The Impact of Economic Freedom, Regulation, Corruption and Transparency on Bank Profitability and Bank Stability: Evidence from the Eurozone Area

Abstract

This paper examines the impact of economic freedom, bank regulation, corruption and transparency on bank profitability and bank stability using a sample of 326 banks from the 19 Eurozone countries over the period 2005-2018. We use a balanced panel data set and the Arellano-Bond Generalized Method of Moments dynamic panel estimation procedure. We find that greater economic freedom boosts profitability and banking stability. Our results show that regulation is positively related to bank profitability and its precise effects on stability depend upon the nature of the regulation. We find that corruption and transparency have a negative impact on bank profitability and bank stability. Our overall results indicate that the impact of the variables of interest is sensitive to the precise measures chosen to calculate profitability and financial stability.

Keywords: *financial crisis, dynamic panels, economic freedom, bank regulation, transparency, corruption*

JEL Classifications: *G01, G21, G28, C33*

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1. Introduction

The European banking sector has been afflicted by two major crises since the turn of the century. Many major European banks were severely affected by the 2007-10 global financial crises and further losses and problems followed for banks exposed to the European economic and financial crisis in Greece, Ireland, Italy, Portugal and Spain (GIIPS). The aftermath of the twin financial crises has led to greater regulation and the requirement for more transparency in reporting of banks financial positions. In addition, there has been greater scrutiny of banks risk exposures via stress tests and a greater monitoring of banking activities and products (see for example Michalak and Uhde, 2012; Elliot *et al.*, 2013; Slimane *et al.*, 2013; and Milani, 2014). To some extent the survival of the Euro currency is tied up with the health of the Eurozone banking system. Hence, a study of the factors that influence the profitability and stability of the Eurozone banking sector is a topic of considerable importance.

The two European banking crises have taken place in mainly market oriented economies which exhibit significant differences in their degrees of economic freedom, regulatory frameworks (of both the banking and non-banking sectors), levels of corruption and degrees of banking sector transparency. This raises the question as to what extent these factors may impact upon the performance of their banking systems in terms of both profitability and stability? The roles played by corruption, economic freedom, regulation and transparency on the performance of the banking sector is also a topic of interest for policy makers, bank managers, investors and bank customers. The topic is also of interest to the general public who can suffer greatly when the banking sector gets into difficulty and needs to be bailed out[1]. Since the global financial crisis (GFC) of mid 2007-2010 and the subsequent crisis of the European banking sector associated with the turmoil in the GIIPS, economic policy makers in Europe have been concerned about the functioning of the capitalist system, how to effectively regulate banks, tackling wrongdoing including corruption and how to make the risks in the system more

[1] Of course, there are differing views on whether bank bailouts are a good idea because of the problem of moral hazard, such as Dam *et al.* (2012) and the effect on sovereign ratings which then further worsen bank Credit Default Swap spreads, see for example Acharya *et al.* (2014).

transparent. The issues addressed in this paper merit consideration from both a theoretical and empirical perspective. The key aim of this paper is to improve the understanding of how these variables influence bank performance and thereby contribute to better policy design.

This paper provides an empirical investigation of the role of corruption, economic freedom, regulation and bank transparency on banking activity in terms of performance measured by both profitability and stability for the 19 Eurozone economies. The paper contributes to the literature in a number of ways. First, we use an empirical framework that examines simultaneously the role of economic freedom, regulation, corruption and transparency on both bank profitability and bank stability. These issues have sometimes been looked at individually and sometimes in various combinations but not to our knowledge altogether and applied to the Eurozone banking sector. Indeed, it is important to explore these four factors at the same time rather than individually to avoid identifying spurious associations. Another contribution is that we apply extensive robustness checks by using different measures of corruption, regulation and economic freedom as well as different metrics for profitability and stability. In addition, we are the first study to look at all of these issues simultaneously when the countries are joined together under via a single currency. Another contribution is that we use a dynamic panel data estimation procedure while many studies tend to look at individual countries or provide only a cross sectional approach. Finally, we also examine how both country level governance and a proxy for bank level governance indicators may affect the influence of corruption, economic freedom, regulation and transparency on both bank profitability and stability.

The rest of this paper is organized as follows: Section 2 presents a review of some of the literature pertaining to corruption, economic freedom, regulation and transparency on banking sector performance. Section 3 outlines the dataset and the various proxies used in our study. Section 4 outlines our empirical research methodology. Section 5 presents our empirical results from the panel data analysis and also examines the influence of governance on our results. Section 6 concludes.

2. The Impact of Corruption, Economic Freedom, Corruption, Regulation and Transparency on Banking Sector performance

In this section, we examine the possible theoretical relationships between corruption, economic freedom, regulation and transparency on the performance of the banking sector. The impact of these variables is of importance because they define the operational environment within which the banking sector operates. These factors may, of course, have interactions with each other in that greater economic freedom is generally accompanied by less rather than more regulation. Similarly, greater regulation may lead to either more or less scope for corruption. For instance, bank supervisors could abuse their power and get involved in corrupt activities that adversely affect bank stability, see Beck *et al.* (2006) and Barth *et al.* (2009). There are also some potential endogeneity issues, since it is quite possible that the performance of the banking sector can affect the degree of regulation. For example, it is clear that the poor performance of the banking sector during the GFC has led to increased regulation of the sector in the way of higher capital requirements and the need for greater transparency of their vulnerabilities with the use of "stress tests" by regulators. For the rest of this section, we consider individually how these factors can affect the banking sector in terms of both profitability and stability. The empirical linkages between these variables and bank performance is examined in more detail in our empirical work.

2.1 The Impact of Corruption

Corruption can be defined as "the abuse of public or corporate office for private gain" (Bhargava, 2005). In the banking sector, financial corruption relates to the dishonest practices of bank managers and/or bank officials including bank supervisors. A significant number of economists argue that corruption has a negative impact upon the banking sector and the economy. At the macroeconomic level, corruption can deform the structure of public expenditure, dampen potential foreign direct investment, increase unproductive foreign indebtedness, lessen the efficiency of economic activity and result in a lower level of national income and higher rates of poverty (see for example, Mauro, 1995; Gastanaga *et al.*, 1998; Asiedu, 2003; and Kunieda *et al.*, 2014). In addition, at the microeconomic level, corruption is generally accompanied by low institutional quality and governance, inefficient institutions in terms of performance and higher costs of doing business (see for example Asiedu, 2003; Méndez and Sepulveda, 2006; and Diaby and Sylwester, 2015). Consequently, the level of corruption in an economy has the potential to undermine bank profitability and stability.

Mongid (2007) shows that banking crises are positively related to a higher level of corruption and poor legal enforcement. Wei (1999) argues that cronyism and corruption can negatively affect the allocation of credit by increasing information asymmetries between borrowers and lenders, causing lending rates to be higher than they would be without corruption. Similarly, Pagano (2008) shows that corruption together with a high participation of government in the banking sector significantly raises bank lending rates.

The literature on corruption is mixed on the issues of profitability and stability. Generally speaking, a higher level of corruption can negatively influence the functioning of the entire financial sector and economy. La Porta *et al.* (2002) argue that countries with greater government ownership of banks tend to be associated with higher levels of corruption which by restricting the ability of banks to attract credit implies lower bank profitability. Also, greater state control usually involves poorer lending decisions which undermines both profitability and stability. More recently, Park (2012) evaluates the influence of corruption on the soundness of the banking sector using an international dataset. The results show that corruption can be associated with a higher proportion of bad loans in the banking sector implying lower profitability and greater risk for the banking sector. In addition, corruption increases the allocation of bank funds from normal to bad projects, which as well as undermining bank soundness also negatively influences economic growth. In addition, they find that corruption may also have played a role in the Asian Financial crisis 1997-99 and the GFC. Similar conclusions are reached by Weill (2011a) and Zheng *et al.* (2013). However, Lalountas *et al.* (2011) point out that in countries with a high degree of risk aversion in the banking sector there could be benefits in terms of increased bank lending due to corruption and that in the short term, corruption can potentially increase bank profitability. However, the observation, that corruption can positively influence bank lending, does not necessarily mean that corruption is good in the longer run. For instance, if an expansion of bank lending activity is accompanied by a later increase in non-performing loans it increases risk and ultimately raises the cost of borrowing for both banks and their customers. Mauro (1995) points out that corruption does not necessarily increase non-performing loans since even good borrowers can bribe a loan officer to speed up the loan and bypass the normal loan review process.

In general, the legal system is the main source of variation in corruption levels, the higher the effectiveness of the judicial system, the lower the level of corruption there will

generally be. Beck *et al.* (2006) argues that a supervisory strategy that improves private monitoring of banks by improving bank disclosure and timely information can play a useful role in reducing lending corruption. While Barth *et al.* (2009) show that the degree of banking competition and information sharing both help to reduce lending corruption. The authors argue that corruption can be a particularly serious problem in developing countries where the lack of laws, judicial independence, prudential regulations and internal bank controls can sometimes be a significant problem in containing corruption. The negative impact of corruption on bank stability in emerging economies is documented in Toader *et al.* (2018) who show that lower levels of corruption are associated with fewer credit losses and with more moderate credit growth. The results of Toader *et al.* (2018) are confirmed in a much larger study of 26,865 banks in 40 developing and developed economies for a period of 26 years by Ho *et al.* (2019) who also find that a higher degree of investors protection including greater transparency reduces the impact of corruption on bank stability.

Overall, from the preceding set of arguments, it can be seen that the impact of corruption on bank profitability and stability is essentially an empirical issue with the general consensus being that greater corruption is likely to have a negative impact on profitability and stability.

2.2 The impact of Economic Freedom

While the impact of economic freedom on the wider economy has been extensively studied (see for example Adkins, Moomaw and Savvides, 2002; Altman, 2008; Bergh and Karlsson, 2010; Heckelman and Knack, 2009) its impact on the banking sector has only recently attracted the attention of researchers such as Claessens and Laeven (2004), Sufian and Habibullah, (2010a and 2010b), Chortareas *et al.* (2013) and Gropper (2015). There are a number of reasons to think that economic freedom can have a positive impact on bank profitability. In their study, Claessens and Laeven (2004) point out that greater economic freedom by permitting new domestic and foreign entrants can increase efficiency and allow for a wider range of products which can improve banking profits. Economic freedom also means that banks tend to lend more, as there are likely to be more firms competing in the economy and there will be greater scope for banks to lend to foreign companies and foreign financial institutions ensuring greater diversification in bank loan portfolios and a superior risk return trade-off for the banking system. Greater economic freedom is also likely to lead to a better operating environment for

business and stronger economic growth resulting in improved banking performance as measured by profitability and stability. In addition, countries with higher levels of economic freedom generally have higher levels of real income (see Holmes *et al.*, 2008) which in turn leads to a higher demand for banking services. Gropper *et al.* (2015) find that US bank performance is positively related to state economic freedom as well as political connections. They also argue that heavy bank regulation reduces opportunities and restricts economic freedom. Additionally, Blau (2017) argues that economic freedom reduces regulatory uncertainty, promotes free trade and these combined with a greater emphasis on property rights reduce the likelihood of market crashes. This implies that economic freedom should be positive for both banking profitability and stability. A higher degree of economic freedom should generally lead to greater competition which may lead to lower inflation and a more stable macroeconomic environment[2].

In their study, Sufian and Habibullah (2010a and 2010b) examine how greater economic freedom impacts on the Chinese and Malaysian banking systems and their results indicate a positive relationship between economic freedom and profitability. In their study, Chortareas *et al.* (2013) find that since 2000 greater economic freedom in 27 of the EU member states is associated with greater efficiency of the banking system. In a recent study, Papanikolaou (2019) shows that greater competition in the market for loans can lower bank lending rates and also increase the likelihood of bad applicants getting access to loans which could undermine bank profitability, although this can be offset by banks improving their credit screening systems. To the extent that greater economic freedom is associated with greater competition in the banking sector, his results suggest a potentially negative effect on overall bank profitability from greater economic freedom.

Bjornskov (2016) examines the impact of economic freedom on crisis risk and estimates the effects on the duration, peak-to-trough GDP and recovery times of 212 crises across 175 countries over the period 1993-2010. The study suggests that economic freedom is strongly associated with smaller peak-to-trough ratios and a shorter recovery time. This implies that it will assist in boosting bank profitability and stability. Economic freedom is also

[2] To the extent that lower inflation is part of the definition of economic freedom one should be careful not to imply the linkage between these two variables is straightforward.

examined by Lin *et al.* (2016) who focus on how financial freedom shapes the effect of changes in bank ownership on cost efficiency. They find that a foreign presence facilitated by financial freedom enhances bank efficiency. Since greater efficiency results in greater profitability and less risk of bankruptcy then it implies that it improves the overall performance of the banking sector. Roychoudhury and Lawson (2010) find that a decline in economic freedom can substantially increase a government's borrowing costs, the implications of this for bank performance is unclear. It could increase the sector's profitability by improving its net interest margin or it could raise the risk and expense facing corporate borrowers and by increasing the banking sectors non-performing loans undermine its profitability and stability.

In sum, the effects of economic freedom on profitability are likely to be positive with respect to both profitability and stability but there could be some ways in which greater economic freedom might undermine banking performance. Easier entry into the sector and greater competition could undermine the average profitability of banks. In addition, greater economic freedom may also mean greater competition for the banking sector from other financial intermediaries such as hedge funds, shadow banks and private equity that compete for banks deposits. These financial intermediaries also provide funds to businesses which can also lower bank profitability. In the context of developing countries, it has been noted that there tends to be greater state control of bank lending decisions and this ultimately means banks tend to lend more to less creditworthy companies than would happen in a private sector controlled banking system which ultimately undermines banking performance. So, the impact of economic freedom on banking profitability and stability is essentially an empirical matter.

2.3 The Impact of Regulation

The impact of the regulatory and supervisory framework on the performance of the banking sector has been extensively studied, see for example, Pelster *et al.* (2016). In the period before the GFC, a consensus was built around the idea that if the burden of regulation was reduced, the banking system would operate more efficiently and perform better. In addition, there was a misplaced tendency to believe that self-regulation generally works better in the financial system than external regulation. This idea fell into disrepute as a result of the financial crisis, which showed that bankers left largely unregulated can cause havoc to the performance of the banking sector with severe consequences for both profitability and financial stability. The post-crisis literature has tended to emphasize the need for regulatory and supervisory reforms to

promote banking and financial stability through a mixture of better regulation, monitoring and improved bank disclosure. In their study, Chortareas *et al.* (2012b) evaluate bank supervision, regulation and efficiency among a sample of 22 EU countries. Their results show that an increased regulatory and supervisory framework has a positive impact on bank profitability through various channels, including a decline in the likelihood of financial distress, a reduction of agency problems and changes in market power.

Many other studies have emphasized the positive impact of regulation, especially the role of capital adequacy requirements in preventing bank failures, protecting customers and the economic system from detrimental externalities (see for example, Rochet, 1992; Dewatripont and Tirole, 1993; Gorton and Winton, 1995; Hovakimian and Kane, 2000). In their study Pelster *et al.* (2016) show that increases in bank capital ratios whilst hitting short run stock performance nonetheless enhances the ability of banks to survive during a crisis. While Alexander *et al.* (2013) argue that raised capital ratios following the GFC have reduced the risk of banks being wiped out by trading losses and on balance have improved the stability of the financial system. Klomp and de Haan (2012) find that regulation tends to have a significant effect only on high risk banks with most measures having no significant impact on low risk banks using beta as a measure of riskiness.

Despite the benefits of regulation, it is important to find an optimal level since excessive regulation can obstruct the efficient operation of banks by increasing costs and restricting useful bank activities. In this respect, Jalilian *et al.* (2007) point out that banks may try to counteract the pressure of a tough regulatory framework by engaging in riskier operations and investments and finding ways to circumvent regulation which can negatively impact upon bank profitability and bank stability. A study by Barth *et al.* (2004) evaluates the impact of a specific regulatory and supervisory strategy on bank development, profitability and stability using survey data for an international sample of 107 countries. Their results indicate that restrictions on bank activities can be damaging for bank profitability and increase the probability of a banking crisis. Similarly, Dermirgüç-Kunt *et al.* (2004) examine the impact of bank regulations, market structure and institutions on net interest margin (NIM) and the cost of financial intermediation using an international dataset based on over 1,400 banks from 72 countries. Their results indicate that tighter regulation of banking activity generates an increase in the cost of financial intermediation, which can adversely affect net interest margin and bank

soundness. Barth *et al.* (2012) evaluate the evolution and impact of bank regulations on a dataset of 125 countries. Based on an extended analysis of the pros and cons of a wide range of regulations, they argue that the existing evidence does not suggest that a tougher regulatory framework will improve bank stability or enhance the efficiency of intermediation or reduce the level of corruption. By contrast, Fernandez and Gonzalez (2005) show that in countries with low accounting and auditing requirements, more control by supervisory authorities can decrease the predisposition to risk taking on the part of bank managers and that increased restrictions on bank activities can decrease the probability of a banking crisis; implying a decrease in profitability but an increase in bank stability. Similarly, Agoraki *et al.* (2011) who focus on a sample of 546 European banks suggests that increased regulation, through higher capital requirements and activity restrictions in combination with a higher level of market power reduces both credit risk and the risk of default. In sum, the impact of regulations on the banking sector's profitability and stability is essentially an empirical matter.

2.4 The Impact of Transparency

In the literature there are various concepts regarding transparency, particularly concerning the impact of transparency in relation to the moment in time when it is promoted. As explained by Nier (2005), transparency can be beneficial *ex ante* by enhancing market discipline. By contrast, *ex post* disclosure can have a negative impact on bank profitability and bank stability by highlighting when a financial institution is already in difficulty. This latter situation was observed during the GFC when banks were forced to become more transparent. In addition, Lang and Lundholm (1993) show that increased disclosure by firms by reducing information asymmetry can also help reduce stock price volatility and lower a firms' cost of capital. Tadesse (2006) argues that greater bank disclosure has benefits for the stability of the financial system and improves market efficiency by facilitating price discovery. Furthermore, greater transparency can help uncover concealed costs and provide protection for investors by enabling a better understanding of the risks in the banking sector.

Transparency is important both for Central Banks with regard to communicating monetary policy (see Winkler, 2000), and the banking sector as a whole. Greater transparency can improve public confidence in the financial sector and the decision making of investors and enables regulators to make better regulations. In the financial system, transparency plays an important role, in terms of increasing the effectiveness of monetary and fiscal policies,

increasing the predictability of Central Bank actions and promoting the independence of the Central Bank. Greater transparency can also play a role in linking executive pay to performance in the banking sector and is a sign of good corporate governance. Transparency can also affect the interest rates charged by banks. Diamond and Verrecchia (1991) develop a theoretical model, which demonstrates that diminishing asymmetric information by revealing information to the public lessens a firm's cost of capital. They also show that a higher level of transparency by helping to overcome information asymmetry can also improve liquidity in a bank's shares and thereby reduce its cost of capital.

Mehrez and Kaufmann (2000) argue that a lack of transparency increases the probability of a banking crisis particularly following a period of financial liberalization. In their model, banks are unable to distinguish between aggregate shocks (including the effects government policy) and firms' quality. In such circumstances, banks may overestimate firms' returns and increase credit above the optimal level. Once banks discover their large exposure, they are likely to roll over loans rather than declare their losses. While this may delay a crisis, it eventually makes the crisis worse than it would have been. Hence, in a country where government policy is not transparent, banks tend to increase credit above the optimal level implying a fall in profitability and a greater risk of financial distress. Other papers, such as Baumann and Nier (2004), Nier and Baumann (2006), Akhigbe *et al.* (2013), and Barakat and Hussainey (2013) estimate the impact of transparency on the banking sector by constructing a bank disclosure index. They find that, increased transparency can translate into better financial performance, lower the risk of a severe banking crisis, enhance overall bank stability and better link senior executive remuneration to bank performance.

While transparency generally has a positive impact on banking activity; too much transparency can have negative effects. Bushee and Noe (2000) argue that increased disclosure can affect the level of institutional holding of a firm's shares but at the same time increase the percentage of "transient" institutional holders of the firm's shares which can actually increase the price volatility of a bank's shares. Cordella and Yeyatti (1998) and Furman and Stiglitz (1998) argue that the disclosure of financial information can also have negative implications at times when a financial institution is already in distress by increasing the risk of bank runs. Excessive transparency can also lead to confusion if the level of financial education is poor due to the risk that the general public does not understand or cannot process very detailed

information provided by financial institutions. One of the main benefits of greater transparency is that it helps limit the scope for corruption and financial fraud in banking. The complexities of modern financial institutions, the greed and naivety of some bank clients and the lack of financial education among ordinary people can facilitate financial fraud and corruption. Lack of transparency and poor financial education can also enable providers of financial services to exploit their customers. In addition, Kolstad and Wiig (2009) argue that a lack of transparency makes corruption less risky and implicitly more attractive, leading to certain employees in the financial sector to exploit their positions at the expense of established social norms and trust. In sum, the precise impact of greater transparency on banking profitability and stability is also an empirical issue.

3. The Data Set

For our analysis of the banking sector in the 19 Eurozone countries, we have used consolidated banking data from Bankscope. After excluding financial institutions and/or periods with missing or zero values and restricting our data to financial institutions that belong in the Eurozone countries. We were left with 448 financial institutions for a period from 2000-2018. Finally, a further data clearing process took place to restrict our analysis to a balanced sample, so as to be able to compare various models effectively without changing the total number of observations. This resulted in reducing the number of Banks in our analysis to 326 and changing the time span to 2005-2018. The data was collected on an annual basis and provided us with a balanced panel of 4,564 observations.[3] The time period was selected to ensure coverage of the most recent banking data and to enable us to estimate the possible effects of the recent financial crises on bank profitability and bank stability. In many of the 19 countries, the banking sector plays a very important role, being the main component of their financial systems (see for example Beck *et al.*, 2005).[4]

[3] Tables with countries and the respective Banks that have been used in our empirical analysis are not reported here for economy of space. Also, analytical tables and results regarding means, standard deviations, max and min values as well as missing observations per country/per year are not provided here due to economy of space. Such data are available from authors upon request.

[4] The issue of whether bank-based systems perform differently than market-based systems with respect to our explanatory variables is not explicitly addressed in our current research but is potentially an interesting avenue for future research.

3.1. Bank Profitability Indices

In many academic studies (for example, Bourke, 1989; Molyneux and Thornton, 1992; Staikouras and Wood, 2004; Park and Weber, 2006; Pasiouras and Kosmidou, 2007; Athanasoglou *et al.*, 2008; Albertazzi and Gambacorta, 2009; Millon Cornett *et al.*, 2010; Dietrich and Wanzenried, 2011; Kanas *et al.*, 2012; among others) the concept of performance is related to the notion of profitability. Profitability can be represented by three indicators; namely Return on Average Assets (*ROAA*), Return on Average Equity (*ROAE*) and Net Interest Margin (*NIM*). *ROAA* indicates the returns generated by bank's assets and is calculated as a ratio of net income to average total assets. *ROAE* shows the return on shareholder's equity and is calculated as net income to average total equity. *NIM* is defined as the difference between the interest income generated by banks or other financial institutions and the amount of interest paid out to their lenders relative to the amount of their interest earning assets. We use all three measures of financial performance in our study to check for the robustness of our results. The first two variables are extensively used in the literature as profitability ratios, representing a financial institution's ability to generate earnings from its investments (see for example, Nier, 2005; Demirgüç-Kunt *et al.*, 2004; Pasiouras, 2008; and Naceur and Omran, 2011). In addition, we include in our analysis the *NIM* as used in the studies by Demirgüç-Kunt *et al.* (2004) and Chortareas *et al.* (2012a).

3.2 Bank Stability Indices

The issue of bank stability relates to bank's capability to endure adverse events, such as banking crises, major policy changes, financial sector liberalization and natural disasters. In the literature, the most commonly used variable to assess the soundness of a financial institution or of a banking system, is the *Z*-score. The *Z*-score is inversely related to the probability of a bank's insolvency (see Boyd and Runkle, 1993). More specifically, the *Z*-score exposes the number of standard deviations that a bank's return has to drop below its expected value, to deplete equity and make the bank insolvent (see Boyd and Runkle, 1993; Lepetit *et al.,* 2008; Lepetit and Strobel, 2015; Laeven and Levine, 2009; Chortareas *et al.*, 2012b; Sufian and

Habibullah, 2012; Bertay *et al.*, 2013; Bourkhis and Nabi, 2013; Pasiouras and Gaganis, 2013; Tabak *et al.*, 2013; Anolli *et al.*, 2014; and Fu *et al.,* 2014). This is given by:

$$Z - score_{it} = \frac{ROAA_{it} + K_{it}}{\sigma(ROAA)_{it}} \quad (1)$$

where $ROAA_{it}$ is the return on average assets; K_{it} is the share of equity capital to total assets (EQAS) and $\sigma(ROAA)_{it}$ is the volatility (standard deviation) of the mean return on average assets, for bank *i* and time *t* (calculated by a moving window of 10 previous years in each case).

A rise of the *Z*-score corresponds to a reduced risk of insolvency. The value of the *Z*-score increases with a higher profitability and a higher equity to total assets and decreases with increased income volatility. Theoretically, the *Z*-score permits a time-varying measure of bank stability that does not experience endogeneity issues. However, since $ROAA$ and the standard deviation $\sigma\ (ROAA)$ are mined from different distributions, this could generate an inconsistency issue. Laeven and Levine (2009) and Houston *et al.* (2011) advocate the use of the natural log of the *Z*-score ln(Z) over the traditional *Z*-score on the basis that the latter's distribution is heavily skewed, whereas the former's is not. In fact, Lepetit and Strobel (2015) show that the traditional *Z*-score provides a less effective upper bound of the probability of insolvency suggesting that the ln(Z) score is an improvement of this traditional measure without imposing any further distributional assumptions. As such we use the ln(*Z)* score as our preferred insolvency risk measure.

Additionally, for reasons of robustness we use an alternative measure of the Z-score (Z-alt) that does not include the EQAS in the numerator of the Z-score calculation. Therefore, our alternative Z-score measure is given by:

$$Z - alt_{it} = \frac{ROAA_{it}}{\sigma(ROAA)_{it}} \quad (2)$$

where everything in equation (2) is defined as above. Also, for the same reasons discussed above, we use the natural logarithm of the Z-alt – ln(Z-alt) – in our estimations in order to smooth out high values of scores since they can be highly skewed.[5]

[5] Apart from the traditional Z-score and Z-alt defined by equations (1) and (2), we have also tested a third Z-score measure which was defined as EQAS/σ(ROAA). This third measure did not provide significant differences to the results obtained from the two previously mentioned measures and therefore tables and results are omitted here for economy of space.

For our third measure of bank stability we use a modified version of the financial system soundness index ($FSSI_{ijt}$) developed by Das *et al.* (2004). This index measures the degree of soundness of a specific system as well as providing an *ex ante* measure of soundness. The *FSSI* index is composed of two main variables, the capital adequacy ratio plus the inverse of the ratio of nonperforming loans to total loans both of which are weighted to reflect the country's degree of financial intermediation. The index takes the following form:

$$FSSI_{ijt} = \frac{TL_{jt}}{GDP_{jt}}\left[\frac{1}{2}(CAR_{it} + 1/NPL_{it})\right] \quad (3)$$

where TL_{jt} is the total loans granted by financial institutions in country *j* at time *t*; GDP_{jt} is the gross domestic product for a specific country *j* at time *t*; CAR_{it} is the capital adequacy ratio for a financial institution *i* at time *t*; and NPL_{it} is the ratio of nonperforming loans of a financial institution *i* at time *t*. A higher *FSSI* indicates greater bank soundness and therefore greater bank stability.

3.3. The Economic Freedom Index

To examine the role of economic freedom (EF) we have used the Heritage Index (HER_IND_{it}) which is commonly used in the literature and is composed of twelve dimensions grouped into four pillars of economic freedom: (i) Rule of Law (RL) (property rights, judicial effectiveness and government effectiveness); (ii) Government Size (GS) (Tax burden, government spending and fiscal health); (iii) Regulatory Efficiency (RE) (business freedom, labour freedom and monetary freedom); and (iv) Open Markets (OM) (trade freedom, investment freedom, financial freedom). These 10 factors are equally weighted to create a composite index taking values from zero to 100 with a higher value indicating a greater degree of economic freedom. The heritage index has been used in recent studies by Chortareas *et al.*, (2013), Bjornskov (2016) and Lin *et al.* (2016). Apart from the overall weighted average (HER_IND_{it}), we also use as robustness tests in our analysis all four components mentioned above that constitute the index (named as HER_RL_{it}, HER_GS_{it}, HER_RE_{it} and HER_OM_{it} respectively). In addition, as a final robustness check we use the alternative index of economic freedom provided by the Fraser Foundation ($FRAS\_IND_{it}$).[6]

[6] The overall Heritage index is scaled 0 to 100 while the Fraser index is scaled 0 to 10 so we multiplied the Fraser index by 10 to rescale it in line with the Heritage index. The robustness tests are reported in section 5.4.

3.4 Corruption Indices

To measure corruption we use two variables, the corruption level of bank officials ($CORR1_{jt}$) and a general value of corruption ($CORR2_{jt}$). The corruption of bank officials can be measured either by the Corruption Perception Index developed by Transparency International (see for example, Barth *et al.*, 2009; Lalountas *et al.*, 2011; and Weill, 2011a and 2011b) or by the indices developed by World Business Environment Survey (WBES). In our paper we choose the two indices developed by WBES due to the need to cover our entire sample. The first WBES index $CORR1_{jt}$ measures the corruption of bank officials as an obstacle for the operation and growth of business and is used in Beck *et al.* (2006); Barth *et al.* (2009); Houston *et al.* (2011); Weill (2011a); Zheng *et al.* (2013). While the second WBES index $CORR2_{jt}$ is a more generalised index of corruption for the country as a whole. These indices take values from 1 to 4, where a higher level of the indices indicates a higher level of corruption. Although, we would expect a negative impact of corruption on bank performance and soundness, the literature highlights some contradictory results. For example, Naceur and Omran (2011) find that lower corruption increases bank profitability measured by NIM in Middle East and North Africa (MENA) countries, while Chortareas *et al*. (2012b) obtain a negative impact of corruption on cost effectiveness and banking efficiency implying lower bank profitability.

3.5. Bank Regulation and Bank Supervision Indices

As proxy measures for bank regulatory and supervisory policies for our group of countries we used the database from the Bank Regulation and Supervision Survey, carried out by Barth *et al*. (2013) and Anginer *et al.* (2019) on behalf of the World Bank. This database provides a unique source of data describing how banks are regulated and supervised for 180 countries around the world. Four unique surveys were carried out in 1999, 2003, 2007 2012 and the dataset was further updated by Anginer *et al.* (2019). While the dataset has some discontinuities, it is the only data that allows us to obtain a series that approximates the recent developments in the bank regulation and supervision instruments for the period of time we use in this study.

In the time series framework, there are many cases of similar values, particularly when there is no change in the values from the survey from the different years when the survey was carried out. However, this is the best available data set that allows us to apply bank regulation

and supervision proxies in a large panel data set. To be able to use the data set, we have to modify the answers provided into scales points. The variables used in our analysis are defined as follows:

Overall Restrictions on Banking Activities (REG_REST_{jt}). This variable values range from 3-12; and it is the summation of *Securities Activities* (defined as the extent to which banks may engage in underwriting, brokering and dealing in securities, and all aspects of the mutual fund industry; scale 1-4), *Insurance Activities* (defined as the extent to which banks may engage in insurance underwriting and selling) and *Real Estate Activities* (defined as the extent to which banks may engage in real estate investment, development and management; scale 1-4). The higher the value of the REG_REST_{jt} variable, the greater the restrictions on banking activities for each country.

Capital Regulatory Index (REG_CAP_{jt}). The values are obtained as the summation of the following two indices, *Overall Capital Stringency* (whether the capital requirements reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined; scale 0-7) plus *Initial Capital Stringency* (whether certain funds may be used to initially capitalize a bank and whether they are officially; scale 0-3). Thus, this variable takes values from 1-10. As with the previous index, the higher the value of this index, the greater the capital stringency regulations in each country.

Official Supervisory Power (REG_SUP_{jt}). This variable takes values from 0-14 and shows whether the supervisory authorities have the authority to take specific actions to prevent and correct problems. The higher the value the greater the degree of banking supervision. For more details on these variables, see Barth *et al*. (2013).

3.6 The Transparency Index

To measure transparency, we have computed a composite disclosure index ($DISCL_{it}$) using the methodology developed by Nier (2005). This index was calculated for each financial institution *i* for every period *t* after extracting the necessary information from Bankscope. The composite disclosure index measures the level of detail which banks provide on 17 dimensions of accounting information in their published accounts relating to both the asset and liability sides of a bank's balance sheet, memorandum items, income statement and sources of funding. The disclosure index is normalized to take a value of between 0 and 1, with a higher value representing a higher level of disclosure. A description of the construction of this index is

provided in Table A1 in the Appendix. We should note that our disclosure index exhibits generally much lower standard deviation than for our other explanatory variables and hence our results with regard to transparency should be treated with a higher degree of caution.

3.7 Macroeconomic Indicators

In addition to our banking sector data, we also use three macroeconomic control variables as proxies of the macroeconomic environment in each country. These are GDP per capita growth ($GDPGR_{jt}$), the inflation rate (INF_{jt}) and the unemployment rate ($UNEMP_{jt}$). The growth rate of GDP per capita is expected to have a positive impact on bank's performance. This is in accordance to the well-documented literature on the association between economic growth and financial sector performance. Also, previous studies such as, Demirgüç-Kunt and Huizinga (1999), Athanasoglou *et al*. (2008) and Waemustafa and Sukri (2015) have reported a positive association between inflation and bank profitability. In general, high inflation rates are associated with high loan interest rates, and can lead to higher bank profits. However, if inflation is not anticipated and banks are sluggish in adjusting their interest rates, there is a possibility that bank costs may increase faster than bank revenues and hence adversely affect bank profitability. Finally, unemployment is expected to have a detrimental effect on banking performance due to the associated lower economic activity.

Table 1 provides definitions and sources of all aforementioned variables used in our econometric analysis. Table 2 reports summary statistics of the key variables used in our analysis for all the countries in the sample.[7] Within our sample, the profitability indicators suggest that, on average, the profitability of the analyzed financial institutions is characterized by positive returns, although these returns have considerably decreased in the aftermath of the GFC. The indicators of stability are represented by ln(Z) score, the ln(Z-alt) score and *FSSI*, which all register increased positive values in light of the measures taken by policy makers since the financial crisis. The Economic Freedom indicator has a wide range from 53.2 in the case of Greece in 2016, to 82.6 in the case of Ireland in 2007. The first two regulation variables are positioned at a mid-level of the high low values suggesting medium levels in terms of restrictions and stringency, while the third regulation variable (bank supervisory power) tends

[7] We do not present summary statistics per country/per year/per bank due to economy of space, as this would have required a very large number of tables and results. Tables and results are available upon request.

more towards the maximum value suggesting a higher supervisory power taking place in the sample analyzed. The average level of corruption in the banking sector at 1.617 seems to be similar to that in the economy as a whole at 1.557. Finally, the disclosure variable is quite high giving a mean value of 0.844 on a scale of 0 to 1. Table 3 reports pairwise correlation coefficients for all our variables. We can see that the correlation amongst our variables is in general reasonably low, suggesting no major issues of multicollinearity problems in our estimations.

[Tables 1, 2 and 3 approximately here]

4. Econometric Methodology

In this section we discuss the econometric approach developed to evaluate the impact of corruption, economic freedom, regulation and transparency on bank profitability and bank stability in the Eurozone area. The empirical work on the determinants of bank profitability and bank stability can theoretically suffer from three sources of inconsistency: omitted variable biases, an endogeneity bias and highly persistent revenues (see Poghosyan and Hesse, 2009; and Naceur and Omran, 2011). The problem of endogeneity particularly arises from the fact that the direction of causality is not necessarily one way. For example, more profitable/stable banks may be able to invest more in reducing corruption and ensuring better compliance with regulations which in turn leads to better profitability and stability.

To deal with these problems, we adopt a dynamic panel approach that allows us to correct these biases. After applying a series of tests for cross-sectional dependence, serial correlation, stationarity and heteroscedasticity, we identified some potential problems with the heteroscedasticity test (the modified Wald test) mainly caused by measurement errors. Two basic estimated models are defined, one to test for the effects on bank profitability and the second to test for the effects on bank stability. The first model is set out as follows:

$$Prof_{i,t} = \alpha_i + \beta_1 Prof_{i,t-1} + \beta_2 EF_{i,t} + \beta_{3m} REG_{i,m,t} + \beta_{4n} CORR_{i,n,t} + \beta_5 DISCL_{i,t} + \beta_6 D\_CRISIS_t + \beta_7 GDPGR_{j,t} + \beta_8 INF_{j,t} + \beta_9 UNEMP_{j,t} + \varepsilon_{it} \quad (4)$$

where $Prof_{i,t}$ is the profitability of the bank *i,* during period *t*; and is measured in our study by three alternative measures (*ROAA, ROAE* and *NIM*). $EF_{i,t}$ stands for Economic Freedom, based

on the Heritage index. $REG_{i,m,t}$ stands for bank regulation indices, where we use three different indicators (m=*REG_REST, REG_CAP* and *REG_SUP*). $CORR_{i,n,t}$ stands for corruption and is measured by two alternative indexes (n); corruption of bank officials (*CORR1*) and general corruption (*CORR2*). $DISCL_{i,t}$ represents bank transparency for bank i during period t, being represented by the disclosure index. Additionally, we include in our model a dummy variable that captures the effects of the recent sub-prime financial crisis (*D_CRISIS*). This variable takes the value of 1 for the years 2007-2010; and zero otherwise.[8] Finally, a set of three macroeconomic indicators are also used for every country j=19 in the sample. The first model in a more analytical form is described as follows:

$$ROAA_{i,t} = \beta_{0i} + \beta_1 ROAA_{i,t-1} + \beta_2 EF_{i,t} + \beta_{31} REG\_REST_{i,t} + \beta_{32} REG\_CAP_{i,t} + \beta_{33} REG\_SUP_{i,t} + \beta_{41} CORR1_{i,t} + \beta_{42} CORR2_{i,t} + \beta_5 DISCL_{i,t} + \beta_6 D\_CRISIS_t + \beta_7 GDPGR_{j,t} + \beta_8 INF_{j,t} + \beta_9 UNEMP_{j,t} + \varepsilon_{i1t} \quad (4a)$$

$$ROAE_{i,t} = \beta'_{0i} + \beta'_1 ROAE_{i,t-1} + \beta'_2 EF_{i,t} + \beta'_{31} REG\_REST_{i,t} + \beta'_{32} REG\_CAP_{i,t} \beta'_{33} REG\_SUP_{i,t} + \beta'_{41} CORR1_{i,t} + \beta'_{42} CORR2_{i,t} + \beta'_5 DISCL_{i,t} + \beta'_6 D\_CRISIS_t \beta_7 + \beta'_7 GDPGR_{j,t} + \beta'_8 INF_{j,t} + \beta'_9 UNEMP_{j,t} + \varepsilon_{i2t} \quad (4b)$$

$$NIM_{i,t} = \beta''_{0i} + \beta''_1 NIM_{i,t-1} + \beta''_2 EF_{i,t} + \beta''_{31} REG\_REST_{i,t} + \beta''_{32} REG\_CAP_{i,t} \beta''_{33} REG\_SUP_{i,t} + \beta''_{41} CORR1_{i,t} + \beta''_{42} CORR2_{i,t} + \beta''_5 DISCL_{i,t} + \beta''_6 D\_CRISIS_t + \beta''_7 GDPGR_{j,t} + \beta''_8 INF_{j,t} + \beta''_9 UNEMP_{j,t} + \varepsilon_{i3t} \quad (4c)$$

The second model that examines the effects on bank stability is given by:

[8] In our empirical analysis we have used three alternative dummy crises definitions. The first one was for the sub-prime financial crisis (2007-2010), which is the one reported in the paper. The second one was the sovereign debt crisis dummy that hit mainly the GIIPS (2010-2013). The third one was a composite dummy that took the value of 1 for the combined crises period (2007-2013). The results in our analysis were not affected much in terms of magnitude and significance of the main analysis; while the first dummy was the one that showed the highest significance from the rest. This might be reflect the fact that the sub-prime crisis affected more all Eurozone countries while the sovereign debt crisis had a more substantial effect on GIIPS. Tables and results are not reported here for economy of space and are available from authors upon request.

$$Stab_{i,t} = \gamma_{0i} + \gamma_1 Stab_{i,t-1} + \gamma_2 EF_{i,t} + \gamma_{3m} REG_{i,m,t} + \gamma_{4n} CORR_{i,n,t} +$$
$$\gamma_5 DISCL_{i,t} + \gamma_6 D\_CRISIS_t + \gamma_7 GDPGR_{j,t} + \gamma_8 INF_{j,t} + \gamma_9 UNEMP_{j,t} + \omega_{it} \quad (5)$$

where $Stab_{i,t}$ is the stability of the bank *i* during the period *t*, and is measured in our analysis by the natural log of the Z-score ln(Z); the natural log of the alternative Z-score ln(Z-alt) and the financial system soundness index (FSSI). The rest of the variables are defined exactly as above. Thus, the second model for regression purposes is as follows:

$$lnZ_{i,t} = \gamma_{0i} + \gamma_1 lnZ_{i,t-1} + \gamma_2 EF_{i,t} + \gamma_{31} REG\_REST_{i,t} + \gamma_{32} REG\_CAP_{i,t} +$$
$$\gamma_{33} REG\_SUP_{i,t} + \gamma_{41} CORR1_{i,t} + \gamma_{42} CORR2_{i,t} + \gamma_5 DISCL_{i,t} +$$
$$\gamma_6 D\_CRISIS_t + \gamma_7 GDPGR_{j,t} + \gamma_8 INF_{j,t} + \gamma_9 UNEMP_{j,t} + \omega_{i1t} \quad (5a)$$

$$ln(Z-alt)_{i,t} = \gamma_{0i} + \gamma_1 lnZ_{i,t-1} + \gamma_2 EF_{i,t} + \gamma_{31} REG\_REST_{i,t} + \gamma_{32} REG\_CAP_{i,t} +$$
$$\gamma_{33} REG\_SUP_{i,t} + \gamma_{41} CORR1_{i,t} + \gamma_{42} CORR2_{i,t} + \gamma_5 DISCL_{i,t} +$$
$$\gamma_6 D\_CRISIS_t + \gamma_7 GDPGR_{j,t} + \gamma_8 INF_{j,t} + \gamma_9 UNEMP_{j,t} + \omega_{i1t} \quad (5b)$$

$$FSSI_{i,t} = \alpha_i + \gamma'_1 FSSI_{i,j,t-1} + \gamma'_2 EF_{i,t} + \gamma'_{31} REG\_REST_{i,t} + \gamma'_{32} REG\_CAP_{i,t} +$$
$$\gamma'_{33} REG\_SUP_{i,t} + \gamma'_{41} CORR1_{i,t} + \gamma'_{42} CORR2_{i,t} + \gamma'_5 DISCL_{i,t} +$$
$$\gamma'_6 D\_CRISIS_t + \gamma'_7 GDPGR_{j,t} + \gamma'_8 INF_{j,t} + \gamma'_9 UNEMP_{j,t} + \omega_{i2t} \quad (5c)$$

Since in our panel data framework we have a large T (T=14) we are able to use the two-step Generalised Method of Moments (GMM) estimator as introduced by Arellano and Bond (1991) and Arellano-Bover/Blundell-Bond (Blundell and Bond, 1995[9]), which mainly using instrumental variables resolves the endogeneity biases in our estimations. Using the Arellano and Bond (1991) estimator the unobserved fixed effects are removed by taking first differences, the right-hand side variables are instrumented using lagged values of the regressors, and the equation in first differences and in levels are jointly estimated. Since the estimated standard errors of the two step GMM estimator tend to be severely downward biased, we correct the bias using the Windmeijer (2005) finite sample correction procedure.

[9] Building upon the work of Arellano and Bover (1995).

In our empirical analysis as a first step we estimate the full models as described in the equations provided above. However, in order to explore further the effects depending on the size of the banks included in our data set, we repeat the estimation of models (4a), (4b), (4c), (5a), (5b) and (5c) with the use of dummy variables that reflect small, medium and large banks respectively. We use the dummies in a multiplicative manner with each of the dependent variables to identify the effect of size in the estimated relationships. We characterize large banks as the top 1/3 of the banks in our sample with the largest total assets, medium size banks as the next 1/3 by total assets and small banks as the 1/3 with the smallest total assets.

To select instrumental variables for the profitability and stability indicator variables, we follow the literature (see Baum *et al.*, 2003) and choose as instruments variables that are exogenous (uncorrelated with the error term of the regression) and relevant to (i.e. strongly influencing) the endogenous regressors in our model. Thus, we chose to regress in each case the remaining lagged indicators apart from the one used in the main regression as a dynamic term. The number of lagged terms was selected by the use of the Schwartz-Bayesian information criterion. The set of instruments used in every model is clearly defined in the notes of every table that reports regression results. Finally, the validity of the instruments is tested using the Hansen J-test statistic of over-identifying restrictions. The models are correctly identified as they satisfy the second order no-autocorrelation criterion AR(2)[10] and the Hansen J-tests.

5. Empirical Results

5.1. Overall Analysis Results

We start our empirical analysis by estimating the full models as described by equations and 4(a), 4(b), 4(c) and 5(a), 5(b), 5(c). Table 4, reports full results of those models.[11]

[10] For each regression model we test for AR(1) and AR(2) orders of the first-differenced residuals. Results are not reported here for economy of space but are available from authors upon request.

[11] Prior to embarking with the GMM results reported in this section, we have estimated regression equations 4(a), 4(b), 4(c), 5(a), 5(b) and 5(c) with the panel Fixed Effects method of estimation. These results are reported in Table A2 in the Appendix. From these static models we can see that the results are quite similar to those obtained in the dynamic models. However, since we want to estimate dynamic models with lagged

[Table 4 approximately here]

When it comes to corruption of either bank officials or the general level of corruption, we can detect a clear negative and significant effect on profitability using both corruption measures and all three profitability measures. We also find that corruption has a significant negative effect on banking stability using the ln(Z) and the ln(Z-alt) score measure for both types of corruption, but although correctly signed it is not significant for the soundness of the financial system (FSSI) proxy measure. These findings confirm earlier studies of La Porta *et al.* (2002) and Park (2012).

For ROAA, ROAE and NIM we observe that Economic Freedom (measured by the overall Heritage Index) has a positive and significant effect on bank profitability regardless of which of the profitability measures is employed. This finding is in agreement with Claessens and Laeven (2004), Gropper *et al.* (2015) and Blau (2017). We also find that economic freedom increases banking stability using either the ln(Z), the ln(Z-alt) or the FSSI measures. This result is important in that it shows that greater economic freedom seems to improve bank profits and also banking stability suggesting that a potential theoretical trade-off does not apply to the Eurozone area.

When it comes the ROAE measure of bank profitability and the impact of banking regulation we generally find evidence of a positive relationship with profitability especially when using the REG_RESTR and REG_CAP measures. We also find that there is a positive relationship between REG_SUP and the NIM measure of profitability. These results are somewhat surprising in suggesting that greater banking regulation in the Eurozone area has improved the profitability of banks, however, they are similar to those obtained by Chortareas *et al*. (2012b). When it comes to stability the picture is somewhat mixed. This is because REG_RESTR improves bank stability as measured by the FSSI measure, while REG_CAP improves stability and REG_SUP worsens it as measured by the two Z-score measures. Hence,

dependent variables, and since our T=14 is much smaller than N=326, the GMM method of estimation is deemed as most appropriate and this is why we focus on the GMM results in our analysis.

our results show that the impact of regulation on bank stability depends in part on the type of regulation one is referring to and also on the measure of stability used.

We do not find any evidence that increased banking transparency has an effect on banking profitability, but we do find some evidence that greater banking transparency worsens banking stability using both the ln(Z), ln(Z-alt) and FSSI measures. The lowering of the banking stability might be because our dataset covers the period of the GFC and the instability in the Eurozone of 2011-13 when increased reporting of the vulnerability of French and German banks to the GIIPS economies came to the fore. To some extent this then impacted on bank share prices lowering the equity to asset ratios and therefore their measured stability.

When it comes to the control variables, the results are pretty much in line with our *a priori* expectations. We find that not surprisingly the financial crisis dummy has a negative effect on profitability. GDP growth has a positive effect on both profits and on banking stability. Inflation is bad for profitability using both ROAE and NIM and undermines banking stability for all three measures. We also find evidence that increased unemployment is bad for both banking profitability and stability.

5.2 The Role of Size

Our overall results strongly suggest that corruption, economic freedom, bank regulation and transparency may play an important role in affecting the banking sector's profitability and stability. However, it not clear that this relationship is necessarily the same for large, medium and small size banks. To explore this issue further in Table 5 we report the results after dividing the banks in our sample into large, medium and small based on their asset size and using a dummy variable for large, medium and small bank size where appropriate.

[Table 5 approximately here]

When it comes to economic freedom, we detect a positive effect for large banks using the ROAA measure of profitability but a significant negative effect for small banks. Similarly, using the ROAE measure we find a significant positive effect for medium size banks and negative for small banks (although only at the 10% significance level). Finally, using the NIM measure there is a significant positive effect for both medium size and small banks. When it

comes to the stability measures, we detect positive impacts from economic freedom for medium, and small banks using the ln(Z) and the ln(Z-alt) measures but not for large banks. However, using the FSSI measure we find a positive impact on stability for large and medium size banks but not small banks. The results show that while economic freedom is generally good for profitability and bank stability the results can differ between different sizes of banks and depend in part on the measures used for profitability and bank stability.

In the case of corruption, we find that it has a significant negative impact on profitability only in the cases of medium and small banks but were unable to detect any significant effects in the case of larger banks. Similarly, we find that the impact of corruption especially of bank officials (CORR1) on bank stability is negative in the case of medium and small banks using the ln(Z) and the ln(Z-alt) measures but we were unable to find any significant negative effects in the case of large banks. This suggests that corruption is not such an important issue for large banks, but it seems to adversely impact medium to small size banks. It could be the case that large banks have better systems and internal controls in place to prevent or limit corruption and its impact. Using the general level of corruption measure (CORR2) we found less significant negative effects on profitability and none on stability at the 5% significance level.

The surprising impact we find from regulation to bank profitability appears to involve only medium size banks in the case of the REG_RESTR variable when looking at ROAA and ROAE and large banks in the case of the REG_CAP variable in terms of ROAE. There is no significant effect in the case of small banks when it comes to profitability. In terms of bank stability, we detect a positive impact from REG_RESTR in the case of medium size banks using FSSI and for medium size banks using REG_CAP. However, when using the REG_SUP measure we find no impact on profitability measures and a negative impact on stability for medium size banks using the ln(Z) and ln(Z-alt) measures. The overall impact of bank regulation is therefore somewhat mixed and depends upon the type of regulation one is talking about and also the size of the bank, with medium size banks seemingly more sensitive than large or small banks to regulatory effects.

With respect to disclosure and bank size we do not detect any significant effects on profitability, but we do detect a significant negative effect on banks stability for large and small banks using the two Z-score measures and for medium size banks using the FSSI measure.

Thus, empirically the evidence suggests that greater disclosure is not necessarily a good idea for enhancing bank stability. There may be good reason why increased disclosure appears to have had a negative effect on bank stability in this period since it covers the GFC period of 2007-10 and the following Eurozone GIIPS crisis of 2010-13. During this period greater transparency may have actually increased the pressure on banks and undermined their stability as investors saw increased chance of bankruptcy and financial distress in the sector.

When it comes to the control variables the results are in line with those reported in Table 4. The financial crisis dummy has a negative effect on profitability and GDP growth has a positive effect on both profits and on banking stability using all three measures. Inflation is bad for profitability using NIM and undermines banking stability for all three measures. We also find evidence that unemployment is bad for all three measures of banking stability.

While our reported empirical results suggest a relationship between the variables of interest and the profitability and stability of the banking sector it would be interesting to know whether these factors affect the behaviour and structure of individual banks and/or the overall composition of banks in an economy. It should be noted that in reality commercial banks are heterogeneous, with differing sizes, each have their individual structures, number and range of products which they offer. As such, regulation may have very little impact on some banks but a much more significant impact on other banks leading some banks to reduce the range of products they offer, affecting their profitability and risks characteristics very differently. This can also apply to banks in different countries in the sample, so that the raising of capital requirements and increased banking supervision post the GFC may have affected the profitability and stability of banks in different members of the 19 Eurozone countries in quite varied ways. Similarly, greater economic freedom and competition with accompanying new entrants might lead existing banks to decrease the range of products they offer so they can concentrate on product areas where they have a competitive advantage. This type of attrition effect has been covered in the context of international trade by Melitz (2003) and Marc, Melitz and Ottoviano (2014) who show how competition across markets and destinations affect both a firm's export product range and product mix and that greater openness to trade leads firms to reduce their export range to their best performing products.

5.3 The Importance of Governance

In the banking literature until recently there has been relatively few empirical studies on the issue of Governance and its potential impact on banking stability and profitability. Governance may well be important because changes in regulatory standards may not mean very much if they are not enforced. Some countries within the Eurozone have better records with regard to governance and the related concept of enforcement than others. John *et al.* (2016) provide an excellent survey of theoretical issues concerning governance in relation to maximising bank equity value, maximising total enterprise value and maximising social objectives. They highlight the importance of high bank leverage which results in a trade-off between strengthening equity governance and maximizing enterprise value. If managers are very closely aligned with shareholders, this can create a conflict with debtholders raising the agency cost of debt and result in incentives for excessive risk-taking to the detriment of firm value. Excessive risk taking can also work against the societal objective of a stable financial system.

Empirical studies by Beltratti and Stultz (2012) find that banks with superior governance perform better. While Klomp and de Haan (2014) find for a panel of banks from 70 developed countries that the combined impact of institutional quality and host banks' governance strengthens the effects of regulation and supervision in reducing bank riskiness. In their study Fratzscher *et al.* (2016) look at how institutional and governance quality affects bank lending in 50 advanced and emerging economies post the GFC. They find higher capital buffers increase bank stability with no discernible effect on private bank lending, while greater bank supervision increases bank lending and improves bank stability with the effects being more pronounced in the less developed countries. They also observe that for some regulatory indicators, the effects on banking stability only materialize once they control for the level of governance. Bermpei *et al.* (2018) look at how institutional quality impacts on banking stability using a sample of 1050 banks from 69 emerging and developing countries for the period 2004-13 and find that the impact depends upon the type of institutional quality and type of regulation. For instance, they find that political stability strengthens the positive effects of capital restrictions on bank stability and that control of corruption can enhances the positive effect of activities restrictions on stability (as measured by lnZ). By contrast, they fail to find any evidence that the negative effect of supervisory power on bank stability is conditioned by institutional quality. Governance issues are also found to be important in relation to the impact of corruption, Toader *et al.* (2018) find evidence that in countries with higher levels of

corruption, banks can improve their stability by implementing rigorous corporate governance practices.

For our empirical work on the issue of Governance we follow Fratzcher *et al.* (2016) and Bermpei *et al.* (2018) in using the country level data on Governance based on an extensive survey set published by the World Bank in a dataset referred to as the World Governance Index (WGI). However, we differ in our treatment from these two studies in that rather than look at how some of the six variables individually affect bank performance we take a more aggregate approach. The World Bank publishes individual data on each of six categories of Governance: Voice and Accountability, Political Stability/No Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. Each country is rated for each of these six variables on a scale of -2.5 to + 2.5. There is no aggregate index of Governance for each country published, so for each year 2005-2018 we took the average score of the 6 individual categories and then rescaled the resulting index by adding 2.5 and doubling the score to generate an aggregate WGI score for each country and each year of between 0 and 10. As a further check on the role of governance, we also follow Fratzcher *et al.* (2016) who pick three of the variables; Voice and Accountability, Government Effectiveness and Rule of Law as the best indicators of Bank Governance. However, rather than apply them individually, we take the average score of these three indicators and transform them into a Bank Governance index with a scale 0 to 10 in the same manner we employed to obtain the country level aggregate WGI, to see if this proxy for Bank Governance makes a significant difference. Our results using the country level Governance index are reported in Table 6 and while the results using the proxy Bank Governance index are reported in Table 7.

[Tables 6 and 7 approximately here]

The results presented in Table 6 show that the country level Governance index (GOV_IND) is an important explanatory variable especially in regards to explaining the profitability since all three measures are significant at the 5% level. It also seems to have a significant role in enhancing bank stability as measured by the two Z-scores although not using the FSSI measure. It is also interesting to see how it has affected the estimated coefficients and significance of our four main variables of interest. The general level of corruption coefficient remains negative and highly significant for all profitability measures and the two Z-scores,

while both corruption measures each reach 10% significance for the FSSI measure as well. This suggests that in general adding country wide governance improves the significance of the corruption measures in relation to our stability measures. When it comes to REG_RESTR the ROAA reaches 10% significance and ROAE and NIM maintain their 5% significance. Additionally, REG_RESTR is now positive and significant for all stability measures improving the results reported in Table 4. With REG_CAP the results are very similar for both the profitability measures as without country governance but the significance for the ln(Z-alt) score falls from 5% to 10%. Finally, when it comes to disclosure the impact of country level governance does not seem to have a significant effect on the overall results. It still seems to have a negative influence on stability measures but no significant impact on the various profitability measures.

Interestingly, when we use the proxy for Bank Governance (BANKGOV_IND) involving only a selection of three of the six governance indicators as depicted in Table 7, we generally get an improvement in our results reported in Table 4. However, the improvement is not as significant as in the instance of using all six governance indicators reported in Table 6. For instance, the general level of corruption CORR2 falls from 5% to 10% significance for ROAA and ROAE. In addition, REG_SUP on NIM now becomes insignificant. Overall, our results seem to indicate that researchers who wish to use Bank Governance in their research should consider using all six WGI indicators rather than just a few of them.

5.4. Further Robustness Tests

As a further check on our results we conducted a series of robustness tests. As previously mentioned, we initially we estimated the models using the fixed effects method and the results were quite similar with the GMM results (see Table A2 in the appendix). However, the GMM results reported in the main part of this paper give more significant estimates and are generally in line with our expectations. Furthermore, the nature of the panel (high N, small T) as well as the fact that we wanted to test the dynamic nature of the relationships requires the GMM method of estimation. So, for the GMM results presented in Table 4 we proceeded with further robustness tests, by altering the definition of the EF proxy. We broke down the Heritage Index of EF to its four key components the Rule of Law, Government Size, Regulatory Efficiency and Open Markets and we re-estimated all regression models using these four variables. This allows us to see which of the components of the EF index is affecting bank performance and

stability and also a check to how sensitive our main results are to alternative measures. Results of these models are presented in Table A3 in the Appendix. From the obtained results, it is clear that the GMM method performs quite well, since all lagged dependent variables are positive and highly significant. Furthermore, the four different sub-indices suggest a largely positive effect coming from economic freedom to bank profitability (we get significant and positive coefficients for all three regressions and bank performance indices) and to a lesser extent to bank stability (from the four sub-indices only HER_OM and HER_RL are positive and significant for both Z-score measures and the FSSI measure. More importantly the rest of the obtained results from these robustness tests suggests that there is again a negative relationship from both CORR1 and CORR2 (although in this case, CORR2 seems to be more detrimental in terms of stability and less for profitability). The rest of the results regarding regulation and disclosure are fairly similar to the ones obtained with the general EF Heritage Index, while all macroeconomic proxies and the crisis dummy have the expected sign and in most cases are statistically significant.

Next, to further explore the robustness of our results we re-estimated again all models, this time using the Fraser Index (rescaled) rather than the Heritage Index. The results of these models are presented in Table A4. The results generally confirm the findings from using the Heritage Index so that our estimates are robust in this respect.

6. Conclusions

In our study, we have looked empirically at the impacts of economic freedom, corruption, banking regulation and transparency on both banking profitability and banking stability using alternative measures of the latter two performance metrics. The role played by the European banking sector in the economic recessions of Europe in recent years shows the importance of looking at how banks are affected by the economic and regulatory environment in which they operate and how changes in these variables can help in the process of ensuring the banking sector returns to improved profitability and greater stability.

We find that economic freedom has a generally positive effect on profitability, with regulation also having a generally positive impact, corruption a negative impact and greater

transparency a negative impact. When it comes to stability, we find that greater economic freedom promotes financial stability, corruption tends to undermine stability while greater regulation may or may not promote financial stability depending on the type of regulation. Finally, we found evidence that greater transparency appears to have a negative effect on financial stability. We also find that the precise effects of economic freedom, regulation, corruption and transparency can depend on the size of banks considered with, for example, economic freedom boosting the profitability of large banks as measured by ROAA but actually lowering it for small banks. Similarly, corruption seems to adversely affect small and medium size banks profitability but seems to have no significant effect on larger banks.

Our results on regulation at first sight stand in contrast to with those obtained by Demirgüç-Kunt and Huizinga (1999) who show that greater regulation imposes higher expenses on financial institutions and/or limits revenue raising activities. However, this may not necessarily be the case, if for example, greater regulation results in in the exit of some institutions in the industry and for the existing firms to concentrate on their best product ranges then our results could in fact be compatible with their study This is similar to the effect observed in Melitz (2003) who shows how exposure to international trade leads only to the most productive firms entering the export market while some of the less efficient domestic firms will exit the market with further increases in the industry's exposure to trade leading to additional inter-firm reallocations towards more productive firms[12]. Overall, our results should be treated with some degree of caution in that they may be time specific since they include a period when there was two major crises facing the European banks which have been followed by greater regulation and an improvement in bank profitability.

Our results for the impact of corruption are in accordance with those obtained by Aburime (2008) who shows that an increase in the corruption index implies a decrease in bank profitability for the Nigerian banking market. Likewise, Pagano (2008) finds that corruption is a significant factor in determining bank lending rates and that at relatively low levels of corruption an increase in corruption leads to a fall in lending rates which decreases bank profitability. We also find some evidence that increased transparency undermines stability which is in line with results reported by Barth *et al*. (2012). These results may be dependent on

[12] We are grateful to an anonymous referee for drawing our attention to this possibility.

the fact that the European banking sector has been afflicted by both by the GFC and the subsequent crisis in the GIIPS which also heavily impacted the French and German banking systems that had large exposures to these countries.

A key contribution of this paper has been to show that conclusions obtained using aggregate data may be sensitive to which performance metrics are used to measure both profitability and stability. For example, results can be different depending on whether profitability is measured by ROAA, ROAE or NIM. When it comes to the two measures of financial stability, results can be different depending on whether ln(Z), ln(Z-alt) or FSSI is used.

In this study, we have used aggregate data across 19 Eurozone economies, however, there is, in fact, a great deal of heterogeneity in the Eurozone banking sector with regard to the level of GDP per capita, degree of economic freedom, level of corruption, degree of regulation and amount of transparency. It would be interesting to see if the aggregate relationships hold if the data is disaggregated. For example, there may be different results if we were to divide the sample into high and low income countries, or if we classify the various banks into say commercial and investment banks or divide the banks by geographical location as done by Bandelj (2016). Another interesting issue would be to examine how the addition of financial inclusion which has been seen by Ahamed and Mallick (2019) as an important determinant of bank stability interacts with the four key variables that we have identified in affecting both banking profitability and stability.

On the policy front, our paper suggests that it is not just regulation that is crucial to determining the performance of the banking system. The results obtained suggest that greater economic freedom can be an effective means of improving bank profitability and stability. Similarly, measures to reduce corruption can also play a part in improving profitability and bank stability. In addition, we find that better Governance can also be useful in promoting bank stability and improve bank profitability. As such, our results suggest that there are different channels for policy makers to go about improving the performance of their banking sector rather than just the bank regulatory approach.

One of the interesting results we have found in this study is that if one supplements the analysis of corruption, economic freedom, regulation and transparency by looking at country level governance and bank governance indicators the results tend to become somewhat more significant. This could be an important policy finding since tackling corruption, increasing economic freedom, changing regulations and increasing transparency alone are more likely to make more of a difference if the country also improves its overall level of governance, institutional quality and enforcement. Another related area for future research would be to examine if political connections between bankers and government officials as well as politicians also influences bank performance and stability, there is interesting recent research in this area including Hung *et al.* (2017) for the case of China and Chen *et al.* (2018) in the case of politically connected CEO's and bank performance during the GFC.

In response to the GFC and the Eurozone crisis, Europe has begun a process of improving the regulation and supervision of European financial institutions. For example, in December 2010 the European Systemic Risk Board (ESRB) was created as an independent body of the EU with responsibility for macro-prudential supervision of the financial system, and for reducing risks in the EU financial sector. In addition, in 2011 the European System of Financial Supervision (ESFS) was created, as a decentralized and multilayer group of micro and macro-prudential organizations, with its main objective being to ensure a harmonized and consistent supervision and regulatory framework in the EU. More recently, there has been progress towards a Banking Union which will involve even greater harmonization of regulation, as will the implementation of Basel III. Our results suggest that greater regulation may not necessarily improve banking stability, suggesting that the focus of regulatory reform should be on quality rather than the quantity of reform. Our study suggests that policy makers need to think carefully about the impact of different types of banking regulations. These include overall restrictions on banking activities, capital adequacy and the framework for supervision and monitoring as these can have differing effects on bank profitability and stability.

Finally, we should note that our analysis has some limitations. An issue of particular interest for future research would be to see if our results would remain valid if other European countries from outside the Eurozone were to be added to the dataset. This is of potential importance as some non-Eurozone countries have better enforcement records when it comes to regulation and dealing with corruption than certain members of the Eurozone. The European

banking industry has been developing rapidly in the last two decades in a continuously changing regulatory and economic environment. As such, our results capture a key period in which there was a massive expansion of the sector followed by a couple of major crises and a prolonged period of dealing with both the GFC and the subsequent European banking crisis. Results in the future might be very different should the sector stabilize, and bank operations move away from some of the riskier operations of the past. There may also be risks to the financial system as a whole if greater regulation of the banking sector shift activities to the less regulated shadow banking sector.

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Table 1: Definitions of the Variables and Data Sources

Variables		**Definition**	**Data sources**
Bank performance	Return on average assets *(ROAA)*	Net income divided by average total assets	Bankscope
	Return on average equity *(ROAE)*	Net income divided by average total equity	Bankscope
	Net interest margin *(NIM)*	The difference between the interest income produced by banks or other financial institutions, and the volume of interest paid out to their lenders relative to the volume of their assets	Bankscope
Bank soundness	Natural logarithm of Z score *ln(Z)*	Natural logarithm of [(EQAS + ROAA)/Variance of ROAA] where EQAS is the Equity to Asset Ratio	Authors calculations
	Natural logarithm of the alternative Z score *ln(Z-alt)*	Natural logarithm of [ROAA/Variance of ROAA]	Authors calculations
	Financial System Soundness Index *(FSSI)*	This index assesses the degree of soundness of a given system and provides an *ex ante* measure of soundness. The index is composed of 2 variables: capital adequacy ratio and the inverse ratio of NPLs, weighted by the intermediation ratio. It was computed using a similar methodology of Das *et al* (2004).	Authors calculations
Economic freedom	Heritage Index (HER_IND)	The heritage index of economic freedom an index from 0 to 100 measuring economic freedom based on 12 dimensions, with higher number corresponding to greater economic freedom.	The Heritage Foundation
	Heritage Index Rule of Low (HER_RL)	A weighted average of the dimensions: property rights, judicial effectiveness and government effectiveness).	
	Heritage Index Government Size (HER_GS)	A weighted average of the dimensions: tax burden, government spending and fiscal health.	
	Heritage Index Regulatory Efficiency (HER_RE)	A weighted average of the dimensions: business freedom, labour freedom, monetary freedom.	

	Heritage Index Open Markets (HER_OM)	A weighted average of the dimensions: trade freedom, investment freedom, financial freedom.	
	The Fraser Index (FRAS_IND)	The Fraser index of economic freedom is an index from 0 to 10 measuring economic freedom based on 5 pillars, with higher number corresponding to greater economic freedom. We multiply by 10 to make it a similar scale of 0 to 100 as for the Heritage index.	The Fraser Institute
Bank Regulation	Overall Restrictions on Banking Activities *(REG_RESTR)*	This variable takes values from 3-12; and it is the summation of *Securities Activities*, *Insurance Activities* and *Real Estate Activities*.	World Bank
	Capital Regulatory Index *(REG_CAP)*	This variable takes values from 1-10. The values are obtained as the summation of the following two indices, *Overall Capital Stringency* plus *Initial Capital Stringency*	World Bank
	Official Supervisory Power *(REG_SUP)*	This variable takes values from 0-14 and shows whether the supervisory authorities have the authority to take specific actions to prevent and correct problems.	World Bank
Corruption	Corruption of Bank officials (*CORR1*)	Corruption of bank officials as an obstacle for the operation and growth of the business (1-no obstacle, 2-minor obstacle, 3- a moderate obstacle, 4-major obstacle)	WBES
	General level of corruption (*CORR2*)	Represents the overall value of corruption, and it takes values from 1 to 4 (1-no obstacle, 2-minor obstacle, 3- a moderate obstacle, 4-major obstacle)	WBES
Transparency	Disclosure index (*DISCL*)	Measures the level of detail, which banks provide on 17 dimension of accounting information in their public accounts. For each sub-index, a 0 was assigned if there was no entry in any of the corresponding categories and a 1 otherwise. The variables were computed using the methodology of Nier (2005) as explained in Table A1 in the Appendix.	Authors calculations
Governance	Governance Index (GOV_IND)	We take the average individual score on each of the six categories of governance: (i) Voice and Accountability, (ii) Political Stability/No Violence, (iii) Government Effectiveness, (iv) Regulatory Quality, (v) Rule of Law and (vi) Control of Corruption to create an aggregate index of Governance for each country and for each year from 2005-2018. We then rescale to generate an aggregate country Governance Index score that ranges between 0 and 10.	World Bank WGI

	Banking Governance Index (BANKGOV_IND)	We take the average individual score on each of three categories of governance: (i) Voice and Accountability, (ii) Government Effectiveness and (iii) Rule of Law to create a proxy Bank Governance for each country, for each year 2005-2018. We then rescale to generate an aggregate Bank Governance score for each country and each year of between 0 and 10.	World Bank WGI
Macroeconomic Variables	Gross Domestic per capita Growth (*GDPGR*)	Annual percentage change of the country's real gross domestic product *per capita*.	World Bank WDI
	Inflation Rate (*INF*)	Annual percentage change of the rate at which consumer prices increase, resulting in a fall in the purchasing value of money.	World Bank WDI
	Unemployment Rate (*UNEMP*)	The number of unemployed individuals divided by all individuals currently in the labour force (expressed as a percentage).	World Bank WDI

This table displays variable names, abbreviations, definitions as well as the source of data.
Notes: *WBES stands for World Business Environment Survey (2000). WGI stands for World Governance Index, WDI stands for World Bank's World Development Indicators.*

Table 2: Descriptive statistics of the Variables

	Variables	Mean	Std. Dev.	Min	Max	Obs
Bank Performance	**ROAA**	0.210	3.233	-44.34	89.00	4564
	ROAE	3.834	13.789	-139.58	81.77	4564
	NIM	1.891	1.907	-42.34	23.35	4564
Bank Soundness	**ln(Z)**	2.416	1.253	-0.66	10.49	4564
	ln(Z-alt)	2.366	1.194	-0.62	8.72	4564
	FSSI	0.193	0.391	-1.74	9.32	4564
Economic Freedom	**HER_IND**	67.23	5.65	53.20	82.60	4564
	HER_GS	47.032	12.712	25.00	82.33	4564
	HER_OM	74.231	8.399	41.83	88.87	4564
	HER_RE	72.049	4.950	61.83	86.33	4564
	HER_RL	66.766	14.727	36.60	94.50	4564
	FRAS_IND	74.460	4.022	65.70	83.20	4564
Corruption	**CORR1**	1.617	1.136	1.00	4.00	4564
	CORR2	1.557	0.937	1.00	4.00	4564
Bank Regulation	**REG_RESTR**	6.299	1.494	3.00	9.00	4564
	REG_CAP	6.590	1.708	3.00	9.00	4564
	REG_SUP	10.442	2.403	5.00	14.00	4564
Transparency	**DISCL**	0.844	0.237	0.12	1.00	4564
Governance	**GOV_IND**	7.063	0.817	5.31	8.79	4564
	BANKGOV_IND	7.254	0.812	5.66	8.85	4564
Macroeconomic Variables	**GDPGR**	1.378	3.517	-14.81	25.16	4564
	INF	1.697	1.698	-4.58	15.43	4564
	UNEMP	9.662	4.610	3.38	27.47	4564

This table presents the summary statistics, reporting the means, medians, maximum, minimum, standard deviations, coefficients of skewness and kurtosis as well as the number of observations for all variables in our analysis. These variables are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); General Heritage Index (HER_IND); Heritage Index Government Size (HER_GS); Heritage Index Open Markets (HER_OM); Heritage Index Regulatory Efficiency (HER_RE); Heritage Index Rule of Law (HER_RL); Fraser Index (FRAS_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP);

Official Supervisory Power (REG_SUP); Disclosure index (DISCL); General Governance Index (GOV_IND); Banking Governance Index (BANKGOV_IND); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP).
Source: Authors calculations.

Table 3: Correlation Matrix of the Variables

	CORR1	CORR2	R_REST	R_CAP	R_SUP	ROAA	ROAE	NIM	DISCL	FSSI	ln(Z)	ln(Z-alt)	HER_IND	HER_GS	HER_OM	HER_RE	HER_RL	FRAS_IND	D_CRISIS	GDPPR	INF	UNEMP	GOV_IND
CORR1	1.00																						
CORR2	**0.54**	1.00																					
REG_RESTR	**-0.14**	**-0.05**	1.00																				
REG_CAP	**0.18**	**-0.03**	**-0.12**	1.00																			
REG_SUP	**-0.03**	**-0.17**	**0.06**	**0.11**	1.00																		
ROAA	**0.00**	**0.04**	**0.04**	**-0.04**	**-0.02**	1.00																	
ROAE	**0.02**	**0.10**	**0.06**	**-0.02**	**-0.13**	**0.35**	1.00																
NIM	**-0.05**	**0.01**	**0.16**	**-0.07**	0.05	**0.32**	0.10	1.00															
DISCL	**0.08**	**0.05**	**0.03**	**0.01**	0.06	**-0.05**	**-0.06**	-0.04	1.00														
FSSI	**0.04**	**-0.01**	**-0.04**	**-0.01**	0.05	**0.06**	**0.01**	0.04	**0.14**	1.00													
ln(Z)	**0.00**	**0.08**	**0.02**	**0.04**	**-0.14**	**0.21**	**0.30**	0.09	**-0.08**	**-0.08**	1.00												
ln(Z-alt)	**-0.01**	**0.09**	**0.01**	**0.04**	**-0.13**	**0.12**	**0.20**	0.08	**-0.09**	**-0.06**	**0.89**	1.00											
HER_IND	**0.18**	**0.02**	**-0.53**	**0.10**	**-0.12**	**0.05**	**0.07**	**-0.07**	**-0.11**	**0.13**	**-0.04**	**-0.06**	1.00										
HER_GS	**0.31**	**0.12**	-0.14	**0.10**	**0.21**	**-0.02**	**-0.05**	**0.09**	**0.05**	**0.15**	**-0.25**	**-0.27**	**0.46**	1.00									
HER_OM	**0.27**	**0.09**	**-0.11**	**0.12**	**0.17**	**0.05**	**0.07**	0.01	**0.01**	**-0.09**	**0.11**	**0.13**	**0.17**	**-0.08**	1.00								
HER_RE	**-0.20**	**-0.24**	**-0.13**	**-0.27**	**-0.26**	0.03	**0.05**	-0.02	**-0.20**	**0.05**	**-0.04**	**-0.07**	**0.43**	**0.08**	**-0.34**	1.00							
HER_RL	**-0.04**	**-0.05**	**-0.48**	**0.17**	**-0.25**	**0.06**	**0.13**	**-0.15**	**-0.11**	**0.09**	**0.10**	**0.10**	**0.72**	**-0.14**	**0.17**	**0.24**	1.00						
FRAS_IND	**0.23**	**0.08**	**-0.50**	**0.19**	**-0.26**	**0.10**	**0.20**	**-0.06**	**-0.07**	**0.16**	-0.01	-0.04	**0.80**	**0.34**	**0.04**	**0.34**	**0.69**	1.00					
D_CRISIS	**-0.03**	**0.24**	**0.24**	**-0.28**	-0.09	-0.06	**-0.15**	**-0.08**	**-0.02**	-0.00	-0.02	-0.03	**0.07**	**-0.08**	**-0.07**	**0.14**	**0.03**	0.01	1.00				
GDPPR	**0.12**	**-0.08**	-0.16	**0.16**	0.01	**0.09**	**0.06**	**-0.01**	**-0.05**	**0.07**	0.01	-0.01	**0.23**	**0.22**	**-0.08**	**0.14**	**0.12**	**0.37**	**-0.23**	1.00			
INF	**0.02**	**0.02**	**0.02**	**-0.11**	0.08	**0.08**	**0.14**	**0.16**	**0.00**	0.03	**-0.07**	**-0.10**	**0.07**	**0.25**	**0.04**	**0.05**	**-0.09**	**0.12**	**0.19**	**0.12**	1.00		
UNEMP	**0.21**	**0.34**	**-0.12**	**0.17**	**-0.03**	**-0.14**	**-0.16**	**-0.02**	**0.08**	0.00	0.00	0.02	**-0.27**	0.05	-0.06	**-0.37**	**-0.35**	**-0.26**	**-0.18**	**-0.25**	**-0.26**	1.00	
GOV_IND	0.00	-0.07	**-0.48**	**0.11**	**-0.22**	**0.08**	**0.15**	-0.14	**-0.10**	**0.10**	**0.06**	0.05	**0.73**	**-0.08**	**0.15**	**0.29**	**0.94**	**0.76**	0.03	**0.18**	**-0.03**	**-0.45**	1.00

This table presents pairwise correlation coefficients for all variables in our analysis These variables are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); General Heritage Index (HER_IND); Heritage Index Government Size (HER_GS); Heritage Index Open Markets (HER_OM); Heritage Index Regulatory Efficiency

(HER_RE); Heritage Index Rule of Law (HER_RL); Fraser Index (FRAS_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); General Governance Index (GOV_IND); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP). Bold values indicate significant correlations. **Source:** Authors calculations.

Table 4: The Effect of Economic Freedom, Corruption, Bank Regulation and Transparency on Bank Performance and Bank Stability						
	Bank Performance Indices			Bank Stability Indices		
Variables	**(equation 4a) ROAA**	**(equation 4b) ROAE**	**(equation 4c) NIM**	**(equation 5a) ln(Z)**	**(equation 5b) ln(Z-alt)**	**(equation 5b) FSSI**
Dependent Variable (-1)	0.107**	0.397**	0.418**	0.386**	0.321**	0.102**
	(0.020)	(0.022)	(0.026)	(0.024)	(0.023)	(0.019)
HER_IND	0.096**	0.228**	0.049**	0.021**	0.073**	0.022**
	(0.045)	(0.101)	(0.013)	(0.006)	(0.007)	(0.003)
CORR1	-0.259**	-0.794**	-0.079**	-0.072**	-0.064**	-0.024
	(0.099)	(0.387)	(0.030)	(0.014)	(0.016)	(0.027)
CORR2	-0.337**	-0.475**	-0.472**	-0.033**	-0.014**	-0.016
	(0.135)	(0.046)	(0.032)	(0.015)	(0.007)	(0.017)
REG_RESTR	0.482	0.494**	0.074**	-0.044	-0.019	0.093**
	(0.467)	(0.246)	(0.037)	(0.037)	(0.019)	(0.038)
REG_CAP	0.192	0.154**	-0.044	0.037**	0.022**	0.011**
	(0.165)	(0.056)	(0.012)	(0.010)	(0.011)	(0.005)
REG_SUP	0.154	-0.094	0.040**	-0.114**	-0.092**	0.014
	(0.118)	(0.080)	(0.014)	(0.018)	(0.038)	(0.013)
DISCL	-0.932	-3.175	1.353	-3.854**	-3.632**	-2.038**
	(1.551)	(3.069)	(1.503)	(1.243)	(1.270)	(0.817)
D_CRISIS	-0.273**	-6.538**	-0.283**	-0.019	-0.026	-0.021*
	(0.110)	(0.762)	(0.155)	(0.024)	(0.027)	(0.012)
GDPGR	0.015**	0.183**	0.005**	0.004*	0.011**	0.003**
	(0.006)	(0.061)	(0.002)	(0.002)	(0.003)	(0.001)
INF	-0.021	-0.345**	-0.055**	-0.021**	-0.021**	-0.013**
	(0.035)	(0.137)	(0.011)	(0.005)	(0.006)	(0.003)
UNEMP	-0.186**	-1.344**	-0.021**	-0.018**	-0.016**	-0.009**
	(0.025)	(0.682)	(0.007)	(0.008)	(0.007)	(0.004)

	10.821**	46.905**	5.061**	2.963**	2.937**	0.360
Constant	(3.380)	(13.580)	(1.039)	(0.494)	(0.565)	(0.247)
No Obs	3,912	3,912	3,912	3,912	3,912	3,912
No Banks	326	326	326	326	326	326
J-stat	52.32	43.36	66.06	58.76	53.43	52.23
p-value	[0.29]	[0.38]	[0.31]	[0.13]	[0.27]	[0.26]

This table reports results for the models presented in equations (4a), (4b), (4c), (5a), (5b) and (5c) as each column indicates. Each column represents a separate regression model. The method of estimation is the two-step Generalised Method of Moments (GMM) estimator. The variables used are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); Heritage Index of Economic Freedom (HER_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP); and a dummy variable that captures the sub-prime financial crisis and takes the values of 1 for the years 2007-2010 and zero otherwise (D_CRISIS). Values of standard errors are reported in parentheses under the estimated coefficients. The instruments are: Constant, lagged terms of the indicators that are not used as dependent variables in the regression model, plus GDPGR(-1); INF(-1); UNEMP(-1); GDPGR(-2) INF(-2) UNEMP(-2).

Note: Statistical significance is indicated as ** $p<0.05$, * $p<0.1$

Source: Authors calculations.

Table 5: The Effect of Economic Freedom, Corruption, Bank Regulation and Transparency on Bank Performance and Bank Stability – The Role of Size						
	Bank Performance Indices			Bank Stability Indices		
Variables	**(equation 4a) ROAA**	**(equation 4b) ROAE**	**(equation 4c) NIM**	**(equation 5a) ln(Z)**	**(equation 5b) ln(Z-alt)**	**(equation 5c) FSSI**
Dependent Variable (-1)	0.098**	0.144**	-0.126	0.407**	0.395**	-0.231**
	(0.025)	(0.018)	(0.201)	(0.203)	(0.184)	(0.049)
D_LARGE*HER_IND	1.261**	3.643	0.307	0.014	0.022	0.541**
	(0.153)	(0.520)	(0.793)	(0.169)	(0.139)	(0.242)
D_MEDHER_IND**	0.346	2.773**	0.472**	0.042**	0.048**	0.120**
	(0.295)	(1.026)	(0.192)	(0.019)	(0.018)	(0.024)
D_SMALLHER_IND**	-0.398**	-3.275*	0.418**	0.024**	0.035**	-0.093
	(0.139)	(1.806)	(0.183)	(0.011)	(0.013)	(0.095)
D_LARGE*CORR1	-1.856	-1.432	-1.979*	-0.091	-0.098	-3.784
	(2.110)	(1.149)	(1.027)	(0.094)	(0.086)	(2.593)
D_MED*CORR1	-0.653**	-1.436**	-3.321**	-0.923**	-0.921**	-0.978
	(0.211)	(0.619)	(1.388)	(0.379)	(0.324)	(0.999)
D_SMALL*CORR1	-1.334**	-3.374**	-0.152	-0.350**	-0.354**	-0.687
	(0.547)	(1.987)	(0.154)	(0.056)	(0.076)	(0.782)
D_LARGE*CORR2	-3.634	-2.612	-3.641*	-2.804	-2.003	-3.179
	(3.167)	(2.993)	(1.964)	(2.087)	(2.187)	(2.052)
D_MED*CORR2	-1.793*	-2.182	-2.345*	-0.382*	-0.374*	-0.321
	(0.942)	(1.670)	(1.412)	(0.211)	(0.211)	(0.861)
D_SMALL*CORR2	-2.582*	-1.117*	-0.054	-0.398*	-0.366*	-0.433
	(1.067)	(0.566)	(0.052)	(0.214)	(0.212)	(0.421)
D_LARGE*REG_RESTR	2.433	9.770	-9.627	2.213	2.322	-0.344
	(1.541)	(8.734)	(8.039)	(2.176)	(2.376)	(0.369)
D_MED*REG_RESTR	7.337*	3.567*	-0.845	-0.867	-0.877	1.643*
	(3.963)	(1.924)	(0.703)	(0.635)	(0.621)	(0.968)

D_SMALL*REG_RESTR	4.132 (3.420)	6.338 (5.213)	6.641 (5.537)	0.117 (0.518)	0.119 (0.549)	0.322 (0.685)
Table 5 (continued)						
D_LARGE*REG_CAP	-4.122 (4.538)	1.636* (0.872)	-4.233 (3.135)	3.434* (1.868)	3.723* (1.988)	-1.888 (1.319)
D_MED*REG_CAP	-6.732 (5.912)	1.686* (0.897)	-1.919 (1.817)	0.341* (0.202)	0.343* (0.201)	0.316 (0.341)
D_SMALL*REG_CAP	1.191 (1.276)	-7.048 (6.822)	4.409 (3.992)	-0.424 (0.612)	-0.431 (0.436)	0.001 (0.001)
D_LARGE*REG_SUP	3.819 (2.953)	-4.312 (3.938)	4.617 (4.570)	-1.642* (0.940)	-1.656* (0.939)	-1.115 (1.619)
D_MED*REG_SUP	-2.514 (2.189)	-0.872 (0.673)	-1.223 (0.997)	-0.316** (0.135)	0.402** (0.121)	-0.712 (0.734)
D_SMALL*REG_SUP	-0.331 (0.225)	-7.616 (6.924)	0.765 (0.436)	-0.121 (0.169)	-0.131 (0.166)	1.339 (1.657)
D_LARGE*DISCL	-6.456 (5.412)	-3.112 (2.188)	-6.552 (5.822)	-0.881* (0.477)	-0.886* (0.477)	-7.719* (4.558)
D_MED*DISCL	-4.325 (3.437)	2.317 (2.296)	7.283 (5.364)	-1.201 (1.216)	-1.203 (1.224)	-5.120* (2.876)
D_SMALL*DISCL	-6.454 (5.977)	5.657 (5.528)	-1.324 (1.103)	-1.627** (0.761)	-1.613** (0.681)	3.114 (1.272)
D_CRISIS	-2.818** (1.005)	-6.328** (3.326)	-1.209** (0.575)	-0.114 (0.299)	-0.121 (0.304)	-0.088 (0.179)
GDPGR	0.106** (0.047)	0.366** (0.055)	0.031** (0.003)	0.018** (0.007)	0.019** (0.007)	0.021** (0.000)
INF	-0.108 (0.214)	-0.512 (0.437)	-0.162** (0.019)	-0.045** (0.002)	-0.047 (0.002)	-0.145** (0.008)
UNEMP	-0.012 (0.117)	-0.332 (0.043)	-0.047 (0.113)	-0.026** (0.006)	-0.022** (0.006)	-0.124** (0.005)
No Obs	3,911	3,911	3,911	3,911	3,911	3,911

No Banks	326	326	326	326	326	326
J-stat	24.658	38.449	24.095	44.461	44.462	25.888
p-value	[0.95]	[0.44]	[0.93]	[0.21]	[0.21]	[0.93]

This table reports results for the models presented in equations (4a), (4b), (4c), (5a), (5b) and (5c) as each column indicates. Each column represents a separate regression model. The method of estimation is the two-step Generalised Method of Moments (GMM) estimator. The variables used are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); Heritage Index of Economic Freedom (HER_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP); and a dummy variable that captures the sub-prime financial crisis and takes the values of 1 for the years 2007-2010 and zero otherwise (D_CRISIS). The size dummies are constructed in terms of the Total Assets of each Bank. Thus, large banks are the top 1/3 of the banks in our sample with the largest total assets (D_LARGE), medium size banks as the next 1/3 by total assets (D_MED) and small banks as the 1/3 with the smallest total assets (D_SMALL). Values of standard errors are reported in parentheses under the estimated coefficients. The instruments are: Constant, lagged terms of the indicators that are not used as dependent variables in the regression model, plus GDPGR(-1); INF(-1); UNEMP(-1); GDPGR(-2) INF(-2) UNEMP(-2).

Note: Statistical significance is indicated as ** $p<0.05$, * $p<0.1$
Source: Authors calculations.

Table 6: The Effect of Economic Freedom, Corruption, Bank Regulation and Transparency on Bank Performance and Bank Stability – The Role of Governance						
	Bank Performance Indices			Bank Stability Indices		
Variables	**(equation 4a) ROAA**	**(equation 4b) ROAE**	**(equation 4c) NIM**	**(equation 5a) ln(Z)**	**(equation 5b) ln(Z-alt)**	**(equation 5b) FSSI**
Dependent Variable (-1)	0.100**	0.326**	0.398**	0.385**	0.317**	0.102**
	(0.020)	(0.023)	(0.027)	(0.024)	(0.023)	(0.019)
HER_IND	0.126**	0.532**	0.056**	0.006**	0.015**	0.024**
	(0.045)	(0.177)	(0.014)	(0.002)	(0.007)	(0.008)
CORR1	-0.279**	-0.988**	-0.084**	-0.037**	-0.062**	-0.014*
	(0.099)	(0.375)	(0.030)	(0.014)	(0.014)	(0.008)
CORR2	-0.432**	-0.451**	-0.442**	-0.032**	-0.014**	-0.014*
	(0.103)	(0.193)	(0148)	(0.015)	(0.007)	(0.007)
REG_RESTR	0.408*	0.353**	0.064**	0.042**	0.017*	0.098**
	(0.241)	(0.113)	(0.027)	(0.017)	(0.010)	(0.047)
REG_CAP	0.282**	0.192**	-0.041	0.038**	0.020*	0.011**
	(0.065)	(0.057)	(0.020)	(0.010)	(0.011)	(0.005)
REG_SUP	0.170*	-0.004	0.039**	-0.028**	-0.025**	-0.014**
	(0.101)	(0.10)	(0.014)	(0.006)	(0.007)	(0.003)
DISCL	-0.933	-3.399	1.673	-3.834**	-3.580**	-2.202**
	(1.547)	(3.870)	(1.202)	(0.243)	(0.270)	(0.815)
GOVERN_IND	2.526**	24.055**	0.555**	0.133*	0.195**	0.024
	(0.653)	(2.313)	(0.190)	(0.074)	(0.094)	(0.044)
D_CRISIS	-0.304*	-6.388**	-0.094*	-0.021	-0.029	-0.022*
	(0.180)	(0.748)	(0.054)	(0.024)	(0.027)	(0.013)
GDPGR	0.014**	0.168**	0.016**	0.005**	0.011**	0.000
	(0.006)	(0.059)	(0.005)	(0.002)	(0.003)	(0.001)
INF	-0.022	-0.209	-0.053**	-0.022**	-0.020**	-0.013**
	(0.035)	(0.133)	(0.011)	(0.005)	(0.006)	(0.003)
UNEMP	-0.163*	-1.207**	-0.036**	-0.006**	-0.004**	-0.008**

	(0.093)	(0.515)	(0.008)	(0.003)	(0.002)	(0.004)
	-5.256	-107.412**	1.601	2.742**	4.277**	0.208
Constant	(5.353)	(19.825)	(1.564)	(0.744)	(0.860)	(0.371)
No Obs	3,912	3,912	3,912	3,912	3,912	3,912
No Banks	326	326	326	326	326	326
J-stat	42.11	44.21	46.44	48.18	47.53	53.24
p-value	[0.39]	[0.38]	[0.30]	[0.36]	[0.37]	[0.27]

This table reports results for the models presented in equations (4a), (4b), (4c), (5a), (5b) and (5c) as each column indicates. Each column represents a separate regression model. The method of estimation is the two-step Generalised Method of Moments (GMM) estimator. The variables used are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); Heritage Index of Economic Freedom (HER_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); Governance Index (GOVERN_IND); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP); and a dummy variable that captures the sub-prime financial crisis and takes the values of 1 for the years 2007-2010 and zero otherwise (D_CRISIS). Values of standard errors are reported in parentheses under the estimated coefficients. The instruments are: Constant, lagged terms of the indicators that are not used as dependent variables in the regression model, plus GDPGR(-1); INF(-1); UNEMP(-1); GDPGR(-2) INF(-2) UNEMP(-2).

Note: Statistical significance is indicated as ** $p<0.05$, * $p<0.1$

Source: Authors calculations.

Table 7: The Effect of Economic Freedom, Corruption, Bank Regulation and Transparency on Bank Performance and Bank Stability – The Role of Banking Governance						
	Bank Performance Indices			Bank Stability Indices		
Variables	**(equation 4a) ROAA**	**(equation 4b) ROAE**	**(equation 4c) NIM**	**(equation 5a) ln(Z)**	**(equation 5b) ln(Z-alt)**	**(equation 5b) FSSI**
Dependent Variable (-1)	0.106**	0.370**	0.420**	0.386**	0.317**	0.102**
	(0.020)	(0.022)	(0.026)	(0.024)	(0.023)	(0.019)
HER_IND	0.111**	0.418**	0.047**	0.007*	0.006**	0.003*
	(0.046)	(0.181)	(0.014)	(0.004)	(0.003)	(0.002)
CORR1	-0.255**	-0.710*	-0.077**	-0.014*	-0.018*	-0.007**
	(0.099)	(0.383)	(0.030)	(0.008)	(0.010)	(0.004)
CORR2	-0.015**	-0.403**	-0.066**	-0.034**	-0.005	-0.015**
	(0.003)	(0.195)	(0.032)	(0.015)	(0.017)	(0.007)
REG_RESTR	0.171*	0.278*	0.071*	0.042**	0.015	0.003
	(0.098)	(0.163)	(0.037)	(0.017)	(0.019)	(0.008)
REG_CAP	0.203*	0.400*	-0.045	0.037**	0.018*	0.011**
	(0.132)	(0.224)	(0.042)	(0.010)	(0.011)	(0.005)
REG_SUP	0.094**	-0.009	0.040**	-0.028**	-0.025**	-0.014**
	(0.046)	(0.008)	(0.014)	(0.006)	(0.007)	(0.003)
DISCL	-0.872	-4.816	-0.381	-0.840**	-0.641**	-0.046*
	(1.551)	(4.001)	(0.504)	(0.243)	(0.270)	(0.027)
GOVERN_BANK	1.130*	17.595**	0.120	0.076	0.117	0.020
	(0.641)	(2.464)	(0.098)	(0.092)	(0.161)	(0.043)
D_CRISIS	-0.261**	-6.169**	-0.087*	-0.028**	-0.029**	-0.020*
	(0.081)	(0.656)	(0.049)	(0.014)	(0.014)	(0.013)
GDPGR	0.016**	0.183**	0.005**	0.004**	0.011**	0.000
	(0.006)	(0.060)	(0.001)	(0.002)	(0.003)	(0.001)
INF	-0.017	-0.357**	-0.055**	-0.021**	-0.019**	-0.013**
	(0.035)	(0.136)	(0.011)	(0.005)	(0.006)	(0.003)

	-0.182**	-1.324**	-0.021**	-0.021**	-0.004	-0.002
UNEMP	(0.025)	(0.597)	(0.008)	(0.004)	(0.004)	(0.002)
	3.584	-69.916**	5.868**	2.452**	4.026**	0.487
Constant	(5.313)	(21.140)	(1.632)	(0.783)	(0.923)	(0.371)
No Obs	3,912	3,912	3,912	3,912	3,912	3,912
No Banks	326	326	326	326	326	326
J-stat	43.26	45.71	44.38	46.18	45.53	52.94
p-value	[0.40]	[0.38]	[0.36]	[0.39]	[0.32]	[0.29]

This table reports results for the models presented in equations (4a), (4b), (4c), (5a), (5b) and (5c) as each column indicates. Each column represents a separate regression model. The method of estimation is the two-step Generalised Method of Moments (GMM) estimator. The variables used are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); Heritage Index of Economic Freedom (HER_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); Banking Governance Index (GOVERN_BANK); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP); and a dummy variable that captures the sub-prime financial crisis and takes the values of 1 for the years 2007-2010 and zero otherwise (D_CRISIS). Values of standard errors are reported in parentheses under the estimated coefficients. The instruments are: Constant, lagged terms of the indicators that are not used as dependent variables in the regression model, plus GDPGR(-1); INF(-1); UNEMP(-1); GDPGR(-2) INF(-2) UNEMP(-2).

Note: Statistical significance is indicated as ** $p<0.05$, * $p<0.1$

Source: Authors calculations.

APPENDIX

Table A1: Construction of the Composite Index of Disclosure

$DISC_{it} = \frac{1}{17}\sum_{k=1}^{17} s_{k,it}$; where s_k are the sub-indices of disclosure.

Disclosure indices

	Sub-index – s_k	Categories
Assets		
Loans	Loans by maturity	Sub three months, three to six months, six months to one year, one to five years, more than five years
	Loans by type	Loans to municipalities/government, mortgages, HP/lease, other loans
	Loans by counterparty	Loans to group companies, loans to other corporate, loans to banks
	Problem loans	Total problem loans
	Problem loans by type	Overdue/restructured/other non-performing
	Securities by type	Detailed breakdown: Treasury bills, other bills, bonds, CDs, equity investments, other investments
Other earning assets		Government securities, other listed securities, non-listed securities
	Securities by holding purpose	Investment securities, trading securities
Liabilities		
Deposits	Deposits by maturity	Demand, savings, sub three months, three to six months, six months to one year, one to five years, more than five years
	Deposit by type of customer	Bank deposits, municipal/government
Other funding	Money market funding	Total money market funding
	Long-term funding	Convertible bonds, mortgage bonds, other bonds, subordinated debt, hybrid capital
Memo lines		
	Reserves	Loan loss reserves (memo)
	Capital	Capital to assets ratio
	Contingent liabilities	Total contingent liabilities
	Off-balance sheet items	Off-balance sheet items
Income statement		
	Non-interest income	Net commission income, net fee income, net trading income
	Loan loss provisions	Loan loss provision

Source: Nier (2005).

Table A2: The Effect of Economic Freedom, Corruption, Bank Regulation and Transparency on Bank Performance and Bank Stability – Fixed Effects Results						
	Bank Performance Indices			Bank Stability Indices		
Variables	**(equation 4a) ROAA**	**(equation 4b) ROAE**	**(equation 4c) NIM**	**(equation 5a) ln(Z)**	**(equation 5b) ln(Z-alt)**	**(equation 5b) FSSI**
HER_IND	0.028**	0.149**	0.068**	0.009*	0.020**	0.005**
	(0.008)	(0.039)	(0.011)	(0.006)	(0.006)	(0.002)
CORR1	-0.035**	-0.731**	-0.140**	-0.029**	-0.042**	-0.009
	(0.007)	(0.269)	(0.028)	(0.011)	(0.014)	(0.005)
CORR2	-0.010*	-0.339*	-0.140	-0.031*	-0.036*	-0.008
	(0.006)	(0.202)	(0.133)	(0.018)	(0.019)	(0.006)
REG_RESTR	0.121**	0.889**	0.127**	-0.030	-0.026	0.009*
	(0.061)	(0.236)	(0.025)	(0.032)	(0.042)	(0.004)
REG_CAP	0.120**	0.458**	0.036**	0.035**	0.030**	0.007**
	(0.040)	(0.155)	(0.016)	(0.008)	(0.008)	(0.003)
REG_SUP	0.036	-0.769	0.041**	-0.026**	-0.013**	-0.006**
	(0.024)	(0.694)	(0.010)	(0.005)	(0.005)	(0.002)
DISCL	-0.695	-2.296	-1.133	-0.148	-0.509**	-0.012*
	(0.742)	(2.873)	(1.300)	(0.146)	(0.149)	(0.005)
D_CRISIS	-0.012**	-1.731**	-0.076**	-0.007	-0.022	-0.028**
	(0.005)	(0.485)	(0.021)	(0.025)	(0.025)	(0.009)
GDPGR	0.046**	0.095*	0.006	0.013**	0.015**	0.000
	(0.015)	(0.056)	(0.006)	(0.003)	(0.003)	(0.001)
INF	-0.056*	-0.440**	-0.118**	-0.021**	-0.025**	-0.006**
	(0.031)	(0.118)	(0.012)	(0.006)	(0.006)	(0.002)
UNEMP	-0.115**	-0.711**	-0.003	-0.019**	-0.001	-0.006**
	(0.017)	(0.067)	(0.007)	(0.003)	(0.003)	(0.001)
Constant	2.642	14.315*	7.118**	3.583**	4.328**	0.431**
	(2.066)	(7.997)	(0.837)	(0.406)	(0.415)	(0.152)
No Obs	4,564	4,564	4,563	4,562	4,564	4,564

No Banks	326	326	326	326	326	326
R-squared	0.038	0.127	0.086	0.036	0.030	0.018

This table reports results for the models presented in equations (4a), (4b), (4c), (5a), (5b) and (5c) as each column indicates. Each column represents a separate regression model. The method of estimation is the panel Fixed Effects (FE) estimator. The variables used are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); Heritage Index of Economic Freedom (HER_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP); and a dummy variable that captures the sub-prime financial crisis and takes the values of 1 for the years 2007-2010 and zero otherwise (D_CRISIS). Values of standard errors are reported in parentheses under the estimated coefficients.

Note: Statistical significance is indicated as ** $p<0.05$, * $p<0.1$

Source: Authors calculations.

Table A3: The Effect of Economic Freedom, Corruption, Bank Regulation and Transparency on Bank Performance and Bank Stability – Robustness tests with the Sub-Indices of Economic Freedom						
	Bank Performance Indices			Bank Stability Indices		
Variables	**(equation 4a) ROAA**	**(equation 4b) ROAE**	**(equation 4c) NIM**	**(equation 5a) ln(Z)**	**(equation 5b) ln(Z-alt)**	**(equation 5b) FSSI**
Dependent Variable (-1)	0.090**	0.314**	0.358**	0.377**	0.317**	0.100**
	(0.020)	(0.023)	(0.027)	(0.024)	(0.023)	(0.020)
HER_GS	0.027**	0.327**	0.011**	0.004	0.000	0.002
	(0.013)	(0.045)	(0.004)	(0.012)	(0.002)	(0.002)
HER_OM	0.130**	0.556**	0.046**	0.004**	0.004**	0.005**
	(0.027)	(0.096)	(0.008)	(0.002)	(0.002)	(0.002)
HER_RE	0.092**	0.499**	0.016*	0.003	0.003	0.002
	(0.029)	(0.107)	(0.009)	(0.004)	(0.005)	(0.002)
HER_RL	0.124**	0.301**	0.031**	0.003**	0.005**	0.002*
	(0.020)	(0.080)	(0.006)	(0.001)	(0.002)	(0.001)
CORR1	-0.261**	-0.857**	-0.082**	-0.007	-0.010	-0.003
	(0.098)	(0.372)	(0.029)	(0.014)	(0.016)	(0.007)
CORR2	-0.034	-0.577	-0.052*	-0.032**	-0.018**	0.013*
	(0.102)	(0.392)	(0.031)	(0.015)	(0.07)	(0.007)
REG_RESTR	0.183	0.340	0.069*	0.040*	-0.023	-0.006
	(0.116)	(0.447)	(0.036)	(0.017)	(0.019)	(0.008)
REG_CAP	0.113*	0.048	0.015	0.035**	0.022**	0.013**
	(0.066)	(0.250)	(0.020)	(0.010)	(0.011)	(0.005)
REG_SUP	0.054	-0.606**	-0.025*	-0.027**	-0.022**	-0.014**
	(0.047)	(0.181)	(0.014)	(0.007)	(0.008)	(0.003)
DISCL	-0.766	-13.735**	-0.278	-0.836**	-0.640**	-0.050
	(1.542)	(5.858)	(0.491)	(0.242)	(0.270)	(0.117)
D_CRISIS	-0.440**	-2.202**	-0.132**	-0.043**	-0.051**	-0.023*
	(0.181)	(0.638)	(0.053)	(0.014)	(0.027)	(0.013)
GDPGR	0.018	0.211**	0.004	0.005**	0.011**	0.000

	(0.016)	(0.059)	(0.005)	(0.002)	(0.003)	(0.001)
	-0.037	-0.264**	-0.049**	-0.021**	-0.022**	-0.012**
INF	(0.035)	(0.133)	(0.010)	(0.005)	(0.006)	(0.003)
	-0.170**	-0.380**	-0.014*	-0.022**	-0.002	-0.003
UNEMP	(0.027)	(0.100)	(0.008)	(0.004)	(0.004)	(0.002)
	15.483**	61.364**	6.236**	2.503**	2.516**	0.709**
Constant	(3.690)	(14.382)	(1.125)	(0.542)	(0.620)	(0.270)
No Obs	3,912	3,912	3,912	3,912	3,912	3,912
No Banks	326	326	326	326	326	326
J-stat	52.22	42.13	46.29	56.76	52.54	51.32
p-value	[0.27]	[0.37]	[0.32]	[0.16]	[0.28]	[0.28]

This table reports results for the models presented in equations (4a), (4b), (4c), (5a), (5b) and (5c) as each column indicates. Each column represents a separate regression model. The method of estimation is the two-step Generalised Method of Moments (GMM) estimator. The variables used are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); Rule of Law (HER_RL); Limited Government (HER_GS); Regulatory Efficiency (HER_RE); Open Markets (HER_OM); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP); and a dummy variable that captures the sub-prime financial crisis and takes the values of 1 for the years 2007-2010 and zero otherwise (D_CRISIS). Values of standard errors are reported in parentheses under the estimated coefficients. The instruments are: Constant, lagged terms of the indicators that are not used as dependent variables in the regression model, plus GDPGR(-1); INF(-1); UNEMP(-1); GDPGR(-2) INF(-2) UNEMP(-2).

Note: Statistical significance is indicated as ** $p<0.05$, * $p<0.1$

Source: Authors calculations.

Table A4: The Effect of Economic Freedom, Corruption, Bank Regulation and Transparency on Bank Performance and Bank Stability – Robustness Tests with the Fraser Index of Economic Freedom						
	Bank Performance Indices			Bank Stability Indices		
Variables	**(equation 4a) ROAA**	**(equation 4b) ROAE**	**(equation 4c) NIM**	**(equation 5a) ln(Z)**	**(equation 5b) ln(Z-alt)**	**(equation 5b) FSSI**
Dependent Variable (-1)	0.094**	0.343**	0.391**	0.384**	0.319**	0.102**
	(0.020)	(0.023)	(0.026)	(0.024)	(0.023)	(0.019)
FRAS_IND	0.133**	0.322**	0.044**	0.015*	0.010*	0.003
	(0.047)	(0.175)	(0.014)	(0.006)	(0.006)	(0.002)
CORR1	-0.151**	-0.267**	-0.044**	-0.033**	-0.035**	-0.007**
	(0.049)	(0.082)	(0.008)	(0.015)	(0.016)	(0.003)
CORR2	-0.057*	-0.358*	-0.048**	-0.035**	-0.014*	0.014*
	(0.023)	(0.198)	(0.022)	(0.015)	(0.007)	(0.007)
REG_RESTR	0.177	0.272	0.071**	0.043**	-0.023	-0.003
	(0.116)	(0.451)	(0.036)	(0.017)	(0.019)	(0.008)
REG_CAP	0.193**	0.256	0.042**	0.038**	0.022**	0.011**
	(0.064)	(0.249)	(0.020)	(0.010)	(0.011)	(0.005)
REG_SUP	-0.021	-0.596**	-0.018	-0.024**	-0.026**	-0.014**
	(0.047)	(0.180)	(0.014)	(0.007)	(0.007)	(0.003)
DISCL	-0.903	-16.683**	-0.352	-0.850**	-0.641**	-0.041
	(1.538)	(5.922)	(0.497)	(0.242)	(0.270)	(0.117)
D_CRISIS	0.237	1.468**	0.075	-0.020	0.024	0.021*
	(0.179)	(0.642)	(0.054)	(0.024)	(0.027)	(0.013)
GDPGR	-0.028*	-0.013	-0.016**	0.003	0.012**	-0.000
	(0.016)	(0.063)	(0.005)	(0.002)	(0.003)	(0.001)
INF	-0.019	0.285**	0.054**	-0.022**	-0.020**	0.013**
	(0.035)	(0.134)	(0.010)	(0.005)	(0.006)	(0.003)
UNEMP	-0.148**	-0.244**	-0.009	-0.019**	-0.003	0.002
	(0.025)	(0.094)	(0.007)	(0.004)	(0.004)	(0.002)
Constant	-25.998**	-102.402**	-5.252**	1.625**	3.256**	0.175

	(4.001)	(15.201)	(1.205)	(0.566)	(0.636)	(0.291)
No Obs	3,912	3,912	3,912	3,912	3,912	3,912
No Banks	326	326	326	326	326	326
J-stat	54.12	44.76	47.22	59.16	53.33	52.14
p-value	[0.26]	[0.41]	[0.33]	[0.15]	[0.27]	[0.28]

This table reports results for the models presented in equations (4a), (4b), (4c), (5a), (5b) and (5c) as each column indicates. Each column represents a separate regression model. The method of estimation is the two-step Generalised Method of Moments (GMM) estimator. The variables used are Return on average assets (ROAA); Return on average equity (ROAE); Net interest margin (NIM); Natural logarithm of Z score ln(Z); Natural logarithm of the alternative Z score ln(Z-alt); Financial System Soundness Index (FSSI); Fraser Index of Economic Freedom (FRAS_IND); Corruption of Bank Officials (CORR1); General level of corruption (CORR2); Overall Restrictions on Banking Activities (REG_RESTR); Capital Regulatory Index (REG_CAP); Official Supervisory Power (REG_SUP); Disclosure index (DISCL); Gross Domestic per capita Growth (GDPGR); Inflation Rate (INF); Unemployment Rate (UNEMP); and a dummy variable that captures the sub-prime financial crisis and takes the values of 1 for the years 2007-2010 and zero otherwise (D_CRISIS). Values of standard errors are reported in parentheses under the estimated coefficients. The instruments are: Constant, lagged terms of the indicators that are not used as dependent variables in the regression model, plus GDPGR(-1); INF(-1); UNEMP(-1); GDPGR(-2) INF(-2) UNEMP(-2).

Note: Statistical significance is indicated as ** $p<0.05$, * $p<0.1$

Source: Authors calculations.

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