
Senegal	0.00	0	0.119	-0.327	-0.247	-0.219	-0.002	7.096	4.815	961	3.000
Sierra Leone	0.00	1	-0.497	-1.244	-0.446	-0.954	-0.418	6.672	5.303	515	6.256
South Africa	0.25	1	0.610	0.499	-0.091	0.492	0.620	8.391	3.412	600	8.000
South Sudan	0.00	1	-1.411	-1.886	-1.883	-1.605	-1.341	7.124	-4.291	228	2.300
Swaziland	0.69	1	-0.045	-0.707	-0.203	-0.515	-1.292	7.962	4.128	967	3.022
Tanzania	0.50	1	-0.190	-0.509	-0.353	-0.407	-0.252	6.837	5.533	515	5.233
Togo	0.00	0	-0.524	-1.403	-0.352	-0.842	-1.105	6.724	3.034	588	3.300
Tunisia	1.00	0	-0.122	0.194	-0.287	-0.125	-0.716	8.281	3.196	565	4.678
Uganda	0.63	1	-0.443	-0.486	-1.112	-0.141	-0.593	6.724	5.390	514	4.700
Zambia	0.63	1	-0.139	-0.718	0.255	-0.491	-0.262	7.369	5.071	553	5.700
Zimbabwe	0.75	1	-0.729	-1.213	-1.054	-1.946	-1.442	6.617	2.964	415	4.700
Total	0.30	0.6	-0.155	-0.485	-0.562	-0.43	-0.433	7.258	4.784	641	4.847

Notes: DRC is Democratic Republic of Congo. Country-level regressors: (1) CGcode, (2) Legal family of origin, (3) Control of corruption, (4) Governance effectiveness, (5) Political stability, (6) Regulatory quality, (7) Voice and accountability, (8) Log (GDPPercapita), (9) Inflation, (10) Enforcing contracts, (11) Strength of investor protection index.

Table 8: Impact of CGcode on bank governance – *CMP* estimation of Equations (1) and (2)

	(1) Logboard size	(2) Using- Big4	(3) CEO duality	(4) Dis- closure	(5) Share- women	(6) In- depend
<i>Equation 1: Bank-level corporate governance indicators, DiD model</i>						
CGcode	-0.360*** (-3.06)	0.634*** (4.49)	-0.555*** (-2.61)	1.048*** (8.74)	0.0683*** (3.46)	0.0969*** (3.67)
Percentage of ownership	-0.000688 (-0.14)	0.00262* (1.90)	0.0111*** (4.33)	-0.00431*** (-3.48)	0.000358** (2.18)	0.00162*** (6.61)
Log (Total assets)	-0.0693 (-0.96)	-0.0303 (-1.20)	0.340*** (6.57)	0.139*** (6.42)	0.0159*** (5.40)	-0.00161 (-0.37)
Institutional ownership	-1.721*** (-3.06)	0.384*** (2.93)	-0.596*** (-2.95)	0.286** (2.06)	0.0190 (1.08)	0.0722*** (2.94)
Log (GDPPercapita)	0.319 (1.42)	0.408*** (8.12)	-0.169 (-1.51)	0.320*** (6.33)	-0.00250 (-0.42)	-0.0477*** (-5.44)
Inflation	-0.00252 (-0.33)	0.0248*** (2.94)	-0.0252 (-1.61)	0.0245*** (2.66)	0.00187* (1.81)	0.00163 (1.01)
Government ownership	- (-0.33)	-0.164 (-0.95)	0.714*** (3.22)	-0.0938 (-0.50)	0.0256 (1.10)	0.0599* (1.70)
cons	-0.235 (-0.11)	-2.731*** (-5.41)	-5.398*** (-6.86)	-5.207*** (-9.55)	-0.239*** (-3.72)	0.608*** (6.59)
Bank-level fixed effects	Yes	No	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Estimation method	FE panel	probit	probit	probit	tobit	tobit
<i>Equation 2: Probit (CGcode=1), probit model</i>						
Legal family of origin	0.976*** (7.56)	1.027*** (7.68)	1.051*** (8.03)	1.180*** (9.75)	1.026*** (7.99)	1.144*** (8.74)
Control of corruption	-0.304** (-2.03)	-0.304** (-2.00)	-0.397*** (-2.65)	-0.282** (-2.02)	-0.273* (-1.84)	-0.386*** (-2.64)
Governance effectiveness	0.813*** (4.42)	0.747*** (3.97)	0.999*** (5.38)	0.826*** (4.67)	0.701*** (3.78)	0.833*** (4.56)
Political stability	0.593*** (8.71)	0.578*** (8.27)	0.615*** (9.04)	0.466*** (7.12)	0.607*** (9.07)	0.590*** (8.76)
Regulatory quality	-0.279 (-1.63)	-0.233 (-1.35)	-0.496*** (-2.81)	-0.177 (-1.09)	-0.194 (-1.14)	-0.241 (-1.42)
Voice and accountability	-1.700*** (-11.57)	-1.669*** (-11.21)	-1.643*** (-10.96)	-1.619*** (-10.85)	-1.673*** (-11.38)	-1.585*** (-10.59)
Log (GDPPercapita)	0.0424 (0.73)	0.0555 (0.94)	0.0256 (0.44)	-0.00475 (-0.09)	0.0236 (0.41)	0.0507 (0.89)
Inflation	0.0163** (2.29)	0.0147** (2.03)	0.0130* (1.80)	0.00698 (1.04)	0.0146** (2.04)	0.0132* (1.84)
Enforcing contracts	-0.993*** (-11.47)	-0.979*** (-11.27)	-0.970*** (-11.15)	-0.911*** (-10.83)	-0.947*** (-10.92)	-0.891*** (-10.02)
Strength of investor protection	0.207*** (4.96)	0.195*** (4.62)	0.216*** (5.10)	0.185*** (4.58)	0.214*** (5.16)	0.148*** (3.50)
cons	-1.590***	-1.664***	-1.584***	-1.319***	-1.571***	-1.583***

... continued

	(1) Logboard size	(2) Using- Big4	(3) CEO duality	(4) Dis- closure	(5) Share- women	(6) In- depend
Year fixed effects	(-3.83) Yes	(-3.94) Yes	(-3.77) Yes	(-3.31) Yes	(-3.82) Yes	(-3.86) Yes
$\ln \sigma_1$	-0.345*** (-12.87)				-1.856*** (-58.00)	-1.373*** (-58.63)
$\operatorname{atanh} \rho_{12}$	0.521*** (5.18)	-0.179 (-1.58)	1.012*** (4.86)	-1.655*** (-3.55)	-0.431*** (-4.03)	-0.404*** (-4.80)
N System	2187	2193	2193	2193	2181	2193
N eq. 1	1106	1246	1205	1246	1077	1162
N eq. 2	2100	2100	2100	2100	2100	2100

Notes: t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Logboard size is calculated as $\log \left((\text{Board size} - 9)^2 \right)$, where 9 is the average board size, see Table 3.

Table 9: Impact of CGcode on bank stability – *CMP* estimation of Equations (1) and (2)

	(1) NPL ratio	(2) Z-score ₁	(3) Z-score ₂	(4) LLP ratio
<i>Equation 1: Bank-level stability indicators, DiD model</i>				
CGcode	4.079*** (4.34)	1.258* (1.80)	15.24** (2.44)	80.72** (2.00)
Percentage of ownership	0.0244 (0.48)	-0.000912 (-0.04)	-0.0229 (-0.08)	0.453 (0.21)
Log (Total assets)	-1.391* (-1.92)	-3.067*** (-8.13)	0.603 (0.14)	-24.44 (-0.69)
Log (GDPPercapita)	-0.444 (-0.20)	-3.452*** (-2.93)	-23.03** (-2.09)	-126.3 (-1.29)
Inflation	-0.0754 (-0.90)	0.0365 (0.87)	0.0596 (0.14)	-6.203 (-1.39)
Logboard size	-0.26 (-1.01)	-0.0185 (-0.12)	1.894 (1.42)	4.339 (0.36)
UsingBig4	6.115 (1.14)	-2.615 (-1.55)	-95.71*** (-3.46)	- -
CEO duality	-1.385 (-0.27)	-8.423** (-2.44)	42.24 (1.60)	-26.15 (-0.14)
Disclosure	-1.211 (-0.62)	0.623 (0.50)	19.76* (1.91)	-4.619 (-0.05)
Sharewomen	-0.392 (-0.12)	4.048* (1.89)	9.083 (0.48)	-81.76 (-0.51)
Indepent	-2.744 (-1.21)	1.411 (1.19)	2.812 (0.28)	123.0 (1.13)
Constant	28.96 (1.32)	71.39*** (6.36)	247.2** (2.13)	1330.7 (1.42)
Bank-level fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
<i>Equation 2: Probit (CGcode=1), probit model</i>				
Legal family of origin	0.956*** (7.39)	0.988*** (7.57)	0.991*** (7.59)	0.972*** (7.47)
Control of corruption	-0.233 (-1.52)	-0.337** (-2.25)	-0.347** (-2.30)	-0.340** (-2.26)
Governance effectiveness	0.860*** (4.73)	0.788*** (4.25)	0.819*** (4.43)	0.804*** (4.34)
Political stability	0.612*** (9.04)	0.595*** (8.73)	0.610*** (8.94)	0.599*** (8.77)
Regulatory quality	-0.289* (-1.72)	-0.205 (-1.18)	-0.233 (-1.35)	-0.240 (-1.39)
Voice and accountability	-1.816*** (-11.80)	-1.701*** (-11.50)	-1.701*** (-11.40)	-1.670*** (-11.23)
Log (GDPPercapita)	0.0101	0.0439	0.0442	0.0464

... continued

	(2) NPL ratio	(3) Z-score ₁	(4) Z-score ₂	(5) LLP ratio
Inflation	(0.17) 0.0147**	(0.75) 0.0154**	(0.76) 0.0154**	(0.79) 0.0158**
Enforcing contracts	(2.08) -1.005***	(2.14) -0.979***	(2.14) -0.980***	(2.20) -0.984***
Strength of investor protection	(-11.50) 0.227***	(-11.26) 0.199***	(-11.29) 0.191***	(-11.33) 0.193***
Constant	(5.33) -1.400***	(4.75) -1.592***	(4.54) -1.540***	(4.56) -1.545***
Year fixed effects	(-3.33) Yes	(-3.82) Yes	(-3.70) Yes	(-3.71) Yes
$\ln \sigma_1$	1.609*** (38.40)	1.173*** (42.34)	3.171*** (96.12)	5.166*** (163.38)
$\operatorname{atanh} \rho_{12}$	-0.983*** (-6.02)	-0.296** (-2.08)	-0.372** (-2.52)	-0.0522 (-0.46)
N System	2,161	2,169	2,131	2,150
N eq. 1	648	901	708	503
N eq. 2	2,100	2,100	2,100	2,100

Notes: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Effect of CGcode on NPL ratio and LLP ratio in the post publication years

	(1) NPL ratio	(2) LLP ratio
CGcode1	3.368*** (3.39)	111.1*** (2.76)
CGcode2	3.234*** (3.30)	85.60** (2.15)
CGcode3	3.846*** (3.72)	136.1*** (3.00)
CGcode4	2.881*** (2.91)	127.3*** (2.76)
CGcode5	0.788 (0.74)	315.9*** (6.05)
CGcode6	1.516 (1.47)	14.16 (0.28)
Percentage of ownership	0.0234 (0.46)	-0.183 (-0.09)
Log (Total assets)	-1.270* (-1.73)	5.134 (0.15)
Log (GDPPercapita)	-0.481 (-0.21)	-167.7* (-1.74)
Inflation	-0.108 (-1.27)	-13.59*** (-3.00)
Logboard size	-0.252 (-0.98)	10.86 (0.93)
UsingBig4	6.018 (1.12)	- -
CEO duality	-2.281 (-0.44)	-171.1 (-0.89)
Disclosure	-0.643 (-0.33)	-23.07 (-0.24)
Sharewomen	-0.0107 (-0.00)	-95.71 (-0.61)
Indepent	-2.504 (-1.10)	139.0 (1.31)
Constant	27.38 (1.24)	1455.6 (1.59)
Bank-level fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
<i>Equation 2: Probit (CGcode=1), probit model</i>		
Legal family of origin	0.955*** (7.39)	0.973*** (7.48)
Control of corruption	-0.238	-0.343**

	(-1.55)	(-2.28)
Governance effectiveness	0.872***	0.806***
	(4.80)	(4.35)
Political stability	0.612***	0.597***
	(9.03)	(8.74)
Regulatory quality	-0.300*	-0.237
	(-1.78)	(-1.37)
Voice and accountability	-1.811***	-1.668***
	(-11.81)	(-11.22)
Log (GDPPercapita)	0.0116	0.0454
	(0.20)	(0.78)
Inflation	0.0148**	0.0156**
	(2.09)	(2.17)
Enforcing contracts	-1.005***	-0.982***
	(-11.52)	(-11.31)
Strength of investor protection	0.227***	0.192***
	(5.34)	(4.55)
Constant	-1.411***	-1.537***
	(-3.35)	(-3.70)
Year fixed effects	Yes	Yes
<hr/>		
$\ln \sigma_1$	1.610***	5.133***
	(37.07)	(160.90)
$\operatorname{atanh} \rho_{12}$	-1.008***	-0.115
	(-5.69)	(-1.10)
<hr/>		
N System	2161	2150
N eq. 1	648	503
N eq. 2	2100	2100

Notes: *CGcode1* to *CGcode6* represent the years 1 (year of publication) to 6 post publication of *CGcode*. *t* statistics in parentheses, Bank fixed effects and year effects included. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Sample splits for NPL ratios

	(1) NPL ratio	(2) NPL ratio
<hr/> <i>Equation 1: Bank-level stability indicators, DiD model</i> <hr/>		
CGcode	-1.654**	5.086***
	(-2.25)	(2.78)
Percentage of ownership	0.0284	0.0926
	(1.24)	(0.76)
Log (Total assets)	-2.300***	-0.286
	(-4.40)	(-0.27)
Log (GDPPercapita)	3.917***	-11.42***
	(3.52)	(-2.59)

Inflation	-0.114** (-1.97)	-0.204 (-1.52)
Logboard size	0.102 (0.77)	-0.984** (-2.06)
Disclosure	-0.188 (-0.13)	0.632 (0.22)
Sharewomen	1.911 (0.98)	-5.174 (-0.93)
Indepent	0.633 (0.55)	-4.187 (-1.08)
UsingBig4	- -	5.861 (0.87)
CEO duality	- -	-1.375 (-0.20)
Constant	6.504 (0.55)	111.9*** (2.61)
Bank-level fixed effects	Yes	Yes
Year fixed effects	Yes	Yes

Equation 2: Probit (CGcode=1), probit model

Legal family of origin	1.601*** (5.37)	0.843*** (5.20)
Control of corruption	0.253 (0.83)	-0.278 (-1.42)
Governance effectiveness	0.486 (1.29)	0.844*** (3.86)
Political stability	0.367*** (3.00)	0.616*** (7.00)
Regulatory quality	-0.447 (-1.35)	-0.295 (-1.41)
Voice and accountability	-1.631*** (-5.05)	-1.743*** (-9.56)
Log (GDPPercapita)	-0.180* (-1.84)	0.101 (1.31)
Inflation	0.0301** (2.28)	0.0112 (1.28)
Enforcing contracts	-0.877*** (-4.79)	-0.955*** (-8.86)
Strength of investor protection	0.246*** (3.00)	0.230*** (4.21)
Year fixed effects	Yes	Yes
Constant	-1.518* (-1.78)	-1.811*** (-3.34)
$\ln \sigma_1$	0.468*** (5.84)	1.877*** (31.50)
$\operatorname{atanh} \rho_{12}$	0.712	-1.234***

	(1.47)	(-4.69)
<i>N</i> System	937	1224
<i>N</i> eq. 1	285	363
<i>N</i> eq. 2	899	1201

Notes: (1) shows results for the subsample of banks with $NPL \leq NPL_{0.5}$, (2) shows results for the subsample of banks with $NPL > NPL_{0.5}$. *t* statistics in parentheses, Bank fixed effects and year effects included. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Robustness checks – country-level determinants of central banks' supervisory guidance on corporate governance

	Dependent variable: prob(CGcode=1)			
	(1)	(2)	(3)	(4)
Legal family of origin	0.495** (2.30)	0.322*** (2.62)	0.880*** (5.96)	1.405*** (3.64)
Control of corruption	- -	- -	-0.789*** (-3.23)	0.0595 (0.15)
Governance effectiveness	- -	- -	1.227*** (4.63)	0.116 (0.24)
Political stability	- -	- -	0.194** (1.97)	0.335* (1.95)
Regulatory quality	- -	- -	-0.117 (-0.46)	-0.0954 (-0.22)
Voice and accountability	- -	- -	-1.105*** (-6.89)	-2.572*** (-5.38)
Log (GDPPercapita)	- -	0.137** (2.39)	- -	0.557*** (3.84)
Inflation	- -	0.00857* (1.84)	- -	0.0210 (1.34)
Strength of investor protection	-0.159 (-1.30)	- -	- -	0.642*** (2.84)
Extent of director liability index	-0.0294 (-0.52)	- -	- -	-0.258*** (-2.94)
Ease of shareholder suits index	0.104* (1.84)	- -	- -	0.0198 (0.24)
Enforcing contracts	-0.00171*** (-5.27)	- -	- -	-0.00318*** (-5.55)
cons	1.485*** (3.49)	-0.987** (-2.16)	-0.342 (-1.42)	-5.492*** (-4.55)
<i>N</i>	359	498	516	347

Notes: *t* statistics in parentheses. Year fixed effects included. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.