Do economic freedom and board structure matter for bank stability and bank performance?

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University of Piraeus

2019

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Abstract

This paper investigates the effects of economic freedom, regulations and bank governance on bank performance and risk-taking in 18 European countries for the period 2004–2016. To this end, we use the Fraser economic freedom index and its sub-components namely credit, labor and business market regulation. Our results reveal that economic freedom increases bank performance and contributes to financial stability and soundness. Moreover, we show that liberal credit, labor and business regulation improves the profitability of banks and reduces risk-taking. Regarding the bank governance variables, we find that a large board increases the probability of default whilst the results are mixed for bank performance. Also, we show that experienced directors are associated with less risk-taking and better bank performance. The impact of female directors is positive on bank performance. Regarding the risk-taking of banks, we find that, in a liberal environment, women lead to less credit risk. Finally, the compensation of directors increases bank performance and reduces risk-taking. Our findings change depending on the time period and the location.

Keywords: Fraser economic freedom index, bank stability, regulation, bank governance, bank performance

JEL Classification: G28; G21; P34; P51

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1. Introduction

Banks play a crucial role in the entire economy as they provide essential financial services and, hence, contribute to economic growth and development (Barth et al., 2006). Because of the importance of banks on economic activities it is not surprising that so much attention has been given on the regulation and supervision of the banking sector (Chortareas et al., 2013; Barth et al., 2006; Laeven and Levine, 2009). More precisely, banks should be regulated and supervised not only to protect investors and consumers but also to safeguard the soundness of the financial system (Barth et al., 2013; Chortareas et al., 2013).

The global financial crisis revealed weaknesses concerning the regulatory framework of financial institutions and, thus, re-activated the debate of whether regulatory reforms can promote well-functioning banking systems (Pasiouras et al., 2009; Sufian and Habibullah, 2010). In this context many rules and recommendations, such as the Sarbanes-Oxley Act of 2002 and the Basel II,III[3], have been issued by regulators and policymakers to promote a more resilient banking sector and enable market participants to make better risk assessments (Chortareas et al., 2013; Barth et al., 2013). However, stricter regulation and direct control of banks by the government may have a negative impact on the economic growth by limiting the economic freedom (Sufian and Majid, 2011; Chortareas et al., 2013). Economic freedom is broadly defined as the freedom to prosper within a country without intervention from a government or economic authority.

Economic freedom plays a vital role to the development of the banking system as it encourages the business environment and contributes to the development of innovative ideas. More precisely, greater economic freedom is likely to lead to a better environment for business and, thus, better economic growth and better banking performance (Sufian and Majid, 2011; Chortareas et al., 2013; Pasiouras et al., 2009). Despite the fact that the impact of economic freedom on the economy has been extensively studied (Bergh and Karlsson, 2010; Altman, 2008), its impact on the banking sector has attracted the interest of researchers only in recent years (Psillaki and Mamatzakis, 2017; Sufian and Majid, 2011; Sufian and Hassan, 2010; Sufian and Habibullah, 2010).

The aim of this essay is to examine whether and to what extent economic freedom and regulation of credit, labor and business market affect bank performance and risk-taking. In order to investigate the impact of regulation on bank performance and bank stability, we use an assortment of information

[3] *In 2009 the Basel committee responded to the lessons of the crisis by taking measures to strengthen the Basel II framework and approved for consultation a package of proposal to strengthen global capital and liquidity regulations with the goal of contributing to the financial stability.*

such as the Fraser economic freedom index[4] (Gwartney et al., 2017), as well as restrictions on credit, labor and business markets. To our knowledge, this essay constitutes the first attempt to consider the impact of economic freedom and credit, labor and business market regulation in combination with bank governance variables, both on bank performance and risk-taking. Using this approach we check for possible changes on the effects of corporate variables on bank performance and stability. Regulators who are concerned with the safety and soundness of the banks may apply additional pressure and legal responsibility on boards and, hence, may affect their impact on bank performance and stability (Barth et al., 2013; Pasiouras et al., 2009).

Moreover, we take into consideration the two different theoretical perspectives that concern the effects of banking regulation; the "public interest view" and the "private interest view" (Shleifer and Vishny, 1998; Barth et al., 2006; Laeven and Levine, 2005). According to the "public interest view", it is believed that banking restrictions would be beneficial as they lead to smaller financial institutions which are easy to monitor. Moreover, when banks operate in a heavily strict environment, they have fewer opportunities to increase risk (Boyd et al., 1998; Barth et al., 2006). In contrast, the "private interest view" holds that there are many advantages when banks are permitted to engage in a broad range of activities (Sufian and Habibullah, 2014; Beach and Kane, 2008). A competitive banking system would limit the ability of regulators to extract bribes, would contribute to the efficient management of financial intermediaries and to the improvement of monetary policy transmission via the interbank market rate and, thus, to the economic growth (Claessens and Laeven, 2004; Beck et al., 2003; Van Leuvensteijn et al., 2008).

Due to the lack of knowledge about the effects of adopting stricter regulation or having more economic freedom on banks, we address the following questions:

- *Does economic freedom lead to an increase in bank risk-taking?*
- *Does economic freedom matter for bank performance?*
- *Does credit market regulation affect bank stability and performance?*
- *Does labor market regulation increase bank performance and decrease risk-taking?*
- *Does business market regulation reduce bank risk-taking and improve bank performance?*
- *Do the macroeconomic variables change the impact of bank governance variables on bank performance and risk-taking?*

[4] *The Fraser economic freedom index consists of size of government, legal structure and security of property rights, access to sound money, freedom to trade internationally and regulation of credit, labor and business sector (Gwartney et al., 2017).*

In order to answer the above questions, we take into consideration our findings from the first essay. More precisely, we use bank governance variables which are considered as main variables of corporate governance (Pathan and Faff, 2013; Belhaj and Mateus, 2016) in conjunction with macroeconomic variables namely, economic freedom, regulation of credit, labor and business market, stock market capitalization and foreign bank assets, to check whether there is any differentiation in the impact of corporate governance variables on bank performance and risk-taking. Moreover, we control for country-level characteristics such as economic conditions taking into account the annual growth of GDP and the annual rates of inflation (Pasiouras, 2008; Maudos et al., 2002; Demirguc-Kunt et al., 2004; Beck et al., 2003).

Moreover, using a sample of commercial banks from 18 different European countries for the period 2004-2016, this essay provides new evidence to the existing literature by considering both developed and developing countries. Prior studies in the literature (Mamatzakis et al., 2013; Sufian and Habibullah, 2010; Sufian and Majid, 2011) analyzed the effect of economic freedom on bank efficiency focusing on Central and Eastern European countries (Psillaki and Mamatzakis, 2017; Mamatzakis et al., 2013; Wah Low et al., 2010; Koutsomanoli-Filippaki et al., 2009b). Also, in order to check for any changes according to location we grouped countries in three separated groups according to their geographic location, such as South, North and Central Europe. Bank regulation differs from country to country as there is a difference in the freedom which permits banks to engage in a range of different activities (González, 2005).

Finally, by analyzing the extent to which a major global shock, that is the recent financial crisis, may have altered regulation and restrictions on banks. More precisely, we investigate the period before, during and after the global financial crisis paying particular attention to the effects of regulatory reforms on bank performance and risk-taking. Due to the fact that today, the largest banks continue to face political and regulatory pressure, the need to rethink bank regulation is of particular importance. Especially, European banks are in a turning point as they face many challenges and also are forced to better understand and respond to the sources of pressure such as regulators and investors (Barth et al., 2013; Houston et al., 2010).

The remainder of the essay is organized as follows. Section 2 presents a review of the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 presents the empirical results and explores some extended analysis and robustness tests. Section 5 concludes.

2. Literature review and hypotheses development

This section presents the literature review and develops the hypotheses regarding the impact of economic freedom and regulations (credit, labor, business) on bank performance and risk-taking.

2.1 Economic freedom, bank performance and risk-taking

The results from previous empirical studies (Sufian and Habibullah, 2010; Wah Low et al., 2010; Sufian and Majid, 2011) regarding the impact of economic freedom on bank efficiency are mixed and hence, need to be further examined. Sufian and Hassan (2010) using a sample of five South East Asian countries for the period 1994-2008, find that economic freedom improves the environment associated with innovation and entrepreneurship, and, thus has a positive impact on economic development and bank performance. This means that when financial institutions operate in a less restricted environment they are more likely to engage in competitive policies and, hence, achieve higher levels of performance.

Similarly, Sufian and Habibullah (2010) examining a sample of Malaysian banks from 1999 to 2007, show that economic freedom has a positive effect on bank profitability. One possible explanation for this result is that economic freedom allows banks to lead to foreign financial institutions and companies. In addition, Baier et al. (2012) analyzing bank data from different countries during the period 1976-2008 report that greater levels of economic freedom are associated with a lower probability of financial crises, thus suggesting that more freedom is conducive to a more stable financial system.

Moreover, Sufian and Majid (2011) analyzing a sample of Islamic banks during the period 2000-2008, provide evidence that there is a positive and statistically significant relationship between economic freedom and bank performance. Economic freedom contributes to the promotion of a sound banking system which is vital for sustainable economic growth. Furthermore, authors support that countries with higher level of economic freedom are more likely to enjoy higher living standards. Their findings corroborate the research conducted by Holmes et al. (2008) who claim that a high level of economic freedom is associated with a high level of GDP per capita and, hence, this in turn may lead to a high demand for banking services.

On the contrary, Wah Low et al. (2010) based on a sample of banks from six East Asian countries during the period 1975-2006 examine the impact of economic freedom on bank performance. Their results indicate that the economic freedom index has a positive and significant impact on bank

performance in Singapore but the effect is negative on the other countries. One possible explanation for this result is that Singapore is widely recognized as a highly open economy with a well developed banking system (Wah Low et al., 2010) and more economic freedom.

In the same line, Demirguc Kunt et al. (2004) using data from 72 countries over the 1995-1999 period find that better institutional framework, as captured by the index of economic freedom, decreases bank performance, measured by the net interest margin. A possible explanation is that in countries where the economic freedom is high, it tends to increase competition in the banking sector from other financial intermediaries such as hedge funds and private equity and, thus, have a negative impact on bank performance.

Moreover, Ghosh (2016) employing bank data from MENA (Middle East and North Africa) countries during the period 2000-2012, shows that economic freedom has a positive and statistically significant impact on bank risk-taking measured by Z-Score and non-performing loans. According to the author, it is believed that more restrictions on banking activities and, therefore less economic freedom improve bank soundness and lead to less risk-taking.

The above argument gives rise to following hypotheses:

Hypothesis 1.a (H1.a): Economic freedom is positively related with bank performance

Hypothesis 1.b (H1.b): Economic freedom is negatively related with bank performance

Hypothesis 1.c (H1.c): Economic freedom increases bank risk-taking

Hypothesis 1.d (H1.d): Economic freedom reduces bank risk-taking

2.2 Credit, labor and business market regulation, bank performance and risk-taking

2.2.1 Credit market regulation, bank performance and risk-taking

Credit market regulation index consists of three sub-components namely ownership of banks, private sector credit and interest rate controls (Gwartney et al., 2017). Credit regulation reflects the conditions in the domestic credit market. According to Barth et al. (2006) there are different views regarding the effects of banking regulation, namely the "public interest view" and the "private interest view". From the "private interest view" it is believed that regulatory restrictions on bank activities could reduce the franchise value of a bank and also impede the ability to diversify income streams and, hence, have a negative impact on bank efficiency and lead to greater instability (Laeven

and Levine, 2007;).

Moreover, many economists (Barth et al., 2000; Haubrich and Santos, 2005; Claessens and Laeven, 2004; Evanoff, 1998) believe that regulatory restrictions may be inefficient for banks. A possible explanation is that such restrictions on banking activities can limit the exploitation of economies of scale. Also, in the developing countries where state control of bank lending decisions tends to be higher than private control, it is likely to lead to lower bank performance. One possible explanation for this result is that banks lend more to less creditworthy companies.

On the contrary, the "public interest view" supports that there are many theoretical reasons that advocate stricter regulations on bank activities. Firstly, it is believed that when banks are allowed to engage in a broader range of activities then it is more likely to have more opportunities to increase risk (Barth et al., 2006; Boyd et al., 1998; Saunders, 1994). Another reason for tighter regulations is that governments usually act in the interests of the public and regulate banks to ensure financial stability and ameliorate market failures.

Claessens and Laeven (2004) examined the effects of entry and regulations on banking activities in 50 countries for the period 1994-2000 and found that stricter restrictions on banking activities resulted in lower competition and, thus, in lower bank efficiency. This happens because competition in the banking sector is crucial for the quality of financial products, the degree of financial innovation and the efficient production of financial services (Claessens and Laeven, 2004).

Furthermore, Chortareas et al. (2013) examining bank data from 27 European countries over the period 2001-2009, show that financial freedom has a positive and significant impact on bank efficiency. One possible explanation for this result is the fact that when banks operate in a less restricted environment it is likely to increase competition and to achieve higher levels of efficiency. Similarly, Barth et al. (2013) based on a sample of banks from 72 countries for the period 1999-2007 find that tighter regulations reduce bank efficiency. Moreover, they indicate that greater independence of supervisory authority enhances bank efficiency level.

In addition, Sufian and Habibullah (2010) studied the relationship between institutional environment and bank performance in Malaysia. Using data for commercial banks in Malaysia from 1999 to 2007, the authors report that financial freedom has a positive and significant impact on bank performance. This means that less control on banks by the government permits financial institutions to engage in banking activities that lead to economic growth and to financial stability (Boyd et al., 2004).

In the same vein, Mamatzakis et al. (2013) using the Fraser index in a sample of 10 Central and Eastern European countries during the period 2000-2010 provide evidence that certain aspects of credit regulation, such as interest rate controls have a negative and statistically significant impact on bank efficiency. This means that the limitations in the interest rate control can act as a barrier for banks to invest in high-risk and high-return projects (Jimenez et al., 2010).

However, Laeven and Levine, 2005 claim that broad banking activities may lead to the formation of complex entities which are difficult to monitor. In addition, the "public interest view" supports that government can contribute to bank stability and protect the economy from the negative effects of bank failure, through effective screening on bank activities (Barth et al., 2006).

Furthermore, Koutsomanoli-Filippaki et al. (2009b) analyzing a dataset of banks from 11 Central and Eastern European countries over the period 1998-2005 show that there is a positive relationship between profit efficiency and banking reform using the European Bank for Reconstruction and Development (EBRD) index of banking sector. Similarly, Delis et al. (2011) using a sample of commercial banks from 22 transition countries between 1999 and 2009 find that regulations which promote monitoring and restrictions on bank activities have a positive impact on bank productivity. This result is corroborated by González (2009) who claim that banks with stricter regulations reduce risk-taking in poorly developed financial markets and increase bank efficiency over the period 1996-2002.

Moreover, Agoraki et al. (2011) based on a sample of Central and Eastern European banks from 1998-2005 support that increased regulation, through higher capital requirements and activity restrictions in combination with a higher level of market power reduce both credit risk and the risk of default. A possible explanation is that restrictions in banking activities increase the likelihood that banks would suffer during financial crises.

The above argument gives rise to following hypotheses:

Hypothesis 2.1.a (H2.1.a): Credit market regulation is positively related with bank performance

Hypothesis 2.1.b (H2.1.b): Credit market regulation is negatively related with bank performance

Hypothesis 2.1.c (H2.1.c): Credit market regulation increases bank risk-taking

Hypothesis 2.1.d (H2.1.d): Credit market regulation reduces bank risk-taking

2.2.2 Labor market regulation, bank performance and risk-taking

Labor market restriction index consists of hiring regulations and minimum wage, hiring and firing regulations, centralized collective bargaining, hours regulations, mandated cost of worker dismissal and conscription (Gwartney et al., 2017). The aim of labor market regulation is to protect employees from arbitrary actions on the part of the employers (Mamatzakis et al., 2013). According to Bertola (2009), factors such as limited wage setting flexibility and regulatory constraints on firing affect labor market dynamics. In many counties, labor market regulations are an important and controversial issue which constrains the ability of businesses to adjust employment levels.

Several studies (Botero et al., 2004; Blanchard and Wolfers 2000; Besley and Burgess 2004; Scarpetta and Tressel, 2004) that relate the labor market regulations to economic outcomes, show that stricter labor regulations tend to decrease economic performance. However, little is known concerning the impact of labor market regulations on bank performance and risk-taking. Mamatzakis et al. (2013) based on a sample of 10 CEE countries during the period 2000-2010 find that there is a positive relationship between liberal labor regulation and bank performance. According to the author, liberal reforms in the labor market may decrease employee complacency and, hence, could lead to an increase in bank performance.

In the same vein, Psillaki and Mamatzakis (2017) using data from 10 Central and Eastern European (CEE) countries for the period 2004 to 2009, show that labor market reforms have a positive and statistically significant impact on bank efficiency. This means that less regulatory restrictions are more likely to increase bank efficiency. One possible explanation for this result is that stricter employment protection legislation affects negatively firm returns and therefore, results in declining productivity growth (Scarpetta and Tressel, 2004; Besley and Burgess, 2004).

On the contrary, other empirical studies claim that stricter labor regulation can increase bank performance. More precisely, Koutsomaloni-Filippaki and Mamatzakis (2013) using bank data from 15 European countries during the period 2005-2010, report that there is a negative and statistically significant relationship between labor market regulations and bank efficiency. Their findings indicate that greater market liberalization would reduce bank efficiency.

This is also consistent with the findings of Deakin and Sarkar (2008) who find that stricter labor regulations have a positive effect on productivity growth in France, Germany and in the United States from 1970 to 2000. In addition, labor market regulations that are linked to wage pressures could lead to higher labor productivity and to a reduction in bank risk due to the investment in

specific skills of employees and to intensive technology (Autor et al., 2007).

The above argument gives rise to following hypotheses:

Hypothesis 2.2.a (H2.2.a): Labor market regulation is positively related with bank performance

Hypothesis 2.2.b (H2.2.b): Labor market regulation is negatively related with bank performance

Hypothesis 2.2.c (H2.2.c): Labor market regulation increases linked to bank risk-taking

Hypothesis 2.2.d (H2.2.d): Labor market regulation reduces linked to bank risk-taking

2.3 Business market regulation, bank performance and risk-taking

Business market regulation index comprises of administrative requirements, bureaucracy costs, regulation about starting a business, extra payments, licensing restrictions and cost of tax compliance (Gwartney et al., 2017). It refers to entry barriers and constrains that may reduce competition and, thus, may also affect bank performance. It is believed that regulatory entry barriers and bureaucratic procedures lead to a reduction in new firms entering in a business and hence, resulted in decreased competition (Klapper et al., 2006).

Chortareas et al. (2013) supports that revenues generated by new businesses have a significant impact on bank profitability. For instance, business regulations and entry barriers can lead to decreased competition, reduced growth and less productivity (Klapper et al., 2006; Loayza et al., 2005). This, in turn has a negative impact on bank performance as firms would not be able to fulfill their obligations to the banks.

In this context, Sufian and Habibullah (2010) using a sample of Malaysian banks from 1999 to 2007, indicate that business freedom has a positive effect on bank profitability. Similarly, Psillaki and Mamatzakis (2017) based on a sample of 10 Central and Eastern European (CEE) countries from 2004 to 2009 find evidence that there is a positive and statistically significant relationship between business regulations on bank efficiency. This means that less regulatory restrictions and entry barriers that concern new businesses are more likely to increase bank efficiency through increased competition and economic growth and development.

However, using a stochastic frontier approach for cost efficiency, Sufian and Habibullah (2014) analyze a sample of commercial banks in Malaysia over the period 1995-2008 and find that there is a negative and statistically significant relationship between business freedom and bank efficiency. This

means that greater freedom to start, operate and close a business, tends to lower bank entry barriers, and hence, intensify competition and impede bank efficiency.

Moreover, business market regulations may also affect bank risk. More precisely, increased business regulations may prompt informality, and, thus, making it harder for banks to assess the creditworthiness of a company (Loayza et al., 2005). This may lead to high levels of non-performing loans and to more credit risk for banks.

Based on the existing literature our hypotheses are as following:

Hypothesis 2.3.a (H2.3.a): Business market regulation is positively related with bank performance

Hypothesis 2.3.b (H2.3.b): Business market regulation is negatively related with bank performance

Hypothesis 2.3.c (H2.3.c): Business market regulation increases bank risk-taking

Hypothesis 2.3.d (H2.3.d): Business market regulation reduces bank risk-taking

2.4 The impact of global financial crisis (GFC) on bank performance and risk-taking

The post-crisis agenda raised questions about regulation and its impact on bank performance and risk-taking. It was recognized that supervision prevents banks from engaging in risky behavior and therefore contribute to bank performance and stability. Shehzad and De Haan (2008) using a sample of developing and developed countries for the period 1981-2002 examine the impact of financial liberalization on systemic and non-systemic banking crises.[5] Their results indicate that financial liberalization reduces the likelihood of systemic crises. Few years later, Barth et al. (2013) show that when banks suffer from banking crisis then stricter regulations would be beneficial as they result in a higher bank performance and in a more stable financial system.

In the same vein, Baier et al. (2012) based on a sample from different countries during the period 1976-2008 find that higher economic freedom is associated with lower probability of a banking crisis. Financial liberalization is considered to enhance financial development as banks can exploit opportunities from increased competition. Also, they report that credit market regulation increases after a financial crisis. A possible explanation for this result is that in the post-crisis period there is a diminution in economic freedom and its components that stems from tighter regulation and slower

[5] *Systemic banking crisis is a crisis in which more or all bank capitals have been exhausted (Caprio and Klingebiel, 1999). Non-systemic crisis is of lesser significance in which large banks fail.*

economic growth. Similarly, De Haan et al. (2009) analyze the effects of crises on economic freedom in Norway and Sweden for 1985-2005 and find that economic freedom falls right after a crisis but then increases.

However, Beltratti and Stulz (2012) using data from different countries over the period 2007-2008 provide evidence that stricter regulation on banking activities resulted in banks performing better during the crisis. Authors believe that traditional bank activities are less exposed to the risks that turn out poorly during the crisis and also support that financial liberalization induces risk-taking behavior and may contribute to banking crises, and hence, to financial instability.

Hypothesis 3.a (H3.a): Compared to 'normal times', the predicted relation between economic freedom, regulation of credit, labor, business market and bank performance varies following the financial crisis.

Hypothesis 3.b (H3.b): Compared to 'normal times', the predicted relation between economic freedom, regulation of credit, labor, business market and risk-taking is less pronounced following the financial crisis.

3. Data and methodology

In this section we analyze the bank sample and the data sources. Furthermore, we describe in detail the variables used in the regression equations and, finally, we present the methodology.

3.1 Sample and Data

The balance-sheet and income statement data used in this study was extracted from the Bankscope database while the macroeconomic data was extracted from the 2017 version of the Fraser Index of Economic Freedom and the Word Bank database for the period 2004 to 2016. The research comprises samples of 75 commercial European banks from 18 European countries namely Spain, Italy, Ireland, the United Kingdom, Denmark, France, Germany, Holland, Belgium, Portugal, Luxembourg, Hungary, Poland, Greece, Sweden and Finland. Moreover, after scrutinizing the data to avoid inconsistencies, errors, and double counting of institutions we end up with an unbalanced panel of 861 bank-year observations.

3.2 Variables

In this sub-section we describe in detail the set of variables considered in our study namely, the dependent variables, the main explanatory variables and the control variables.

3.2.1 Dependent variables

In line with previous studies (Belhaj and Mateus, 2016; Pathan and Faff 2013; Andres and Vallelado 2008; Setiyono and Tarazi 2014), we employ alternative proxies of bank performance (PERFOR) and risk-taking (RISK) that are commonly used in the existing literature as they provide us with different types of information on governance, the multiple proxies of performance and risk. Finally, we will check the robustness of our findings using these different proxies of bank performance and risk. These are, return on average assets (ROAA), return on average equity (ROAE), net interest margin (NIM) and Tobin'sQ ratio for bank performance, Z-Score, non-performing loans (NPL) and Tier1-capital ratio for risk-taking. .

Return on average assets (ROAA) is an accounting-based measure of bank profitability. It is the net income after taxes, as a percentage of total assets (Pathan and Faff, 2013; Andrés and Vallelado, 2008). Return on average assets (ROAA) reflects the capability of a bank to generate profits from its asset management functions. Moreover, it is used as the key ratio for the evaluation of bank performance in the existing literature (Claessens and Laeven, 2004; Mamatzakis and Bermpei, 2016). Return on average equity (ROAE) is the net income after taxes as a percentage of equity (Aebi et al., 2012). It is a direct measure of returns to shareholders and is influenced by the capital structure of a financial institution. Banks with higher leverage, and hence, lower equity, generally record lower percentage of return on average assets (ROAA) but higher percentage of return on average equity (ROAE). Moreover, return on average equity (ROAE) explains how effectively shareholder's funds are being used by the management of the bank.

Net interest margin (NIM) is the net interest income as a percentage of the average profit (Pathan and Faff, 2013). It is important to bank managers because it indicates whether asset and liability management is being done properly, meaning that the bank earns income on its assets and has low cost on its liabilities (Raharjo et al., 2014; Marinković and Radović, 2014). Tobin'sQ is the sum of the market value of equity and the book value of liabilities divided by the carrying amount of total assets (Pathan and Faff, 2013). Several studies have used this efficiency measure as a dependent variable in the banking sector (Belhaj and Mateus, 2016; Staikouras et al, 2007). Its importance

derives from the fact that it records the value of future investment opportunities. Therefore, a high value of this index means that a bank has high growth potential.

The first measure of bank risk is Z-Score. It is used in bank governance literature (Bai and Elyasiani, 2013; Delis et al., 2012; Beltratti and Stulz, 2012; Laeven and Levine, 2009) referring to the relationship between bank risk and capital regulations, deposit insurance and other regulatory policies. It is defined as the mean of (ROA) +CAR/σ (ROA) where ROA is the return on assets and CAR is the capital-asset ratio. Hence, Z-Score can be defined as a measure of the distance to default (Bai and Elyasiani, 2013). A lower value of Z-Score indicates higher bank risk.

Non-performing loans (NPL) is used as a proxy for credit risk and financial stability. It is the ratio of loans loss provisions divided by total loans (Pathan et al., 2008). According to the European Central Bank (ECB, 2017), it is a credit risk measure that directly affects the profitability of banks and, hence, financial stability. A high percentage of this proxy means that there is an increase on credit portfolio which could spillover and affects the stability of the financial system (ECB, 2017).

Finally, the Tier 1 capital ratio[6] is the ratio of a bank's core equity capital to its total risk-weighted assets (RWA). Risk-weighted assets are the total of all assets held by the bank weighted by credit risk according to a formula determined by the Basel rules (BCBS, 2010). It is a key measure of a bank's financial strength.

3.2.2 The Fraser Index of Economic Freedom indicators

According to Gwartney et al. (2017) the Fraser economic freedom index measures the degree to which the policies and institutions of countries are supportive of economic freedom. A country has to provide secure protection of privately owned property and a stable monetary environment in order to receive a high economic freedom index. Moreover, it should have low levels of taxes, refrain from creating barriers to both domestic and international trade and rely more on markets than government (Gwartney et al., 2017; Pasiouras et al., 2009). Each component of economic freedom is placed on a scale from 0 for no freedom to 10 for maximum freedom.

The credit market regulation (CR-REG) component consists of the following sub-components: i) ownership of banks (CR-OWN), ii) private sector credit (CR-PR) and iii) interest rate controls (CR-IR). The sub-component ownership of banks (CR-OWN) measured as the percentage of deposits

[6] *Tier1 capital increases from 4%in Basel II to 6% applicable in 2015. This 6% is composed of 4.5% of CET1, plus an extra 1.5% of additional Tier1.*

held in private owned banks. The other two sub-components, namely private sector credit (CR-PR) and interest rate controls (CR-IR), indicate the extent to which credit is supplied to the private sector and whether controls on interest rates interfere with the market in credit (Gwartney et al., 2017). Higher levels of the credit regulation index denote less regulatory restriction.

However, we also consider the other two sub-components of regulation, namely labor market regulations and business regulation to examine their impact on bank performance and risk-taking. Labor market regulation (LB-REG) component, is designed to measure the extent to which these restraints upon economic freedom are present. In order to earn high marks in the component rating regulation of the labor market, a country must allow market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription (Gwartney et al., 2017).

Finally, the business regulation (BS-REG) component presents the extent to which regulations and bureaucratic procedures restrain entry and reduce competition. In order to earn high score in this component, countries have to allow markets to determine prices and refrain from regulatory activities that retard entry into business and increase the cost of production. Moreover, they must refrain from using their power to extract financial payments and reward businesses at the expense of others (Gwartney et al., 2017).

3.2.3 Control variables

We use a number of bank-specific and country-specific variables. To begin with bank-specific variables, bank size (LNTA), is defined as the natural logarithm of the bank's total assets (Psillaki and Mamatzakis, 2017; Barth et al., 2013; Chortareas et al., 2013). Secondly, we employ the level of capitalization variable which is defined as the equity of total assets (CAPITAL) and it is used as a proxy for capital adequacy or capital risk (Chortareas et al., 2013; Belhaj and Mateus, 2016; Pathan and Faff, 2013). The next variable refers to the ratio of loans to total assets (LOANSTA) used as a proxy for asset utilization (Psillaki and Mamatzakis, 2017; Pasiouras, 2006; Mamatzakis et al., 2013). It is a measure of loan activity and it is expected to be positive as it is associated with well-functioning intermediation by financial institutions (Mamatzakis et al., 2013).

Furthermore, in order to account for macroeconomic conditions within each country, we employ the following variables. Firstly, we use the GDP growth (GDP) which equals the rate of real per capita GDP growth and it is considered as a proxy for the fluctuations in economic activities (Agoraki et al., 2011; Mamatzakis et al., 2013). GDP growth is commonly used as an indicator of the monetary

environment. Inflation (INF) equals the annual rate of the change in the Consumer Price Index[7] 2010 (CPI). It is believed that underdeveloped countries are linked to high levels of inflation (Boyd et al., 2001).

Another variable is the stock market capitalization to GDP (MACGDP) used as a proxy for the size of the stock market (Beck et al, 2003; Demirguc-Kunt and Huizinga, 2000; Pasiouras, 2008). Despite the fact that previous studies in the literature (Demirguc-Kunt and Huizinga 1999; Bart et al, 2006, Pasiouras et al., 2009) employed this indicator, their results still remain mixed. Moreover, to capture for the impact of the presence of foreign banks we use the percentage of foreign bank assets among total assets (FOREIGN) as a proxy for market structure (Psillaki and Mamatzakis, 2013; Pasiouras et al., 2009; Weill, 2003).

Finally, we employ some bank governance variables as explanatory variables. We use those that have the most significant impact on both bank performance and risk-taking in accordance with our findings in the first essay. More precisely, we use board size (BS), gender diversity (FEMALE), board financial experience (EXPER) and compensation (COMPENSATION).

According to Pathan and Faff (2013), Staikouras et al. (2007), board size (BS) is defined as the sum of the directors within a board (executive and supervisory). Financial experience (EXPER) is the average number of financial experience relevant either on the supervisory or executive board on which the director sits (Fernandes and Fich, 2013). The percentage of female directors (FEMALE) is defined as the percentage of women on the board (Owen and Temesvary, 2018). Finally, according to BoardEx definitions, compensation (COMPENSATION) is the sum of salary and bonus.

3.4 Empirical models and methodology

3.4.1 Fixed-Effects model

Our sample is a mixture of time series and cross-sectional analysis and as a consequence the most efficient tool to use is panel data analysis (Andres and Vallelado, 2008). The advantage of this method is that it takes into account the heterogeneity, which is the specific characteristics of each bank, such as the quality of management, business activity among others (Belhaj and Mateus, 2016).

The first econometric method we apply to control the impact of bank governance variables on bank performance and risk-taking is Fixed-Effects.[8] When the unobserved effect is correlated with

[7] *Basis year is the 2010.*

independent variables, then this method gives unbiased estimators in contrast with Pooled OLS method which produces biased and inconsistent estimators.

Bank performance model

$$(PERFOR)\ i,t = \beta_0 + \beta_1 EC\text{-}FR\ i,t + \beta_2 CR\text{-}REG\ i,t + \beta_3 LB\text{-}REG\ i,t + \beta_4 BS\text{-}REG\ i,t + \beta_5 LNTA\ i,t + \beta_6 CAPITAL i,+\beta_7 LOANSTA i,t+\beta_8 GDP i,t+\beta_9 INF i,t+\beta_{10} MACGDP i,t+\beta_{11} FOREIGN i,t+\beta_{12} BS i,t+\beta_{13} EXPER i,t+\beta_{14} FEMALE i,t+\beta_{15} COMPENSATION i, + ui + \varepsilon i,t \quad (1a)$$

Bank risk model

$$(RISK)\ i,t = \beta_0 + \beta_1 EC\text{-}FR\ i\ t + \beta_2 CR\text{-}REG\ i,t + \beta_3 LB\text{-}REG\ i,t + \beta_4 BS\text{-}REG\ i,t + \beta_5 LNTA\ i,t+ \beta_6 CAPITAL i,t+\beta_7 LOANSTA i,t+\beta_8 GDP i,t+\beta_9 INF i,t+\beta_{10} MACGDP i,t+\beta_{11} FOREIGN i,t+\beta_{12} BS i,t+\beta_{13} EXPER i,t+\beta_{14} FEMALE i,t+\beta_{15} COMPENSATION i, + ui + \varepsilon i,t \quad (1b)$$

Where ***PERFOR*** and ***RISK*** denote performance and risk-taking respectively for bank i, **t** the time period, **ln** the natural logarithmic, **β** the parameters to be estimated, **u** the unobserved fixed-effect for bank **i** and **ε** the remaining disturbance term.

3.4.2 Endogeneity issues and Two-step system GMM model

To address the endogeneity problem in corporate governance literature, we use the two-step system estimator approach, proposed by Arrelano and Bover (1995) and Blundell and Bond (1998). This estimator involves the use of dynamic effect by adding a lagged dependent variable to the explanatory variable. Moreover, by applying the two-step system GMM, we can build instruments for endogenous variables. More precisely, to treat all potentially endogenous variables, we use their past values as their respective instruments (Vallascas and Hagendorff, 2013).

To test the validity of the multiple lags as an instrument, we calculate the Hansen/Sargan test (Pathan and Faff, 2013; Andres and Vallelado, 2008). The *AR(1)* and *AR(2)* measure first and second degree serial correlation. The residuals of the first differences *AR(1)* may be correlated but there should be no correlation in the second differences *AR(2)* (Cameron and Trivedi, 2009).

[8] *Applying Hausman Test (Wooldridge, 2012) we conclude that the methodology to be used is Fixed Effects.*

Bank performance model

$$(\textbf{PERFOR})\ i,\ t = \beta_0 + \beta_1 PERFOR\ i,\ (t-1) + \beta_2 EC\text{-}FR\ i,t + \beta_3 CR\text{-}REG\ i,t + \beta_4 LB\text{-}REG\ i,t + \beta_5 BS\text{-}REGi,t + \beta_6 LNTAi,t + \beta_7 CAPITALi,t + \beta_8 LOANSTAi,t + \beta_9 GDPi,t + \beta_{10} INFi,t + \beta_{11} MACGDPi,t + \beta_{12} FOREIGNi,t + \beta_{13} BSi,t + \beta_{14} EXPERi,t + \beta_{15} FEMALEi,t + \beta_{16} COMPENSATIONi, + ui + \varepsilon i,t \quad (2a)$$

Bank risk model

$$(\textbf{RISK})\ i,\ t = \beta_0 + \beta_1 RISK\ i,\ (t-1) + \beta_2 EC\text{-}FR\ i,\ t + \beta_3 CR\text{-}REG\ i,\ t + \beta_4 LB\text{-}REG\ i,\ t + \beta_5 BS\text{-}REG\ i,\ t + \beta_6 LNTAi,t + \beta_7 CAPITALi,t + \beta_8 LOANSTAi,t + \beta_9 GDPi,t + \beta_{10} INFi,t + \beta_{11} MACGDPi,t + \beta_{12} FOREIGNi,t + \beta_{13} BSi,t + \beta_{14} EXPERi,t + \beta_{15} FEMALEi,t + \beta_{16} COMPENSATIONi, + ui + \varepsilon i,t \quad (2b)$$

Where ***PERFOR*** and ***RISK*** denote performance and risk-taking respectively for bank **i, t** the time period, **ln** the natural logarithmic, **β** the parameters to be estimated, **u** the unobserved fixed-effect for bank **i** and **ε** the remaining disturbance term.

Table 1 summarizes the definitions of the variables used in this study. More precisely, the first group concerns the dependent variables which are bank performance and bank risk. Moving to the second group, Table 1 represents the definitions of Fraser Index of Economic Freedom Indicators which are economic freedom, credit regulation, labor regulation, business regulation. Moreover, the third group, Table 1 below, provides the definitions of control variables (bank size, capital ratio, loans to total assets, GDP, inflation, stock market capitalization to GDP, presence of foreign banks, board size, financial experience, the percentage of female directors and compensation). Finally, except for the definitions of variables, Table 1 also presents the Databases which we used to extract the data.

Table 1: Definition of variables

	Variables	*Definition*	*Database*
Panel A: Dependent Variables			
Tobin'sQ	Tobin'sQ	The sum of the market value of equity and the book value of liabilities divided by the carrying amount of total assets	BankScope
ROAA	Return on average assets	The net income after taxes, as a percentage of total assets	BankScope
ROAE	Return on average equity	The net income after taxes as a percentage of equity	BankScope
NIM	Net interest margin	The net interest income as a percentage of average earning assets.	BankScope
Z-Score	Z-Score ratio	The ratio of: mean(ROAA)+CAR / st.dev (ROAA)	BankScope
NPL	Non-performing loans	The ratio of loans loss provisions divided by total loans	BankScope
Tier1-capital ratio	Tier1-capital ratio	The shareholder funds plus perpetual noncumulative preference shares as a percentage of risk weighted assets and off balance sheet risks measured under the Basel rules.	BankScope
Panel B: The Fraser Index of Economic Freedom Indicators			
EC-FR	Economic Freedom	It measures the degree to which the policies and institutions of countries are supportive of economic freedom. The cornerstones of economic freedom are personal choice, voluntary exchange, freedom to enter markets and compete, and security of the person and privately owned property. It measures the degree of economic freedom in five broad areas namely, size of government, property rights, access to sound money, freedom to trade international and regulation of credit, labor and business market. This variable takes values between 0 and 10 with higher values indicating greater economic freedom.	The 2017 version of the Fraser index of Economic Freedom
CR-REG	Credit Regulation	It reflects conditions in the domestic credit market. This variable takes values between 0 and 10 with higher values indicating greater credit freedom.	The 2017 version of the Fraser index of Economic Freedom
LB-REG	Labor Regulation	It measures the extent to which these restraints upon economic freedom are present. In order to earn high marks in the component rating regulation of the labor market, a country must allow market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription. This variable takes values between 0 and 10 with higher values indicating greater labor freedom.	The 2017 version of the Fraser index of Economic Freedom
BS-REG	Business Regulation	It identifies the extent to which regulations and bureaucratic procedures restrain entry and reduce competition. This variable takes values between 0 and 10 with higher values indicating greater business freedom.	The 2017 version of the Fraser index of Economic Freedom
CR-OWN	Ownership of banks	This sub-component measures the percentage of bank deposits held in privately owned banks. Countries with larger shares of privately held deposits received higher ratings. When privately held deposits between 95% and 100%, countries were given a rating of 10. When private deposits constituted between 75% and	

		95% of the total, a rating of 8 was assigned. When private deposits were between 40% and 75% of the total, the rating was 5. When private deposits are between 10% and 40%, countries received a rating of 2. A zero rating was assigned when private deposits were 10% or less of the total. The 2017 version of the Fraser index of Economic Freedom	
CR-PR	Private sector credit	This sub-component measures the extent to which government borrowing crowds out private borrowing. When data are available, this sub-component is calculated as the government fiscal deficit as a share of gross saving. Higher values are indicative of greater credit freedom. The 2017 version of the Fraser index of Economic Freedom	
CR-IR	Interest rate controls	Data on credit-market controls and regulations were used to construct rating intervals. Countries with interest rates determined by the market, stable monetary policy, and positive real deposit and lending rates received higher ratings. When interest rates were determined primarily by market forces and the real rates were positive, countries were given a rating of 10. A zero rating was assigned when the deposit and lending rates were fixed by the government and real rates were persistently negative by double-digit amounts or hyperinflation had virtually eliminated the credit market. The 2017 version of the Fraser index of Economic Freedom	
Panel C: Control Variables			
LNTA	Bank size	The natural logarithm of total assets	BankScope
CAPITAL	Capital adequacy ratio	The ratio of equity to total assets	BankScope
LOANSTA	Leverage ratio	The ratio of loans to total assets	BankScope
GDP	GDP growth	The rate of real per capita GDP growth.	World Bank
INF	Inflation	Annual rate of inflation.	World Bank
MACGDP	Stock market capitalization to GDP	The ratio of stock market capitalization to GDP. The variable serves as a proxy of financial development.	World Bank
FOREIGN	Presence of foreign banks	Percentage of the total banking assets that are held by foreign banks. A foreign bank is a bank where 50 percent or more of its shares are owned by foreigners.	World Bank
COMPENSATION (in 000s)	Compensation	The sum of salary and bonus	BoardEx
FEMALE	Female directors	The percentage of directors on the board who are female	BoardEx
BS	Board size	The number of directors sitting on the board	BoardEx
EXPER	Financial experience	The average number of financial experience relevant either on the supervisory or executive board on which the director sits.	BoardEx

4. Empirical results

4.1 Descriptive statistics and Correlation matrix

Table 2 provides the descriptive statistics on dependent variables, independent variables and control variables for the sample of European banks from 2004 to 2016. More precisely, panel A presents descriptive statistics of bank risk-taking and performance measures. The average Tobin'sQ fluctuates between 0.04% and 1.63%. Also the sample mean return on average assets (ROAA) is 0.64%. Our findings are in line with Belhaj and Mateus (2016) and Staikouras et al. (2007) who find that Tobin'sQ average is 1.03% and the mean return on assets (ROA) is 0.75% using a sample of 58 European banks. The average return on average equity (ROAE) is 7.89% while for net interest income (NIM) the mean is 1.72%. In the same direction, Belhaj and Mateus (2016) find an average return on equity ROE of 9.7% over the period 2002-2011. As the sample includes the crisis period we observe some negative values for our performance measures.

Regarding risk measures, we see in Table 2 that the average Z-Score is 10.11. This means that many banks face a default risk (Levine, 2004) as a higher Z-Score indicates that a bank has higher returns to cover its liabilities. The mean ratio of non-performing loans (NPL) is 6.91% with a maximum value of 44.86%. The mean of Tier1-capital ratio is 11.11% with a minimum value of 4.20%.

The variables in Panel B of Table 2 show that the average of economic freedom (EC-FR) is 7.49 with a minimum of 6.43 and a maximum of 8.30. Regarding the variable credit regulation, Table 2 demonstrates that credit regulation has an average 8.97 with a minimum of 6.00 and a maximum of 10.00. Moreover, the component of labor regulations has a mean of 6.43. The average of business regulation is 7.14 with a minimum value of 4.77 and a maximum value of 8.57. Our results corroborate those of Mamatzakis et al. (2013) who examined the impact of regulation on bank efficiency in Central and Eastern European countries during the period 2000-2010 and show that credit regulations are more established compared to the reforms of the labor and business market regulation.

Panel C of Table 2 presents the descriptive statistics of the control variables considered in our study. The banks in our sample have an average asset size of €7.32 billion. We use the natural logarithm of total assets in order to eliminate the effect of outliers on our results. The average of capital adequacy ratio reaches 13.92% while the minimum value is 4.10%. Our results are close to Belhaj and Mateus (2016) who find that the average equity to asset ratio (capital ratio) for European banks over the

period 2002-2011, is 11.62%. Banks are highly leveraged; the mean ratio of leverage is 12.63% while the maximum value is 89.06%. Moreover, the mean of GDP growth is 0.99% while the average of inflation is 1.83%. Regarding the stock market capitalization to GDP we find that the minimum value is 9.06% and the maximum value is 57.17%. The mean concerning the presence of foreign banks is 23.54% with a minimum value of 0% and a maximum value of 90%. According to Agoraki et al. (2011) a high presence of foreign banks contributes to more benefits for banks and to less risk-taking (Demirguc-Kunt and Serve, 2009).

The bank governance variables in Panel C of Table 2 show that the average board size (BS) is 16.44 with a minimum of 2 and a maximum of 34 directors. Our results are close to Fernandes et al. (2017) who find that the average number of the board of directors is 16.39 for European banks over the period 2007-2008. Similarly, the results of Belhaj and Mateus (2016) show that during the period 2002-2011 European banks have an average number of board members of 15.87. According to Booth et al. (2002) the number of directors in banks is usually larger than the one in non-financial firms. A large board in banks can be explained by many factors, such as the large size of banks. Also, Table 2 reports that bank directors have on average 5.77 years of bank experience with a minimum of one year and a maximum of 19.45 years. The mean percentage of female directors is 13.36% with a minimum value of 0% and a maximum value of 54.45%. In addition, the mean salary plus bonus (total compensation) for the directors is €4.45 million.

Table 2: Descriptive statistics (2004-2016) All Countries

Variables	Observations	Mean	SD	Min	Max
Panel A: Dependent Variables					
Tobin'sQ (%)	645	1.02	0.15	0.04	1.63
ROAA (%)	809	0.64	1.17	-12.36	6.23
ROAE (%)	807	7.89	13.84	-48.01	51.46
NIM (%)	809	1.72	1.10	-1.60	10.27

Z-SCORE (%)	739	10.11	6.55	-3.05	41.14
NPL (%)	767	6.91	6.59	0.17	44.86
TIER1-CAPITAL (%)	714	11.11	4.61	4.20	69.25
Panel B: The Fraser Index of Economic Freedom Indicators					
EC-FR	861	7.49	0.30	6.43	8.30
CR-REG	861	8.97	0.81	6.00	10.00
LB-REG	861	6.43	1.21	3.68	8.46
BS-REG	860	7.14	0.86	4.77	8.57
Panel C: Control Variables					
LNTA (in €bil.)	811	7.32	1.98	2.59	11.76
CAPITAL (%)	727	13.92	4.67	4.10	68.36
LOANSTA (%)	807	12.63	16.2	24.02	89.06
GDP (%)	821	0.99	2.97	-9.13	25.55
INF (%)	821	1.83	1.27	-4.47	7.95
MACGDP (%)	790	49.10	29.30	9.06	57.17
FOREIGN (%)	720	21.55	23.54	0	90
BS (No)	861	16.44	5.89	2.00	34.00
EXPER (%)	861	5.77	2.76	1.00	19.45
FEMALE (%)	860	13.36	11.68	0.00	54.54
COMPENSATION	850	4.45	6.03	1.30	11.46

(in €mil.)

Note: This table presents the distribution of each variable by showing mean, standard deviation, minimum (min) and maximum (max) value.

Table 3 presents Pearson pair-wise sample correlations between variables. Multicollinearity among the regressors is not a serious concern since the maximum sample correlation is just 0.50 between Tier1-capital and Z-Score (Gujarati, 2004).

Table 3: Correlation Matrix

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	EC-FR	1.00																					
2	CR-REG	**0.21***	1.00																				
3	LB-REG	**0.33***	**0.30***	1.00																			
4	BS-REG	**0.32***	**0.20***	**0.38***	1.00																		
5	INF	-0.14	-0.07	**-0.08***	**-0.13***	1.00																	
6	GDP	0.12	**0.10***	0.11	**0.09***	**0.29***	1.00																
7	LNTA	**0.11***	0.16	**0.15***	**0.12***	0.17	0.16	1.00															
8	CAPITAL	0.19	0.17	0.21	0.25	**-0.13***	0.10	**-0.22***	1.00														
9	LOANSTA	-0.18	-0.16	-0.14	-0.22	0.11	**-0.09***	**-0.07***	0.12*	1.00													
10	MACGDP	0.12	-0.15	0.11	**0.26***	0.09	0.30	**0.16***	**-0.22***	0.16	1.00												
11	FOREIGN	**-0.14***	0.09	0.15	-0.08	**0.12***	**0.09***	**-0.15***	**0.21***	-.0.15	**-0.14***	1.00											
12	BS	**-0.11***	**-0.18***	-0.30	**-0.27***	-0.21	-0.06	**0.13***	**-0.22***	0.12	**-0.24***	0.06	1.00										
13	EXPER	**-0.17***	0.14	-0.07	0.12	0.07	**-0.09***	**0.14***	**-0.26***	**0.19***	0.17	0.07	-0.01	1.00									
14	FEMALE	**0.18***	**0.11***	**0.29***	**0.30***	-0.29	**0.08***	**0.27***	**0.17***	**0.12**	**0.18***	**-0.19***	**0.24***	**0.07***	1.00								
15	COMPENSATION	**0.32***	-0.12	**0.17***	0.15	**0.08***	**0.12***	**0.48***	0.02	**0.14**	0.30	-0.14	0.057	**-0.10***	**0.24***	1.00							
16	TOBIN'SQ	**0.17***	0.08	0.16	0.08	-0.07	**0.24***	**-0.18***	**0.10***	**0.21***	**0.14***	-0.07	**-0.26***	-0.01	0.03	0.07	1.00						
17	NPL	**-0.35***	-0.19	**-0.12**	**-0.20***	-0.26	**-0.19***	**-0.13***	**0.11***	**0.14***	**-0.38***	0.09	**-0.09***	-0.03	**0.08***	**0.14***	**0.11***	1.00					
18	ROAA	**0.12***	**0.24***	**0.15***	**0.18***	-0.10	**0.32***	**0.09***	**0.14***	-0.06	0.15	0.19	**-0.08***	**0.12***	-0.07	0.001	**0.33***	**-0.29***	1.00				
19	ROAE	**0.17***	**0.21***	**0.08***	**0.09***	-0.09	0.23	0.01	0.15	**-0.08***	**0.26***	0.18	-0.01	**0.07***	-0.01	0.03	**0.13***	**-0.12***	**0.39***	1.00			
20	NIM	**-0.23***	0.18	**-0.09***	**-0.33***	0.12	**-0.06**	**-0.23***	-0.05	0.19	-0.24	**0.25***	-0.02	**0.23***	-0.04	**0.09***	**0.19***	**0.27***	**0.24***	**0.07***	1.00		
21	Z-SCORE	**0.25***	0.15	0.32	**0.27***	-0.14	**0.17***	**0.10***	**0.38***	**0.12**	**0.34***	**-0.12***	**-0.31***	0.068	**0.32***	**0.21***	**0.19***	**-0.19***	**0.25***	**0.21***	-0.045	1.00	
22	TIER1-CAPITAL	**0.08***	0.09	**0.21***	0.24	**-0.17***	-0.16	**-0.13***	**0.22***	**-0.28***	-0.06	0.08	**-0.25***	-0.014	-0.024	-0.03	**0.09***	0.12	**0.15***	0.07	-0.012	**0.50***	1.00

Note: The table reports Pearson Correlation Matrix. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

4.2 Descriptive statistics per country and per year

Tables 4a and 4b present the average value of Frazer Index of Economic Freedom Indicators (economic freedom, credit regulations, labor regulations, market regulations) per country and per year respectively. Regarding the analysis of the countries (Table 4a) we notice that the average size of economic freedom varies between 6.96 in Greece and 8.05 in the UK. Greece and Poland have the lowest value of economic freedom with an average of 6.96 and 7.11 respectively, while Ireland and the UK have the highest value of economic freedom with an average of 8.01 and 8.05 correspondingly. This means that developed countries are more liberal than developing ones, as they record higher value on the index of economic freedom.

As far as the credit regulation is concerned, it varies from 7.84 to 9.92. At the country level the best performers in terms of credit regulation (CR-REG) are Spain (9.92) and Denmark (9.84) while the worst is Greece (7.84). Regarding labor regulation (LB-REG) the most liberalized labor markets are the UK (8.25) and Sweden (7.96) while Greece (4.46) and Germany (4.61) are the countries with the most rigid labor regulation. Moreover, business regulation (BS-REG) is significantly more liberal in Sweden (8.19) while Italy (5.87) and the Czech Republic (6.03) represent the countries with the most strict business regulation (BS-REG).

Continuing with the per year analysis (Table 4b), we notice that in 2004 the mean of economic freedom was 7.58 and remained at the same level during the crisis with an average of 7.40. Regarding the credit regulation (CR-REG), Table 4b reports that there is a slight increase as from 9.06 in 2004 it reached 9.14 in 2016 while freedom from labor regulation (LB-REG) has increased from 5.79 to 7.03 over the same period. Similarly, business regulation has improved from 7.29 in 2004 to 7.71 in 2016. Our results corroborate the research conducted by Mamatzakis et al. (2013) who found that credit, labor and business regulation improved during the period 2000-2010 in the Central and Eastern European countries.

Table 4a: Descriptive statistics per country

Countries	*Variables*			
	EC-FR	***CR-REG***	***LB-REG***	***BS-REG***
Austria	7.66	9.25	5.99	7.28
Poland	7.11	8.50	5.41	6.03
Czech Republic	7.35	9.53	7.88	5.93
Hungary	7.28	9.61	9.86	6.40
Luxembourg	7.54	9.00	9.63	7.65
Belgium	7.39	9.52	7.10	7.13
Germany	7.62	8.06	4.61	7.38
Netherlands	7.60	9.41	4.72	7.36
France	7.34	9.36	5.65	7.13
Ireland	8.01	8.60	7.70	7.84
UK	8.05	8.64	8.25	7.76
Denmark	7.77	9.84	7.40	8.05
Sweden	7.48	9.27	7.96	8.19
Finland	7.76	9.71	5.36	8.13
Portugal	7.29	7.86	5.39	6.53
Spain	7.45	9.92	5.81	7.67
Greece	6.96	7.84	4.46	6.19
Italy	7.20	8.94	6.46	5.87

Note: This table reports the mean value in each country for economic freedom and regulation variables.

Table 4b: Descriptive statistics per year

Year	*Variables*			
	EC-FR	***CR-REG***	***LB-REG***	***BS-REG***
2004	7.58	9.06	5.79	7.29
2005	7.61	9.06	6.05	7.16
2006	7.57	9.11	6.08	6.73
2007	7.53	9.03	6.04	6.61
2008	7.43	9.06	6.10	6.61
2009	7.39	9.00	6.49	6.64
2010	7.41	8.57	6.54	7.31
2011	7.46	8.84	6.75	7.38
2012	7.43	8.85	6.82	7.41
2013	7.46	9.01	6.72	7.45
2014	7.54	9.08	6.66	7.34
2015	7.57	9.07	6.83	7.70
2016	7.56	9.14	7.03	7.71

Note: This table reports the mean value in each year for economic freedom and regulation variables.

4.3 Empirical results based on the Fixed-Effects method

Tables 5 and 6 report the Fixed-Effects estimation results on equations (1a, 1b) for bank performance and risk-taking as the dependent variables. The effect of economic freedom (EC-FR) on performance is positive and significant at the 1% level only for net interest margin, rendering support to hypothesis H1.a. Our results are consistent with Wah Low et al. (2010) who found that economic freedom increased bank performance in Singapore during the period 1975-2006. A possible explanation is that a competitive banking market can exploit the benefits of broad banking activities (Sufian and Majid, 2011). Moreover, the effect of economic freedom is positive for Z-Score and Tier1-capital but negative and statistically significant for non-performing loans, providing support for hypothesis H1.d. According to Barth et al. (2006) in terms of diversification there are many benefits for banks from range activities.

The estimated coefficient of credit regulation (CR-REG) is positive and significant at the 1% level for return on average assets (ROAA) and return on average equity (ROAE). The positive impact of liberal credit regulation on bank performance is in line with previous studies (Chortareas et al., 2013; Sufian and Habibullah, 2010) who show that permitting banks to engage in a range of activities leads to economic growth. Thus, we accept hypothesis H2.1.a. However, the results regarding the effect of credit regulation on bank risk-taking are not significant (Table 6) and hence, we reject both hypotheses H2.1.C and H.2.1.d.

Furthermore, the results regarding the coefficient of labor regulation (LB-REG) on bank performance is positive for the net interest margin at the 1% level (Table 5), rendering support for hypothesis H2.2.a. As mentioned by Psillaki and Mamatzakis (2017) liberal reforms in the labor market may increase bank efficiency as they reduce employee complacency and associated absenteeism (Riphahn, 2004). Regarding the risk-taking of banks, it is observed from Table 6 that labor regulation increases the proportion of Tier1-capital ratio. This means that relaxing regulation contributes to financial stability (Barth et al., 2013). Hence, we accept hypothesis H2.2.d.

Moreover, we find that the coefficient of business regulation (BS-REG) has a positive and statistically significant impact on bank performance for all proxies at the 1% level. This means that liberal business regulation improves bank performance. One possible explanation is that fewer restrictions concerning new companies are more likely to increase bank efficiency (Psillaki and Mamatzakis, 2017). Therefore, hypothesis H2.3.a is confirmed. Additionally, the effect of business regulation is negatively related with bank risk-taking when measured by non-performing loans

(Table 6). Thus, liberal business regulations are beneficial for banks as they make it easy for banks to assess the creditworthiness of a company which in turn leads to lower levels of non-performing loans (Loayza et al., 2005). Consequently, we accept hypothesis H2.3.d.

As far as concerns control variables are concerned, bank size (LNTA) appears to be negatively and statistically significant at the 1% for Tobin'sQ and return on average assets (ROAA). A possible explanation is that the increase of portfolio diversification leads to lower risks and therefore lower return for banks. Our findings support previous researches conducted by Staikouras et al. (2007), Belhaj and Mateus (2016), among others. Moreover, the impact of bank size on risk-taking is positive and significant at the 1% level for Z-Score.

The effect of capital ratio (CAPITAL) is positive and statistically significant in all performance measures except for Tobin'sQ and return on average assets (ROAA). This positive relationship indicates that banks with high capitalization perform better (Pathan and Faff, 2013, Das and Ghosh, 2006; Psillaki and Mamatzakis, 2017). As a result, banks with better high capitalization are more stable. However, the results regarding the coefficient of capital ratio on risk-taking are mixed; positive and significant at the 1% level for Tier1-cpaital but negative at different levels for Z-Score and on-performing loans. Banks that are active in lending business have more risky investments. As mentioned by Berger et al. (2012) risky banks also hold on average more off-balance-sheet items. This indicates that these items are not used to offset risks on the balance sheet, but rather as an additional instrument to engage in risky investments.

The GDP growth appears to be positively and statistically significant at different levels regardless of how performance is measured. One possible explanation is that higher levels of GDP growth are associated with less credit risk and more bank performance (Agoraki et al., 2011). In addition, there is no statistically significant relationship to any bank risk indicator and GDP growth. Moreover, the impact of inflation (INF) on bank performance is negative and significant at different levels for all measures except from return on average equity (ROAE). A possible explanation is that a high level of inflation is associated with more costs and therefore, decreases bank performance (Kasman and Yildirim, 2006; Pasiouras et al., 2009). Also, the coefficient of inflation on bank risk-taking is positive and significant at the 1% level for non-performing loans, and thus, contributes to credit risk (Table 6).

The effect of capital stock market capitalization to GDP (MACGDP) is negative and statistically significant at the 1% level for all performance measures except for the net interest margin (Table 5).

Moreover, the impact of stock market capitalization to GDP on bank risk-taking is negative at the 1% level for both Z-Score and Tier1-capital ratio but positive at the 1% level for non-performing loans. A possible explanation is that in a well-developed country, businesses have the opportunity to rely on equity rather than on bank finance (Pasiouras et al., 2009).

Moreover, the presence of foreign banks (FOREIGN) appears to be positively and statistically significant at the 10% level for net interest margin. A possible explanation is that when banks operate within a highly concentrated market, they have the ability to charge high loan rates. Our findings support previous research conducted by Ataullah and Le (2006) among others. However, the impact of the presence of foreign banks on risk-taking is not significant.

Also, we consider the ratio of loans to total assets as a proxy for asset utilization (LOANSTA). Our results are mixed; we show a negative relationship between loans to total assets and bank performance for Tobin'sQ and net interest margin but a positive and significant at the 1% significance level for return on average assets (ROAA) and return on average equity (ROAE); the negative association between asset utilization and bank efficiency may reflect greater pressure in containing costs of credit origination and monitoring for larger loan portfolios. Moreover, our findings indicate that the effect of asset utilization on risk-taking is negative for Z-Score and Tier1-capital ratio at the 1% level.

The effect of board size (BS) on performance is positive and significant at the 1% and 5% level for return on average assets (ROAA) and return on average equity (ROAE) respectively. A large number of directors on boards may contribute positively to the decision-making process and, hence, improve the performance of banks. Regarding the risk-taking, we show that the effect of board size is negative and significant at the 10% level for non-performing loans but positive and significant at the 5% level for Tier1-capital ratio (Table 6). Thus, when we consider macroeconomic variables, the findings regarding the relationship between board size and risk-taking change on the Fixed-Effects model. One possible explanation is that high levels of economic freedom in conjunction with less labor regulation could lead to better decisions and less risk-taking through higher labor force participation. This means that in such environments the different skills and experiences of board members may constitute a large board more efficient.

In Table 5 we find that the estimated coefficient of the financial experience (EXPER) of directors is positive and significant at different levels for all measures except for Tobin'sQ. Experienced directors have a better understanding of the dynamics and complexity of the banking market activity

and its regulatory environment. Regarding the risk-taking of banks, it is observed from Table 6 that the experience of directors reduces the percentage of non-performing loans (NPL) and increases Z-Score. Thus, the impact of macroeconomic variables does not change the effect of financial experience on both bank performance and risk-taking.

Gender diversity increases bank performance when measured by net interest margin (Table 5). This result indicates that female directors (FEMALE) are more effective than men in monitoring. Moreover, the results (Table 6) regarding the effect of female directors on risk-taking indicate that the presence of women on boards reduces bank risk when measured by Z-Score ratio. Consequently, the implementation of macroeconomic variables does not alter the effect of gender diversity on bank risk-taking.

In addition, from Table 5 we observe that the compensation of directors (COMPENSATION) has a positive and significant impact on all performance measures. Also, the impact of compensation, which is measured by cash and bonus, on bank risk-taking is positive and significant at the 10% level only for the Tier1-capital ratio. Therefore, the macroeconomic conditions do not change the impact of compensation on both bank performance and risk-taking. Thus, an increase in cash bonuses lowers bank risk.

Table 5: Empirical results for bank performance based on Fixed-Effects

Variables	**Tobin'sQ**	**ROAA**	**ROAE**	**NIM**
EC-FR	0.0258	-0.372	0.046	**0.0332****
	(0.276)	(0.330)	(0.142)	(0.05)
CR-REG	-0.0014	**0.0354*****	**0.0604*****	0.0073
	(0.223)	(0.000)	(0.000)	(0.514)
LB-REG	0.0044	-0.055	0.0132	**0.0114*****
	(0.295)	(0.462)	(0.395)	(0.001)
BS-REG	**0.011*****	**0.245*****	**0.085*****	**0.0151*****
	(0.000)	(0.000)	(0.000)	(0.000)
LNTA	**-0.0856*****	**-0.064*****	-0.345	0.0453
	(0.000)	(0.001)	(0.293)	(0.200)
CAPITAL	0.00267	0.016	**0.071****	**0.0353*****
	(0.234)	(0.407)	(0.04)	(0.000)
LOANSTA	**-0.0082*****	**0.381*****	**0.0386*****	**-0.08612*****

	(0.000)	(0.000)	(0.000)	(0.000)
GDP	**0.015***	**0.0531*****	**0.119*****	0.0612
	(0.10)	(0.001)	(0.000)	(0.211)
INF	**-0.0041*****	**-0.055***	-0.155	**-0.0377****
	(0.001)	(0.10)	(0.192)	(0.04)
MACGDP	**-0.077*****	**-0.0126*****	**-0.213*****	-0.0119
	(0.000)	(0.001)	(0.000)	(0.221)
FOREIGN	0.00589	-0.00438	-0.232	**0.0821***
	(0.209)	(0.313)	(0.271)	(0.06)
BS	0.0025	**0.0144*****	**0.0528****	0.0126
	(0.539)	(0.001)	(0.05)	(0.165)
EXPER	-0.015	**0.0521****	**0.0985****	**0.0325*****
	(0.238)	(0.05)	(0.05)	(0.000)
FEMALE	0.0017	0.0013	0.0596	**0.0564***
	(0.287)	(0.199)	(0.185)	(0.10)
COMPENSATION	0.00289	**0.00625***	**0.0076***	0.00269
	(0.166)	(0.09)	(0.10)	(0.231)
Constant	**1.632*****	**2.45*****	**3.78*****	**2.214*****
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	758	784	649	657
Adjusted R^2	0.217	0.224	0.267	0.231
N. of Banks	73	73	73	73

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank performance (PERFOR) which measured by Tobin'sQ, ROAA, ROAE and NIM. Definitions of all variables are provided in Table 1 Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

Table 6: Empirical results for bank risk based on Fixed Effects

Variables	**Z-Score**	**NPL**	**Tier1-Capital**
EC-FR	**0.0865***	**-0.0425*****	**0.0497*****
	(0.10)	(0.001)	(0.003)
CR-REG	0.0127	0.0240	0.0159
	(0.178)	(0.179)	(0.189)
LB-REG	-0.01185	-0.0351	**0.0167*****

	(0.288)	(0.246)	(0.001)
BS-REG	0.0872	**-0.0177*** **	0.0592
	(0.129)	(0.000)	(0.411)
LNTA	**0.02574***	0.0340	0.0432
	(0.10)	(0.143)	(0.107)
CAPITAL	**-0.0866*** **	**-0.0194** **	**0.0778*** **
	(0.000)	(0.027)	(0.000)
LOANSTA	**-0.0285*** **	-0.01305	**-0.0460*** **
	(0.000)	(0.289)	(0.000)
GDP	-0.0306	-0.1144	0.0988
	(0.261)	(0.157)	(0.156)
INF	-0.0206	**0.0670*** **	-0.0074
	(0.175)	(0.000)	(0.198)
MACGDP	**-0.0287*** **	**0.0788*** **	**-0.0967*** **
	(0.000)	(0.000)	(0.000)
FOREIGN	-0.0132	0.0231	0.04752
	(0.257)	(0.151)	(0.109)
BS	0.0372	**-0.1029***	**0.0457** **
	(0.313)	(0.06)	(0.05)
EXPER	**0.0668** **	**-0.0282*** **	0.0102
	(0.05)	(0.000)	(0.128)
FEMALE	**0.0141***	-0.0381	0.0991
	(0.10)	(0.161)	(0.192)
COMPENSATION	0.00635	0.00958	**0.821*** **
	(0.222)	(0.131)	(0.000)
Constant	**2.337*** **	**3.432*** **	**3.752*** **
	(0.000)	(0.000)	(0.000)
Observations	758	612	753
N. of Banks	74	67	74
Adjusted R^2	0.318	0.284	0.243

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank risk (RISK) which measured by Z-Score, NPL and Tier1-Capital. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

4.3.1 Decomposing credit market regulation

To investigate further the impact of credit regulation on bank performance and risk-taking we next consider its main components. These are the percentage of deposits held in privately owned banks (CR-OWN), the government borrowing that does not crowd out private sector borrowing (CR-PR) and the limitation in the interest rates controls (CR-IR) that lead to high spreads and/or negative real interest rates (Psillaki and Mamatzakis, 2017). The models, described by equations 3a and 3b below, are estimated using the Fixed-Effects method.

Bank performance model

$$(PERFOR)i,t=\beta_0+\beta_1 CR\text{-}OWNi,t+\beta_2 CR\text{-}PRi,t+\beta_3 CR\text{-}IRi,t+\beta_5 LNTAi,t+\beta_6 CAPITALi,+\beta_7 LOANSTA_{i,t}+\beta_8 GDPi,t+\beta_9 INFi,t+\beta_{10} MACGDPi,t+\beta_{11} FOREIGNi,t+\beta_{12} BSi,t+\beta_{13} EXPERi,t+\beta_{14} FEMALEi,t+\beta_{15} COMPENSATIONi,+ ui + \varepsilon i,t \quad (3a)$$

Bank risk model

$$(RISK)i,t=\beta_0+\beta_1 CR\text{-}OWNi,t+\beta_2 CR\text{-}PRi,t+\beta_3 CR\text{-}IRi,t+\beta_5 LNTAi,t+\beta_6 CAPITALi,+\beta_7 LOANSTA_{i,t}+\beta_8 GDPi,t+\beta_9 INFi,t+\beta_{10} MACGDPi,t+\beta_{11} FOREIGNi,t+\beta_{12} BSi,t+\beta_{13} EXPERi,t+\beta_{14} FEMALEi,t+\beta_{15} COMPENSATIONi,+ ui + \varepsilon i,t \quad (3b)$$

Where ***PERFOR*** and ***RISK*** denote performance and risk-taking respectively for bank i, **t** the time period, **ln** the natural logarithmic, **β** the parameters to be estimated, **u** the unobserved fixed-effect for bank **i** and **ε** the remaining disturbance term.

The results in Table 7 indicate that the credit ownership (CR-OWN) variable increases bank performance at different levels when measured by Tobin'sQ and net interest margin. One possible explanation is that private ownership of banks increases performance through better allocation of credit in the economy that results from more adherences to market discipline (Mian, 2003). Moreover, the coefficient of the privately owned banks variable (CR-OWN) has no significant impact on bank risk-taking regardless of risk proxy.

Regarding the private sector variable (CR-PR) variable, we find that the impact on bank performance is negative and significant for return on average assets (ROAA) and return on average equity (ROAE) at the 1% and 5% levels respectively (Table 7). Our results are in line with those of Psillaki and Mamatzakis (2017) and Mamatzakis et al. (2013). One possible explanation is that the private

sector is linked to costly monitoring and screening which turn in decreased profitability. However the results are mixed for bank risk-taking (Table 8). More precisely, we find that private sector borrowing has a negative and significant impact at the 1% level for non-performing loans which means which reduces credit risk. Also the impact on Tier1-capital is negative and hence, the government borrowing that does not crowd out private sector borrowing leads to a less stable banking system. One possible explanation is that when credit is directed to state the financial system is more stable.

The coefficient of interest rate controls (CR-IR) has a negative and significant impact on bank performance for almost all proxies except for Tobin'sQ at different levels (Table 7). Concerning the effect on risk-taking, we show in Table 8 that the interest rate control variables (CR-IR) increase bankruptcy. One possible explanation is that interest rate controls act as barriers for banks to take on increased risk and high-return projects (Hellman et al., 2000).

Concerning the impact of board size (BS) on bank performance when we employ the sub-components is positive and significant at the 5% level for return on average assets (ROAA). Our results are consistent with those from Table 5 which argue that a large number of directors on boards may contribute positively to the decision-making process and, hence, improve bank performance. Regarding risk-taking the results are the same as in Table 6. More precisely, we show that the effect of board size is negative and significant at the 5% level for non-performing loans (Table 8).

In Table 7 we find that the estimated coefficient of the financial experience (EXPER) of directors is positive and significant at different levels for all measures, as in Fixed-Effects model (Table 5). Experienced directors have a better understanding of the complexity of financial activities and its regulatory environment. Regarding the risk-taking of banks, it is observed from Table 6 that the experience of directors reduces the percentage of non-performing loans (NPL) and increases Z-Score and Tier1-capital as in Table 6.

Gender diversity (FEMALE) has no significant impact on bank performance for any measure (Table 7). Moreover, the results regarding the effect of female directors on risk-taking are the same as in Table 6. More precisely, the presence of women on boards reduces bank risk when measured by Z-Score ratio. Female directors are more risk averse than men. Finally, from Tables 7 and 8 we observe that the compensation of directors (COMPENSATION) has no significant impact on bank performance and risk-taking.

Table 7: The impact of the Fraser sub-components of the Credit Regulation index on bank performance

Variables	Tobin'sQ	ROAA	ROAE	NIM
CR-OWN	**0.00864***	0.0198	-0.827	**0.126*****
	(0.08)	(0.713)	(0.984)	(0.000)
CR-PR	-0.00216	**-0.227*****	**-0.254****	-0.0501
	(0.361)	(0.001)	(0.04)	(0.327)
CR-IR	-0.00909	**-0.451*****	**-0.3888***	**-0.220*****
	(0.765)	(0.000)	(0.10)	(0.002)
GDP	**0.00048****	**0.112*****	**0.1731*****	0.00514
	(0.02)	(0.001)	(0.000)	(0.732)
INF	-0.0016	**-0.0241****	-0.524	**0.0309****
	(0.432)	(0.03)	(0.546)	(0.04)
CAPITAL	**0.00386****	**0.0394*****	0.274	-0.00741
	(0.02)	(0.001)	(0.194)	(0.649)
LNTA	0.00254	**-0.150*****	**-0.436*****	**-0.177*****
	(0.174)	(0.001)	(0.000)	(0.001)
LOANSTA	**-0.478*****	0.00340	**-0.315*****	**0.0163*****
	(0.01)	(0.354)	(0.000)	(0.002)
MACGDP	**0.0994*****	**0.00693*****	**0.124*****	-0.00169
	(0.000)	(0.002)	(0.000)	(0.152)
FOREIGN	-0.00284	**0.00571****	**0.0624***	**0.00558****
	(0.312)	(0.04)	(0.10)	(0.05)
BS	-0.00749	**0.181****	1.990	-0.0208
	(0.596)	(0.08)	(1.216)	(0.0501)
EXPER	**0.00238****	**0.0714*****	**0.885*****	**0.0317*****
	(0.001)	(0.001)	(0.000)	(0.001)
FEMALE	-0.00426	-0.00849	-0.0157	0.00188
	(0.284)	(0.525)	(0.731)	(0.250)
COMPENSATION	-0.00839	0.00417	0.00617	-0.00130
	(0.179)	(0.328)	(0.452)	(0.151)
Constant	**0.567*****	**1.896****	**1.447*****	**2.494*****
	(0.000)	(0.05)	(0.001)	(0.000)
Observations	482	567	555	567

Adjusted R^2	0.294	0.287	0.257	0.301
N. of Banks	67	73	73	73

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank performance (PERFOR) which measured by Tobin'sQ, ROAA, ROAE and NIM. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

Table 8: The impact of the Fraser sub-components of the Credit Regulation index on bank risk

Variables	**Z-Score**	**NPL**	**Tier1-Capital**
CR-OWN	-0.00821	0.397	-0.00680
	(0.135)	(0.353)	(0.124)
CR-PR	0.0454	**-0.837*** **	**-0.194***
	(0.115)	(0.000)	(0.10)
CR-IR	**-0.828*** **	0.897	**-0.475****
	(0.000)	(0.619)	(0.05)
GDP	0.0161	-0.125	-0.0357
	(0.255)	(0.780)	(0.247)
INF	-0.0520	**-0.680*** **	-0.0277
	(0.474)	(0.000)	(0.482)
LNTA	0.0341	0.236	-0.0682
	(0.170)	(0.285)	(0.101)
CAPITAL	**0.952*** **	**0.272*** **	**0.903*** **
	(0.000)	(0.000)	(0.000)
LOANSTA	0.0118	-0.0215	**-0.0280*** **
	(0.993)	(0.219)	(0.001)
MACGDP	**0.0301*** **	**-0.0872*** **	-0.0279
	(0.001)	(0.001)	(0.481)
FOREIGN	-0.0160	**-0.0376****	0.00161
	(0.121)	(0.05)	(0.675)
BS	-0.250	**-1.028****	0.0704
	(0.178)	(0.05)	(0.163)
EXPER	**0.0603***	**-0.223****	**0.0574***
	(0.10)	(0.05)	(0.10)
FEMALE	**0.0164***	-0.00642	**0.0210****
	(0.10)	(0.252)	(0.05)

COMPENSATION	0.00435	0.00947	-0.00356
	(0.518)	(0.154)	(0.595)
Constant	**2.129*** **	**1.953*** **	**1.755*** **
	(0.000)	(0.000)	(0.000)
Observations	568	506	559
Adjusted R^2	0.297	0.265	0.258
N. of banks	73	65	72

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank risk (RISK) which measured by Z-Score, NPL and Tier1-Capital. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

4.4 Empirical results based on the two-step system GMM method

We report the system estimator regression results in Tables 9 and 10. In line with our previous results, economic freedom (EC-FR) is positively related to bank performance at different levels for all measures apart from net interest margin. This positive relationship between economic freedom and bank performance was indicated by the Fixed-Effects method. Thus, hypothesis H1.a is accepted. Countries with heavy regulation reduce opportunities, and hence, decrease competition. Moreover, the effect of economic freedom on risk-taking is positive and statistically significant for the Z-Score ratio and Tier1-capital ratio but negative for non-performing loans (NPL), rendering support to hypothesis H1.d. Our results indicate that more economic freedom is associated with a lower probability of default due to high competition and economic growth. Thus, economic freedom promotes financial system soundness.

Similarly, as before, credit regulation (CR-REG) is positively related to bank performance at the 1% level for the Tobin'sQ ratio, the return on average assets (ROAA) and the return on average equity (ROAE), at different levels, providing support for hypothesis H2.1.a. In contradiction to our previous findings, the results regarding the coefficient of credit regulation on risk-taking are mixed. More precisely, credit regulation (CR-REG) is positively related to bank risk at the 1% level for Z-Score ratio and at the 10% level for non-performing loans (NPL). As a consequence, the liberal credit regulation increases credit risk (Table 10). One possible explanation for this result is that stricter regulation in combination with a high level of market power contributes to reduction of credit risk (Agoraki et al., 2011). Thus, we accept both hypotheses H2.1.c and H2.1.d.

The effect of labor regulation (LB-REG) on bank performance is positive and significant, as before, for all proxies at different levels, except for net interest margin Thus, we accept hypothesis H2.2.a. One possible explanation is that greater regulation reduces competition and thus, leads to low levels of bank efficiency (Scarpetta and Tressel, 2004). Concerning the effect of labor regulation on risk-taking the results remain the same, with those from Fixed-Effects model (Table 6). More precisely, liberal labor regulation reduces risk-taking, as we find a positive and significant relationship for Z-score but negative for non-performing loans (Table 10). Therefore, we accept hypothesis H2.2.d.

The results regarding business regulation (BS-REG) on bank performance are the same as before. Based on the two-step system GMM method (Table 9), we find a positive and significant relationship between business regulation and bank performance for all proxies apart from net interest margin. Thus, we accept hypothesis H.2.3.a. Moreover, the effect of business regulation on risk-taking is positive and statistically significant for the Z-Score ratio but negative for non-performing loans (NPL) at the 1% level (Table 10), rendering support to hypotheses H2.3.c and H2.3.d. A possible explanation for this result is that liberal regulation of the business market leads to low levels of non-performing loans and therefore to less credit risk.

Contrary to our previous results the effect of bank size (LNTA) on performance is now positive and significant at different levels for almost all proxies except for return on average assets (ROAA). Larger banks are expected to use better technology, be more diversified and better managed. Larger banks may also enjoy economies of scale. Regarding risk-taking, the results remain the same as in the Fixed-Effects model. More precisely, the effect of size (LNTA) on bank risk-taking is positive and significant at the 1% level for Z-Score and Tier1-capital ratio (Table 10), in line with the too-big-to-fail concept.

Our results in Table 9 show a positive relationship between tighter capital regulation (CAPITAL) and bank performance for all performance measures. In line with our previous findings, the effect of capital ratio is negative at the 5% level for non-performing loans (NPL) but positive at the 1% level for Z-Score and Tier1-capital ratio. Well-capitalized banks have the required liquidity in order to manage credit risk.

According to the GDP growth (GDP) the sign of the relationship remains constant and positive for bank performance as on the Fixed-Effects model. In contradiction to our previous results, we find that the impact of GDP growth on bank risk-taking is positive and significant at the 5% level for Z-Score. More, precisely, banks with higher leverage tend to decrease probability of default (Table 10).

Our result corroborates research conducted by Agoraki et al. (2011) who claim that high levels of GDP growth increase bank soundness.

Concerning the relationship between bank performance and inflation (INF) the results are the same as on the Fixed-Effects model (Table 5). More precisely, the inflation is negative and significant at the 1% level for almost all proxies apart from net interest margin (NIM). One possible explanation for this result is that a lower inflationary environment is more conducive to bank activities (Barth et al., 2013). Similarly, the results regarding the impact of the inflation variable on risk-taking remain the same in the two-step system GMM model. According to Table 10 we find a positive and significant relationship between inflation and bank risk-taking, measured by non-performing loans at the 10% level, meaning that high levels on inflation increase credit risk.

In contradiction to our previous results the effect of stock market capitalization to GDP (MACGDP) is positive and significant at the 1% level for return on average assets (ROAA) and return on average equity (ROAE). Our results are in line with those of Barth et al. (2006) and Demirguc-Kunt and Huizinga (1999) among others, who found a positive relationship between stock market capitalization and bank performance. According to the authors, this positive relationship could be explained due to the complementary effect between debt and equity financing (Pasiouras et al, 2009).

Moreover, the results regarding the effect of stock market capitalization (MACGDP) on bank risk-taking are different from those using the Fixed-Effects model (Table 6). More precisely, the stock market capitalization is positive and significant at different levels for both Z-Score and Tier1-capital but negative for non-performing loans at the 1% level, meaning that stock market capitalization reduces credit risk and contributes to the financial stability.

Regarding the effect of the presence of foreign banks (FOREIGN) the results are not the same as before. Based on the two-step system GMM model in Table 9 we show that there is no significant relationship between bank performance and foreign banks. Moreover, regarding bank risk-taking the results are mixed (Table 10) and different from those of the Fixed-Effects model (Table 6). More precisely, we find that foreign banks increase credit risk as they are positively linked to non-performing loans but they also enhance the Tier1-capital ratio.

Contrary to our previous results the effect of loans to total assets (LOANSTA) on bank performance is negative and statistically significant at the 1% level for all proxies (Table 9). Moreover, our findings indicate that the effect of asset utilization on risk-taking is negative for Z-Score and Tier1-capital ratio at the 5% level but positive and significant at the same level for non-performing loans.

One possible explanation for this result is that loans are usually linked to higher operational risks and, therefore, they need to be monitored (Garcia-Herrero et al., 2009).

In addition, the relationship between board size (BS) and performance is negative and significant at the 1% for return on average assets (Table 9). Our findings indicate that the board of directors becomes less effective when the number of members increases (Pathan and Faff, 2013). The impact of board size on risk-taking is negative at the 5% for Z-Score and Tier1-capital ratio (Table 10). A liberal economic environment in conjunction with less credit regulation might give the opportunity to board members to take more risks and hence, to increase the likelihood of default risk.

Based on the results in Table 9, we find that the effect of financial experience (EXPER) on bank performance is positive and significant at different levels, except for return on average equity (ROAE). Furthermore, the experience of directors has a positive impact on credit risk-taking as it is positively associated with non-performing loans (Table 10). Our results are the same as those in Tables 8 and 9. One possible explanation is that managers often operate in the interest of shareholders and hence led to risky decisions. Macroeconomic conditions do not alter the impact of financial experience on bank performance and risk-taking.

Furthermore, in Table 9 we find that the effect of female directors on bank performance is positive and significant at different levels except for return on average equity (ROAE). Moreover, the effect of female directors (FEMALE) on bank risk-taking is negative and significant at the 1% level for non-performing loans (Table 10). Thus, macroeconomic conditions change the impact of gender diversity on bank performance and risk-taking when we apply the two-step system GMM model. One possible explanation is that in a liberal labor environment the presence of women tends to be high. This in turn, leads to less credit risk as women are considered to be less overconfident than men, and thus, they do not take risks.

Concerning the relationship between bank performance and compensation (COMPENSATION) the results are the same as in Tables 8 and 9. More precisely, the compensation of directors is positive and significant at the 1% level for Tobin'sQ (Table 9). Regarding the risk-taking the impact of compensation is negative and significant at the 1% level for both non-performing loans and Tier1-capital. One possible explanation is that in a more liberal and competitive environment, directors are more willing to invest in positive Net Present Value projects (Curi and Murgia, 2018).

Table 9: Empirical results for bank performance based on Two-step system GMM method

Variables	Tobin'sQ	ROAA	ROAE	NIM
Tobin'sQ (t-1)	**0.722*** **			
	(0.000)			
ROAA (t-1)		**0.1196*** **		
		(0.000)		
ROAE (t-1)			**0.3756*** **	
			(0.000)	
NIM (t-1)				**0.748*** **
				(0.000)
EC-FR	**0.0138** **	**0.05317*** **	**0.1310*** **	0.0514
	(0.05)	(0.000)	(0.000)	(0.148)
CR-REG	**0.0443** **	**0.271*** **	**0.0221*** **	0.0145
	(0.02)	(0.000)	(0.000)	(0.241)
LB-REG	**0.0241** *	**0.115*** **	**0.2005** *	0.0129
	(0.10)	(0.001)	(0.10)	(0.371)
BS-REG	**0.0633*** **	**0.0296*** **	**0.0376*** **	0.0831
	(0.001)	(0.000)	(0.001)	(0.184)
GDP	**0.0121*** **	**0.0916*** **	**0.141*** **	-0.0507
	(0.000)	(0.000)	(0.000)	(0.152)
INF	**-0.0094*** **	**-0.0628*** **	**-0.197*** **	0.0415
	(0.000)	(0.000)	(0.000)	(0.387)
CAPITAL	**0.0459** **	**0.0282*** **	**0.0731*** **	**0.0114** *
	(0.02)	(0.000)	(0.000)	(0.10)
LNTA	**0.0505*** **	0.0857	**0.0145** **	**0.0246*** **
	(0.001)	(0.158)	(0.05)	(0.007)
LOANSTA	**-0.4636*** **	**-0.176*** **	**-0.128*** **	**-0.0370*** **
	(0.000)	(0.000)	(0.000)	(0.000)
MACGDP	0.00332	**0.0108*** **	**0.115*** **	-0.0441
	(0.416)	(0.000)	(0.000)	(0.387)
FOREIGN	0.00314	0.01233	0.0157	0.01807
	(0.283)	(0.155)	(0.259)	(0.189)
BS	0.0442	**-0.0203*** **	0.3191	-0.0514
	(0.203)	(0.001)	(0.160)	(0.143)

EXPER	**0.0759****	**0.0453*****	0.5351	**0.0112****
	(0.05)	(0.001)	(0.114)	(0.05)
FEMALE	**0.00276*****	**0.0727*****	0.0257	**0.0240****
	(0.001)	(0.001)	(0.178)	(0.04)
COMPENSATION	**0.4636*****	0.0667	0.00329	0.00113
	(0.000)	(0.133)	(0.241)	(0.136)
Constant	**0.789*****	**1.179*****	**2.301*****	**0.331*****
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	417	596	548	581
AR(1)	**-1.83[0.05]****	**-2.08[0.00]*****	**-3.02[0.00]*****	**-1.93[0.04]****
AR(2)	0.25[0.48]	0.40[0.16]	0.82[0.41]	0.49[0.62]
Hansen J-stat	105.2 [0.65]	167.4 [0.49]	172.7 [0.58]	175.9 [0.82]
N. of instruments	204	257	222	235
N. of Banks	73	75	75	75

Note: This table reports regression results obtained via the Two-step system GMM method. The dependent variable is bank performance (PERFOR) which measured by Tobin'sQ, ROAA, ROAE and NIM. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

Table 10: Empirical results for bank risk based on Two-step system GMM

Variables	**Z-Score**	**NPL**	**Tier1-Capital**
Z-Score (t-1)	**0.6853*****		
	(0.000)		
NPL (t-1)		**1.115*****	
		(0.000)	
Tier1-Capital (t-1)			**0.305*****
			(0.000)
EC-FR	**0.1145*****	**-0.0284***	**0.0267*****
	(0.003)	(0.076)	(0.001)
CR-REG	**0.2391*****	**0.0460***	0.00222
	(0.008)	(0.060)	(0.857)
LB-REG	**0.2415****	**-0.0889*****	0.00875
	(0.013)	(0.006)	(0.599)
BS-REG	**0.0611*****	**-0.0134*****	-0.00223

	(0.000)	(0.001)	(0.252)
GDP	**0.0259****	-0.0151	0.00747
	(0.032)	(0.106)	(0.112)
INF	**-1.009*****	**0.605***	**-0.686*****
	(0.000)	(0.055)	(0.000)
LNTA	**0.585*****	-0.0638	**0.129*****
	(0.000)	(0.471)	(0.000)
CAPITAL	**0.493*****	**-0.0633****	**0.700*****
	(0.000)	(0.030)	(0.000)
LOANSTA	**-0.916****	**0.178****	**-1.040****
	(0.024)	(0.031)	(0.014)
MACGDP	**0.0316*****	**-0.0681*****	**0.0669****
	(0.000)	(0.000)	(0.005)
FOREIGN	-0.0280	**0.0100**	**0.0123*****
	(0.317)	(0.207)	(0.000)
BS	**-0.1802****	-0.0184	**-0.0233****
	(0.000)	(0.132)	(0.018)
EXPER	**-0.049****	**0.0118*****	**0.0322**
	(0.024)	(0.001)	(0.335)
FEMALE	0.0360	**-0.0302*****	-0.00461
	(0.130)	(0.000)	(0.226)
COMPENSATION	-0.0049	**-0.00349*****	**0.00662*****
	(0.317)	(0.000)	(0.000)
Constant	**-1.157*****	**-6.969****	**0.706*****
	(0.000)	(0.014)	(0.000)
Observations	638	587	582
AR(1)	**-2.76[0.000]*****	**-2.08[0.000]*****	**-2.23[0.000]*****
AR(2)	0.91[0.365]	-1.54[0.125]	0.44[0.663]
Hansen J-stat	167.2 [0.54]	156.4 [0.72]	179.3 [0.78]
N. of instruments	254	183	152
N. of banks	72	71	70

Note: This table reports regression results obtained via the Two-step system GMM method. The dependent variable is bank risk (RISK) which measured by Z-Score, NPL and Tier1-Capital. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

4.5 Empirical results for the period before, during (2004-2009) and after (2010-2016) the Global Financial Crisis (GFC)

In this section, we divide the sample into two periods, the first concerning the period before and during the Global Financial crisis (2004-2009) and the second concerning the period after the crisis (2010-2016). Tables 11 and 12 below show the results based on the Fixed-Effects method (models 1a, 1b).

The sign of the effect of economic freedom (EC-FR) is positively related to bank performance before and during the financial crisis but has no significant impact for the period after the financial crisis (Table 11), providing support for hypothesis H3.a. Moreover, the impact of economic freedom on risk-taking is positive for Z-Score ratio but negative for non-performing loans (NPL) and significant at different levels for the period before and during the financial crisis meaning that economic freedom contributes to financial stability. One possible explanation is that financial liberalization promotes financial development through increased competition (Baier et al., 2012). However, the effect of economic freedom regulation is negative for Z-Score and Tier1-capital but positive for non-performing loans at different levels for the period after the global financial (Table 12), rendering support to hypothesis H3.b. This means that stricter regulation and the compliance of banks with principles may prevent financial institutions from excessive risk-taking.

In addition, the effect of the credit regulation (CR-REG) variable on bank performance varies. More precisely, we find that there is no significant impact for the period before and during the financial crisis on bank performance (Table 11). However, the impact of credit regulation is negative and significant at different levels for both return on average assets (ROAA) and return on average equity (ROAE). One possible explanation is that after a post-crisis period credit regulation tends to increase so as to contribute to financial stability (Baier et al.2012). Thus, we accept hypothesis H3.a.

Moreover, the impact of credit regulation (CR-REG) on risk-taking is positive for Z-Score ratio and Tier1-capital ratio but negative and significant for non-performing loans (NPL) at different levels for the period before and during the financial crisis, meaning that liberal credit regulation reduces bank risk-taking as it promotes competition and gives opportunities to banks to exploit economies of scale. However, the effect of credit regulation on risk-taking changes after the financial crisis (Table 12). More precisely, the impact of credit regulation is positive for non-performing loans but negative for Z-Score and Tier1-capital at different levels, rendering support to hypothesis H3.b. This means that liberal credit regulation is less pronounced after the global financial crisis. One possible explanation

for this finding is that stricter credit regulation improves bank soundness and leads to less risk-taking through supervisory power (Ghosh, 2016; Barth et al., 2013).

Labor regulation (LB-REG) has a positive and significant impact on bank performance at 5% level when measured by return on average assets (ROAA) and net interest margin (NIM) for the period before and during the financial crisis (Table 11). However, the sign changes for the period after the global financial crisis as the impact of liberal labor regulation is negative and significant at the 1% level for return on average assets (ROAA), providing support to hypothesis H3.a. One possible explanation is that wages pressures would induce higher labor productivity due to capital deepening and therefore, would lead to more bank performance (Autor et al., 2007).

Moreover the sign of labor regulation (LB-REG) on bank risk-taking remains constant and positive at the 1% level for Z-Score before, during and after the global financial crisis (GFC). Thus, we reject hypothesis H3.b. Our results are in line with those of Mamatzakis et al. (2013) who claimed that liberal labor regulation has resulted in productivity gains in Central European Countries during the period 2000-2010. One possible explanation is that increased redundancy of unproductive employees is associated with more productivity (Eslava et al., 2004).

The sign of business regulation (BS-REG) is positive and significant at different levels for return on average equity (ROAE) and net interest margin before and during the global financial crisis (GFC). This means that liberal business regulation increases bank performance. One possible explanation is that heavier regulation of entry has higher corruption and hence, may negatively affect economic growth and bank performance (Djankov et al., 2003). Furthermore, the effect of business regulation (BS-REG) is positive and significant at the 10% level for Tobin'sQ but negative and significant at the same level for net interest margin for the period after the crisis (Table 11), rendering support to hypothesis H3.a.

Furthermore, the effect of business regulation (BS-REG) is positive and significant at the 1% level before and during the crisis for the Tier1-capital ratio (Table 12). This means that liberal business regulation contributes to financial stability. The impact of business regulation on bank risk-taking remains the same for the period after the global financial crisis as it reduces the non-performing loans ratio and hence, reduces credit risk. One possible explanation is that the fewer number of procedures needed to obtain building permits or reducing the time taken to grant legal identity to a business would lead to increased competition and more productivity which in turn has a positive impact on bank performance. Thus, we reject hypothesis H3.b.

According to the GDP growth (GDP) the sign of the relationship remains constant regardless of the period. More precisely, the impact of the GDP growth (GDP) is positive and significant for most proxies of bank performance for the whole period. One possible explanation is that economic growth can enhance bank profitability through increasing the demand for financial transactions such as the household and business demand for loans. Regarding risk-taking (Table 12), the impact of GDP growth is positive and significant at different levels for Z-Score and negative for non-performing loans for the period before, during and after the global financial crisis. This means that strong economic conditions are also characterized by a high demand for financial services, thereby increasing bank profits and hence, lead to less credit risk.

The effect of inflation on bank performance (Table 12) is negative and statistically significant at different levels for most bank measures. Also, the sign of inflation on bank risk-taking is positive and significant at the 1% level for non-performing loans only for the period after the global financial crisis (Table 11). A possible explanation is that inflation has a negative effect on bank profitability and risk if wages and other costs grow faster than the rate of inflation (Ali, et al., 2011).

The effect of bank size (LNTA) on bank performance is negative and significant at different levels for almost all proxies except for return on average equity (ROAE), for the period before and during the financial crisis (Table 11). Although, for the period after the crisis the findings are mixed; negative at the 1% level for return on average assets (ROAA) but positive at the same level for net interest margin. Regarding risk-taking, the impact of bank size (LNTA) has no significant impact on bank risk for any proxy, for the whole period.

Our results show a positive relationship between tighter capital regulation (CAPITAL) and bank performance regardless of the period considered. This means that banks with more equity can meet their funding needs and increase their efficiency. However, the effect is significant for most of the proxies of bank performance for the period after the financial crisis (Table 11). Similar, are the results for the relationship between stricter capital regulation and risk-taking (Table 12). More precisely, tighter capital regulation reduces credit risk and probability of bankruptcy for the whole period.

The results regarding the loan to total assets variable are mixed for the period before and during the financial crisis (Table 11); negative and significant at the 1% level for Tobin'sQ, return on average equity (ROAE) and net interest margin but positive at the same level for return on average assets (ROAA). However the effect of loans to assets after the crisis is positive and significant at different

levels for return on average assets (ROAA) and net interest margin. One possible explanation is that banks with a high intermediation capacity operate more efficiently (Carvallo and Kasman, 2005; Mamatzakis et al., 2013). Regarding the effect of loans to total assets (LOANSTA) the sign remains positive and significant at the 5% level for the Z-Score ratio for the whole period (Table 12).

In Table 11 we find, that the results regarding the stock market capitalization (MACGDP) variable are mixed for the period before and during the global financial crisis (GFC). Moreover, the impact of stock market capitalization is positive and significant at the 1% level for Tobin'sQ and return on average equity (ROAE) but negative at the same level for net interest margin. The effect is positive and significant at different levels for almost all proxies apart from net interest margin, for the period after the global financial crisis. One possible explanation is that in less developed stock markets firms tend to rely more on bank finance rather than equity (Pasiouras et al., 2009). Moreover, the impact of stock market capitalization to GDP on bank risk-taking remains positive and significant at different levels for both Z-Score and Tier1-capital (Table 12).

The results regarding the effect of the presence of foreign banks (FOREIGN) varies for the period before and during the financial crisis (Table 11); negative for return on average assets (ROAA) but positive for return on average equity (ROAE). Similarly, the findings regarding the presence of foreign banks are inconclusive for the period after the crisis; negative for Tobin'sQ but positive for return on average assets (ROAA) and net interest margin. One possible explanation is that the more presence of foreign banks may limit the ability of domestic banks to operate efficiently (Lensink et al., 2008). However, the effect of foreign banks on risk-taking (Table 12) is positive and significant at the 1% level for Tier1-capital ratio for the whole period.

The sign of the effect of board size (BS) on bank performance (Table 11) changes from insignificant to positive for the period after the global financial crisis (GFC). Our results indicate that the presence of several directors on the board has a positive effect on the advisory functions, the monitoring and the increase of returns (Peni and Vahama, 2012). The sign of the effect of board size (BS) on risk-taking remains constant and negative for non-performing loans for the period before and after the global financial crisis (GFC) which means that the presence of more directors in the board reduces credit risk (Table 12). Thus, macroeconomic conditions alter the impact of board size on bank risk-taking. A possible explanation is that a large board might operate efficiently in an economic freedom environment and hence, could lead to better decisions with less risk for the banks, through exploiting the different background and skills of directors.

In addition, the sign of the financial experience (EXPER) variable on bank performance remains constant and positive (Table 11) before, during and after the global financial crisis (GFC). One possible explanation is that a better understanding of banking activities by the directors contributes to better management supervision. Furthermore, the effect of financial experience (EXPER) is positive and significant at the 1% level before and during the financial crisis for Z-Score ratio but has no significant impact for the period after the crisis (Table 12). This means that more experienced directors contribute to the financial stability. Macroeconomic conditions do not change the impact of financial experience on bank performance and risk-taking.

Gender diversity (FEMALE) has a positive and significant impact on bank performance at the 5% level for the whole period. However, the effect of female directors (FEMALE) on risk-taking is positive and significant at the 5% level for Tier1-capital ratio only for the whole period but negative and significant at the 5% level for non-performing loans for the period after the crisis (Table 12). Thus, the implementation of macroeconomic conditions does not change the impact of women on bank performance and risk-taking. One possible explanation is that women are more risk-averse in the financial decision making-process (Barber and Odean, 2001).

The sign of the compensation on bank performance is positive and significant at different levels regardless of the period before and during the global financial crisis (GFC). However, the compensation variable has no significant impact on bank performance after the global financial crisis (Table 11). Regarding risk-taking, the effect of compensation of directors is positive and significant at the 10% level for Z-Score. In a liberal labor environment directors have more incentives to promote bank soundness which would be linked to more bonuses.

Table 11: Empirical results for bank performance before, during and after the global financial crisis

	2004-2009				2010-2016			
Variables	**Tobin'sQ**	**ROAA**	**ROAE**	**NIM**	**Tobin'sQ**	**ROAA**	**ROAE**	**NIM**
EC-FR	**0.0554*** **	**0.01285***	-0.03948	-0.161	0.0432	0.373	-0.8069	-0.157
	(0.001)	(0.10)	(0.388)	(0.430)	(0.452)	(0.570)	(0.157)	(0.243)
CR-REG	-0.00661	0.00567	0.5748	0.0522	0.00541	**-0.3166** **	**-0.571** **	0.0422
	(0.137)	(0.245)	(0.532)	(0.396)	(0.226)	(0.05)	(0.000)	(0.424)
LB-REG	0.00134	**0.09061** **	0.5575	**0.1097** **	0.0326	**-0.3967** **	-2.158	-0.0164
	(0.230)	(0.05)	(0.468)	(0.05)	(0.187)	(0.003)	(0.444)	(0.509)
BS-REG	0.03431	0.0989	**0.2018***	**0.1518** **	**0.0745***	-0.29053	-3.687	**-0.182***
	(0.164)	(0.135)	(0.10)	(0.05)	(0.10)	(0.204)	(0.124)	(0.010)
GDP	**0.00292** **	**0.00321** **	**0.1065** **	-0.00123	0.00412	**0.251** **	**1.488** **	0.00184
	(0.001)	(0.002)	(0.000)	(0.198)	(0.211)	(0.000)	(0.001)	(0.102)
INF	**-0.0484** **	**-0.00245** **	-0.0200	**-0.056** **	**-0.0318***	0.0930	-0.00327	**-0.0366** **
	(0.001)	(0.001)	(0.597)	(0.05)	(0.10)	(0.0823)	(0.289)	(0.05)
LNTA	**-0.01139***	-0.0315	**-0.180** **	**-0.0227** **	0.0513	**-0.175** **	-1.260	**0.0170** **
	(0.10)	(0.287)	(0.004)	(0.000)	(0.452)	(0.001)	(0.170)	(0.000)
CAPITAL	-0.00126	**0.0215** **	0.0271	-0.01837	**0.0457** **	**0.108** **	**0.217** **	-0.00751
	(0.278)	(0.05)	(0.781)	(0.125)	(0.001)	(0.001)	(0.000)	(0.630)
LOANSTA	**-1.553** **	**1.212** **	**-0.8589** **	**-0.788** **	0.6321	**0.0111***	0.153	**0.0270** **
	(0.000)	(0.001)	(0.008)	(0.000)	(0.120)	(0.010)	(0.110)	(0.003)
MACGDP	**0.0659** **	0.00751	**0.1232** **	**-0.0047** **	**-0.4320** **	**0.0216** **	**0.217** **	0.00182
	(0.001)	(0.234)	(0.002)	(0.001)	(0.001)	(0.005)	(0.101)	(0.211)

FOREIGN	-0.00102	**-0.00269*** **	**0.0715** **	0.00474	**-0.0692** **	**0.0070*** **	0.0410	**0.00733** *
	(0.520)	(0.001)	(0.005)	(0.118)	(0.05)	(0.000)	(0.220)	(0.10)
BS	0.03489	0.00482	-0.3948	0.08081	**0.751*** **	**0.0292** *	**0.532** *	**0.0150** **
	(0.431)	(0.211)	(0.286)	(0.317)	(0.001)	(0.10)	(0.000)	(0.05)
EXPER	**0.0313** **	**0.0721*** **	**0.6871*** **	**0.0480*** **	**0.129*** **	**0.749*** **	**0.351*** **	**0.795*** **
	(0.05)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
FEMALE	-0.00102	0.00213	0.0267	**0.08556** **	0.0963	0.00997	**0.184** **	-0.00311
	(0.153)	(0.312)	(0.540)	(0.05)	(0.254)	(0.125)	(0.05)	(0.229)
COMPENSATION	0.00802	0.00711	**0.00141*** **	**0.00463** **	0.00657	0.00856	0.00620	-0.0888
	(0.397)	(0.296)	(0.000)	(0.005)	(0.001)	(0.195)	(0.121)	(0.142)
Constant	**1.186*** **	**2.245*** **	**2.281*** **	**1.531*** **	**1.834*** **	**2.103*** **	**2.32*** **	**3.485** **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.05)
Observations	257	257	257	257	339	375	389	390
Adjusted R^2	0.198	0.202	0.164	0.257	0.230	0.312	0.220	0.258
N. of banks	75	75	75	75	75	75	75	75

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank performance (PERFOR) which measured by Tobin'sQ, ROAA, ROAE and NIM. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

Table 12: Empirical results for bank risk before, during and after the global financial crisis

	2004-2009			**2010-2016**		
Variables	**Z-Score**	**NPL**	**Tier1-Capital**	**Z-Score**	**NPL**	**Tier1-Capital**
EC-FR	**0.526*** **	**-0.911** *	0.589	**-0.4032*** **	**0.812** **	**-1.769*** **

	(0.000)	(0.10)	(0.122)	(0.000)	(0.012)	(0.000)
CR-REG	**0.745****	**-0.672*****	**0.541****	**-0.697****	**1.989*****	**-0.360****
	(0.05)	(0.000)	(0.05)	(0.05)	(0.000)	(0.05)
LB-REG	**0.0362*****	-1.321	0.0962	**1.036*****	-1.050	0.0615
	(0.000)	(0.322)	(0.138)	(0.000)	(0.671)	(0.185)
BS-REG	-0.245	-0.872	**0.611*****	-0.112	**-0.331****	0.361
	(0.126)	(0.407)	(0.001)	(0.676)	(0.000)	(0.034)
GDP	**0.201****	**-0.811*****	0.0745	**0.160****	**-0.941*****	0.0224
	(0.05)	(0.001)	(0.420)	(0.04)	(0.001)	(0.464)
INF	-0.9102	1.012	-0.463	-0.0823	**1.934*****	0.102
	(0.169)	(0.421)	(0.514)	(0.124)	(0.000)	(0.814)
LNTA	-0.181	0.517	-0.520	0.168	0.809	-0.101
	(0.324)	(0.321)	(0.112)	(0.261)	(0.502)	(0.106)
CAPITAL	**0.935*****	**-0.786***	**0.962*****	**0.935*****	0.0998	**0.848*****
	(0.000)	(0.10)	(0.001)	(0.000)	(0.109)	(0.001)
LOANSTA	**0.6210****	-0.0692	-0.0759	**0.0468****	-0.0350	-0.00963
	(0.02)	(0.230)	(0.168)	(0.02)	(0.417)	(0.156)
MACGDP	**0.364*****	-0.0591	**0.0542***	**0.102*****	- 0.0335	**0.0143***
	(0.001)	(0.264)	(0.10)	(0.001)	(0.293)	(0.10)
FOREIGN	0.0981	0.0945	**0.0631*****	0.00990	0.0385	**0.0221*****
	(0.210)	(0.120)	(0.001)	(0.198)	(0.305)	(0.002)
BS	-0.0156	**-0.521***	0.0196	-0.0149	**-0.177***	0.00131
	(0.321)	(0.10)	(0.320)	(0.476)	(0.10)	(0.252)
EXPER	**0.0754***	-1.417	0.754	0.0307	-1.012	0.8971
	(0.10)	(0.104)	(0.120)	(0.287)	(0.152)	(0.275)
FEMALE	0.00296	0.0961	**0.0875****	0.00159	**-0.102****	**0.0259****

	(0.411)	(0.136)	(0.05)	(0.191)	(0.005)	(0.05)
COMPENSATION	0.0547	-0.00857	0.00981	**0.06051***	0.0876	-0.00315
	(0.178)	(0.326)	(1.751)	(0.10)	(0.334)	(1.693)
Constant	**2.243*****	**-2.953***	**2.158*****	3.243	**-3.953***	**2.292*****
	(0.000)	(0.10)	(0.000)	(0.123)	(0.10)	(0.000)
Observations	280	268	254	250	232	244
Adjusted R^2	0.291	0.234	0.236	0.279	0.214	0.298
N. of banks	70	69	68	69	69	67

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank risk (RISK) which measured by Z-Score, NPL and Tier1-Capital. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

4.6 Exploring the Global Financial Crisis

In this section, we examine how the global financial crisis (GFC) affects the impact of economic freedom and regulation of credit, labor and business market on bank performance and risk-taking. To address this issue, we add interaction terms to our regression models. The models, described by equations 4a and 4b below, are estimated using the Fixed-Effects method.

Bank performance model

$$(PERFOR)i,t=\beta_0+\beta_1 CRISIS*EC\text{-}FRi,t+\beta_2 CRISIS*CR\text{-}REGi,t+\beta_3 CRISIS*LB\text{-}REGi,t+\beta_4 CRISIS*BS\text{-}REGi,t+\beta_5 LNTAi,t+\beta_6 CAPITALi,+\beta_7 LOANSTAi,t+\beta_8 GDPi,t+\beta_9 INFi,t+\beta_{10} MACGDPi,t+\beta_{11} FOREIGNi,t+\beta_{12} BSi,t+\beta_{13} EXPERi,t+\beta_{14} FEMALEi,t+\beta_{15} COMPENSATIONi,+ ui + \varepsilon i,t \quad (4a)$$

Bank risk model

$$(RISK)i,t=\beta_0+\beta_1 CRISIS*EC\text{-}FRi,t+\beta_2 CRISIS*CR\text{-}REGi,t+\beta_3 CRISIS*LB\text{-}REGi,t+\beta_4 CRISIS*BS\text{-}REGi,t+\beta_5 LNTAi,t+\beta_6 CAPITALi,+\beta_7 LOANSTAi,t+\beta_8 GDPi,t+\beta_9 INFi,t+\beta_{10} MACGDPi,t+\beta_{11} FOREIGNi,t+\beta_{12} BSi,t+\beta_{13} EXPERi,t+\beta_{14} FEMALEi,t+\beta_{15} COMPENSATIONi,+ ui + \varepsilon i,t \quad (4b)$$

Where ***PERFOR*** and ***RISK*** denote performance and risk-taking respectively for bank **i**, t the time period, **ln** the natural logarithmic, **β** the parameters to be estimated, **u** the unobserved fixed-effect for bank i and **ε** the remaining disturbance term. We consider the dummy variable CRISIS which takes the value one for the period 2004 to 2009 and the value zero for the period 2010 to 2016.

According to the results of Tables 13 and 14 the negative coefficient of the CRISIS*(REG) variable means that the effect of economic freedom and regulation of private, labor and business market is more pronounced for the period after the financial crisis (Wooldridge, 2012).

The effect of the economic freedom variable is positive and significant on the return on average assets (ROAA) at the 5% level which means that a high degree of economic freedom is linked to better economic growth and thus, to better bank performance (Table 13). Our results are consistent with those of Sufian Hassan (2010) and Sufian and Majid (2011) among others, providing support for hypothesis H1.a. Also, the CRISIS*(EC-FR) variable is negative at the 1% level for net interest margin, meaning that after the financial crisis the linkage is more important. Our results are not the same with those in Table 11 as we find that the effect of economic freedom on bank performance has

no significant impact regardless of the risk measure for the period after the crisis. Similarly, the effect of economic freedom on return on average assets (ROAA) is more pronounced for the period after the crisis. However, the positive coefficient of the economic freedom CRISIS*(EC-FR) variable means that a low value in economic freedom increases bank performance when measured by return on average assets (ROAE), for the period before and during the financial crisis. Thus, we accept hypothesis H3.a.

In addition, the positive impact of the economic freedom (EC-FR) variable on Tier1-capital ratio (Table 14) means that greater levels of economic freedom increase competition and growth development and hence, contribute to financial stability, rendering support to hypothesis H1.d. Also, the positive impact of the CRISIS*(EC-FR) variable on Tier1-capital ratio shows that the effect of economic freedom is more significant for the period after the global financial crisis. Thus, we reject hypothesis H3.b. Our results are not the same with those in Table 12 as we find that the impact of economic freedom on risk-taking is negative and significant for Tier1-capital for the period after the crisis.

Moreover, in Table 13, the relationship between the credit regulation and bank performance is positive and significant at the 1% level for return on average assets (ROAA) and return on average equity (ROAE). Our findings are in line with Chortareas et al. (2013) who show that financial freedom has as positive impact on bank efficiency, providing support for hypothesis H2.1.a. Also, the CRISIS*(CR-REG) variable is negative at the 1% level for return on average assets (ROAA), meaning that after the crisis the linkage is more important. Regarding the risk-taking the credit regulation has no significant impact on bank risk. Thus, we reject both hypotheses H2.1.c. and H2.2.d.

Form Table 13, the impact of the labor regulation on bank performance is positive and significant at the 1% level for Tobin'sQ and for net interest margin (NIM). One possible explanation is that minimising business start-up regulations and reducing the time and cost required for firm registration are all found to increase the number of new businesses and jobs created and thus, result in increased bank performance (Mamatzakis et al., 2013). Hence, we accept hypothesis H2.2.a. Moreover, the negative effect of the CRISIS*(LB-REG) variable on bank performance and especially on Tobin'sQ and return on average equity (ROAE) is negative at the 1% level, means that the impact of liberal labor regulation is more important for the period after the financial crisis. Our results are similar with those from the Table 11 as we show that the relationship between labor regulation and bank performance is positive for the period after the crisis only when measured by Tobin'sQ.

Also, the effect of labor regulation on risk-taking is negative for non-performing loans (NPL) at the 5% level but positive for Z-Score and Tier1-capital at different levels (Table 14) rendering support to hypothesis H2.2.d. This means that liberal labor regulation reduces bank risk-taking. One possible explanation for this result is that increasing the flexibility of the labor market increases both the employment rate and the rate of participation in the labor force and hence, lead to a reduction in bank risk. Moreover, the impact of the CRISIS*(LB-REG) on risk-taking is positive and significant for non-performing loans (NPL) and Z-Score at the 1% level but negative at the same level for Tier1-capital, meaning that labor regulation is significant for bank risk for the whole period (Table 14). Hence, we reject hypothesis H3.b. Our results are in line with those from Table 12 where we show that liberal labor regulation increases bank risk-taking for the period 2004-2016.

Furthermore, regarding the business regulation variable we find that it has a positive and significant impact on bank performance at the 1% level for any measure (Table 13) and, hence, we accept hypothesis H2.3.a. One possible explanation is that business economic freedom is associated with more job creation which leads to increased bank performance (Mamatzakis et al., 2013). Also, the coefficient of the CRISIS*(BS-REG) variable is positive at the 1% level for return on average equity (ROAE) but negative at the 1% for the other proxies, meaning that the impact of business regulation on bank performance is significant for the whole period.

Also, we find that business regulation has a greater influence on bank risk after the financial crisis as the coefficient of CRISIS*(BS-REG) is negative and significant at the 1% level for both non-performing loans (NPL) and Tier1-capital. Thus we reject hypothesis H3.b. Moreover, Table 14 indicates that business regulation has no significant impact on risk-taking regardless of risk measure. Our results are not similar with those in Table 12, as we find that the liberal business regulation reduces bank risk-taking for the period after the financial crisis (2010-2016).

Table 13: Empirical results for bank performance with interactions

Variables	**Tobin'sQ**	**ROAA**	**ROAE**	**NIM**
EC-FR	0.0754	0.875	-0.058	**0.425****
	(0.132)	(0.230)	(0.196)	(0.05)
CR-REG	-0.0235	**0.0354*****	**0.0721*****	0.0874
	(0.223)	(0.000)	(0.000)	(0.211)

LB-REG	**0.0398*** **	-0.547	0.0245	**0.0122*** **
	(0.001)	(0.162)	(0.411)	(0.001)
BS-REG	**0.0526*** **	**0.745*** **	**0.063*** **	**0.0963*** **
	(0.000)	(0.000)	(0.001)	(0.001)
LNTA	**-0.7852*** **	**-0.0987*** **	-0.411	0.0695
	(0.000)	(0.001)	(0.591)	(0.245)
CAPITAL	**0.0981** **	0.0612	**0.0876** **	**0.0396*** **
	(0.04)	(0.469)	(0.05)	(0.001)
LOANSTA	**-0.0963*** **	**0.482*** **	**0.0410*** **	**-0.0563*** **
	(0.000)	(0.000)	(0.000)	(0.001)
GDP	0.0158	**0.891*** **	**0.248*** **	0.4526
	(0.126)	(0.001)	(0.001)	(0.289)
INF	**-0.0423*** **	0.0574	-0.213	**-0.0396** **
	(0.001)	(0.198)	(0.156)	(0.001)
MACGDP	**-0.826*** **	**-0.256*** **	**-0.378*** **	-0.0274
	(0.000)	(0.001)	(0.001)	(0.312)
FOREIGN	0.0789	-0.00741	-0.496	**0.962** **
	(0.209)	(0.313)	(0.195)	(0.05)
CRISIS*(EC-FR)	-1.120	**-0.652*** **	**0.963*** **	**-0.453*** **
	(0.120)	(0.000)	(0.000)	(0.001)
CRISIS*(CR-REG)	-1.089	**-0.503*** **	-0.789	-0.456
	(0.315)	(0.000)	(0.234)	(0.120)
CRISIS*(LB-REG)	**-0.897*** **	0.6891	**-1.012*** **	-1.164
	(0.000)	(0.112)	(0.000)	(0.189)
CRISIS*(BS-REG)	**-1.123*** **	**-0.962*** **	**0.814*** **	**-0.789*** **
	(0.000)	(0.000)	(0.000)	(0.001)
BS	0.0521	**0.1485*** **	**0.0963*** **	0.0126
	(0.620)	(0.001)	(0.001)	(0.175)
EXPER	-0.891	**0.0521** **	**0.0782** **	**0.0412*** **
	(0.120)	(0.05)	(0.05)	(0.001)
FEMALE	**0.0762** **	0.0856	0.4785	**0.0621** **
	(0.054)	(0.212)	(0.278)	(0.05)
COMPENSATION	0.00812	**0.0693***	**0.0076***	0.01025
	(0.175)	(0.10)	(0.10)	(0.189)
Constant	**2.859*** **	**1.079*** **	**-1.781*** **	**-1.896*** **

	(0.000)	(0.000)	(0.000)	(0.000)
Observations	657	625	636	627
N. of Banks	75	73	74	73
Adjusted R^2	0.289	0.221	0.263	0.302

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank performance (PERFOR) which measured by Tobin'sQ, ROAA, ROAE and NIM. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

Table 14: Empirical results for bank risk with interactions

Variables	**Z-Score**	**NPL**	**Tier1-Capital**
EC-FR	0.0268	-0.0785	**0.0891***
	(0.201)	(0.296)	(0.10)
CR-REG	-0.0963	0.0456	-0.0147
	(0.364)	(0.245)	(0.269)
LB-REG	**0.0896***	**-0.312****	**0.126*****
	(0.10)	(0.05)	(0.001)
BS-REG	0.0852	0.0245	0.0618
	(0.187)	(0.169)	(0.378)
LNTA	**0.0278***	**0.296*****	**0.0281*****
	(0.10)	(0.000)	(0.002)
CAPITAL	**-1.120****	0.9872	-0.478
	(0.05)	(0.126)	(0.320)
LOANSTA	0.0756	-0.0047	0.0784*
	(0.210)	(0.420)	(0.10)
GDP	-0.374	**-1.077*****	**1.012*****
	(0.104)	(0.002)	(0.000)
INF	**-0.891*****	**0.786*****	-0.821
	(0.001)	(0.001)	(0.423)
MACGDP	**0.775*****	**-0.469*****	**0.821***
	(0.000)	(0.001)	(0.10)
FOREIGN	**-0.0373*****	**-0.793*****	**-0.698*****
	(0.001)	(0.001)	(0.000)
CRISIS*(EC-FR)	**1.013*****	0.478	**0.978*****

	(0.000)	(0.120)	(0.001)
CRISIS*(CR-REG)	-0.8131	-0.7561	0.6541
	(0.436)	(0.489)	(0.355)
CRISIS*(LB-REG)	0.7853	**0.697*** **	**-0.978*** **
	(0.134)	(0.000)	(0.001)
CRISIS*(BS-REG)	-0.846	**-0.478*** **	**-0.821*** **
	(0.245)	(0.000)	(0.000)
BS	**-0.451*** **	**0.364*** **	-0.7218
	(0.000)	(0.001)	(0.125)
EXPER	**0.624*** **	-0.7841	**0.821***
	(0.001)	(0.458)	(0.10)
FEMALE	**-**0.2471	**-0.503*** **	**-0.631***
	(0.125)	(0.000)	(0.10)
COMPENSATION	**0.0074*** **	**-0.0089*** **	**0.0689*** **
	(0.001)	(0.001)	(0.001)
Constant	**1.891*** **	**2.079*** **	**-2.594*** **
	(0.000)	(0.000)	(0.001)
Observations	696	657	708
N. of Banks	74	73	74
Adjusted R^2	0.287	0.320	0.246

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank risk (RISK) which measured by Z-Score, NPL and Tier1-Capital. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

4.7 Empirical results by groups of countries

In order to examine for any region specific differences concerning the effect of economic freedom and regulation of credit, labor and business on bank performance and risk-taking, we divide our sample in three groups of countries based on their geographic location. Group A consists of countries of Southern Europe such as Greece, Spain, Italy and Portugal. Group B consists of countries of Northern Europe such as Ireland, UK, Sweden, Finland and Denmark. Group C consists of countries of Central Europe such as Germany, France, Luxembourg, Belgium, Netherlands, Austria, Hungary, Poland and Czech Republic.

Based on the results of Table 15, the effect of economic freedom (EC-FR) is positively related to bank performance for countries in Group A and Group B regardless of how it is measured in different significance levels. Thus, we accept hypothesis H1.a. One possible explanation is that economic freedom improves innovation and entrepreneurship and hence, has a positive impact on bank performance. However, economic freedom is positive for countries of Group C which means that a high degree of economic freedom leads to high levels of bank performance. Although, the coefficient of economic freedom has no statistically significant impact and thus, it does not affect bank performance in the countries of Central Europe. Moreover, the effect of economic freedom on bank risk is positive for Z-Score and Tier1-capital ratio meaning that high levels of economic freedom reduce bank risk (Table 16). However, the results are mixed for Group B relatively to the measure of risk-taking while the effect of economic freedom is not significant for Group C. Hence, we accept both hypotheses H1.c and H1.d.

Concerning the impact of credit regulation (CR-REG) on bank performance, the results are inconclusive for both Group A and Group B. Also, the effect is positive and significant at the 10% level for return on average equity (ROAE) for Central Europe countries (Table 15). Moreover, the estimated coefficient of credit regulation is positive and significant at the 1% level for non-performing loans for countries of Group A. This means that liberal credit regulation increases credit risk (Table 16), rendering support to hypothesis H2.1.c. One possible explanation is that in developing countries where there are high levels of corruption banks lend more to less creditworthy companies. However, the effect of credit regulation on risk-taking is negative at the 1% level for non-performing loans in Group B and positive at the 10% level for Tier1-capital in Group C, meaning that stricter credit regulation increases credit risk. Thus, we accept hypothesis H2.1.d.

The relationship between the labor regulation variable (LB-REG) and bank performance is negative at different levels for countries of Group A. This means that stricter labor regulation increases bank performance in developing countries. However, the impact of labor regulation is positive for countries of Group B. Nevertheless, the estimated coefficient of economic freedom is negative but has no significant impact for countries of Group C (Table 15). Hence, we accept both hypotheses H2.2.a and H2.2.b. One possible explanation is that employees tend to invest more in skills when they perceive a high risk of losing their jobs because of the absence of employment protection (Koutsomanoli-Filippaki and Mamatzaskis, 2013). The effect of labor regulation (LB-REG) on bank risk is negative (reduces) and significant at different levels for countries of Group B and C (Table 16). More precisely, we find that liberal labor regulation reduces risk-taking and probability of

default for Southern and Northern Europe countries. One possible explanation is that liberal labor regulation turn in better bank performance and hence, reduces risk-taking with respect to innovation and technology (Bassanini and Ernst, 2002; Scarpetta and Tressel, 2004). Thus, we accept hypotheses H2.2.c and H2.2.d. However, the estimated coefficient of labor regulation indicates that stricter labor regulation reduces the probability of default while increases the non-performing loans ratio. Nevertheless, labor regulation has no significant impact on countries of Group A.

The results concerning the business regulation (BS-REG) variable are mixed (Table 15); positive for return on average equity (ROAE) but negative for the other proxies at different levels, rendering support to hypotheses H2.3.a and H2.3.b. However, the impact of business regulation is positive at the 5% level for Tobin'sQ in Northern Europe countries. One possible explanation is that in a good economy less business regulation promotes business creation which in turn increases profits for banks and, hence leads to high levels of performance (Sufian and Habibullah, 2010). On the contrary, the impact of business regulation on bank performance is negative and significant at the 5% level for return on average assets (ROAA) and return on average equity (ROAE) for countries of Croup C.

Therefore, the impact of business regulation (BS-REG) on bank risk is negatively (reduces) and statistically significant for countries of Southern Europe. This means that liberal business regulation leads to less credit risk and thus we accept hypothesis H2.3.d. One possible explanation is that less restrictions and entry barriers may lead to more businesses which turn in increased demand for financial services and hence lead to more revenues for banks and less risk. However, the effect is positive (increases) for countries of Group B and Group C as more liberal business regulation is associated with more credit risk (Table 16). Thus, we accept hypothesis H2.3.c.

According to the GDP growth (GDP) the effect on bank performance is positive and significant at different levels regardless of bank's location. One possible explanation is that a soundly managed bank would profit from loans and securities sale (Sufian and Habibullah, 2010). Therefore, the findings concerning risk-taking indicate that the GDP growth reduces credit risk only for Northern Europe countries. The GDP growth has no significant impact for the countries of Group A and Group C.

Regarding the inflation (INF) variable the effect on bank performance is negative for countries of Group A and Group C. Therefore, the findings concerning risk-taking indicate that inflation increases bank risk-taking at different levels regardless of bank's location. One possible explanation

is that an unexpected rise in inflation causes cash flow difficulties for borrowers that may lead to premature termination of loan arrangements and precipitate loan losses (Perry, 1992).

With regard to the control variables, the estimated coefficient of size (LNTA) on bank performance is negative and significant at different levels, for countries of Group B and Group C regardless of how performance is measured (Table 15). Regarding risk-taking we find in Table 16 that bank size reduces probability of default in Southern and Northern Europe countries. Nevertheless, regarding the countries of Central Europe (Group C) we find the opposite effect: smaller banks may enjoy economies of scale and tend to be more efficient.

Our results show a positive relationship between tighter capital regulation (CAPITAL) and bank performance for Groups A and B and negative for Group C. Better capitalized banks have stronger incentives in improving their performance and minimizing costs. Also, the capital adequacy ratio (CAPITAL) reduces bank risk for all Groups of countries. The estimated coefficient of loans to total assets (LOANSTA) on bank performance is negative and significant at different levels, for countries of Group B and Group C regardless of how performance is measured (Table 15). Nevertheless, regarding the countries of Southern Europe (Group A) we find the opposite effect: asset utilization increase bank performance in developing countries when used efficiently. Regarding risk-taking we find in Table 16 that asset utilization reduces credit risk and contribute to bank stability regardless of bank's location.

Moreover, our findings indicate that there is a positive relationship between stock market capitalization (MACGDP) and bank performance for Group A but a negative for Group C. The results are mixed for Group B. In well-developed stock markets, companies tend to rely on equity rather than bank finance (Pasiouras et al., 2009). Regarding risk-taking we find in Table 16 that stock market capitalization increases probability of default in Southern and Northern Europe countries. Nevertheless, regarding the countries of Central Europe (Group C) we find the opposite effect; stock market capitalization improves bank stability and decreases credit risk.

Furthermore, the impact of the presence of foreign (FOREIGN) on bank performance is positive and significant at different levels for countries of Group A and Group C. one possible explanation is that banks in concentrated markets may be able to offer lower deposit rates and charge higher loan rates (Ataullah and Le; 2006) However, the results are mixed for countries of Group B (Table 15). Concerning risk-taking, the presence of foreign banks reduces bank risk regardless of bank's location (Table 16).

Based on the results of Table 15, the effect of board size (BS) is negatively related to bank performance for countries in Group A and positively related for countries in Group B regardless of how it is measured in different significance levels. Our findings indicate that large boards of directors perform worse than smaller ones in developing countries as they are more quick in the decision-making process (Hogue and Muradoglu, 2010; Belhaj and Mateus, 2016). However, the board size variable has no significant impact for countries of Group C (Table 15).

Also, the coefficient of board size (BS) is significant for all risk measures and for all Groups (Table 16). More precisely, the effect of board size (BS) on bank risk is negative for Southern and Central Europe countries and positive for Northern Europe countries. Our findings reveal that macroeconomic factors in conjunction with regulation of countries may alter the impact of board size on risk-taking. More precisely, in developing countries where corruption is high it is beneficial for bank to have small boards as the latter are more easy to monitor and to come to a common decision quickly.

The effect of financial experience is positively and significantly related with bank performance at different levels regardless of bank's location (Table 15). More experienced directors may lead to beneficial decisions for the bank. Nevertheless, the findings concerning the coefficient of financial experience on risk-taking show that financial experience reduces credit risk for Southern and Northern Europe countries while it has no significant impact for Central Europe countries. Consequently, the implementation of macroeconomic factors changes the impact of financial experience on bank risk. One possible explanation is that in developing countries wage pressures could result in higher labor productivity due to investment in capital-intensive industries (Autor et al., 2007).

The relationship between the female directors and bank performance is positive for countries of Group A and Group C but there is no significant impact for countries of Group B (Table 15). Our findings indicate that there is a positive relationship between women and bank performance. One possible explanation for this result is that women may contribute to the effectiveness of the board due to their specific skills and knowledge (García-Meca et al., 2015). The effect of women directors (FEMALE) on bank risk is significant at different levels. We find mixed results for Southern and Central Europe countries. Hence, the presence of women for Northern Europe countries has no significant impact on risk-taking.

Also, the estimated coefficient of compensation has no significant effect on bank performance measures for countries of Group A and Group C but positive and significant at the 1% level for countries belonging to Group B. Therefore, the impact of compensation on bank risk is positive and statistically significant for countries of Southern Europe and Northern Europe. However, the effect is not significant for countries of Central Europe. Our results show that an increase in CEO cash bonuses in European banks leads to lower risk (Vallascas and Hagendorff, 2013).

Table 15: Empirical results for bank performance by Group of Countries

	Group A				Group B				Group C			
Variables	**Tobin'sQ**	**ROAA**	**ROAE**	**NIM**	**Tobin'sQ**	**ROAA**	**ROAE**	**NIM**	**Tobin'sQ**	**ROAA**	**ROAE**	**NIM**
EC-FR	**0.00930*** **	**0.4391**	**0.2731** **	**0.093*** **	**0.0154***	**0.0970*** **	0.6671	**0.0223***	0.0309	0.0470	0.3671	0.189
	(0.000)	(0.234)	(0.05)	(0.000)	(0.10)	(0.000)	(0.182)	(0.10)	(0.143)	(0.169)	(0.188)	(0.139)
CR-REG	**-0.0117** **	**0.389*** **	2.947	**-0.0117** **	-0.0125	**-0.158*** **	**5.811** **	**0.0412** **	0.00986	0.126	**0.563***	0.0393
	(0.05)	(0.000)	(0.215)	(0.05)	(0.217)	(0.000)	(0.05)	(0.05)	(0.118)	(0.936)	(0.10)	(0.716)
LB-REG	-0.00736	**-0.329** **	**-0.3524***	-0.00736	-0.0203	**0.110*** **	0.864	-0.00118	-0.00240	-0.00192	-0.988	0.0603
	(0.547)	(0.000)	(0.881)	(0.500)	(0.317)	(0.000)	(0.437)	(0.141)	(0.644)	(0.535)	(0.172)	(0.431)
BS-REG	**-0.0245*** **	**-0.552*** **	**0.7582*** **	**-0.0245*** **	**0.0663** **	0.00421	-5.545	-0.00128	-0.00383	**-0.162** **	**-0.792** **	-0.0600
	(0.000)	(0.001)	(0.001)	(0.001)	(0.05)	(0.449)	(4.014)	(0.156)	(0.125)	(0.10)	(0.05)	(0.210)
GDP	**0.00419*** **	**0.0950** **	**0.206*** **	**0.0419*** **	-0.00234	**0.00261***	**0.940** **	0.0075	0.00214	**0.0716*** **	**1.090*** **	0.0091
	(0.001)	(0.05)	(0.000)	(0.001)	(0.341)	(0.10)	(0.05)	(0.348)	(0.185)	(0.001)	(0.000)	(0.212)
INF	**-0.00659*** **	**-0.134***	**-1.775***	**-0.0659*** **	**-0.0109** **	**0.00137*** **	**0.059*** **	0.00026	**-0.00737***	**-0.0746** **	**-0.297** **	0.0024
	(0.001)	(0.10)	(0.10)	(0.001)	(0.05)	(0.002)	(0.000)	(0.192)	(0.10)	(0.05)	(0.05)	(0.354)
LNTA	0.00199	0.0454	1.308	0.00199	**-0.0176** **	0.250	**-2.408** **	**-0.419*** **	**-0.0197*** **	**-0.172*** **	**-1.669*** **	**-0.372*** **
	(0.511)	(0.0973)	(1.404)	(0.511)	(0.05)	(0.299)	(0.10)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
CAPITAL	0.151	**0.150*** **	**1.467*** **	0.00151	**0.0869*** **	-0.0165	**1.601*** **	**-0.0109***	-0.00926	0.00510	**0.0797*** **	**0.0202***
	(0.118)	(0.003)	(0.000)	(0.118)	(0.001)	(0.168)	(0.000)	(0.10)	(0.136)	(0.108)	(0.000)	(0.10)
LOANSTA	-0.00170	**0.0239** **	**0.414*** **	-0.0170	**-1.647** **	**-1.915*** **	**-1.071*** **	**-0.334*** **	**-0.540*** **	-0.00191	**-0.0929** **	**-0.0888** **
	(0.488)	(0.05)	(0.000)	(0.488)	(0.05)	(0.000)	(0.000)	(0.000)	(0.000)	(0.343)	(0.05)	(0.05)
MACGDP	**0.0212*** **	0.0596	**0.0514*** **	**0.0693** **	**0.0212*** **	**-0.964*** **	**0.185** **	**-0.793*** **	0.00121	0.00405	0.00328	**-0.0619*** **
	(0.000)	(0.113)	(0.001)	(0.05)	(0.001)	(0.000)	(0.05)	(0.000)	(0.324)	(0.267)	(0.441)	(0.001)
FOREIGN	-0.1451	**0.2451** **	**0.316*** **	0.0723	0.00259	**-1.964*** **	0.0321	**0.7893*** **	-0.00109	**0.0128*** **	0.0673	**0.0117** **
	(0.131)	(0.05)	(0.001)	(0.144)	(0.776)	(0.000)	(0.197)	(0.000)	(0.711)	(0.000)	(0.615)	(0.05)
BS	**-0.00152***	-0.00195	-0.201	**-0.00152***	-0.00246	**0.9645*** **	0.433	**1.334*** **	-0.00367	-0.0379	0.738	0.0262
	(0.10)	(0.179)	(0.258)	(0.10)	(0.374)	(0.000)	(0.492)	(0.000)	(0.862)	(0.736)	(0.243)	(0.207)
EXPER	-0.00350	**0.0793*** **	**0.884** **	-0.000350	-0.00573	**0.196*** **	0.190	-0.3341	-0.00368	0.00174	**0.674***	0.0258
	(0.111)	(0.000)	(0.000)	(0.111)	(0.355)	(0.000)	(0.458)	(0.235)	(0.225)	(0.196)	(0.10)	(0.157)
FEMALE	**-0.00842** **	**0.0375** **	**0.0448** **	**-0.00842** **	0.08305	**-0.986*** **	**-0.167***	**-0.734*** **	-0.00142	0.00359	0.0627	**0.0789** **
	(0.400)	(0.001)	(0.05)	(0.05)	(0.703)	(0.000)	(0.10)	(0.000)	(0.476)	(0.417)	(0.756)	(0.05)
COMPENSATION	0.001250	0.7781	0.00136	0.1257	**0.0974*** **	**0.0960*** **	-0.00288	**0.334*** **	0.0155	0.0292	0.00698	-0.3510
	(0.250)	(0.196)	(0.114)	(0.256)	(0.001)	(0.000)	(0.296)	(0.001)	(0.321)	(0.281)	(0.474)	(0.230)

Constant	**1.095*** **	**-2.073***	**-2.247*** **	-0.296	**-1.242** **	**1.781*** **	**0.875*** **	**1.977*** **	**0.233** **	**1.926*** **	**1.071*** **	**0.775*** **
	(0.000)	(0.10)	(0.000)	(0.188)	(0.05)	(0.000)	(0.000)	(0.000)	(0.05)	(0.000)	(0.000)	(0.000)
Observations	197	219	243	234	198	170	170	150	245	261	259	275
Adjusted R^2	0.211	0.265	0.291	0.285	0.348	0.273	0.188	0.245	0.134	0.235	0.198	0.212
N. of Banks	25	25	23	23	22	22	22	22	30	30	30	30

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank performance (PERFOR) which measured by Tobin'sQ, ROAA, ROAE and NIM. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

Table 16: Empirical results for bank risk by Group of Countries

	Group A			**Group B**			**Group C**		
Variables	**Z-Score**	**NPL**	**Tier1-Capital**	**Z-Score**	**NPL**	**Tier1- Capital**	**Z-Score**	**NPL**	**Tier1-Capital**
EC-FR	**0.5372*** **	-0.0891	**1.0867*** **	**0.6142*** **	**3.321** **	-0.1935	-0.517	-1.0186	0.8192
	(0.000)	(0.145)	(0.001)	(0.001)	(0.04)	(0.179)	(0.623)	(0.129)	(0.118)
CR-REG	0.254	**0.978*** **	0.131	0.361	**-0.4402*** **	0.242	-0.118	0.292	**0.587***
	(0.309)	(0.000)	(0.139)	(0.214)	(0.001)	(0.377)	(0.198)	(0.528)	(0.10)
LB-REG	-0.415	-0.672	0.0351	**0.961** **	**-0.4577** **	**1.229*** **	**0.0549***	**-0.915*** **	**0.523*** **
	(0.307)	(0.654)	(0.140)	(0.04)	(0.10)	(0.001)	(0.10)	(0.000)	(0.000)
BS-REG	**0.425*** **	**-0.857*** **	**0.790*** **	0.5762	**0.651*** **	-0.0287	0.189	**0.744***	-0.128
	(0.000)	(0.000)	(0.000)	(0.210)	(0.000)	(0.596)	(0.148)	(0.10)	(0.281)
GDP	0.0868	0.105	0.00862	0.0868	**-0.549*** **	**0.123***	0.0365	-0.0203	-0.0547
	(0.762)	(0.146)	(0.340)	(0.235)	(0.000)	(0.10)	(0.283)	(0.726)	(0.564)
INF	**-0.302** **	**1.333*** **	**-0.233*** **	**-0.302** **	**0.532** **	**-0.139***	0.0779	**0.473*** **	0.103
	(0.05)	(0.001)	(0.000)	(0.05)	(0.04)	(0.08)	(0.583)	(0.000)	(0.120)
LNTA	**1.164*** **	**-1.142***	-0.453	0.9783	0.921	**1.532*** **	**-0.486*** **	0.320	-0.0188
	(0.000)	(0.621)	(0.127)	(0.137)	(0.694)	(0.000)	(0.000)	(0.440)	(0.153)
CAPITAL	**1.030*** **	-0.00827	**0.815*** **	**1.030*** **	**-1.043*** **	**0.987*** **	**0.848*** **	**-0.284*** **	**0.847*** **
	(0.001)	(0.141)	(0.001)	(0.001)	(0.208)	(0.000)	(0.001)	(0.001)	(0.001)
LOANSTA	**0.0899*** **	**-0.164*** **	**0.0206***	**0.0920*** **	-0.2481	-0.120	-0.00810	-0.0191	-0.0202
	(0.001)	(0.001)	(0.10)	(0.000)	(1.899)	(1.233)	(0.862)	(0.253)	(0.131)
MACGDP	**-0.789*** **	0.8750	**-0.685*** **	-0.437	**0.909** **	-0.0193	**0.240*** **	**-0.0361** **	0.0143
	(0.000)	(0.126)	(0.001)	(0.360)	(0.03)	(0.124)	(0.001)	(0.05)	(0.245)

FOREIGN	**0.5960*** **	0.7831	**0.436*** **	**0.5960*** **	0.0246	-0.00421	**0.0198***	**-0.0853*** **	0.0197
	(0.000)	(0.196)	(0.001)	(0.000)	(0.470)	(0.135)	(0.10)	(0.000)	(0.152)
BS	**-0.145*** **	0.0469	0.0325	**0.278*** **	**-0.505***	**0.174****	-0.0940	**0.523*** **	-0.302
	(0.001)	(0.101)	(0.218)	(0.001)	(0.10)	(0.05)	(0.148)	(0.366)	(0.281)
EXPER	**0.181*** **	**-0.251****	0.0283	**0.493*** **	-0.302	0.00469	0.0442	-0.0837	0.0337
	(0.000)	(0.05)	(0.276)	(0.001)	(0.216)	(0.670)	(0.383)	(0.111)	(0.748)
FEMALE	**0.0593****	**0.231*** **	0.00920	0.0593	0.0192	-0.0180	-0.00555	**0.0808*** **	**0.0358****
	(0.000)	(0.001)	(0.122)	(0.349)	(0.432)	(0.137)	(0.802)	(0.0223)	(0.05)
COMPENSATION	**0.00432*** **	-0.00919	**0.00134***	**0.00811*** **	0.00161	-0.00368	-0.00356	-0.00971	-0.00292
	(0.001)	(0.120)	(0.08)	(0.000)	(0.166)	(0.500)	(0.561)	(0.139)	(0.104)
Constant	**-1.763*** **	**1.808*** **	1.085**	**1.920*** **	**-0.7895*** **	**1.774*** **	**1.190****	0.338	**1.014*** **
	(0.000)	(0.001)	(0.04)	(0.000)	(0.000)	(0.000)	(0.05)	(0.139)	(0.000)
Observations	243	228	263	124	148	151	234	175	234
Adjusted R^2	0.228	0.237	0.245	0.272	0.275	0.318	0.279	0.317	0.301
N. of Banks	27	27	27	25	14	14	25	21	26

Note: This table reports regression results obtained via the Fixed-Effects method. The dependent variable is bank risk (RISK) which measured by Z-Score, NPL and Tier1-Capital. Definitions of all variables are provided in Table 1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

5. Conclusion

In this essay, we examined the impact of economic freedom and regulation of credit, labor and business market on bank performance and bank stability in a sample of 75 European commercial banks for the period from 2004 to 2016. To our knowledge, this is the first study which relates corporate governance variables with regulation and economic freedom and control for any changes in the impact of bank governance on bank performance and risk-taking while we employ macroeconomic factors.

The empirical findings provide answers to our main research questions while they reveal a number of critical issues as regards the impact of macroeconomic variables on corporate governance mechanisms. Overall, our results show that economic freedom increases bank performance in many cases. This means that a high degree of economic freedom is associated with high levels of bank performance. One possible explanation for this result is that economic freedom promotes innovation and entrepreneurship, and hence, leads to economic growth and to better banking performance.

Regarding the risk-taking of banks, our findings indicate that economic freedom contributes to financial system soundness. One possible explanation is that more economic freedom is associated with a lower probability of default due to high competition and economic growth. However, the impact of economic freedom on bank risk changes depending on the time period and the location.

Moreover, credit regulation has a positive and statistically significant impact on bank performance, supporting that more liberal credit regulation improves the profitability of banks. One possible explanation is that liberal credit regulation resulted in fewer restrictions on banking activities and hence, allows banks to exploit the economies of scale. Furthermore, the results regarding risk taking are mixed depending on the risk measure, the time period and the location.

In addition, the impact of labor market regulation on bank performance is positive, meaning that liberal labor regulation increases the profitability of banks. One possible explanation is that liberal labor regulation promotes competition and thus, leads to high levels of bank efficiency. Also, the impact of labor regulation is negative on risk-taking. A possible explanation is that liberal labor regulation contributes to better bank performance and hence, reduces risk-taking with respect to innovation and technology.

Furthermore, business regulation increases bank performance, meaning that liberal business regulation enhances bank profitability through the increased competition and increased growth.

However, our results change when we consider the location of banks. Regarding the risk-taking of banks, our findings indicate that stricter business regulation contributes to more risk. Business regulation and entry barriers lead to less revenues from new businesses, decreased productivity and hence, result in less gains for banks and in more risk-taking.

Sound corporate governance is associated with less need for monitoring and supervision and less bank controls. Our findings reveal that the implementation of macroeconomic variables alters the impact of bank governance on bank performance and risk-taking in some cases. More precisely, the results regarding the impact of board size on bank performance and risk-taking are mixed and similar with those in the first essay, in the majority of the tests. However, in the two-step system GMM model our results are not the same with those in the first essay. More precisely, we find that a large board increases the probability of default. One possible explanation is that a liberal economic environment in conjunction with less credit regulation might give the opportunity to board members to take more risks and hence, to increase the likelihood of default risk.

Moreover, the impact of financial experience on bank performance and risk-taking does not change in many cases. The results reveal that experienced directors are associated with more bank performance and less risk-taking. One possible explanation for this result is that a more experienced board can identify risks that will affect financial stability and, hence, can advise managers on how to handle these risks to avoid losses. However, our results change when we take into account the location of banks. More precisely, we show that the impact of financial experience is more significant in developing countries as it reduces credit risk and probability of default. One possible explanation is that in developing countries wage pressures could result in higher labor productivity due to investment in capital-intensive industries.

Concerning the impact of female directors on bank performance we find that female directors increase bank performance. One possible explanation is that women contribute to board effectiveness through their knowledge and skills. However, regarding the risk-taking of banks the results are not the same with those in first essay, when we apply the two-step system GMM. More precisely, we find that female directors reduce credit risk. One possible explanation is that in a liberal labor environment the presence of women tends to be high. This in turn, leads to less credit risk as women are considered to be less overconfident than men, and thus, avoid taking more risks.

Finally, the compensation of directors increase bank performance and reduces risk-taking. Our results reveal that when the performance achievements concern long-term investments then the

payment tends to be higher. However, regarding the risk-taking of banks the results differ for those in the first essay, when we apply the two-step system GMM. More precisely, we show that compensation contributes to financial stability. One possible explanation is that in a more liberal and competitive environment, directors are more willing to invest in positive Net Present Value projects.

References

Agoraki, M., Delis, M. & Pasiouras, F., 2011. Regulations, competition and bank risk-taking in transition countries. Journal of Financial Stability 7, 38-48.

Arellano, M., Bover, O., 1995. Another look at the instrumental-variable estimation of error-components models. Journal of Econometrics 68, 29–52.

Autor, D., William, R., & Kugler, D., A., 2007. Does employment protection reduce productivity? Evidence from US States. The Economic Journal 117, 189-217.

Ataullah, A., & Le, H., 2006. Economic Reforms and Bank Efficiency in Developing Countries: the Case of the Indian Banking Industry. Applied Financial Economics, 16(9), 653-663.

Baier, S., Clance, M., & Dwyer, G., 2012. Banking Crises and Economic Freedom. SSRN Electronic Journal.

Barber, M., & Odean, T., 2001. Boys will be boys: Gender, overconfidence, and common stockinvestment. The Quarterly of Economics 116(1), 261-292.

Barth, J., Caprio, G., & Levine, R., 2004. Bank regulation and supervision: what works best? Journal of Financial Intermediation 13(2), 205–248.

Barth, J., Caprio, G., & R. Levine, R., 2006. Rethinking Bank Regulation Till Angels Govern. Cambridge University Press, New York, NY.

Barth, J., Caprio, & Levine, R., 2008. Bank regulations are changing: for better or worse? Comp. Econ. Stud. 50, 537–563.

Barth, J., Chen, L., Ma, Y., Seade, J., & Song, F., 2013. Do bank regulation, supervision and monitoring enhance or impede bank efficiency? J. Bank. Finance 37, 2879–2892.

Bassanini, A., & Ernst, E., 2002. Labour market regulation, industrial relations and technological regimes: a tale of comparative advantage. Industrial and Corporate Change, 11(3), 391-426.

Beck, T., Demirgüç-Kunt, A., & Levine, R., 2003. Law, endowments, and finance. Journal of Financial Economics, 70(22), 137-181.

Carvallo, O., & Kasman, A., 2005. Cost efficiency in the Latin American and Caribbean banking

systems. Journal of International Financial Markets, Institutions and Money, 15(1), 55-72.

Chortareas, G., Girardone, C., & Ventouri, A., 2013. Financial freedom and bank efficiency: Evidence from the European Union. Journal of Banking & Finance, 37(4), 1223-1231.

Claessens, S., & Laeven, L., 2004. What drives bank competition? Some international evidence. Journal of Money, Credit and Banking, 36(3), 563-583.

Delis, M., & Papanikolaou, N., 2009. Determinants of bank efficiency: evidence from a semi-parametric methodology. Managerial Finance 35(3), 260–275.

Delis, M., Molyneux, P., & Pasiouras, F., 2011. Regulations and productivity growth in banking: evidence from transition economies, journal of money. Journal of Money Credit and Banking 43(4), 735–764.

Demirguc-Kunt, A., Laeven, L., & Levine, R., 2004. Regulations, market structure, institutions, and the cost of financial intermediation, journal of money. Journal of Money Credit and Banking 36(3), 593–622.

Demirguc-Kunt, A., Detragiache, E., & Tressel, T., 2008. Banking on the principles: compliance with basel core principles and bank soundness. Journal of Financial Intermediation 17, 511–542.

Djankov, S., Glaeser, E., La Porta, R., Lopez-de-Silanes, F. & Shleifer, A., 2003. The new comparative economics. Journal of Comparative Economics, 31(4), 595-619.

Deakin, F., & Sarkar. P., 2008. Assessing the Long-Run Economic Impact of Labour Law Systems: A Theoretical Reappraisal and Analysis of New Time Series Data. CLPE Research Paper 30.

Gonzalez, F., 2005. Bank regulation and risk-taking incentives: An international comparison of bank risk. Journal of Banking and Finance 29, 1153-1184.

Ghosh, S., 2016. Does economic freedom matter for risk-taking? Evidence from MENA banks. Review of Behavioral Finance, 8(2), 114-136.

Gwartney J. D., Hall J. C., & Lawson R., 2012. Economic Freedom of the World: 2017 Annual Report. Vancouver, BC: The Fraser Institute. Data retrieved from www.freetheworld.com.

Hellman, F., Murdock, K., & Stiglitz, J., 2000. Liberalization, moral hazard in banking and

prudential regulation: Are capital requirements enough?. American Economic Review, 90(1), 147-165.

Houston, J. F., Lin, C.,Lin, P.& Ma,Y.,2010.Creditor rights, information sharing, and bank risk taking. Journal of Financial Economics 96(3), 485-512.

Kasman, A., & Yildirim, C., 2006. Cost and profit efficiencies in transition banking: the case of new EU members. Applied Economics, 38(9).

Koutsomanoli-Filippaki, A., & Mamatzakis, E., 2013. How labour market regulation shapes bank performance in EU-15 countries?. Working Papers 162, Bank of Greece.

Koutsomanoli-Filippaki, A., Mamatzakis, E., & Staikouras, C., 2009. Structural reforms and banking efficiency in the new EU States. Journal of Policy Modelling 31(1), 17–21.

Koutsomanoli-Filippaki, A., Margaritis, D., & Staikouras, C., 2009a. Efficiency and productivity growth in the banking industry of Central and Eastern Europe. Journal of Banking and Finance 33, 557–567.

Koutsomanoli-Filippaki, A., Margaritis, D., & Staikouras, C., 2009b. Profit efficiency under a directional technology distance function approach. Managerial Finance 35 (3), 276–296.

Laeven, L., & Levine, R., 2009. Bank governance, regulation and risk taking. Journal of Financial Economics, 93(2), 259-275.

Lensink, R., Meesters, A., & Naaborg, I., 2008. Bank efficiency and foreign ownership: Do good institutions matter?. Journal of Banking & Finance, 32(5), 834-844.

Loayza, N., Fajnzylber, P., & Calderon, C., 2005. Economic Growth in Latin America and the Caribbean: Stylized Facts, Explanations, and Forecasts. The World Bank, Washington, DC.

Mamatzakis, E., Kalyvas, A., & Piesse, J., 2013. Does regulation in credit, labour and business matter for bank performance in the EU-10 economies? International Journal of Economics and Business 20(3), 341–385.

Mamatzakis, E., & Bermpei, T., 2016. What is the effect of unconventional monetary policy on bank performance?. Journal of International Money and Finance 67, 239-263.

Marinković S. & Radović, O., 2014. Bank net interest margin related to risk, ownership and size: an

exploratory study of the Serbian banking industry, Economic Research-Ekonomska Istraživanja, 27:1, 134-154.

Pasiouras, F., Gaganis, C. H., & Zopounidis, C., 2006. The impact of bank regulations, supervision, market structure, and bank characteristics on individual bank ratings: a cross-country analysis. Review of Quantitative Finance and Accounting 27, 403–438.

Pasiouras, F., Tanna, S.,& Zopounidis, C., 2009. The impact of banking regulations on banks' cost and profit efficiency: cross-country evidence. International Review of Financial Analysis 18, 294–302.

Psillaki, M., & Mamatzakis, E., 2017. What drives bank performance in transitions economies? The impact of reforms and regulations. Research in International Business and Finance, 39, 578-594.

Scarpetta, S., & Tressel, T., 2004. Boosting Productivity Via Innovation and Adoption of New Technologies: Any Role for Labor Market Institutions?. World Bank Working Paper No. 3273.

Sufian, F., & Habibullah, S., 2010. Does economic freedom fosters banks' performance? Panel evidence from Malaysia. Journal of Contemporary Accounting and Economics 6, 77-91.

Sufian, F., & Hassan, K., 2010. Economic freedom and bank intermediation spreads: Do countries level of economic development make a difference? SSRN Electronic Journal.

Sufian, F., & Habibullah, S., 2014. Economic freedom and bank efficiency: does ownership and origins matter?, Journal of Financial Regulation and Compliance, 22(3),174 – 207.

Sufian, F. & Majid, M. Z., 2011. The nexus between economic freedom & Islamic bank performance: Empirical evidence from the MENA banking sectors. 8th International Conference on Islamic Economics & Finance, Retrieved from: www.iefpedia. com/english/?p=6649.

Shleifer, A., & Vishny, R., 1998. A survey of corporate governance. Journal of Finance Volume 52(2), 1997.

Shehzad, C. T., & De Hann, J., 2008. Financial Liberalization and Banking Crises. University of Gronengen Working Paper.