Central Banks and Inequality. An Analysis of Developed and Developing Countries

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Abstract

This paper proposes a new theory that links the role of Central Bank Independence with inequality. The literature on this topic is very scarce and does not empirically test this relationship. The literature argues that there is a significant positive relationship between inflation and inequality. The mechanism we propose is that the CBI has a direct effect on reducing inequality, because its main role is to lower inflation. Our paper analyzes this relationship over a period of 30 years (1990-2020) in 141 states. We consider that our study can represent a very valuable contribution to the literature being innovative in two ways: 1) The results confirm a negative relationship between CBI and inflation and 2) We analyze two other variables that CBI relies on to be effective.[1]

[1] This essay was prepared for FGDB Costin Murgescu Contest - 2021 Edition and it contains 25 pages excluding front page and bibliography.

Introduction

Studies on income inequality have shown in recent years that this can be the cause of many social and political problems. It is believed that the risk of financial crises increases (Ranciere and Winant, 2015), but also that of social and political unrest (Acemoglu and Robinson, 2000). Inequality varies greatly from country to country, but an upward trend has been demonstrated in all states (Piketty, 2013).

However, the causes of this general trend are undertheorized and in this paper we will try to demonstrate how the dynamics of inequality are related especially to that of a financial institution, namely the Central Bank.

In this paper, we will analyze and discuss this problem from several angles with the aim to offer a more rigorous perspective about the dynamics of CBI and inequality. Because most of the studies on this topic focus strictly on developed states, we decided it would be beneficial to take in consideration a larger sample of countries with a different political context that are spread across different continents (Developed States, Developing States and Least Developed States)

We focus on Central Bank Independence (CBI) to explain the differences in inequality between the countries we are analyzing. Thus, our research question is: *Does the Central Bank have any influence on increasing or decreasing inequality?* Governments like to abuse monetary policy in order to keep themselves in power. This could include more redistribution or subtle political arrangements with other institutions. However, if the Central Bank is independent, it weakens the government's ability to implement inflationist policies.

There is a consistent literature body that states an independent central bank favors long-term inflation reduction. In relation to inequality, as we will explain below, there are a number of studies that show a high long-term inflation is not only damaging the economy but increases inequality on a long period of time. Thus, the Central Bank

has a direct effect on inequality because its main duty is to monitor and stabilize inflation.

However, this model is an oversimplification of the process and it does not answer a problem that could arise. What happens if the Central Bank does not have strong enough channels or simply people and other institutions do not obey its monetary policy? Therefore the other part of our paper argues that the Central Bank is dependent on two other major factors to be effective in decreasing inflation; 1) the level of financial development and 2) the quality of political institutions.

As we can see in the graphs below (Fig.1 and 2), developing countries have not only the highest levels of inequality in the world, but also the highest inflation. Furthermore we see that in the long run the most developed countries maintain a constant stability of prices, while Least Developed Countries together with Developing record a constant increase (Fig.2).

Figure 1 – Distribution of inequality across countries (Gini Coefficient)

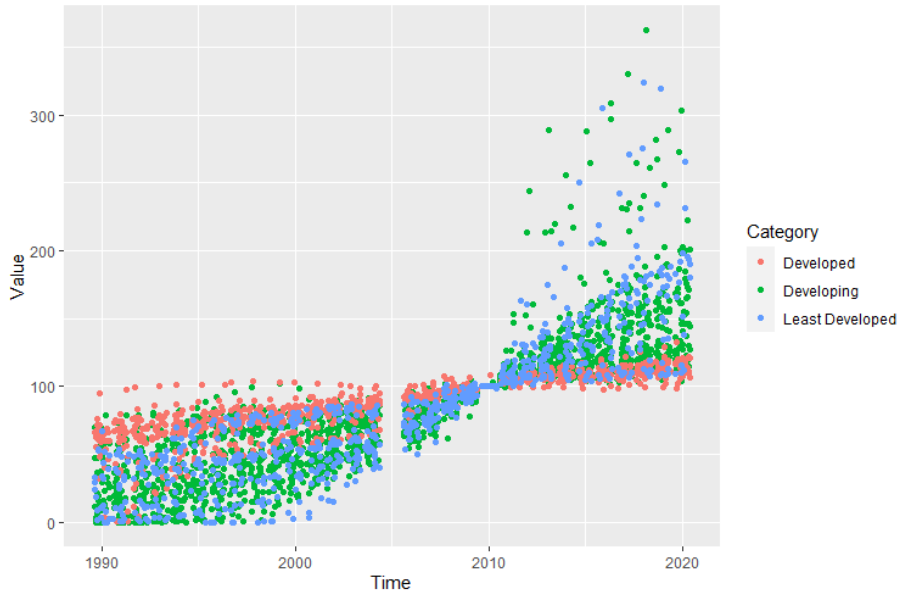


Figure 2 – Inflation over time using Consumer Price Index (own calculations)

The figure below shows (Fig.3) the distribution of states according to the degree of financial development. As we can notice, the developed states record the highest values of development, while Least Developed Countries occupy the lowest positions.

Figure 3 – Financial Development (FD) across countries (own calculations)

We can find similar values in relation to Institutional Quality. Least Developed Countries have the weakest institutional quality in the world while most developed states occupy the upper positions.

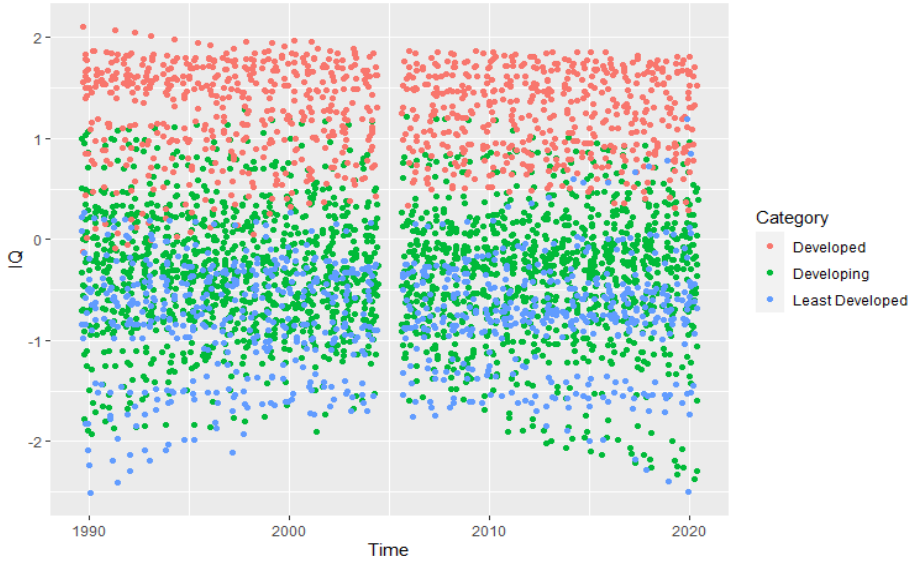


Figure 4 – Institutional Quality (IQ) across countries (own calculations)

We believe that these polarized values can generate very different results, but at the same time they can help us to understand in a comparative perspective how the conditions from different social contexts influence certain processes.

The contribution of our study lies in the idea of explaining how financial institutions impact inequality. Because there are very few studies on this subject, we believe that our paper makes a new contribution to the literature.

Literature Review

The idea of granting the Central Bank a degree of independence began to be discussed in the political and economic sciences as early as 1980. In 1990 a large wave

of states decided to expand their central bank autonomy. The theories that underlie the central bank's independence from politicians' interference are based on the idea that inflation will be reduced in the long run due to the fact that monetary policy is designed to withstand the change of governments and different economic philosophies. Thus, this includes that monetary policy is delegated to unelected officials and that government influence is reduced or completely eliminated

The idea to expand the central bank independence was intensely debated in the literature and in this debate there are two major perspectives conflicting. One school of thought states that central bank independence must increase for the reasons mentioned above (Kydland and Prescott, 1977; Barro and Gordon, 1983; Rogoff, 1985), and the other body argues that this is either irrelevant or the model does not reflect the reality. The argument is that the strict relationship between CBI and inflation requires other mechanisms to support it. For example, Posen (1995) argues that CBI is dependent on the degree of financial development while others such as Sturm and de Haan (2001) state that the relationship is very sensitive depending on the methodology used.

The reasons why the methodology used is very important can vary from the use of the CBI index to the available data. There are various indexes that measure the independence of the central bank, the most famous being Cukierman’s (1992). However, the newest and most promising is Garriga’s index (2016). Garriga expands Cukierman's (1992) database and adds new variables that measure Central Bank independence. Furthermore, the importance of the data used is important. For example, many less developed states with a deficient legislative system could suffer of many informal practices, namely subtle political arrangements or weak rule of law (Heilscher and Markwardt, 2012).

The idea of an independent central bank goes hand in hand with the idea that the government's influence on monetary policy is reduced. This is because politicians could abuse their influence to impose a distributive electoral program that would increase inflation but bring short-term votes. Bernanke (2010) and Klomp and de Haan (2010) argue that a monetary policy implemented by a conservative and independent Central Bank will keep long-term inflation under control. At the same time, the analyzes indicate

a lower inflation in the states with the Independent Central Bank than in the states in which did not grant this independence. Other authors such as Kokoszczyński and J. Mackiewicz-Łyziak (2020) argue that Central Bank independence is effective only in developed countries, while Peter Hall (1993) argues that inflation is not controlled directly by the Bank, but rather the political and economic design of the state is more important.

Inequality and Inflation

The GINI coefficient is the most famous and used index for measuring inequality. This index is inspired by Lorenz's model which projects absolute inequality and perfect equality as the relationship between the cumulative percentage of the population and the proportion of total income earned by each cumulative percentage. The GINI coefficient varies from 0 (perfect equality) to 100 (perfect inequality). This index is especially helpful when there are changes in income in the middle part of the income distribution because it treats symmetrically the changes both at the upper and lower level (Duro, 2004).

There is a fairly consistent body of literature that analyzes the effects of inflation on inequality. This relationship is especially important for policy makers who need to consider the long-term implications of government redistribution (Al-Mahrubi, 2000). Romer and Romer (1997), Balbanesi (2007) and Cardoso (1992) found in their studies that there is a significant positive correlation between inflation and inequality; the higher the inflation, the higher the inequality. Al-Mahrubi (1997) investigates this relationship using the inflation rate together with the GINI coefficient, political instability, trade openness and the influence of the Central Bank on the process. The results are in line with those of Dolmas et al., (2000) who show that economies with high levels of income inequality tend to have higher levels of inflation.

Among the political effects on inflation we list Desai et al. (2003) which analyzes the political structure of 120 states in the period 1960-2000 and discovers that the

competitiveness of the political system is central in explaining the positive correlation between inflation and inequality.

Another interesting study is that of Dolmas and Wynne (2000) which analyzes inequality in democratic and non-democratic states. The results indicate a significant positive relationship between inflation and inequality only in democratic states where the degree of independence of the central bank is low and where voters' preferences influence policies. One problem of the methodology used is what happens when the central bank's degree of independence is high and the parties cannot apply their economic redistribution as they wish? Furthermore, although the study considers the role that political institutions could play in this mechanism, the authors do not empirically analyze this impact.

Other studies worth mentioning are (Beetsma and Van der Ploeg, 1996; Albanesi 2001, 2007; Erosa and Ventura, 2002; Persson and Tabellini, 2002), all arguing that there is a positive correlation between inflation and inequality. Albanesi (2007) finds a strong positive correlation between inflation and inequality in 51 developed and developing countries between 1966 and 1990. Li and Zou (2002) analyze cross-country panel data to see the impact of inflation on income distribution. The results indicate that inflation decreases distribution efficiency and reduces economic growth. Walsh and Yu (2012) show that food inflation affects inequality differently from nonfood inflation, respectively nonfood inflation aggravates inequality, while the results for nonfood inflation are mixed.

But how does inflation actually affect inequality?

Economic theory has identified various costs of inflation, but also actions against it. For example, optimizing savings in local currency can prevent losses associated with rising inflation. Furthermore, investing in indices or bonds, renegotiating the employment contract adjusted to the inflation rate are other ways of defending against inflation. But the problem arises when inflation has an aggressive fluctuation and the future sounds uncertain. At a concrete level, when inflation rises, work, but also the

worker's salary devalues (Fischer, 1993). Another consequence of inflation is the reduction in the nominal value of total assets held by workers. These associated losses can only be mitigated if the worker anticipates rising inflation and takes steps to protect his income.

At the other pole are richer citizens who are not as affected by inflation as the poorer segment for several reasons: Their higher income allows them to get over inflation, and the higher investments (stock market, bonds, etc.) they have tend to grow faster than long-term inflation (Bulir, 1998). At the same time, these investments are dependent on the degree of financial development of a country, so the less developed it is, the more severe the inflation felt in the population.

In the face of social and economic problems caused by inflation, the state can intervene with a program of economic redistribution. In the face of a too high inflation, taxing the rich becomes inefficient for two reasons:

1) The rich are fewer than the poor, and the number of those who need help is growing in the given conditions.

2) Because inflation is high, redistribution loses its value.

In the context of income distribution, inflation helps debtors. Inflation can help reduce public debt. First, inflation erodes the real value of debt. Second, inflation can affect the primary balance, including whether brackets are not indexed under a progressive income tax (Akitoby et al., 2014). In developing countries, income is low and the indebtedness of the economy is very high. In addition to many other taxes that exist, inflation is positioned as a new tax that reduces the the level of consumption. Thus, inflation in these conditions would greatly affect consumption and increase income inequality (Narob, 2015).

The literature, but also the mechanism exposed above communicates us in general terms that high inflation is a very important condition in relation to inequality. High inflation affects the poor much more than the rich, and this means that the poor

become poorer faster than the rich. Furthermore, the mechanisms available to the state, including redistribution or higher taxes become much less efficient.

Central Bank Independence and Inequality

Now that we have clarified the main directions that the literature is discussing, we will discuss the relationship between Central Bank Independence and Inequality.

Since 1990, economic inequality has steadily increased in most states, yet the political motives that have supported this growth in while in others not remain poorly understood. Among the very few studies available that link the Independence of the Central Bank to this phenomenon is Aklin et.al (2021)

The mechanism proposed by the authors is very creative and innovative. First, Central Bank Independence constrains the government's fiscal policies of redistribution, which reduces the transfer of wealth from the rich to the poor. Second, the Central Bank supports the government to deregulate financial markets that generate a boom in asset values and indirectly favor the richer segments of the population. This paper is an example of how, indirectly, the objectives of the Central Bank increase inequality in society.

The paper finds strong support for its main hypothesis, demonstrating that CBI is actually increasing inequality. However, we can indicate two main limitations of the methodology used:

1) The study is not time-series nor does it include too many states (the main area is that of developed states)

2) What happens if the Central Bank is either not strong enough or not supported in achieving its objectives? We consider that the simple independence of the Central Bank is not enough, and in order to be effective it needs two other big factors: the Institutional

Quality and the degree of Financial Development. Our argument is that the higher the value of the two, the greater the effectiveness of the Central Bank.

Another paper we want to mention is Carstens (2021). This essay focuses more on explaining the process by which Central Banks contribute more or less to increasing inequality in society. The author insists especially on the composition of monetary policy but also on the structural reforms that the government could adopt to reduce inequality. Inflation is seen as the most important factor in increasing inequality, and the main weapon of the Central Bank is monetary policy that stabilizes prices.

An older paper but one that offers quite promising results is Dolmas et.al. (2000). This paper focuses on inequality and inflation in democratic and undemocratic states including the CBI as a variable in the mechanism. The results obtained indicate that reducing inflation and inequality is more effective in democracies than in non-democracies. The authors claim that the explanation lies in "certain institutional arrangements" and in the power of the vote that are influencing the whole mechanism. We believe that the results do not necessarily reflect reality because the authors confuse democracies with advanced states. Beside a considerable financial power, these advances states also have a high quality institutional design.

The main criticism we bring to the presented articles is that they confuse the high degree of independence of the central bank with the equally high degree of effectiveness of the central bank. In our paper we will systematically demonstrate that the Central Bank, in order to reduce inflation, is dependent on the degree of financial development and the quality of political institutions.

Financial Development and Financial Mechanism

Studying the interconnection between the financial system and the financial transmission mechanism, the literature highlighted two great perspectives (Peek and

Rosengren, 2013; Bean et al., 2002). One of them claims that the monetary policy transmitted has effects on consumer behavior. The other goes on the idea that the financial system is only a passive element in the transmission of monetary policy.

Although the relationship between the two is a complex one and requires a separate study, we can expect different results in each state depending on the efficiency of the two. For example, monetary policy may be more efficient in states with weaker financial systems, but with many companies dependent on bank loans (Carranza et al., 2010; Ma and Lin, 2016) or credit channel is stronger where there is financial frictions because it amplifies the effect of monetary policy shocks on inflation (Cicarelli et. al., 2014)

After the general presentation of the financial system, we will now explain the concrete mechanism by which the financial system affects the Central Bank. There is a large body of literature that argues that in order to implement its monetary policy, the Central Bank must be helped by a strong financial system. Cechetti and Krause (2001) found evidence suggesting an independent central bank, along with a strong financial sector led to a general long-term decline in inflation. Bittenchourt et.al., (2014) shows that a more developed financial sector considerably reduces economic fluctuations.

Posen (1993) has different analyzes on this subject and explains that the relationship between CBI and inflation is most often influenced by a third or fourth factor. Posen states that Central Banks are more effective in reducing inflation if two conditions are met:

1) Politicians do not interfere in monetary policy

2) There is a developed financial system that can support more efficient price stabilization. Posen (1993) concludes that a more developed financial system means a more developed monetary policy that can operate at much lower costs and interest rates. States with a weaker financial system operate at much higher costs, which generate higher inflation and higher interest rates. This discourages the efficiency of monetary policy (Agoba, et.al, 2017)

In developing countries, where weaker financial systems are present, there is a high possibility that the Central Bank, even if it wants to, will not be able to reduce inflation due to the problems it could cause in another area that it needs to monitor, namely the unemployment rate. To lower inflation, the interest rate must rise to discourage lending. This leads to a slowdown in economic growth, declining investment and production and thus a higher unemployment rate. Thus, a smaller available credit means a greater variability of investments. In advanced states where capital abounds in the market, there is enough credit for investment (Mehortra and Yetman, 2015).

In the literature, low inflation is also seen as a precondition for the development of the financial system, as it stimulates investment, exports and financial markets. If inflation is not kept under control in the long run, the result will be exactly the opposite (IMF and World Bank, 2001)

Another paper (Agoba, et.al., 2017) argue that in addition to a developed financial system, a high quality institutional design is necessary. Developed countries with an equally developed financial and banking system tend to have a sustainable economic growth. The financial sector offers the possibility of loans for the development of small and medium enterprises that generate economic growth and jobs. The results of Agoba et.al, (2017) seem to indicate that CBI has no contribution in encouraging economic growth in Africa. The explanation lies in the idea that the CBI is too ineffective to operate in countries where institutional quality and the financial system are weak.

Political Institutions

The influence of political institutions on the economy is the very foundation of political economy, and there is a body of literature that argues that states with weak institutions usually have higher inflation (Camillo and Miron, 1997).

Following this logic, states with strong institutions where the rule of law is respected grant their institutions a larger autonomy, which in fact gives power to the CBI (Crower and Meade, 2008). There are also papers that test this relationship empirically.

Keefer and Statsvage (2003) argue that the effectiveness of Central Bank Independence is strengthened in states where there is competition between parties (multi-party system). The two studies thus show that political institutions represent endogenous influences in the relationship between CBI and inflation.

Hayo and Voigt (2008) reinforce this perspective with a paper showing that the relationship between CBI and inflation is significant only in states where the system of checks and balances is strong enough. Moreover, Aisen and Veiga (2008) argue that in states where political stability is high, inflation tends to rise due to frequent changes in power and discontinuous monetary policies. Cukierman et. al., (1989) demonstrates that developing countries have a much smaller fiscal capacity. The deficit created generates a political tendency to print money, which can generate inflation in both the long and short term.

The body of literature presented refers to the importance of institutions and political stability in determining inflation. However, we believe CBI needs another leverage in order to keep the inflation low in the long run. What could the Central Bank do if citizens simply do not comply with the monetary policy? Thus, in order to solve this problem, a high degree of trust of the citizens in the political institutions and implicitly in the Central Bank is needed.

Hielscher and Markwardt (2012) and Posen (1995) analyze this relationship and suggest that a higher rate of people's trust in political institutions extends to the Central Bank. Moreover, the Central Bank cannot operate in a context in which citizens, politicians or commercial banks either do not comply or don’t trust the Central Bank's expertise. Hielscher and Markwardt's (2012) paper is part of the literature body that argues that simply granting central bank independence is not enough to explain price stabilization in a context where there are complex relationships between politics, the electorate, or other institutions. The authors argue that the design of political institutions, reflected in democracy, accountability, rule of law and bureaucracy are needed to improve the credibility of monetary policies.

Theory

In the above sections we have systematically analyzed the existing perspectives in relation to our subject but we also highlighted the mechanism we want to implement. We summarize the whole process below:

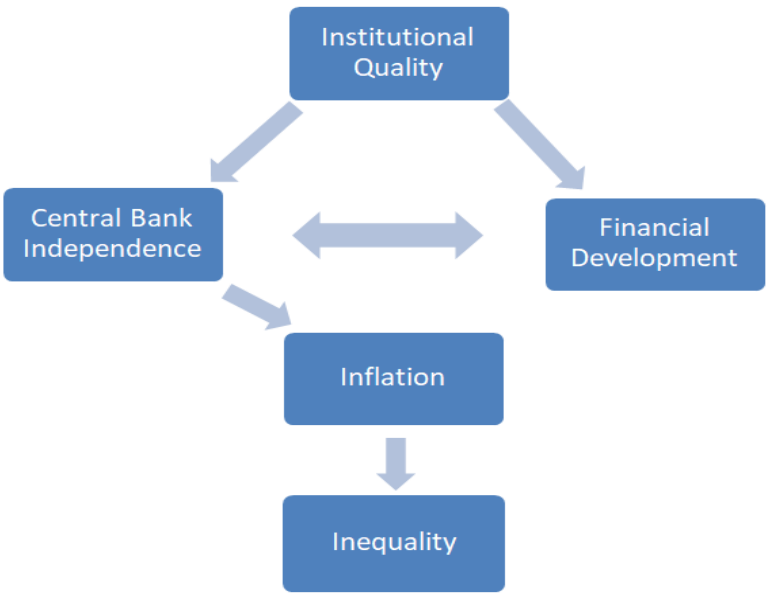
There is a positive relationship between inequality and inflation; states with higher inflation tend to experience a greater increase in long-term inequality. Many states, since the early 1990s, have begun to grant increasing independence to the Central Bank in the hope that it will stabilize prices in the long run if the political and electoral objectives no longer interfere with the bank's monetary policy. But as we argued in the literature review, the simple association between CBI and lower inflation is an oversimplification of the process and because of this reason we are going to use two other variables that have a marginal effect on CBI effectiveness, namely: Institutional Quality and Financial Development

Because the reasons why inequality is growing faster in some states and less in others is still very little understood, we propose a new theory to explain this phenomenon having as main explanation the effectiveness of CBI.

The theory we propose is that the effectiveness of CBI is a very important factor that has to be considered in explaining the increase/decrease of inequality. Because the CBI is directly dependent on Institutional Quality and Financial Development, we can expect the Central Bank to be less efficient in stabilizing inflation in developing countries, which record much lower values in relation to financial development and institutional quality and therefore CBI being less effective in keeping inequality under control. Therefore what this paper wants to demonstrate is that inequality increases only in developing and least developed countries because the CBI is less effective in stabilizing prices than in developed countries. By effectiveness of CBI we mean, inflation as low as possible.

The figure below is a representation of our model. Institutional quality affects both CBI and Financial Development. Regarding the CBI, as we explained, it is necessary for the citizens to trust the institutions, and in order to be reliable, the institutions must be

efficient (see Putnam, 1993; Christensen and Per, 2005; Paxton, 2002; Arnold, 2012). Institutional Quality is also important in the development of the financial system. Poor states are affected by corruption, political instability, insurrections and civil wars. Under these conditions, external or internal investors are not interested in investing in a country where the institutions do not guarantee the protection of their contracts (Mark and Jordan, 2008)



Furthermore, the CBI influences Financial Development by applying growth policies and stabilizing prices. The influence of the two on the CBI is especially relevant due to the fact that the states have granted the independence of the central bank regardless of their degree of financial or political development (Fig.5). But this does not mean, as we explained above, that CBI is also effective.

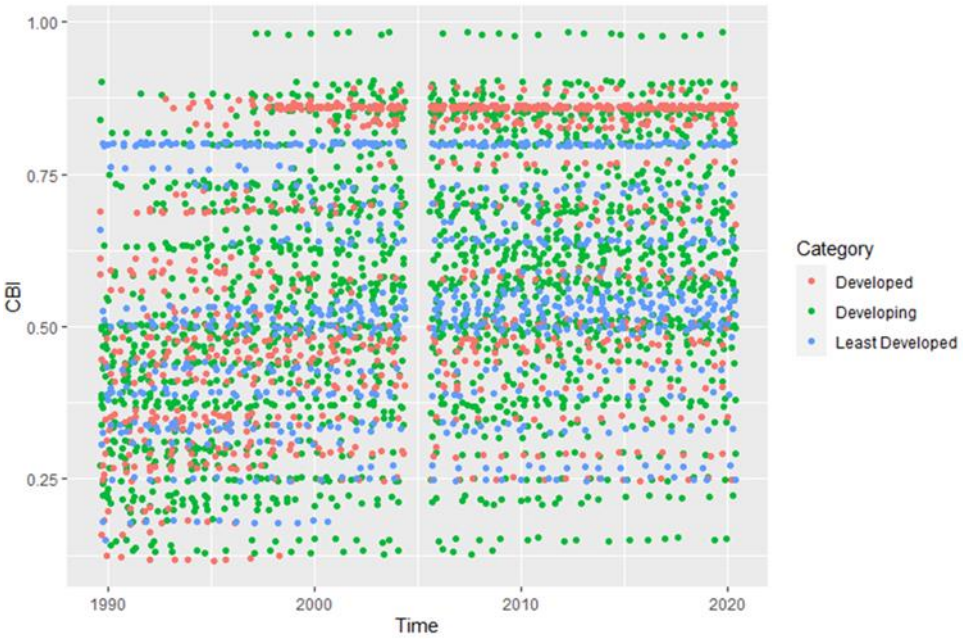


Figure 5 – Distribution of countries according to CBI

Hypotheses

1) Financial Development and Institutional Quality increase CBI effectiveness

2) CBI effectiveness decrease inequality

Dependent Variable: Gini coefficient/ Consumer Price Index

Independent Variables: CBI, Consumer Price Index for all products, Financial Development, Institutional Quality, GDP/cap

Methodology

The paper analyzes the relationship between CBI, inflation and inequality in the period 1990-2020, including a total of 141 countries: Developed Countries (33),

Developing Countries (77) and Least Developed Countries (31). In our study we will use the Consumer Price Index as a variable for inflation. We are using an OLS with fix effects model including states and time:

$$Y_{it} = \beta + \beta_1 X_{1,\,it} + \beta_k X_{k,\,it} + \gamma_2\, CBI\ + \mu_{it}$$

Where CV is the conditioning variable i.e Institutional Quality (IQ) or Financial Development (FD)

$$Y_{it} = \beta + \beta_1 X_{1,\,it} + \beta_k X_{k,\,it} + \gamma_2\, CBI_i\ + \gamma_3\, FD_i + \gamma_4\, IQ_i + (CBI_i * CV_i) + \mu_{it}$$

In order to analyze the marginal effects of Financial Development and Institutional Quality on CBI we are going to use a couple of interaction terms. To measure CBI we will use the index proposed by Garriga (2016). CBI index is based on the aggregation of 16 indicators in 4 categories: Bank governor, policy creation, objectives and limitations on lending to the government. The index varies from 0 to 1, the value 1 representing absolute independence and 0 a complete lack of independence. The index proposed by Garriga (2016) includes almost all countries in the world and although it does not take into account many variables (such as government intervention in the formulation of monetary policy) it is considered the most comprehensive index of its kind.

When we refer to the degree of development of the financial sector we will use an index created by the International Monetary Fund.

The Financial Development Index (FD) measures approximately all the characteristics of the financial sector starting from depth, access, efficiency to financial markets in almost all countries of the world. The index ranges from 0 to 1, a higher rate meaning a more developed financial sector. The index has two parts: the Financial Institutions Index (FI) and the Financial Market Index (FM), which in turn are divided into other subdivisions (Financial Development Database, 2021):

Financial Institutions Depth Index (FID) which compiles data on bank credit to the private sector in percentage of GDP, pension fund assets to GDP, mutual fund assets to GDP and insurance premiums, life and non-life to GDP.

Financial Institutions Access Index (FIA) which compiles data on bank branches per 100,000 adults and ATMs per 100,000 adults. This proxy was used due to lack of information for other financial institutions.

Financial Institutions Efficiency index (FIE) which compiles data on banking sector net interest margins, lending-deposits spread, non-interest income to total income, overhead costs to total assets, return on assets, and return on equity

Furthermore, the Financial Market Index **(FM)** is an aggregate of:

Financial Markets Depth index (FMD) which compiles data on stock market capitalization to GDP, stocks traded to GDP, international debt securities of government to GDP, and total debt securities of financial and nonfinancial corporations to GDP.

Financial Markets Access index (FMA), which compiles data on percent of market capitalization outside of top 10 largest companies and total number of issuers of debt (domestic and external, nonfinancial and financial corporations) per 100,000 adults.

Financial Markets Efficiency index (FME), which compiles data on stock market turnover ratio (stocks traded to capitalization). A higher turnover should indicate higher liquidity and greater efficiency in the market.

To measure institutional quality we will use the Worldwide Governance Index provided by the World Bank. Furthermore we are going explain how the World Bank formulated the explanation for each variable (WGI-Home, 2021).

Governance in our times presupposes the existence of a central power and channels through which this power is disseminated in society. This mechanism also implies an input-output relationship, ie how the government is elected, monitored or replaced by citizens. The government instead takes care of public policies, civil rights

and liberties, and the interaction between political and economic institutions with the social environment.

The Worldwide Governance Indicators report on six broad dimensions of governance for over 200 countries and territories over the period 1990-2019:

- Voice and Accountability
- Political Stability and Absence of Violence
- Government Effectiveness
- Regulatory Quality
- Rule of Law
- Control of Corruption

Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. This table lists the individual variables from each data source used to construct this measure in the Worldwide Governance Indicators

Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Values range from -2.5 to 2.5, and higher values mean better institutional quality.

In our paper we aggregated Voice and Accountability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption in the variable named "*Institutional Quality*".

Results and Discussion

After applying the OLS with fixed effects we obtained the following results:

The results in Fig.5 have as dependent variable the Consumer Price Index for all Products. These are the aggregate values of all states. In addition to GDP/cap, we have included 3 interaction terms between CBI, Institutional Quality, Financial Development and Political Stability. We notice that the interaction effects of FD and IQ on CBI is a negative one, i.e the higher the values of the two, the more efficient the central bank becomes in stabilizing prices. This could be explained by the fact that more stable countries experience a higher economic growth and its result is inflation.

	Dependent variable:
	Consumer Price Index All
CBI	2.750***
	(0.231)
GDP	0.006***
	(0.001)
Financial Development	4.038***
	(0.446)
Institutional Quality	1.715***
	(0.178)
Political Stability	-0.641***
	(0.183)
CBI * Financial Development	-1.620**
	(0.666)
CBI * Institutional Quality	-2.840***
	(0.308)
CBI* Political Stability	1.503***
	(0.316)
Observations	3,188
R2	0.253
Adjusted R2	0.220
F Statistic	129.296*** (df = 8; 3053)
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 5 – Regression results for inflation (Consumer Price Index)

The results in Fig. 6 represent the aggregate values of all states, but this time the dependent variable is Inequality (Gini Coefficient). In addition to interactions, we also included Inflation, which, as we can see, has a statistically significant relationship with inequality. The results of the interactions are very similar to Fig. 5, the interactions between CBI, Financial Development and Institutional Quality have a significant negative effect on inequality, because they are both equally effective in reducing inflation through CBI.

	Dependent variable:
	Gini
CBI	3.434***
	(1.294)
Consumer Price Index All	0.017***
	(0.002)
GDP	0.015*
	(0.008)
Financial Development	-0.866
	(2.588)
Institutional Quality	4.267***
	(1.070)
Political Stability	2.068*
	(1.114)
CBI * Financial Development	-9.981***
	(3.674)
CBI * Institutional Quality	-4.715***
	(1.754)
CBI * Political Stability	-2.658
	(1.835)
Observations	2,258
R2	0.077
Adjusted R2	0.023
F Statistic	19.712*** (df = 9; 2132)
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 6 - Regression results for inequality (measured in Gini Coeficient)

The graph (Fig.7) below represents the combined plotted marginal effects of Financial Development and Institutional Quality on CBI. We can notice that the relation is positive and therefore a more developed financial system and better institutional quality increase the effectiveness of CBI. This demonstrates our argument that FD and IQ represent endogenous influences on CBI.

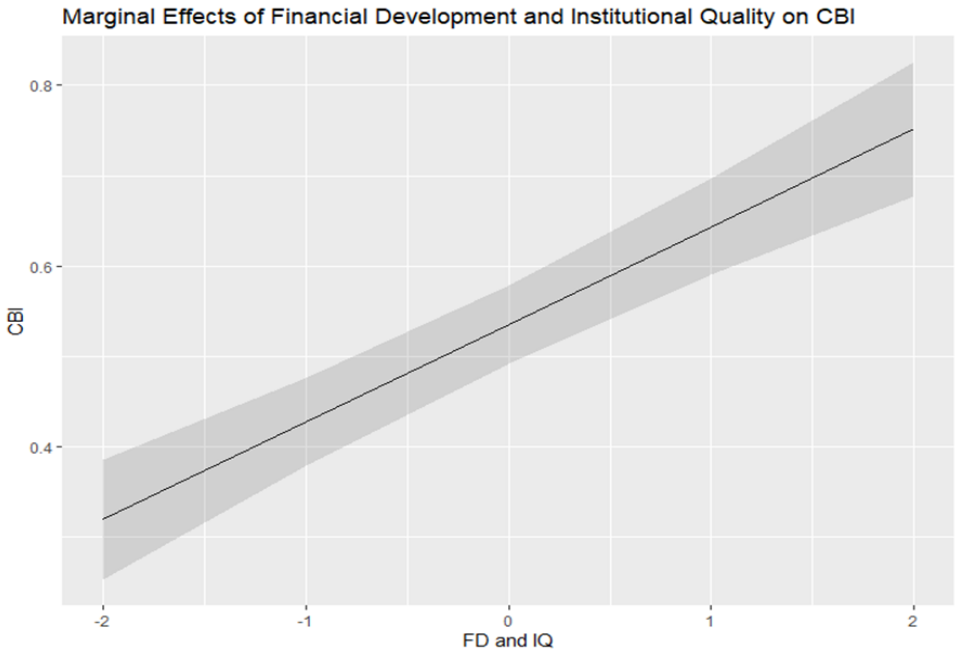


Figure 7

In the last graph (Fig.8) we have the interaction between Inequality (Gini Coefficient) and Consumer Price Index (Inflation) at certain given values of CBI. The values 0.13 and 0.98 represent the lowest value and the highest value in the whole sample. As we can see, inequality decreases in the long run if inflation is kept under control by an independent central bank. The trend we can deduce is that the closer the Central Bank approaches the maximum limits of independence, the more inequality decreases. This is in line with the literature which 1) argues that an independent central bank keeps inflation under control in the long run and 2) High inflation favors increasing long-term inequality. However, inflation increases inequality only in the absence of an independent central bank.

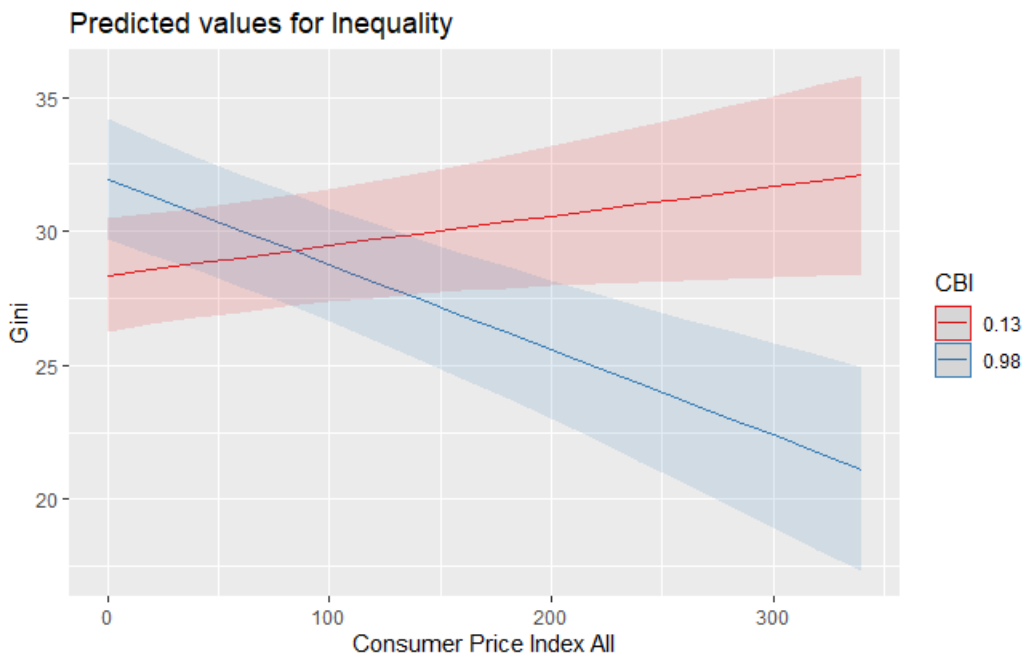


Figure 8

Conclusion

In this paper we proposed a new theoretical model that links CBI with income inequality by building a mechanism that provides an explanation for the variations in inequality from country to country. We reviewed the literature and found a large support for the theory that links inflation to inequality, however very few of these papers were considering linking CBI to it. The results obtained indicate support for both hypotheses in our study. Higher values of Financial Development and Institutional Quality increase the effectiveness of CBI. In turn, a more effective CBI keeps inflation under control in the long run and becomes effective in reducing inequality as well. Our paper analyzed this relationship in 141 states that have varying degrees of financial development and institutional quality. The CBI is most effective in developed countries, while the developing and least developed countries record very high values of inequality

sustained by a high inflation. Our explanation for this phenomenon is that the CBI is less effective in these states due to the economic and political context. Our essay is innovative in three ways: We discuss the role that CBI plays in the causes of inequality, contributing to the few studies that exist on this topic. 2) Our analysis is rigorous including a very large number of states with different political and economic backgrounds. And 3) The paper analyzed the role that Financial Development and Institutional Quality could play in boosting CBI effectiveness.

There are obviously variables that we have not taken into account and may represent topics of future studies, such as the role that dictatorships or competition between parties could have in influencing inequality.

Appendix 1 List of countries

Albania, Algeria, Azerbaidjan, Bahrain, Belarus, Bolivia, Bosnia and Hertzegovina, Botswana, Brazil, Bulgaria, Cameron, Chile, China, Colombia, Congo, Costa Rica, Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, Gabon, Georgia, Ghana, Hungary, India, Indonesia, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Libya, Malaysia, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Namibia, Nicaragua, Niger, Nigeria, Northern Macedonia, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, Serbia, Senegal, Singapore, South Africa, Sudan, Sri Lanka, Syria, Tajikistan, Thailand, Togo, Tunisia, Turkey, Ukraine, Uruguay, Venezuela, Vietnam, Zimbawe, Australia, Austria, Bahamas, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Portugal, Qatar, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States, Angola, Bangladesh, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Democratic Republic of Congo, Ethiopia, Gambia, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Rwanda, Sierra Leone, Tanzania, Togo, Uganda, Zambia

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Sovereign risk connectedness in the European Union: examining the impact of ECB's policy announcements

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Abstract

This paper assesses ECB unconventional policy announcements' impact on SCDS market connectedness in the EU between 2009 and 2014. The results indicate that ECB unconventional policy measures decreased sovereign default risk not only in Eurozone countries but also in Central and Eastern European countries. To explore monetary policy spillovers across European countries we apply Diebold & Yilmaz connectedness framework combined with an event-study methodology. We find evidence of intense pozitive spillovers from ECB monetary policy measures to all EU countries. Spillover transmission protected SCDS market from negative shocks. Among the different types of policy instruments, we find that spillovers from asset purchases programs increase *all-in-all connectedness*, and spillovers from mixed policy measures increase *within-cluster connectedness*. The results also shed light on the effectiveness of several monetary policy instruments: asset purchases programs and quantitative easing are the most effective policy instruments for decreasing sovereign risk.

1 INTRODUCTION

Since the beginning of the financial crisis in 2007, major central banks have implemented both conventional and unconventional monetary policy measures to control the spread of financial instability. Central banks around the world struggle to tackle economic negative consequences not only by lowering key interest rates but also by designing innovative programs and tools to ease the flow of credit. For ECB, the sovereign debt crisis added an extra layer of responsibility testing its capacity to contain financial instability through non-conventional policy measures. Confronted with the possibility of multiple debt crises, ECB engaged in targeted sovereign debt purchases exercising its *lender-of-last-resort* capacity. Between 2009-2014 the shift from its traditional operating framework included even more new policy measures. However, their impact on Central and Eastern European (CEE) markets has rarely been assessed.

While the literature investigated cross-border spillover transmission channels of unconventional monetary policy focusing on various financial variables (Georgidas & Grab, 2015; Apostolou, & Beirne, 2017), only a few studies focused on spillover transmission from European Monetary Union (EMU) member states to six Central and Eastern European economies [1] (Falagiarda et. al., 2015; Ciarlone & Colabella, 2016). Moreover, a vast literature investigated how sovereign credit risk changes spillover transmission depending on global factors (Ang & Longstaff, 2013; Pan & Singleton, 2008) or country-specific domestic fundamentals (Aizenman & Park, 2013; Beirne & Fratzscher, 2013; Jeanneret, 2018). Investigating sovereign market connectedness in an intended integrated monetary union by taking into account the impact of unconventional monetary policy measures proves to be valuable not only for measuring credit risk magnitude in the European Union but also for designing monetary policy programs aimed at containing financial distress.

[1] Central and Eastern European economies belong to the European Union, but they are not included in EMU. In fact, under Art. 140 TFEU the six CEE economies are member-states with derogation. In line with the official classification, throughout the analysis we divide our sample into two components: Eurozone (including opt-out countries which are graded as advanced economies) and Member states with derogation (all Central and Eastern European Countries and Sweden).

Thus, our paper stands between two research fields: one exploring unconventional monetary policies' impact on financial markets and one exploring spillover transmission. First, this paper aims to investigate how monetary policy announcements increase or decrease spillover transmission between Eurozone and Central and Eastern European countries during turbulent times (more specifically, during sovereign debt crisis). Second, we examine the short-term impact of monetary policy announcements on the European Sovereign Credit Default Swap (SCDS) market.

We contribute to the literature in at least two ways. First, we explore EU sovereign market connectedness through the application of Diebold & Yilmaz (DY) methodology to SCDS which represent a measure for sovereign default probabilities. This provides an undetermined estimation of country-specific sovereign risk. In addition, to account for the influence of global or domestic factors in spillover transmission, we compare two different measures: SCDS returns and SCDS idiosyncratic returns. Second, through an event study methodology, we explore the unconventional monetary policy announcements' impact on SCDS market while other studies focused exclusively on bond or equity markets. This supports other empirical findings about the importance of spillover transmission within an increasing sovereign risk environment. Overall, studies about spillovers triggered by unconventional monetary policy measures in the EU are insufficient and limited by the impossibility of designing a model that takes into account all the factors that impact financial assets. Exploring spillovers transmission through the application of two separated methodologies may be the most effective way to describe the impact of specific policy events on sovereign connectedness and risk.

The results indicate that ECB unconventional policy measures contained financial distress not only for Eurozone countries but also for the CEE region. We find evidence of strong spillovers from ECB's monetary policy measures to all countries, including CEE countries. Among different types of monetary policy measures, we find that spillovers from asset purchases programs were the most noticeable, while spillovers from mixed unconventional measures are rather unclear: spillovers from asset purchases programs increase *all-in-all connectedness* and spillovers from mixed measures increase *within-cluster connectedness*. The results also shed light on the effectiveness of several monetary policy instruments: asset purchases programs and quantitative easing are the most effective policy instruments for decreasing sovereign default risk.

The paper is structured as follows. Section 2 presents briefly the literature related to spillover transmission from advanced economies to emerging markets, from Eurozone countries to CEE. It simultaneously considers the influence of domestic and global factors on spillover transmission. Section 3 presents data and methodological elements. Section 4 presents the results, while conclusions are drawn in Section 5.

2 RELATED LITERATURE

Financial market connectedness and the impact of unconventional monetary policies have recently dominated academic research, as well as policy debates. The impact of unconventional monetary policy in spillover transmission from advanced economies to emerging markets has not been directly assessed through econometric techniques. However, empirical studies related either to market connectedness or to unconventional monetary policies on financial assets observed the presence of spillover transmission across countries. To what extent spillover transmission impacts economic performance, especially within systems oriented towards monetary integration, remains understudied.

Two research directions have a direct connection with our paper. On the one hand, studies focus on the impact of unconventional monetary policy on financial assets prices. On the other hand, authors discuss spillover effects from unconventional measures to emerging economies. While exploring both issues within the same methodology to observe a direct impact of policy in spillover transmission encounters econometrical difficulties, both directions point out implications of monetary policy actions for emerging economies.

A large proportion of the literature focusses on the impact of FED's policies spillover transmission to emerging markets. Aizenman et al. (2014) assess the impact of Fed's tapering monetary policy on financial markets in emerging economies arguing that countries with weaker domestic fundamentals experience a smaller depreciation of exchange rate, a less significant fall in stock prices and a less significant increase in CDS spreads than countries with stronger domestic fundamentals. Fratzscher et.al. (2013) finds that

FED's measures since the implementation of the second round of quantitative easing policies (2010) globally increased equities, while their impact on yields is rather unobservable. They conclude that US's unconventional monetary policy triggered portfolio rebalancing and acted in a pro-cyclical manner for capital flows to emerging markets. Similar to Aizenman et al. (2014) who describe the importance of domestic fundamentals in spillover transmission, Georgiadis and Gräb (2015) show that the magnitude of spillover effects across economies depend on countries' financial openness, exchange rate regimes, trade and the integration with the Eurozone. Apostolou and Beirne (2017) study changes in the ECB and FED's balance sheets examining how much volatility in EMs' financial variabiles can be explained by these changes. They find that bond markets are more responsive to positive volatility spillovers while FED has the most significant impact. They also find that EMs' stock markets are subject to negative volatility spillovers. We contribute to the European literature by comparing two SCDS returns and SCDS idiosyncratic returns. The comparison accounts for the influence of global and domestic factors in spillover transmission.

Moreover, several studies focused on the global impact of unconventional monetary policies. Lim et. al. (2014) find that quantitative easing policies have been transmitted globally through liquidity, portfolio balancing, and confidence channels arguing that these effects cannot be attributed to market expectations of country-specific domestic fundamentals. Fic (2013) examines unconventional policies' impact on BRIC countries (Brazil, China, India and Russia). They find that unconventional policies undertaken by major central banks (FED, BoE, ECB and BoJ) lead to lower yields, higher equity prices, and lower investment premia. Chinn (2013) discusses the impact of unconventional monetary policies on exchange rate and asset prices in emerging economies concluding that more volatility is introduced into global markets while supporting global rebalancing through emerging countries' motivation for market currency revaluation.

Two main conclusions are clearly visible from the above literature review. Firstly, there is a consensus regarding spillover effects from advanced economies' monetary policy measures. Secondly, most of the studies focused on spillover effects from FED's policies to emerging markets. We contribute to the literature regarding the impact of ECB's unconventional policy measures to emerging markets by exploring system-wide connectedness in the EU. This allows us to conclude on the magnitude of country-specific sovereign default risk.

3 METHODOLOGY AND DATA

3.1 Data

Daily 5Y sovereign CDS data is used in both parts of our empirical analysis. We chose SCDS spreads to offer a good illustration of default risk. Compared to its corresponding market, the bond market, the SCDS market is more liquid enabling better estimates for default risk. SCDS spreads are quoted in basis points. Higher spreads indicate increasing market expectations about the possibility of a default, while lower spreads indicate diminishing market expectations about a default.

The dataset comprises the daily exchanges on the 5-year credit risk representing the average premium (average between demand and supply) from 1st of January 2009 to 31st of December 2014 quantifying a total of 1565 observations. The selected sample comprises 23 EU member states.[2] The data is extracted from DataStream being fully denominated in Euro to ensure the comparability of time series. Missing segments of the price series are interpolated through previous-day price repetition.

In the implementation of the DYCI model, both SCDS returns and SCDS idiosyncratic returns measures are chosen as variables of interest, rather than the SCDS spreads themselves. SCDS returns reflect to a certain extent systemic sovereign credit risk since it captures the influence of global financial market variables, while the idiosyncratic measure is more sensitive to countries' economic fundamentals capturing sovereign domestic risk.

To extract the idiosyncratic returns measures, we use the generalized dynamic factor model proposed by Forni et al. (2000) and adapted by Barigozzi and Hallin (2016). For our $N \times T$ panel dataset, we have

[2]The lack of data availability for certain member states resulted into sovereigns' exclusion. In addition, we kept United Kingdom in our sample since for the entire sample period it had EU membership

$Y = \{Y_{\mathrm{it}}; i = 1, ..., N; t = 1, ..., T\}$ of CDS returns. The generalized dynamic factor model decomposes Y_{it} into a common component, X_{it}, driven by q factors, and an idiosyncratic component, Z_{it} ,as follows:

$$Y_{\mathrm{it}} = X_{\mathrm{it}} \ + \ Z_{\mathrm{it}}$$

The common component takes the form of an auto-regressive representation as:

$$X_{\mathrm{it}} = \sum_{k=1}^{q} b_{\mathrm{ik}}(L) u_{\mathrm{kt}}$$

where L is the lag operator, the q factors are defined as an orthonormal zero-mean white noise vector process $u_t = \{u_{1\mathrm{t}}, ..., u_{\mathrm{qt}}\}$, and the filters $b_{ik}(L)$ are one-sided and square-summable. We choose the number of factors by applying the Hallin and Liška (2011) criterion, which indicates one common factor.

3.2 Diebold-Yilmaz connectedness measures and graphical representations

Diebold-Yilmaz Connectedness Index (DYCI) methodology is based on generalized variance decompositions of a vector autoregressive (VAR) model. DYCI association with network graphical display results in a powerful spillover representation across countries connecting forecast error variance decompositions matrices with network edge weights. The measure reveals how much SCDS i's future uncertainty results from shocks in variable j. DYCI methodology starts with the implementation of a covariance-stationary VAR model with N variables is defined as follows:

$$Y_t = \sum_{t=1}^{p} \varnothing \ x_{t-i} + \varepsilon_t$$

with $\varepsilon_t \sim (0, \Sigma)$ being a $N \times 1$ vector of residuals. The moving average representation of VAR takes the following form:

$$Y_t = \sum_{n=0}^{\infty} A_j \varepsilon_{t-n}$$

where $N \times N$ is a coefficient matrix. A_j follows recursive pattern as $A_j = \phi_1 \cdot A_{j-1} + \phi_2 \cdot A_{j-2} + ... + \phi_p \cdot A_{j-p}$. A_0 is an identity matrix and $A_j = 0$ for $j < 0$. Because the number of estimated parameters increases quadratically with the number of variables, the VAR estimation adopts Dermirer et. al. (2018) approach to estimate sparse VAR of SCDS idiosyncratic and returns measures using an elastic net estimator. The estimator minimizes the sum of squared errors and shrinks coefficients to zero if estimating them does not substantially reduce prediction error. We calculate the decomposition of the variance of the forecast error at h steps ahead:

$$\varphi_{\mathrm{ij}}(H) = \ \frac{\gamma_{\mathrm{ij}}^{-1} \Sigma_{h=0}^{H-1} \left(e_j^{'} A_h \Sigma e_j \right)^{-2}}{\Sigma_{h=0}^{H-1} (e_j^{'} A_h \Sigma A_h^{'} e_j)}$$

where Y_{ij} is the element on the principal diagonal of Σ. The decomposition records how much variance of the forecast error of SCDS idiosyncratic or returns measures at h steps ahead is due to the shocks in another variable included in the VAR model. Each matrix element is normalized by summing the row so that the decomposition including shocks in each market equals the total decomposition of all variables sums to N:

$$\tilde{\varphi_{\mathrm{ij}}}(H) = \ \frac{\varphi_{\mathrm{ij}}(H)}{\Sigma_{j=1}^{N} \left(\varphi_{\mathrm{ij}}(H) \right)}$$

where $\Sigma_{j=1}^{N} \left(\varphi_{\mathrm{ij}}(H) \right) = 1$ and $\Sigma_{i,j=1}^{N} \left(\varphi_{\mathrm{ij}}(H) \right) = N$. In addition, $\varphi_{\mathrm{ij}}(H)$ is the directional pairwise connectedness from variable j to variable i. For our graphical representation, it represents the estimated

size of the edge from node j to node i. Similarly, directional spillovers received/ transmitted can also be decomposed:

$$\text{DS } \overset{\leftarrow}{j}\ (H) = \frac{\Sigma^{N}_{i,\ j=1,\ i\neq j}\widetilde{\varphi}_{\text{ij}}(H)}{\Sigma^{N}_{i,\ j=1,}\ \widetilde{\varphi}_{\text{ij}}(H)} \times 100$$

$$\text{DS } \overset{\leftarrow}{i}\ (H) = \frac{\Sigma^{N}_{j,\ i=1,\ i\neq j}\widetilde{\varphi}_{\text{ij}}(H)}{\Sigma^{N}_{i,\ j=1,}\ \widetilde{\varphi}_{\text{ij}}(H)} \times 100$$

These measures denote the spillover level received or transmitted by variable i within the system. Finally, the total spillover index is calculated as:

$$S(H) = \frac{\Sigma^{N}_{i,\ j=1,\ i\neq j}\widetilde{\varphi}_{\text{ij}}(H)}{N} \times 100$$

denoting the overall spillover significance that originates in other countries on the determination of SCDS measures. This measure is called "system-wide connectedness" or "dynamic connectedness index".

The graphical display of our empirical analysis follows the results obtained from DYCI presenting estimated connectedness measures. Corresponding to our sample, we have 23 nodes and as many as 23^2 edges. Presented shortly, networks graphical representations follow three simple rules: node size is a linear function of total directional connectedness "to others" representing a direct measure of default risk; node location is determined by the directional spillovers "to" and "from" (Nodes with many strong links to other nodes are located at the network's center, while nodes with weak links are located close to the sidelines); edge thickness indicates a strong pairwise connectedness (Presenting whole network structure with all the resulting edges would hide the basic patterns in spillover transmission. Therefore, only the thickest edges are shown in our graphs.)

3.3 High-Frequency Event Study

To quantify country-specific changes in SCDS spreads around monetary policy announcements we apply a high-frequency event-study initially proposed by Fama et. al. (1969). Changes in SCDS markets are measured in a narrow window of time to shortly measure the effects of policy announcements. Considering rational expectations theory's implications for financial markets, SCDS pricing should promptly change after policy announcements. More specifically, one-day or two-day changes in SCDS spreads are sufficient in estimating an unbiased effect of monetary policy announcements.[3] Thus, we can test our two null hypotheses presented under section 5.4. The statistic that we use is each event change divided by the unconditional standard deviation for the one/two-days CDS change rate before the announcement date. We compute unconditional standard deviation using data from 14^{th} of January 2008 to 8^{th} of October 2008. Similar methodologies are performed by Rebucci et. al. (2021) and Swanson et. al. (2011).

[3]The high-frequency event study methodology operates under several assumptions: (i) markets are efficient and rational, (ii) the lack of confounding factors impacting asset prices and (iii) events are unexpected. However, our event sample encompasses several monetary policy announcements aimed at re-orienting market expectations (more specifically, forward guidance - FG - discourses presented in Table 1) violating the third assumption. Moreover, the issue of cofounding factors driven by the simultaneous implementation of monetary policy actions including changes in interest rates could also be a valuable concern. However, we keep all monetary policy events (incl. FG discourses and other unconventional monetary policy actions) since we used multiple -day event windows. Using more than one-day window allows for the possibility that SDSC may not react immediately to monetary policy announcements. Additionally, to take into account this market inefficiency, for DYCI dynamic estimation we consider connectedness matrices 14 days before/ after a monetary policy announcement.

4 RESULTS

4.1 Static network structures: idiosyncratic vs returns

This section presents the static sovereign CDS network estimating the average measure of connectedness among markets over the full sample period. Figure 1 presents sovereign CDS connectedness for returns and idiosyncratic measures. Both figures reveal sovereigns' connectedness is transmitted through three groups of countries: GIIPS countries (Italy, Spain, Portugal), CEE countries (Bulgaria, Croatia, Romania, Poland, Hungary), and Core Eurozone countries (excl. GIIPS).[4]

The sovereigns' connectedness reported through edges' intensity is quite weak for both the idiosyncratic component and returns measures. These results are in line with Heinz & Sun (2014) that find that during the European sovereign debt crisis spillovers between Central, Eastern, and South-Eastern European countries were relatively small. Moreover, these results indicating weakness of spillovers intensity are compatible with Aizenman & Park's (2013) findings that observe a constant degree of spillover propagation suggesting a controlled contagion risk and a stable integration for different eurozone countries.

Credit risk magnitude determined by the node size shows that high credit-risk countries are strongly interconnected. While for the returns measures there is a clear distinction between the main GIIPS and CEE countries with all CEE countries being located at the center of the network, for the idiosyncratic component almost all countries transmit spillovers being all connected at the network's center. Even though the idiosyncratic network shows a slightly higher degree of connectedness between several Core Eurozone countries and GIIPS countries (Italy and Spain registering highest credit risk), Core Eurozone countries are weakly connected to high-risk countries. CEE countries also show a low degree of connectedness being located at the network's peripheries signaling a low credit risk. In addition, two bilateral linkages occur (Ireland – Czech Republic, Slovenia – Slovakia), but with no connection with the most- tightly connected countries within the network.

4.2 Dynamic index estimation

The dynamic index estimation provides an assessment of the average network during 2009-2014. The sample period starts on 30^{th} January 2009 when a group of 10 Central and Eastern European banks requested bailouts and it covers the peaks of the European sovereign debt crisis. The sample ends two months after 4^{th} September 2014 when ECB decided to cut interest rates to new record levels. However, financial linkages between countries vary over time and are influenced by specific economic, financial, and political events.

To capture over-time connectedness dynamics, we use a rolling window analysis of 250 days, roughly 12 months. We connect the over-time connectedness index with important economic events to obtain an understanding of what type of events encourage or offset spillover transmission. Figure 1 presents the over-time connectedness measure for both the idiosyncratic component and returns. Comparing over-time connectedness between the two measures we make several observations.

First, the idiosyncratic index is significantly less high than the returns index until the end of 2014 indicating a lower level of financial integration among sovereigns: while returns measures reach a spillover connectedness of 80% during turbulent times, the idiosyncratic index only reaches 60%. However, the half-year 2014, when interest rates hit the zero lower bound, signals the occurrence of a convergence trend between the two both connectedness measures showing a high degree of financial integration

Second, the idiosyncratic connectedness index is more unstable with frequency highs and lows over shorter periods. For instance, the period between May 2010 and May 2011 is characterized by more than four highs

[4]The multivariate cluster analysis performed on the correlation matrix displayed a strong connectedness measure among sovereigns based on their geographical distribution. The cluster algorithm attempts to sort the states into groups with similar characteristics. Following the literature, we assumed the existence of three clusters (GIIPS countries, Core Eurozone and CEE). Thus, the number of k-medoids equalled 3. The results showed a high degree of connectedness among neighbouring countries: an Eastern European cluster (EE, LV, CZ, PL, HU, LT, RO, BG, HR, SI, SK), a Western European cluster (AT, UK, NL, PT, IT, ES, BE, DK, DE, SE, FR) and a third cluster only with Ireland suggesting that Ireland risk is distinct from other states. Overall, these results show a strong regional component of sovereign credit risk supporting (Ang & Longstaff, 2013) findings about Europe.

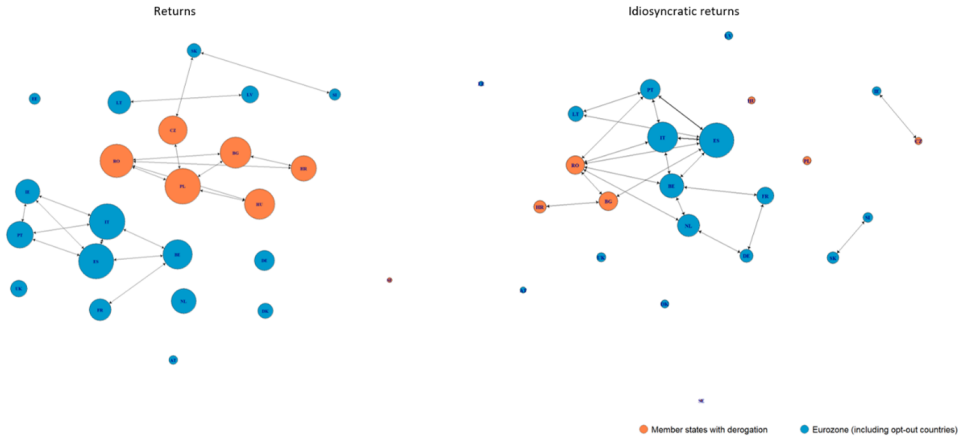

Figure 1: Static network structures during sovereign debt crisis for both returns and idiosyncratic returns

and lows for the idiosyncratic index, while the returns index remains stable.

Third, there is a similar evolution pattern between the two measures allowing us to indirectly infer that the idiosyncratic index is mainly driven by global credit events, rather than by local events.[5] There are only three time periods when the two indexes follow opposite directions: returns index increases while idiosyncratic index decreases. The first one occurs in the second half of 2011 during the implementation of SMP (10^{th} of May 2010) and after the first Greek Austerity Plan (3^{rd} of May 2010). The second one corresponds to the announcement of the Second Greek Economic Adjustment Programme (2011-July-21). The third one corresponds to the date when Portugal received financial assistance from the EU and the IMF.

Finally, while there are several index increases over time we identify several juncture points corresponding to two types of events: monetary policy announcements and unexpected events announcements. These junctures show a significant increase or decrease in both returns and idiosyncratic indices. On the one hand, there are several sudden changes caused by unexpected events. For instance, after Greece revealed its unprecedented budget deficit, the index decreased with approximately 10 percentage points for the idiosyncratic component and approximately 5 percentage points for the return measures in less than 30 working days. Moreover, when seven banks failed the stress tests performed by the Committee of European Banking Supervisors the idiosyncratic index increased with approximately 7 percentage points in less than 5 working days. On the other hand, unconventional monetary policy announcements have also a significant impact on sovereign market connectedness. For instance, when ECB announced SMP the idiosyncratic index increased by approximately 10 percentage points, and the returns index increased by approximately 4 percentage points in less than one week. Moreover, when ECB announced its decision to impose negative interest rates on banks' overnight deposits, the return index decreases by approximately 18 percentage points and the idiosyncratic index by approximately 5 percentage points.

Since we want to capture the impact of monetary policy announcements on spillover transmission during turbulent economic times in the EU, we exclude unexpected events to focus on nine ECB's monetary policy announcements. All of them signal highs or lows of spillover index in both returns and idiosyncratic measures and they indicate either lender-of-last-resort program other unconventional monetary policy tools.

[5]The Granger Causality test was applied to check whether total spillovers obtained for returns can predict the total spillover for the idiosyncratic component ($p - value = 0.04823$). The significance test revealed that total connectedness on returns is useful in predicting the evolution of idiosyncratic connectedness. There is no problem with reverse causation.

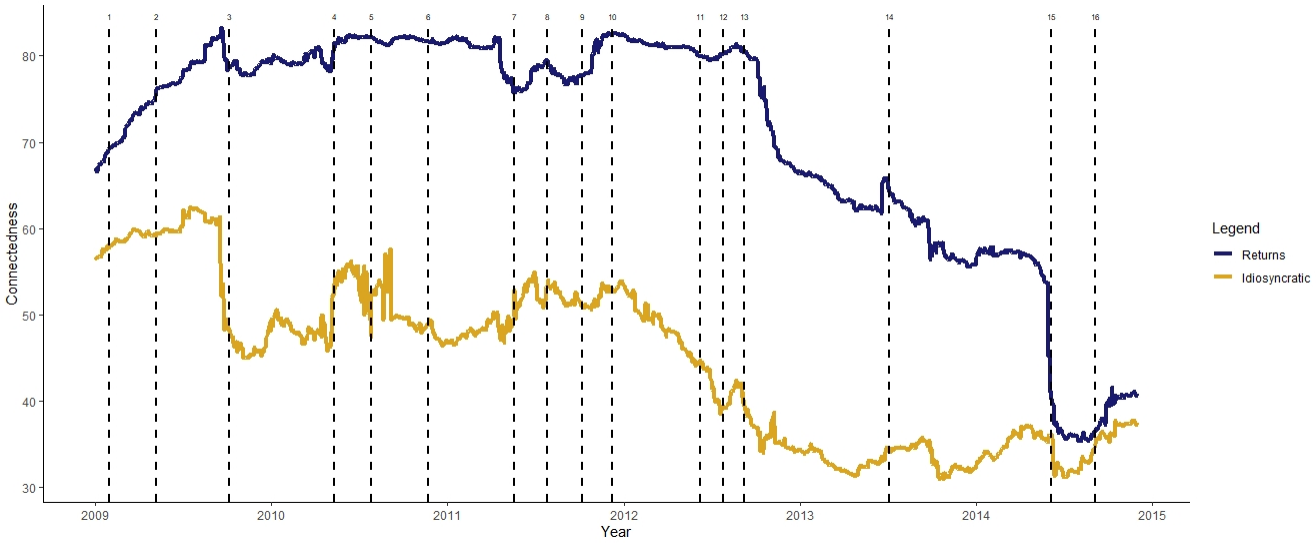

Figure 2: Dynamic sovereign CDS market connectedness during Sovereign Debt Crisis (correlation with ECB's unconventional monetary policy announcement and unexpected events). **1**) A group of 10 central and eastern European banks had already asked for a bailout (30th of January 2009) **2**) Covered bond purchase program (CBPP1) and ECB reduced rates with 25 basis points (7th of May 2009) **3**) Greece revealed that its budget deficit was 12.7% of gross domestic product (5th of November 2009) **4**) A three-year program for Greece and Securities Market Program (SMP) announcement (10th of May 2010) **5**) Seven EU banks fail stress tests (26th of July 2010) **6**) Irish authorities request financial assistance (22nd of November 2010) **7**) Portugal receives financial assistance from the EU and the IMF (18th of May 2011) **8**) Second Greek Economic Adjustment Programme (21st of July 2011) **9**) Covered Bond Purchase Program 2 (6th of October 2011) **10**) LTROs expansion announcement and the reduction of ECB main policy rate by 0.25 basis points (8th of December 2011) **11**) Spain requests financial assistance (8th of June 2012) **12**) "Whatever it takes" speech (26th of July 2012) **13**) Outright Monetary Transactions (OMT) announced (6th of September 2012) **14**) "Keeping interest rates unchanged" Speech (4th of July 2013) **15**) ECB policy rate breaking through the zero lower bound for the first time and imposed negative interest rates on banks' overnight deposits. TLTROs announced (5th of June 2014) **16**) ECB's QE announcement (4th of September 2014)

4.3 Dynamic network structures around monetary policy announcements

To assess the time-varying characteristics of the CDS network and the impact of monetary policy announcements, we look at the evolution of connectedness across time; more specifically 14 days before and after the event. Assessing connectedness around specific events allows us to observe whether spillovers propagation intensified or diminished. Annex 1 contains all the dynamic network structures for both the idiosyncratic and returns measures.Moreover, to assess the effectiveness of monetary policy actions on spillover transmission, we divide monetary policy announcements depending on the type of policy action managed by the ECB: asset purchase program (APP), interest rates changes (IR), targeted lending (TL), lending operations (LO) and forward guidance (FG). [6]

Event Number and Event Date	**Type of policy action**	**Event description**
(1) 7$^{\text{th}}$ of May 2009	APP	Covered bond purchase program (CBPP1)
	IR	Reduction of main policy rate by 0.25 basis points
	LO	12-month LTROs announcement
(2) 10$^{\text{th}}$ of May 2010	APP	Securities Markets Program (SMP)
(3) 6$^{\text{th}}$ of October 2011	APP	Covered bond purchase program (CBPP2)
(4) 8$^{\text{th}}$ of December 2011	LO	36-month LTROs expansion announcement; enlarging the pool of eligible assets as collaterals
	IR	Reduction of main policy rate by 0.25 basis points
(5) 26$^{\text{th}}$ of July 2012	FG	Mario Draghi's "Whatever it takes" Speech and the indication of expending sovereign debt purchases
(6) 6$^{\text{th}}$ of September 2012	APP	Outright Monetary Transactions (OMT) program
(7) 4$^{\text{th}}$ of July 2013	FG	"Keeping interest rates unchanged" Speech
(8) 5$^{\text{th}}$ of June 2014	IR	The decision to impose negative interest rates by reducing banks' overnight deposit rate by 10 basis points to -0.10%.
	TL	TLTRO I announced
(9) 4$^{\text{th}}$ of September 2014	IR	Reduction of the policy rate to 0.05 from 0.15; reduction of deposit facility rate by 10 basis points to -0.20%
	APP	ABSPP programme (Asset-Backed Securities' Programme)
	APP	CBPP3

Table 1: Events' classification

4.3.1 Asset purchases programs increasing *all-in-all* market connectedness

APPs gained significance at the beginning of the sovereign debt crisis. First, in May 2010 ECB announced direct purchases of government bonds in secondary markets under the SMP. The program aimed to restore trust levels in sovereign bond markets which threatened to escalate several debt crises. Second, in September 2012 to calm market fears about the dissolution of the monetary union, ECB announced the introduction of OMT. The program follows the same pattern as SMP encompassing the possibility of purchases of government bonds issued by countries under the European Stability Mechanism. While the first two programs are categorized under the umbrella of "lender-of-last-resort programs", the third program ABSPP (4$^{\text{th}}$ of September 2014) is part of larger quantitative easing tools implemented after the fall below the Zero Lower Bound for interest rates.

The dynamic network structures indicate a high degree of connectedness among the CEE region and Eurozone after each monetary policy announcement. All three programs increase spillover transmission among European sovereigns without intensifying the default risk. Additionally, strong bilateral spillovers occur for both idiosyncratic and return measures suggesting a stable and moderated monetary integration. Figure 3 presents sovereign connectedness after the SMP announcement for the returns measure.

[6]The last two events are considered pure quantitative easing policy measures since asset purchases are not sterilized.

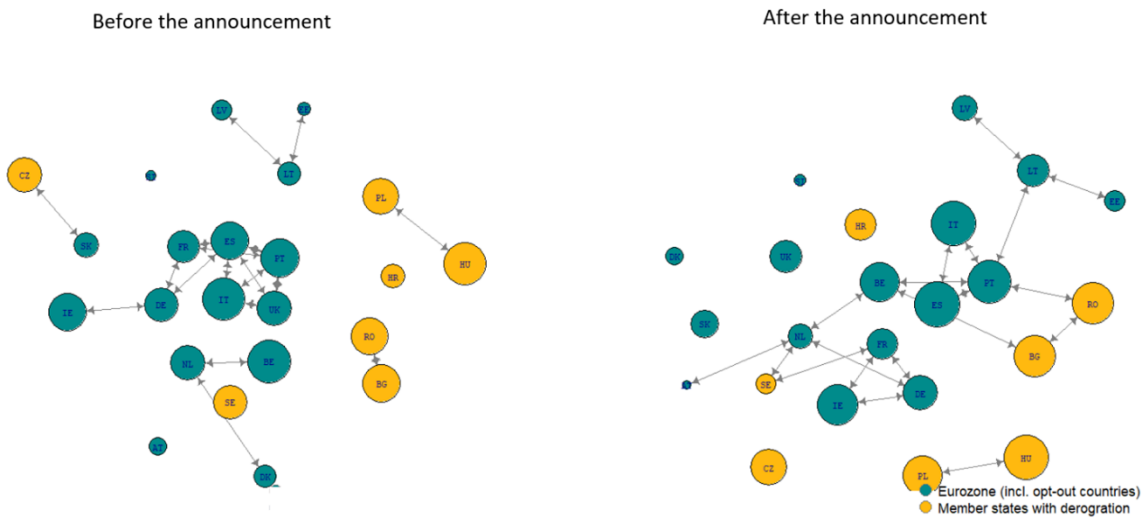

Figure 3: Sovereign CDS market connectedness 14 days before and after the announcement of the Securities Market program (10^{th} of May 2010)

4.3.2 Forward-guidance

Among the toolkit for unconventional monetary policy tools, forward guidance corresponds to a communication strategy delivering a commitment to future interest rate decisions. Forward guidance aims to influence long-term interest rates, rather than short-term interest rates which are, in turn, affected by market expectations on future short-term rates. While there is an increasing academic and policy attention on forward-guidance actions, our empirical results shed little light on its impact on financial markets. Mario Draghi's "Whatever it takes", a pure forward-guidance action followed by the announcement of OMT, as well as his speech notifying his intention of "Keeping interest rates unchanged" (26^{th} of July 2012) have an insignificant impact on spillover transmission across European CDS markets. Indeed, "Whatever it takes speech" seems to have a slightly increased impact on the idiosyncratic measure connecting Eurozone CDS markets. Figure 4 describes this impact.

4.3.3 Mixed unconventional policy measures to increase geographical cluster-within connectedness

During the early sovereign debt crisis, ECB shifted its policy actions from traditional to unconventional monetary tools. During 2009 and early 2010, to support the flow of credit and increase public trust in the banking system, ECB conducted direct purchases of covered bonds and reduced its main policy rate by 0.25 basis points. In addition, ECB programs included LTROs (Long-Term Refinancial Operations) – time-limited loans to banks partially used for buying government debt. The connectedness impact on CEE countries of these measures was quite limited: Figure 5 presents the network structure on returns measure 14 days before and after the day of announcement of all the above-mentioned policy actions. It reveals an intensified spillover transmission for Eurozone countries but decreased connectedness within CEE. Similar results can also be observed for events 3 and 4 when the same mix of policy actions was deployed only 2 months apart. Increased connectedness is observed only depending on geographical clusters for the majority of the networks in our sample.

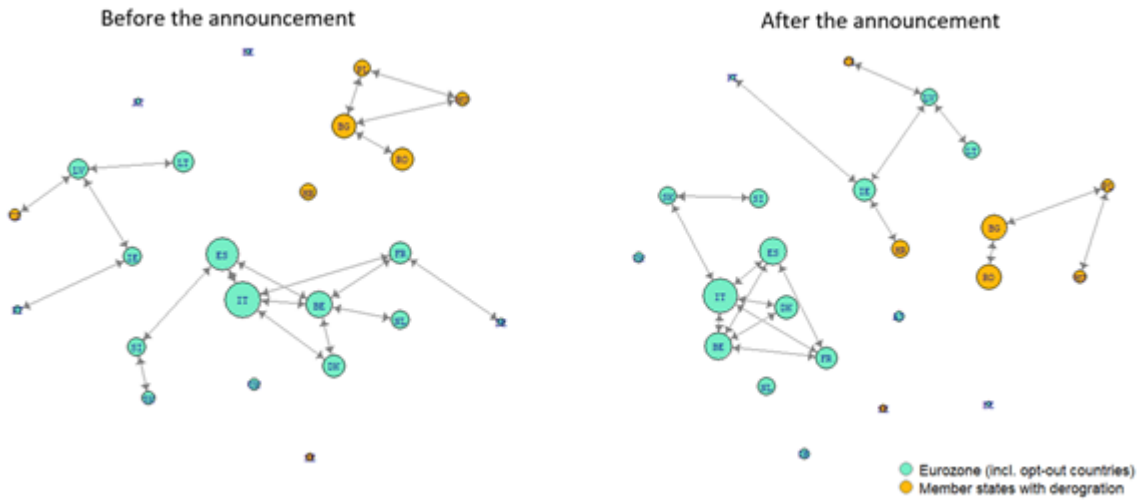

Figure 4: Sovereign CDS market connectedness 14 days before and after Mario Draghi's speech "Whatever it takes" (26th of July 2012)

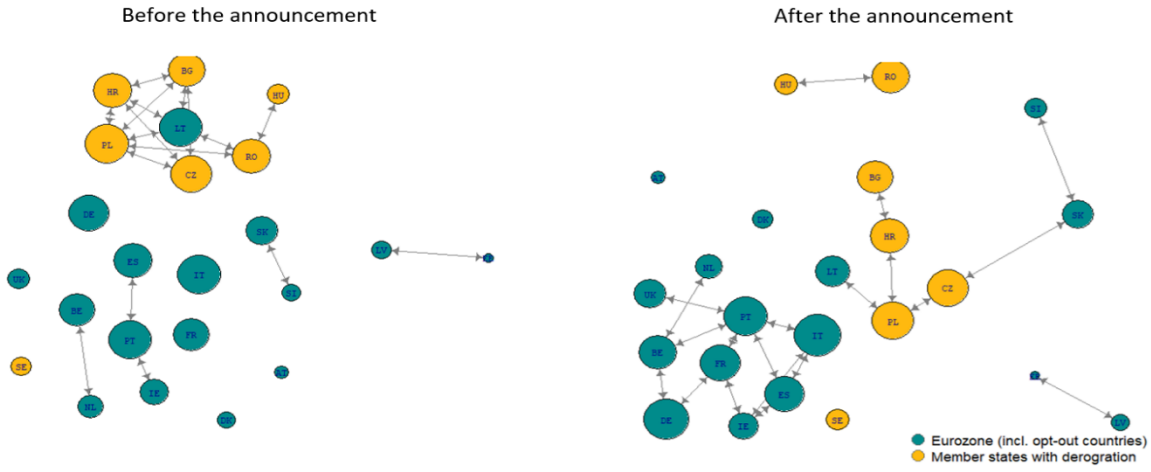

Figure 5: Sovereign CDS market connectedness 14 days before and after the announcement of CBPP1 and the 25 basis points interest rate reduction (7th of May 2009)

Overall, our empirical results show two important factors that contribute to sovereign risk connectedness: the over-time spillover unpredictability and monetary policy announcements' influence on spillover transmission. On the one side, over-time unpredictability is determined by the fact that connectedness among SCDS markets changes over time. While we can identify an increase in bilateral/group spillovers between certain countries at certain moments in time, these patterns change substantially over time. An interesting finding is that both idiosyncratic and returns measures, as well as the spillover index evolution, generate similar results across the EU suggesting that sovereign risk is rather driven by global market factors such as risk premium or investment flows rather than by domestic fundamentals (Longstaff et al. 2011). On the other side, the results shed light on the impact of unconventional monetary policy toolkit in spillover transmission across EU member states. While FG actions do not seem to have a specific impact on spillover transmission, APPs increase all-in-all market connectedness generating spillovers from Eurozone to CEE (and vice versa), and mixed unconventional policy measures increase spillover transmission among geographical clusters. Particular attention needs to be paid to pure quantitative easing policy packages implemented after the fall of interest rate below the zero lower bound. For instance, the announcement of ABSPP and CBPP3 combined with the reduction of the interest rate resulted in increased connectedness among CEE and Eurozone and decreased default risk.

4.4 Event study results

The application of DYCI provides an understanding of the short-term impact of monetary policy announcements on the European CDS market. Given our previous results regarding spillover transmission around announcements about APPs and mixed-unconventional policy actions, we formulate our event study null hypothesis: monetary policy announcements do not affect European SCDS markets. The alternative hypothesis is that monetary policy announcements should produce an increase or decrease in SCDS basis points indicating growing or diminishing market expectations of default. Table 1 presents our results based on the geographical clusters[7].

Before discussing the impact of the different types of policy events on the SCDS market, we make two general observations. First, there is a geographical distribution of default risk among sovereigns determined by country-specific common elements captured previously by dynamic network structures on both idiosyncratic and returns measures: approximately all policy announcements produce a decrease in SCDS basis points in highly-indebted GIIPS countries; policy announcements have a significant decreasing impact on the Baltic states, especially Latvia and Lithuania which are the most responsive countries; policy announcements impact on CEE countries is geographically unequally distributed due to the country-specific dissimilarities. Second, a chronological view on table 1 indicates some form of incremental effects for monetary policy announcements. Without a doubt, policy actions are gradually incorporated into financial prices through a slow-moving adjustment process, whereas FG might play a role in the incremental process of building market expectations (Rostagno et. al., 2021). Moreover, compared to our previous results about FG where spillover transmission is negligible, event study results indicate significant SCDS decreases at least for Mario Draghi's "Whatever it takes speech". However, our empirical results concerning the impact of FG remain debatable and problematic since our "pure FG" control measure - Keeping interest rates unchanged" Speech - does not shed the same impact as the "Whatever it takes speech" followed only two months after by the OMT announcement.

4.4.1 APPs alone vastly decrease SCDS spreads

Compared to mixed unconventional policy actions, APPs alone substantially decrease SCDS spreads diminishing default risk. After the SMP announcement, SCDS spreads fell by 3 to 9 basis points in Core Eurozone countries, by approximately 20 basis points in GIIPS countries with the highest decrease of 61 basis points registered in Portugal, by 20 basis points in Lithuania, and by approximately 20 basis points in CEE region. Surprisingly, while for most countries the two days market change in SCDS spreads is negative,

[7] We do not report SCDS changes for United Kingdom, Denmark and Sweden since they are classified as advanced economies but are not part of the Eurozone having a different economic relation with EMU established through other type of agreements.

Events		Eurozone														Member states with derogation					
		Core Eurozone					GIIPS				Eastern Eurozone					CEE					
		AT	NL	BE	DE	FR	IT	ES	PT	IE	EE	LV	LT	SI	SK	CZ	BG	HR	PL	RO	HU
Event 1	One-day market response	-15***	-6***	-7***	-1.5***	-4***	-9***	-13***	-5***	-15***	-15	-50***	0	-3	-5**	0	-8*	-13***	5*	15**	-12**
	Two-days market response	-15***	-4*	-9***	-2***	-4***	-9***	-14.5***	-5*	-15***	-15	-50***	0	-3	-5	5*	-8	-13**	5	-1	-5
Event 2	One-day market response	-7.9***	-8.9***	4.9***	0	2.9***	-10***	-5***	-10***	10***	0	21**	10***	0	1	11***	5	4	0	2	-4
	Two-days market response	-7.9***	-8.9***	0.9	-2.9***	-3*	-27***	-27***	-61***	-15***	-10	1	-20***	-5	-2	-4	-26***	-11*	-13*	-25**	-18**
Event 3	One-day market response	0.06	2.43	0.38	2.3	-1.3	-4***	6***	-8***	-3***	-13	0	-4***	2	2	0	-9**	-5	-4*	-9	6
	Two-days market response	-6.9***	-0.49	1.3	0***	-4.4***	-33***	-2	-36***	-25***	-13	-2	-6***	2	2	-2	-13*	-9	-8*	-13	1
Event 4	One-day market response	0.04	2.9*	-2.2*	-2.8***	-2.4**	10***	-7***	-1	6**	0	1	3**	0	1	1	4	2	1	2	2
	Two-days market response	7.47***	6.3***	9.7***	0.22	14.7***	39***	10***	2	13***	0	12	18***	4	6*	3	13*	8	11**	5	17*
Event 5	One-day market response	-2.1**	-4.2**	-5.3***	-3.4***	-4.3	-21***	-26***	-39***	-25***	0	-4	-4***	0	0	-2	-4	-21***	-5**	-18**	-8
	Two-days market response	-3.6**	-5.5**	-8.1***	-3.4***	-8.5***	-38***	-47***	-48***	-34***	0	-10	-18***	-3	-2	-8***	-9	-21***	-11**	-26**	-20**
Event 6	One-day market response	-3.5**	-0.39	6.8***	0.3	-4.3***	-7***	-7***	-26***	-5*	0	-11	-2*	-13***	0	1	14***	-13***	0	-9	-1
	Two-days market response	-6.7**	-4.9**	-6.7***	-0.3	-1.6	-21***	-25***	-32***	-37***	0	-16	-7***	-53***	-8	-2	-18	-29***	-6	-26**	-9
Event 7	One-day market response	-0.6	0.5	-1.9	-0.9**	-0.7	-2*	-3**	-2	-1	4	3	3**	4	0	-4**	2	-7*	-3	0	0
	Two-days market response	-0.5	-0.7	-2.3	-1.4**	-1.2	-8***	-6***	-7***	-2	4	3	3	4	0	-4	6	-7	-3	0	0
Event 8	One-day market response	-0.9	0	-1.5	0	-3***	-13***	-8***	0	-8***	0	0	0	0	0	0	0	0	0	0	-9
	Two-days market response	-1	-0.9	-2.2	-1.2**	-4.8***	-20***	-12***	0	-11***	-2	0	-23***	-10***	0	0	0	0	0	-7	-9
Event 9	One-day market response	-1.5	-0.9	-1	-0.3	0	-5***	-1	-8***	0	0	0	0	0	0	0	0	0	0	0	-1
	Two-days market response	-1.6	-0.9	-1	-0.6	0	-5**	-1	-6**	0	-2	0	0	-1	0	0	0	-3	0	0	-8

Table 2: Event study results on geographical clusters

one-day market change is positive for some countries: Belgium, Ireland, Latvia, Lithuania, Czech Republic. After the OMT announcement both one-day and two-day results, SCDS changes fell for almost all countries (only one-day SCDS change is positive for Belgium). GIIPS countries registered the highest average decline of 20 basis points, followed by the Eastern Eurozone cluster with an average decline of approximately 18 basis points and by the CEE region with an average decline of 13.5 basis points.

4.4.2 Mixed unconventional policy measures with mixed results

Mixed unconventional measures have mixed results especially if they are dispersed in time: while the introduction of CBPP1, the announcement of 12-month LTROs, and the reduction of policy rate (Event 1) determined a decline in SCDS spreads for all countries, only the announcement about LTROs expansion and interest reduction (even though preceded by CBPP2 two months before) determined a rise in SCDS spreads. More specifically, around event 4 SCDS spreads increased by approximately 13 basis points in all countries but with little impact on the Eastern European cluster, while event 1 determined a decline of approximately 11 basis points.

4.4.3 Quantitative easing impact on SCDS market

While we would expect to observe increases in SCDS basis points determined the be TLTRO I announcement, we noticed several declines. However, this situation occurs in a negative interest rate environment with a specific change in strategy for lending operations: compared to previous LTRO operations, TLTRO operations are "targeted" allowing banks to receive capital only if it is disbursed towards private clients. The 2014 policy actions form a quantitative easing package with a targeted impact on GIIPS countries. For instance, a fall of approximately 12 basis points occurs after the announcement of TLTRO I in Italy, Spain, and Ireland. Moreover, the announcement of CBPP3 and ABSPP, a program conflicting with TLTRO I, determined falls between 5 and 8 basis points in SCDS.

5 Limitations, future research, and conclusions

In this paper, we provide some insights into spillover transmission among EU member states. We find evidence of strong spillovers from ECB's monetary policy measures to all countries, including GIIPS and CEE countries. Among ECB's monetary policy measures, we find that spillovers from asset purchases programs were the most noticeable, while spillovers from mixed unconventional measures are rather unclear: spillovers from asset purchases programs increase all-in-all connectedness and spillovers from mixed measures increase within-cluster connectedness. The results also shed light on the effectiveness of several monetary policy measures: asset purchases programs and quantitative easing policy measures are the most effective policy instruments for decreasing default risk. The results suggest that sovereign default risk decreases over time with the implementation of APPs. They are are in line with Ciarlone & Colabella's (2016) findings indicating that the implementation of ECB's APPs was able to protect EU-6 financial markets from negative shocks. The results about Forward Guidance and the effectiveness of targeted lending operations below the zero lower bound need further study through different methodologies since event study application resulted in conflicting observations. In addition, we find strong evidence that SCDS market connectedness is subject to a high degree of market unpredictability since spillover transmission constantly changes over time. This finding reflects Apostolou and Beirne's (2017) observation that volatility proportion in emerging countries modifies over time along with changes in FED and ECB's balance sheets.

This paper has several limitations. One limitation of this paper is its limited lack of focus on CEE countries. To address this problem, we plan to restrict our sample even more. This will allow us to explore spillovers only among EU member states (excluding Sweden, Denmark, and United Kingdom) resulting in more clear conclusions about the effectiveness of policy instruments for European monetary integration. A second limitation is related to event studies methodologies: the impact of a policy actions gets perceived slowly and gradually by the market, and then, adjusted in prices. In this sense, event study methodologies have a build-in lack of memory which is a disadvantage in assessing spillover transmission even though our results show these incremental effects of monetary policy actions. A third limitation is the lack of connection between spillover transmission magnitude and monetary policy transmission channels. To solve this challenge, we plan to analysis ECB's programs specific objectives with regards to our event study results. Adopting another econometric estimation strategy for assessing monetary policy transmission channels and their impact on spillover transmission may result into a more complex analysis about the pricing of different financial assets.

In conclusion, our results shed light on the ECB's effectiveness in transmitting positive spillovers over the entire European SCDS market. There is a clear suggestion that portfolio rebalancing channel played an important role in spillover transmission across EU. Through this channel, ECB's policy measures decreased sovereign risk protecting all economies from negative shocks determined by international' investors risk aversion.

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Appendix 1

Network structures on the idiosyncratic measure

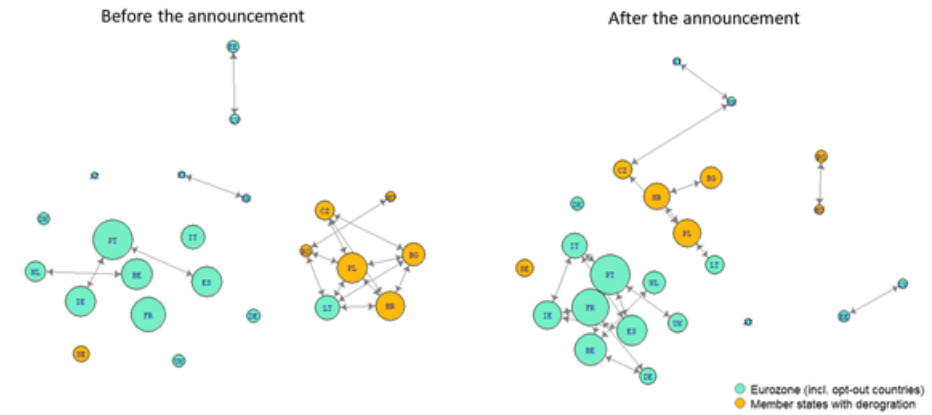

Figure 6: Sovereign CDS market connectedness 14 days before and after the announcement of CBPP1 and the 25 basis points interest rate reduction (7^{th} of May 2009)

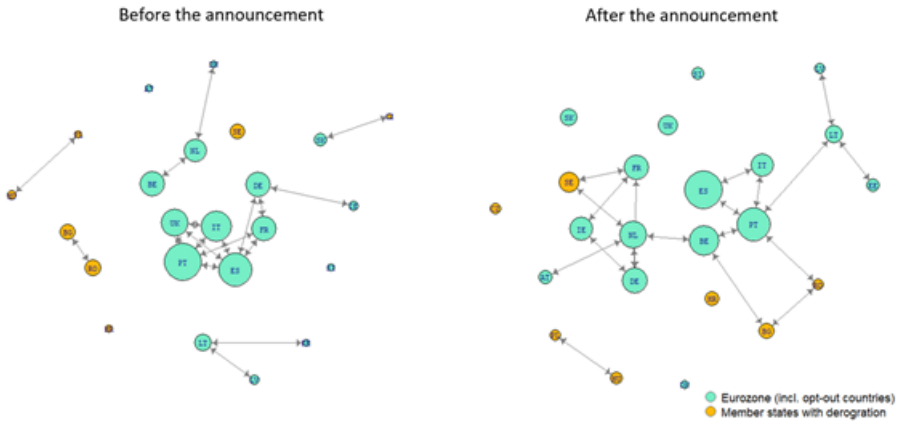

Figure 7: Sovereign CDS market connectedness 14 days before and after the announcement of the Securities Market program (10^{th} of May 2010)

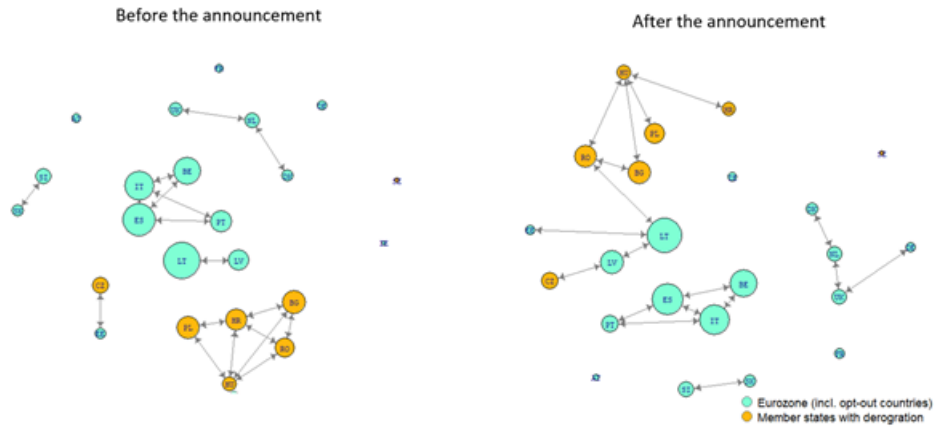

Figure 8: Sovereign CDS market connectedness 14 days before and after the announcement of the Covered bond purchase program (CBPP2) – 6th October 2011

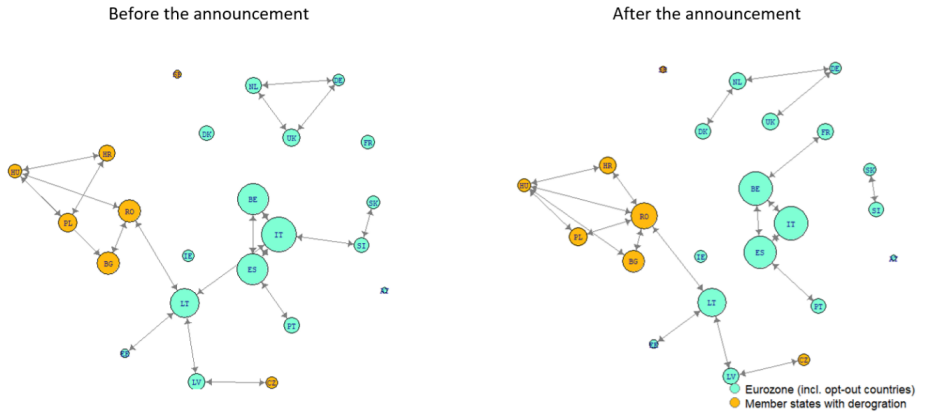

Figure 9: Sovereign CDS market connectedness 14 days before and after the announcement of the LTROs expansion announcement and the reduction of ECB main policy rate by 0.25 basis points (9th of December 2011)

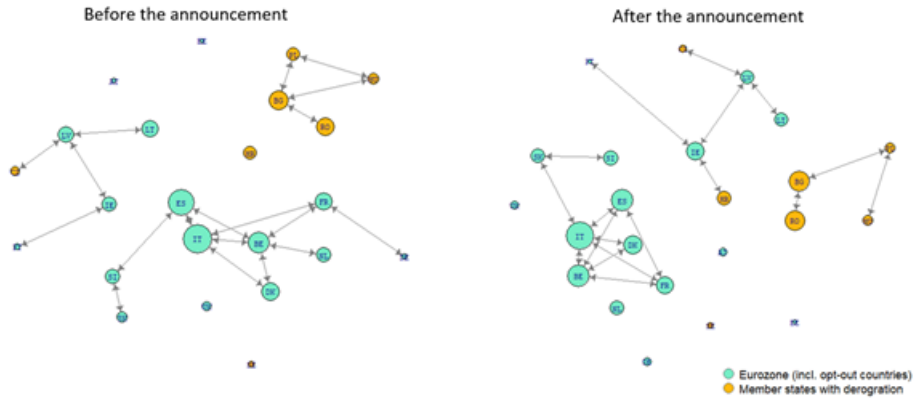

Figure 10: Sovereign CDS market connectedness 14 days before and after Mario Draghi's speech "Whatever it takes" 9 (26^{th} of July 2012)

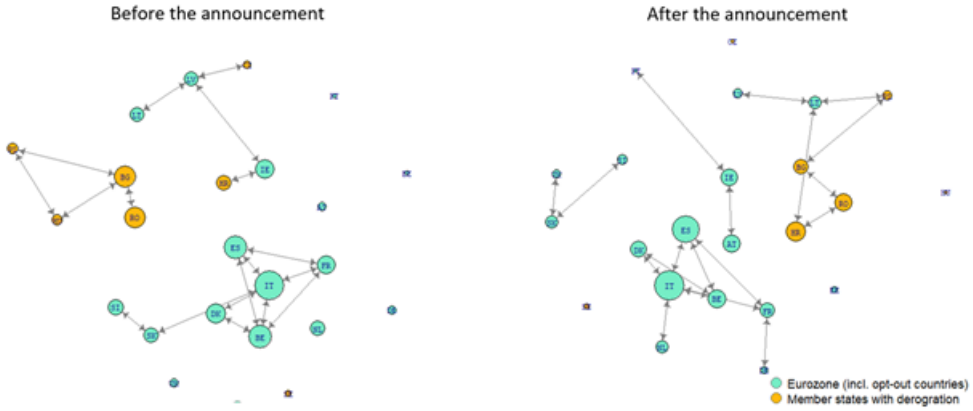

Figure 11: Sovereign CDS market connectedness 14 days before and after ECB's announcement about Outright Monetary Transactions (OMT) program (6^{th} of September 2012)

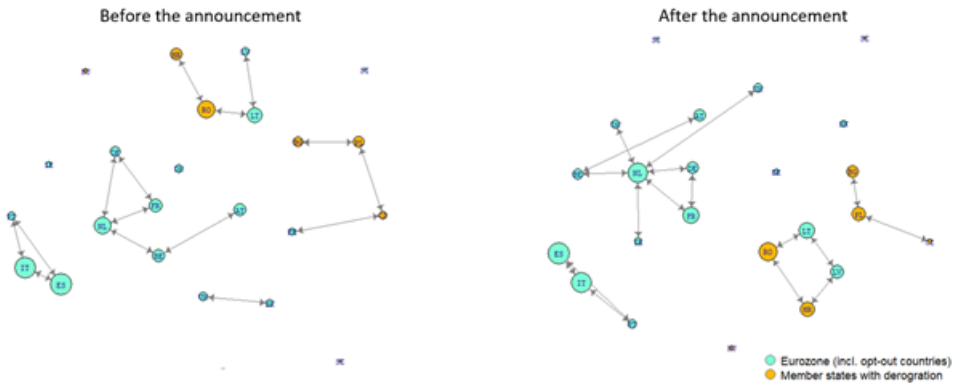

Figure 12: Sovereign CDS market connectedness 14 days before and after "Keeping interest rates unchanged" Speech– 4th of July 2013

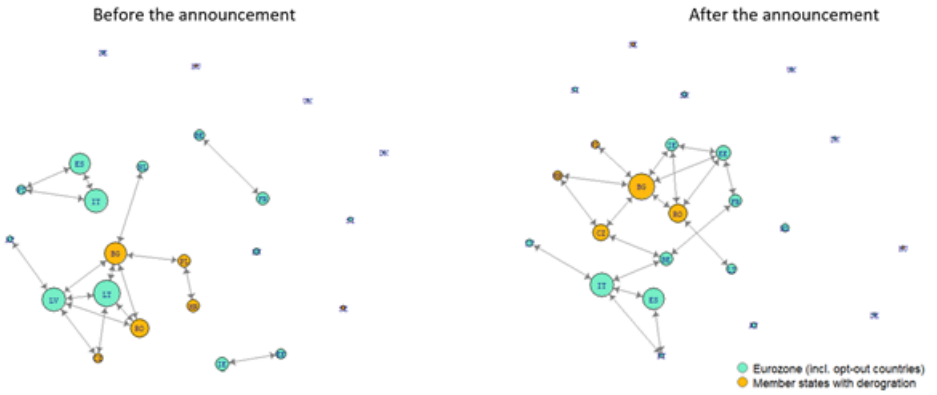

Figure 13: Sovereign CDS market connectedness 14 days before and after ECB's announcement about TLTROs - Targeted longer-term Refinancing Operations (5th of June 2014)

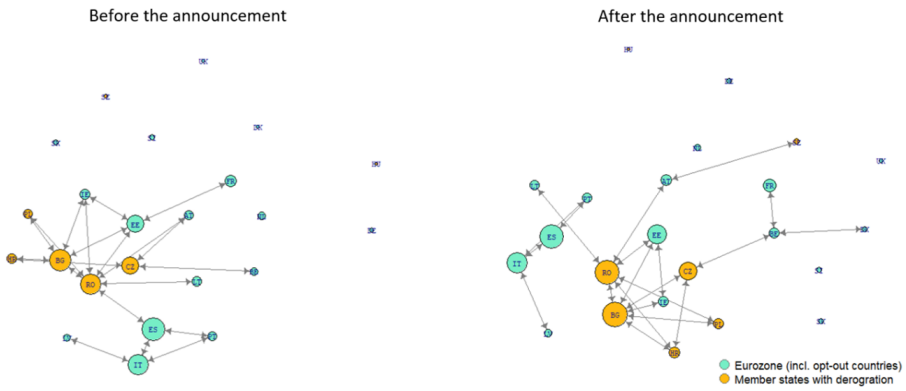

Figure 14: Sovereign CDS market connectedness 14 days before and after ECB's QE announcement (4$^{\text{th}}$ of September 2014

Network structures on the returns measure

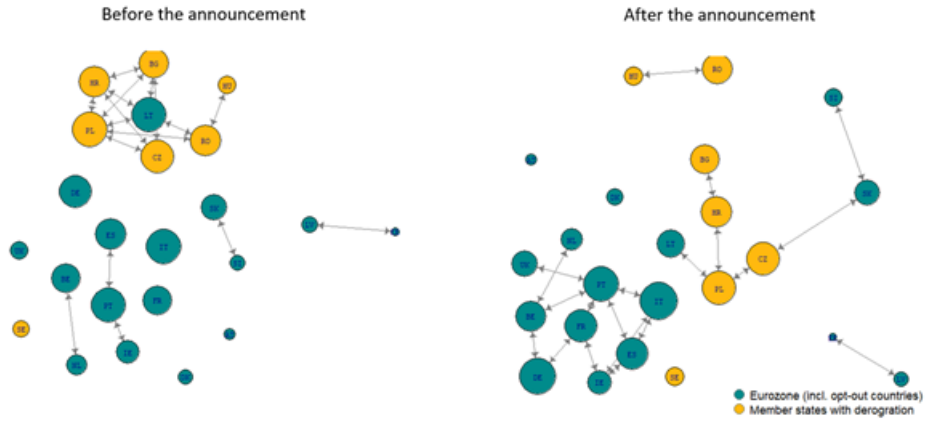

Figure 15: Sovereign CDS market connectedness 14 days before and after the announcement of CBPP1 and the 25 basis points interest rate reduction (7^{th} of May 2009)

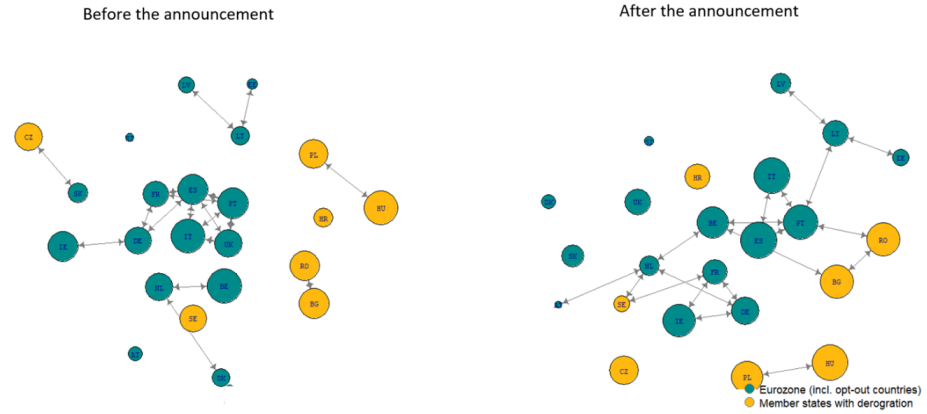

Figure 16: Sovereign CDS market connectedness 14 days before and after the announcement of the Securities Market program (10^{th} of May 2010)

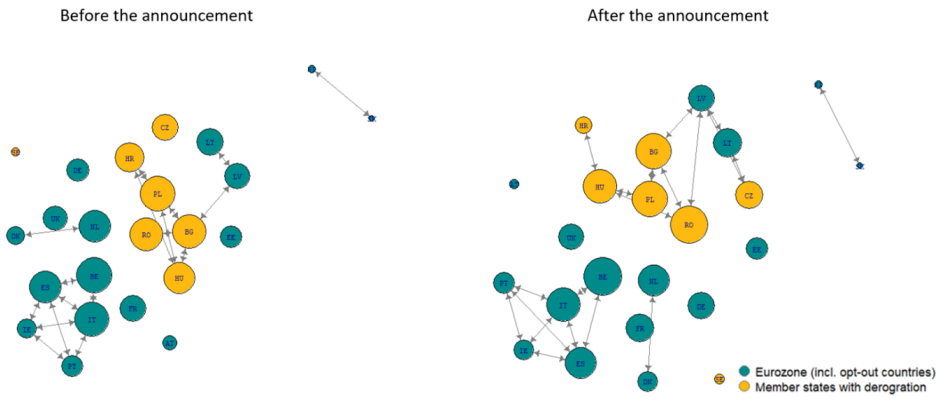

Figure 17: Sovereign CDS market connectedness 14 days before and after the announcement of the Covered bond purchase program (CBPP2) – 6th October 2011

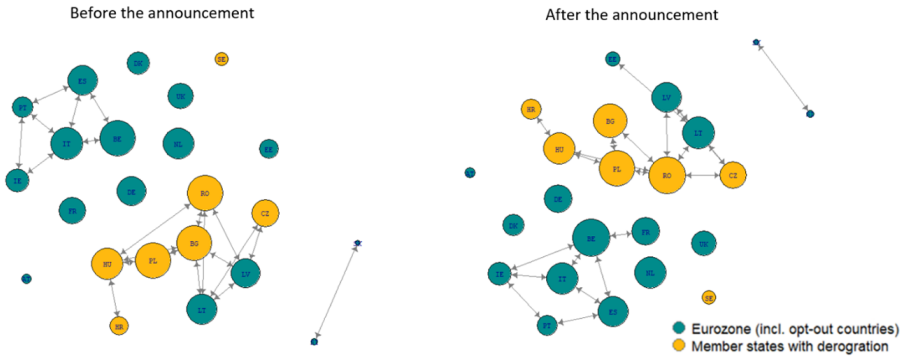

Figure 18: Sovereign CDS market connectedness 14 days before and after the announcement of the LTROs expansion announcement and the reduction of ECB main policy rate by 0.25 basis points (8th of December 2011)

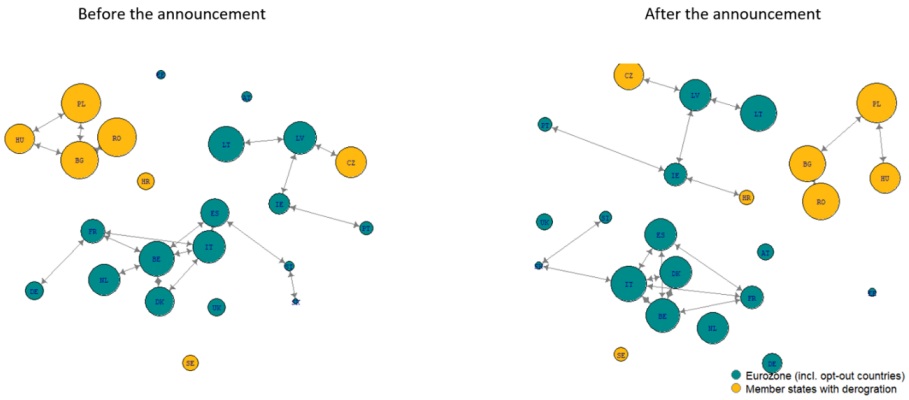

Figure 19: Sovereign CDS market connectedness 14 days before and after Mario Draghi's speech "Whatever it takes" (26^{th} of July 2012)

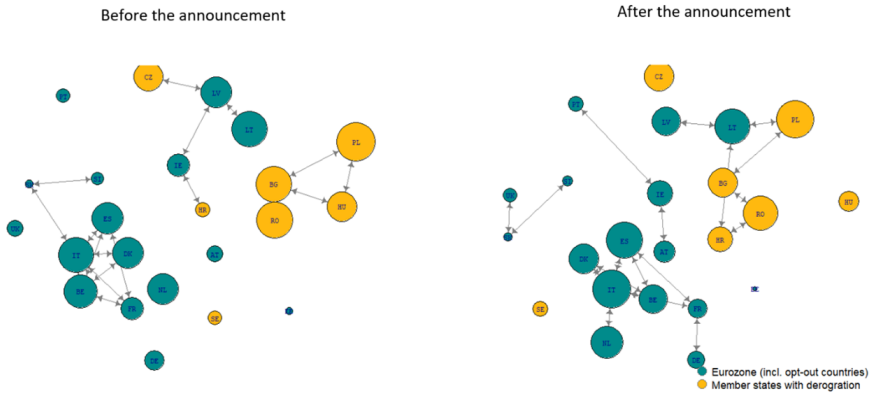

Figure 20: Sovereign CDS market connectedness 14 days before and after ECB's announcement about Outright Monetary Transactions (OMT) program (6^{th} of September 2012)

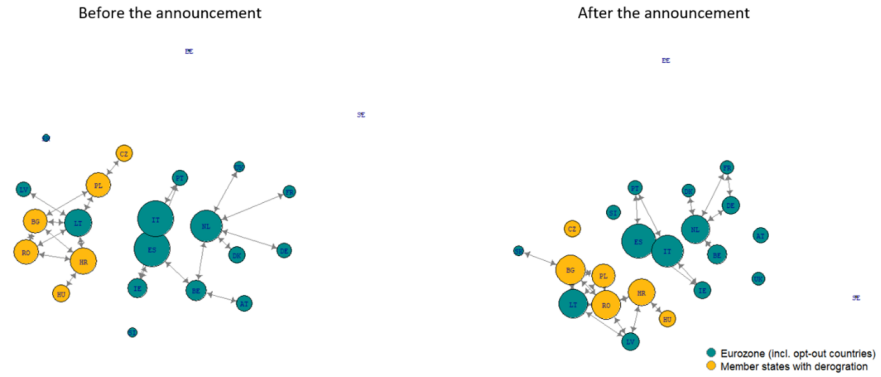

Figure 21: Sovereign CDS market connectedness 14 days before and after "Keeping interest rates unchanged" Speech – 4th of July 2013

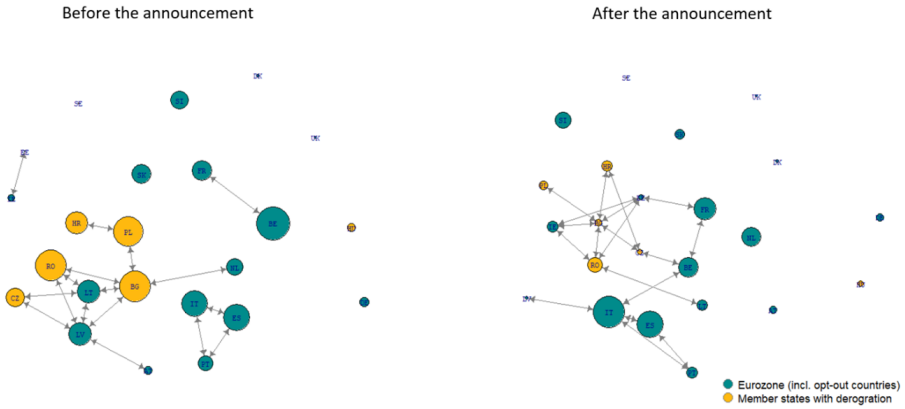

Figure 22: Sovereign CDS market connectedness 14 days before and after ECB's announcement about TLTROs - Targeted longer-term Refinancing Operations (5th of June 2014)

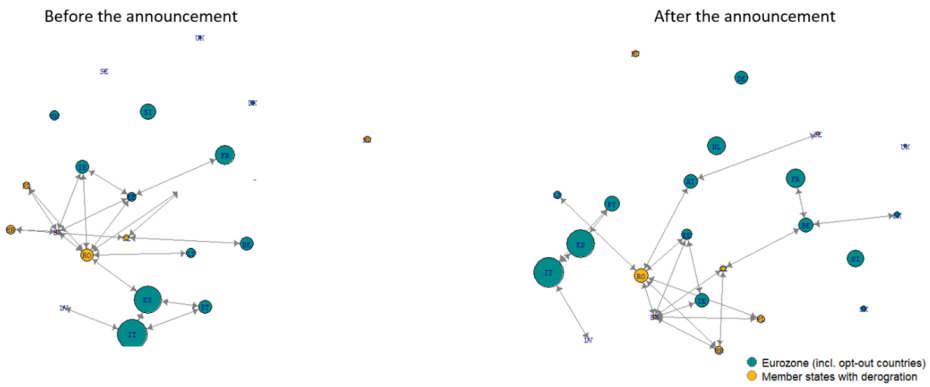

Figure 23: Sovereign CDS market connectedness 14 days before and after ECB's QE announcement (4th of September 2014)

Appendix 2

EU	European Union
ECB	European Central Bank
EMU	European Monetary Union
CEE	Central and Eastern European countries
SCDS	Sovereign Credit Default Swaps
FED	Federal Reserve
CDS	Credit Default Swaps
US	United States of America
EM	Emerging Market
BoE	Bank of England
GIIPS	Greece, Italy, Ireland, Portugal, and Spain
BoJ	Bank of Japan
SMP	Securities Market Program
APP	Asset Purchase Program
IR	Interest Rate
TL	Targeted Lending
LO	Lending Operations
FG	Forward Guidance
OMT	Outright Monetary Transactions
FG	Forward Guidance
CBPP	Covered Bond Purchase Program
TLTRO	Targeted Longer-Term Refinancing Operations
LTRO	Longer-Term Refinancing Operations

The Impact of Culture on Government Interventions in the Banking Sector

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Abstract

How does the national culture influence the government interventions across the banking sector? I aim to answer this question, by analysing a sample of European countries that experienced financial assistance from government during 2008-2018. I find that regulators are more likely to bail out banks in less masculine, less hierarchical, and higher affective autonomous countries. Moreover, when governments intervene, they provide a greater size of financial assistance in countries with these national cultural characteristics, especially if institutions are stronger and the supervisors more independent. Results are robust to different methods of estimations, subsamples, and additional controls. [1]

Key words: government interventions, bailouts, culture, institutions

JEL classification: E58, G01, G21, G28, H81

[1] This paper contains 25 pages, excluding first page and bibliography, but including annexes.

1. Introduction

In the aftermath of 2008 Global Financial crisis, the European governments provided a series of financial packages to banking institutions to reestablish financial stability and restore the confidence within the financial system.[2] The implementation of these incentives was slower and different in comparison with the MY interventions in terms of conditions, costs and behavioral commitments of banks (Pisani-Ferry and Sapir, 2010). Through this paper, I aim to demonstrate that national cultural characteristics have an important role in determining the government incentives to bail out financial institutions, as well as the implementation of the bailout packages.

The size of the interventions in European countries is about € 1.9 trillion and take the form of guarantees of bank liabilities, recapitalizations, impaired asset measures and other liquidity measures. The most used measure (61% of the total financial aid) is represented by the guarantees offered by the government in case of bank's failure to repay its debts, being followed by recapitalizations which imply the restructuring of bank's equity, and then by the removal of "toxic" assets. The impaired asset measures usually implied the implementation of a "bad bank" scheme, the highest volume being noticed in Germany. Finally, the government intervened through liquidity support packages, especially in United Kingdom and Netherlands. Sometimes, the government applied a mix of these measures, and in several rounds to restore the confidence within the financial system.

This paper aims to investigate the relation between national culture and the likelihood of governments to rescue banks with financial difficulties. Although, many determinants of these interventions have been analysed, such as the fiscal capacity (Stavrakeva, 2020) or the effects of "too big to fail", "too interconnected to fail" or "too many to fail" (Brown and Dinç, 2011), to my knowledge, there is no study that focuses on the impact of national culture on the bank bailouts. My main research questions are: How does national cultural characteristics influence the likelihood and volume of bailouts? How do institutional and supervisory frameworks affect this relation?

[2] The first large institutions rescued are in Benelux countries and Ireland, events that triggered bailout strategies for most European countries. The financial assistance programs take different forms: stabilizing banks in Spain, establishing "a bad bank" in Germany, or nationalizing institutions in United Kingdom and Netherlands. These interventions prevented the collapse of the financial system, but led to the occurrence of European Sovereign Debt Crisis (Berger and Roman, 2020).

To assess my research questions, I employ a sample of 28 European countries (EU countries and United Kingdom). Although each intervention by the government must be approved by the European Commission, every state had the possibility to decide the bailing out of a bank and the size of the financial assistance. This gives my the opportunity to analyze the behavior European governments considering the differences among their cultural values. The analyzed period is 2008-2018, covering the two main events that generated the occurrence and large size of bank bailouts in Europe, i.e., the Global Financial Crisis and the European Sovereign Debt Crisis. As methodology, in a first phase, I use a Logit model to estimate the probability of a government to offer financial assistance versus not to intervene. In the second phase, I estimate the size of used financial aid as share in GDP through a Tobit model.

My empirical results depict an economically significant relation between three cultural traits and the likelihood of government to rescue the stressed banks. These are masculinity, hierarchy and affective autonomy. Consistent with my hypotheses, I obtain that masculinity and hierarchy are negatively correlated with the probability of providing bank bailouts, while the level of affective autonomy influences positively the size of government's interventions. Furthermore, I find that institutional and supervisory frameworks are important channels through which culture affects government interventions.

Results are robust to different estimation strategies, like instrumental variables analysis, Probit models, additional control variables, as well across different subsamples.

My paper relates to the extant literature on bank bailouts. Previous research finds that the likelihood of banks to be recapitalized is determined by the fiscal capacity of government (Acharya et al., 2021). Lower revenues decrease the capacity to intervene (Stavrakeva, 2020) and even generate sovereign shocks (Manzo and Picca, 2020). Moreover, too many weak banks in the banking sector delay the authorities' interventions (Brown and Dinç, 2011). Politically connected banks are more likely to be saved (Duchin and Sosyura, 2014; Berger and Roman, 2017; Chavaz and Rose, 2019) although the long-run performance of these financial institutions is worser compared with their counterparts (Biau, et al., 2020) and they are more risk-taking

(Kostovetsky, 2015).[3] Duchin and Sosyura (2009) found evidence that banks' political and regulatory connections impact the financial aid.

A higher likelihood of a government to intervene is linked with a higher level of credit risk (Dam and Koetter, 2012), greater bank size (Panageas, 2009; Gerhardt and Vennet, 2016), higher liquidity risk (Fernandes, 2016), or with interconnectedness and a volatile ROA. Analysing the TARP program, Bayazitova and Shivdasani (2012) bring evidence that the approved banks had a stronger quality of assets in comparison with the non-recipients and they pose greater systematic risk.

Also, my paper is related to the literature on national culture and bank stability. For example, banks in individualistic countries have riskier portfolios, due to overconfidence and overoptimism (Damtsa, 2018). In masculine countries the probability of bank failure is increased due to the fact that governments are less likely to recapitalize the weak banks as the dominant value in these societies is competitiveness (Berger, et al., 2021). Zheng et al. (2013) studied the fraudulent behaviour which can occur as a cause of collectivism, showing that there is a higher likelihood of bribe among bank officers and bank customers in collectivist societies. The level of deposits is positively correlated with the level of trust and hierarchy and negatively correlated with the level of individualism (Damtsa, et al., 2019). Moreover, banks have the tendence to offer the borrowers smaller loans at a higher interest rate especially when they are culturally distant (Giannetti and Yafeh, 2012). The quality of bank earnings is also influenced by the national culture despite the authorities' regulations in which. The countries identified by higher level of individualism, higher level of power distance and lower level of uncertainty avoidance report smoother earnings (Kanagaretnam, et al., 2011). Also, it has been observed that the share of values among employees and institutions leads to a stronger safety net and less focus on excessive growth, phenomena induced to the competition (Song and Thakor, 2019). The cultural heritage of CEOs impacts also the performance of a certain institution, positively when competition intensifies and negatively in case of s stable environment (Nguyen, et al., 2018).

[3] There is also an extant literature on the effects of bailouts, showing that many intervened banks increased their risk profile, invested in risky securities or issued riskier loans (Duchin & Sosyura, 2014). In turn, TARP funds had a positive impact on credit supply (Li, 2013).

Despite the rich research on the determinants bank bailouts, very little or nothing is known about the how national culture characteristics affect the decision of regulator to intervene and provide financial packages to the banking sector. On the other side, most of the literature focus on the effects of national culture attributes on bank failures, risk-taking, or performance, ignoring the relation between cultural values and bailouts. I aim to fill the gap and contribute to the literature on bank bailouts in several ways. First, I assess the effects of national culture on the likelihood of regulator to provide bailouts, as well as on the size of financial assistance, assessing a wide variation of bailouts specific to EU countries. Second, I bring new insights by examining different channels that can influence the relation between national culture and bailouts. Specifically, I investigate the role of institutional, supervisory and regulatory framework. Nevertheless, my paper has important policy implications, suggesting that regulatory authorities should take into consideration the impact of national culture on the governments' interventions when saving financial institutions in order to avoid being biased by a county's specific cultural traits.

The paper is organized as follows. Section 2 develops the hypotheses. Section 3 presents data collection and the sample's construction. Section 4 describes the empirical approach. The results and robustness tests are discussed in the section 5. Section 6 concludes.

2. Hypotheses Development

In this section, I develop hypotheses in respect to the relation between the national cultural traits which will be introduced in my empirical models and the likelihood of government's interventions. For each cultural dimension, I bring arguments on how it can influence the decision of government to intervene in the banking sector.

2.1. Bank bailouts and power distance

Power distance involves the perception of people regarding the distribution of power, being able to expect and accept that the power is distributed unequally. Another characteristic of high power distance countries is that authority is based on tradition. The level of power distance can impact the likelihood of a government to intervene due to the fact that a higher level of power distance implies that the government is

prone to admit that not all of the financial institutions have equal rights to be rescued, being less willing to save the weak ones.

On the other hand, the bank managers in low power distance cultures tend to be more trusting. This involves that they will take more riskier decisions (Das and Teng, 2004) which may lead to a higher possibility of bank failure and a higher necessity of bank bailouts. Due to this fact, I expect that the level of power distance will be proportional with the need of financial assistance.

H1: Power distance can diminish the probability and size of bank bailouts.

2.2. Bank bailouts and individualism

In individualistic countries, own welfare is above of that of the group and the members of these cultures are characterised by overoptimism which is associated with risk-taking activities. Analysing these aspects, I expect that a higher level of individualism will be associated with a higher probability of government to offer financial assistance due to the fact that the regulatory authorities do not take into consideration the welfare of everyone, more precisely the taxpayers' money. They will tend to risk the taxpayers' contributions, being optimistic that implemented measures will decrease significantly the systematic risk.

H2: Masculinity can enhance the probability and size of bank bailouts.

2.3. Bank bailouts and masculinity

The masculine cultures emphasize the importance of competition and personal achievement. The regulatory authorities support the competition between financial institutions and stressed banks may be allowed to fail. Therefore, the representatives of these countries are less sensible to rescue the weak ones**.** This is the main reason for which I assume that the likelihood of bank bailouts will be negatively correlated with the level of masculinity. Furthermore, bank managers are less risk-averse and a higher level of masculinity is associated with a higher probability of default (Berger et al., 2021).

H3: Masculinity can diminish the probability and size of bank bailouts.

2.4. Bank bailouts and uncertainty avoidance

Uncertainty avoidance measures the extent to which the society's members can accept that the future is unpredictable or they try to control it. Therefore, I assume that the government in high uncertainty avoidance countries will not analyse in detail the causes of financial difficulties faced by stressed banks. Also, a culture associated with high uncertainty avoidance has a significant preference for exact rules. Being concerned about the existence of clear rules, the regulatory authorities may not be willing to implement in a due time rescue measures.

H4: Uncertainty avoidance can diminish the probability and size of bank bailouts.

2.5. Bank bailouts and hierarchy

Hierarchy is defined by a discrepancy between ranks, the society's members being organised in groups. The prevalent values in a hierarchical society are: social power, authority and prosperity. The hierarchal cultures are associated with conservatorium (Schwartz, 1994), fact that can result in a lower availability of governments to apply new and innovative saving measures for troubled banks. Furthermore, the societies identified by a higher level of hierarchy are less optimistic in comparison with the egalitarian ones (Schwartz, 1994). Therefore, I expect that regulatory authorities may not rescue the stressed financial institutions, considering that these interventions are too risky.

H5: Hierarchy can diminish the probability and size of bank bailouts.

2.6. Bank bailouts and mastery

As discussed, mastery involves the desire of society's members to change the social world in most of the cases with the help of technology. These cultures are more dynamic in comparison with those defined by harmony (Schwartz, 2007) and the people are encouraged to be self-assertive. Moreover, the societies which are identified by mastery tend to emphasise the importance of competition and success to attain the group's goals. Being prone to change the social world and oriented to achievement, I expect that these cultures may risk the taxpayers' contributions and rescue the weak banks.

H6: Mastery can enhance the probability and size of bank bailouts.

2.7. Bank bailouts and affective autonomy

A high level of affective autonomy suggests that individuals are encouraged to express their own feelings and ideas (Sagiv and Lee, 2006) and are interested in pursuing affectively positive experiences. In the same direction, the members are considered to be more autonomy. Analysing the characteristics of these societies, which encourage the members to express their own preferences and visions, I assume that the regulatory authorities may not penalize the banks that are more risk-taking and they may intervene to eliminate the spill-overs created by systematic risk. Moreover, these cultures emphasize the importance of group's welfare, being more likely to save the stressed banks.

H7: Affective autonomy can enhance the probability and size of bank bailouts.

3. Data

3.1. Sample

To assess the impact of culture on government interventions, I use a sample of 28 European countries (EU and United Kingdom). The data regarding the volume of used financial aid as share in GDP is from European Commission, and span from 2008 to 2018. Through this dataset I cover both the Global Financial Crisis and the European Sovereign Debt Crisis, periods during which governments provided the largest amount of public bailouts. The choice of this sample is based on the huge differences among the European countries, especially cultural differences. Moreover, most of the studies in respect to bank bailouts analysed the effects and determinants of TARP program in USA.

3.2. Dependent variables

In the Probit model, I introduced a dummy variable as dependent variable which takes the value the value 1 if the government bailed out the financial sector within a country in a given year, and 0 otherwise. For the Tobit model, I introduced the size of bailouts provided by government to the financial sector as percentage of GDP as dependent variable. It is important to analyse the determinants of bank bailouts' likelihood, as well as of the size of bailouts due to the fact that some variables impact only the size of

bailouts or they can have a higher influence on the bailouts' size if the probability of government to intervene is higher. Further, most of the previous research focus on bank bailouts' likelihood (Bayazitova and Shivdasani, 2012; Li, 2013; Dam and Koetter, 2012) and only a few on the size of the financial assistance of government offered to troubled banks.

On average, the financial aid as share in GDP provided to the banking sector from my analysed countries is about 0.473% ranging from 0.1% in Austria or Luxembourg to 17.4% to in Ireland.

3.3. National Culture Variables

The main regressors that I use in my empirical framework consists of several indices that reflect the cultural dimensions of nations and are widely employed in the literature. First, I consider the cultural variables of Hofstede like power distance, individualism, masculinity and uncertainty avoidance. These are collected from Hofstede Insights Database. **Power distance** reflects the capacity of less powerful people and organisations to accept that the power is distributed unequally and it is commonly used to identify a stratified society. **Individualism**, assumes that personal interest is more valuable than the group's interest. The predominant values of individualistic cultures are personal achievement and overoptimism. The **masculine** societies are identified by competition and material reward for success. Moreover, this type of cultures tends to be less emphatic with the weak one. **Uncertainty avoidance** involves the perception of people regarding the future, whether they accept that the future can be unpredictable or they try to control it through beliefs and institutions.

Second, I include some of the cultural indices of Schwartz (2007), i.e., hierarchy, mastery, and affective autonomy. **Hierarchy** assumes that higher ranking members of the society take the most important decisions. The hierarchical societies seem to be more conservative and less willing to apply innovative measures of bailout support. The high level of **mastery** points out the importance of independence and ambition, the individuals trying to achieve the personal interests by changing the social world. Moreover, the individuals of these societies are encouraged to be self-assertive. **Affective autonomy** reflects the aspiration of people for affectively positive experiences, willing to express their own preferences and abilities. Appendix A.1 gives the definition of variables.

Power distance index scores the highest level in Slovakia and the lowest level in Austria. Then, individualism level is the highest in United Kingdom with the level of 89 and the lowest in Portugal with the value of 27 units. I notice that the highest level of masculinity is in Slovakia. In opposition, the lowest level of masculinity index can be observed in Sweden. In respect to the last cultural trait of Hofstede's set, it is noticeable that the highest value is met in Greece and the lowest in Denmark. Regarding the Schwartz' set of cultural variables, I find that the level of hierarchy is the highest in Bulgaria with the value of 2.68 and the lowest in Italy with the value of 1.6. Mastery index scores the highest value in Greece and the lowest value in Finland. The last analysed cultural trait, affective autonomy, has the highest value of 4.39 in France and the lowest value of 2.99 in Slovakia[4].

Table 1 shows that there are significant differences in the mean size of bailouts provided to the European countries which are identified by high level vs. low level of cultural indices. This difference in means of the bailouts' volume is especially significant for individualism, masculinity, hierarchy, mastery and affective autonomy. For instance, the difference in mean of bailout's size is 0.42 within the countries which are represented by high vs. low level of individualism. These significant differences among the volume of financial aid provided by governments across countries with different cultural values, determined my to examine further the impact of national culture on government interventions.

Insert Table 1 here

3.4. Additional controls

In addition to the cultural dimensions, I employ in my models controls for banking sector characteristics from the World Development Indicators database. First, I control for the capitalization of the banks using the *Bank capital to Total assets ratio*. Second, I include the *Bank credit to Bank deposits ratio* to reflect the funding risk. Third, I introduce the *Bank noninterest income to Total income ratio* to account if a bank is involved in other activities besides the traditional ones. In most of the cases, the involvement of the banks in other activities imply higher risks which are associated with a higher likelihood of receiving a bailout (Dam and Koetter, 2012). Forth, I control

[4] The results are available at request.

for the volume of non-performing loans using the *Bank non-performing loans to Gross loans Ratio*, as banks with a higher quality of assets are more likely to be rescued (Bayazitova and Shivdasani, 2012). Finally, I include the *Bank return on assets* ratio to account for the banks' profitability.

I also control for macroeconomic determinants of bank bailouts, using data from different. To account for political connections, I include a variable collected from Braun and Raddatz (2010) which measures the extent to which the members of banks' board have political affiliation (*Political connected banks)*. Many studies provide evidence that politically connected banks are more likely to be bailed out (Duchin & Sosyura, 2012; Li, 2013; Berger & Roman, 2017). Next, I control for the macroeconomic conditions, considering indicators like *Inflation*, *Private credit to GDP*, *GDP growth* and *Government consolidated gross debt* from the World Development Indicators database (Brown and Dinc, 2005; Acharya et al., 2021). The fiscal capacity of the government plays an important role in the bailout process due to the fact the lower government revenues will diminish the probability of authorities to intervene (Stavrakeva, 2020). Finally, I control for the quality of institutions using the *Regulatory quality index* from the Worldwide Governance Indicators database. Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations. (Berger et al., 2021).

On average, the Bank capital to Total assets ratio is 9.42% for the countries included in my sample. The Bank credit to Bank deposits has a mean of 125.10% and ranges from 7.23% to 367.08%, showing significant differences in funding risk across the analysed countries. The mean of Bank noninterest income to Total income ratio is 40.62%, the mean of Bank non-performing loans to Gross loans ratio is 7.04%, while the mean of ratio of Return on Assets is 0.37%.

4. Methodology

I estimate the probability of the government to provide financial assistance versus not intervene through a logit model. This methodology is widely employed in the banking literature to assess the likelihood of bailouts (see for example Bayazitova and Shivdasani, 2012; Behn et al., 2015) as it provides more robust estimates in comparison with other methods. The empirical specification I employ is as below:

$$log\left(\frac{Prob(Bailout_{c,t})}{1-(Prob(Bailout_{c,t})}\right) = \alpha + \sum_{i=1}^{8} \beta_i * Culture_{i,c} + \gamma * Bank\ variables_{c,t-1} +$$

$$\delta * Country\ variables_{c,t-1} + \beta_y + \varepsilon_{c,t} \qquad (1)$$

where $Prob(Bailout_{c,t})$ identifies the probability of a government to provide financial assistance to country c during year t; $Culture_{i,c}$ is a vector consisting of national cultural indices (Power distance, Individualism, Masculinity, Uncertainty avoidance, Hierarchy, Mastery, Affective autonomy).[5] $Banking\ variables_{c,t-1}$ controls for banking sector characteristics and consists of Bank capital to Total assets, Bank credit to Bank deposits, Bank noninterest income to Total income, Bank Non-performing loans to Gross loans and Bank return on assets. $Country\ variables_{c,t-1}$ controls for country-level determinants like Politically connected banks, Inflation, Private credit to GDP, GDP growth, Government consolidated gross debt and Regulatory quality. Banking and country-level controls are lagged by one period. β_y represents the year fixed effects.[6] $\varepsilon_{c,t}$ is the standard error term clustered at country × year level[7].

To analyze the causal relation between national culture and the size of conditional on the likelihood of bailouts I use a Tobit model. Not all the countries from my sample offered financial assistance to the banking sector, therefore this methodology permits to account for the truncation of bailouts' size at zero. The empirical specification I employ is as below:

$$Vol(Bailout_{c,t}) = \alpha + \sum_{i=1}^{8} \beta_i * Culture_{i,c} + \gamma * Bank\ variables_{c,t-1} +$$

$$\delta * Country\ variables_{c,t-1} + \beta_y + \varepsilon_{c.t} \qquad (2)$$

where $\mathrm{Vol}(Bailout_{c,t})$ is the size of bailouts as share in a country's GDP conditional on the probability of a government to provide financial assistance to country c during year

[5] As robustness method, I run the empirical models for each variable separately and I find evidence that the results are robust.

[6] I re-estimate the results by eliminating the year fixed effects and I obtain very similar results for both sets of cultural traits. Due to incidental parameter problem, I do not introduce country fixed effects as these effects may impede to analyse accurately the relation between national culture and bank bailouts (Green, 2004).

[7] I obtain the same results by implementing country level clustering as robustness method.

t. The explanatory variables are similar with that used in equation (1)[8]. β_y represents the year fixed effects.[9] $\varepsilon_{c,t}$ is the standard error term clustered at Country × Year level.

5. Results

5.1. Main results

Panel A from Table 2 reports the results of the regressions detailed in the previous section. Overall, I find a significant impact of some of the national cultural characteristics on the probability of government to provide bailouts, as well as on the size of the rescue packages.

Insert Table 2, Panel A here

Firstly, results from column (1) show that masculinity is negatively associated with the likelihood of government to intervene, consistent with hypothesis H3. The results are also economically significant. A one standard deviation increase in the masculinity index generates, on average, a 38 percent decrease in the standard deviation of the log odds of bank bailouts. Moreover, when governments save troubled banks, they provide a significantly lower size of financial assistance in more masculine countries, as depicted in column (2). A one unit increase in the masculinity index generates, on average, a 2 percent decrease in the size of financial assistance provided to banks. These findings suggest that regulators are less emphatic with the weak banks in masculine societies that value competitiveness and firmness.

Secondly, I obtain that hierarchy is negatively correlated with the banks' bailout probability, consistent with the hypothesis H5. The results are economically significant. A one standard deviation increase in the hierarchy index generates, on average, a 37 percent decrease in the standard deviation of the log odds of bank bailouts. In respect to the size of bank bailouts, I notice in column (4) that authorities in hierarchical societies tend to provide lower financial assistance when they intervene. A one unit increase in the hierarchy index generates, on average, a 172.5 percent decrease in

[8] As robustness check, I run the empirical models for each variable separately and I find evidence that the results are similar with the main findings.

[9] I re-estimate the results by eliminating the year fixed effects and I obtain very similar results for both sets of cultural traits. Due to incidental parameter problem, I do not introduce country fixed effects as these effects may impede to analyse accurately the relation between national culture and bank bailouts (Green, 2004).

the size of financial assistance provided to banks. The findings indicate that hierarchical societies characterized by conservativism and pessimism, are less prone to apply new rescuing measures and offer financial aid for the stressed banks.

Finally, my results suggest that affective autonomy affects positively the likelihood of bank bailouts. Consistent with the hypothesis H7, the results are statistically and economically significant. A one standard deviation increase in the hierarchy index generates, on average, a 42 percent increase in the standard deviation of the log odds of bank bailouts. Moreover, results from column (4) indicate that affective autonomy has a positive impact on the size of bailouts provided to the banking sector. A one unit increase in the affective autonomy index generates, on average, a 115.9 percent increase in the size of financial assistance provided to banks. Overall, the results show that in cultures characterized by a higher level of affective autonomy, governments are more likely to intervene as they may be more interested in the group's welfare.

Regarding the control variables, I find that governments characterised by lower capitalization and lower credit risk are more likely to intervene. Also, the likelihood, as well as the size of bailouts are higher in countries where politically connected banks are more present and where the private credit to GDP is greater.

5.2. Robustness tests

5.2.1. Instrumental variable analysis

Although the national culture does not change significantly over time (Williamson, 2000; Hofstede, 2001), there still can be a causality issue between national culture and the bailouts provided by governments. To address the potential endogeneity problems that can occur because of the omitted variables that impact the likelihood of governments to intervene and are correlated with the national culture, I implement an instrument variable analysis. I re-estimate the impact of cultural indices on bailouts' likelihood and volume using the IV Probit 2SLS approach and the IV Tobit 2SLS approach and a set of instruments previously employed in the literature (Guiso et al., 2009; Zheng et al., 2013; El Ghoul & Zheng 2016; Damtsa, 2018). For the Hofstede's cultural set, I re-estimate my results using as instruments: Pronoun drop, Ethnical fractionalization, Population in 1990, Gender inequality, and Democracy index. For the

Schwartz's cultural set, I use Pronoun drop, Ethnical fractionalization, Population in 1990, Gender inequality, and Political rights index. [10]

My first instrument is *Pronoun* drop from Davis and Abdurazokzoda's (2016), which is the share of a country's population that speaks a language in which first-person singular pronoun drop is allowed. According to Davis and Abdurazokzoda's (2016), the possibility to accept the pronoun drop is associated with a higher level of individualism. Secondly, I use the *Ethnical fractionalisation* index from Alesina et al., 2003. This variable reflects the probability that two randomly selected individuals from a population belong to a different ethnicity. Thirdly, I collect the data regarding population (i.e., the natural logarithm of a country's population in 1990 from Eurostat). As pointed by Hofstede (2001), larger populations are identified by a higher level of masculinity. Another factor in regards to the demography is the Gender Inequality, as one of the predominant values of hierarchical societies and masculine societies is the inequality of rights. Data on the Gender Inequality index are obtained from International Monetary Fund database. Further, I use the *Democracy index*, data collected from the Economist Intelligence Unit. The index captures the quality of democracies based on 60 indicators which measure the pluralism, civil rights and political culture. Based on the score, the countries are classified into: full democracies, flawed democracies, hybrid regimes, and authoritarian regimes. I introduce this instrument due to the fact that regulatory authorities may be more willing to save the weak ones as these cultures are interested in the welfare of everyone.

Finally, I employ the *Political rights index* from Freedom House database. This is an overall index that measures the extent to which the political and civil rights are taken into consideration by state and nonstate actors. Societies that respect the rights of the individuals may be less willing to risk the taxpayers' contributions.

The IV first stage results show that the following instruments are significantly correlated with masculinity: pronoun drop, ethnical fractionalisation, population in 1990, and gender inequality. Ethnical fractionalisation is negatively correlated with the level of hierarchy, while population in 1990 and political rights index is positively associated

[10] The instruments are lagged by two periods.

with this cultural value. Finally, pronoun drop and ethnical fractionalisation are negatively correlated with affective autonomy, while population in 1990 impacts positively the level of affective autonomy.

The IV second stage results from Panel B, Table 2 indicate that the masculinity and hierarchy affect negatively the probability of bank bailouts, and respectively the volume of bank bailouts, while affective autonomy influences positively the probability of bank bailouts, and respectively their volume. Thus, my main findings are robust to the IV methodology. To assess the robustness of the instruments, I apply several tests. The Wald exogeneity test and the Anderson-Rubin weak instrument F-test have the null hypothesis that the coefficients of the variables are equal to 0. In both cases, I the null hypothesis is rejected at 1% level. Further, I perform the Hansen's J test to assess the null hypothesis that instruments and error terms are uncorrelated. The statistics in Panel B show that the instruments set is valid.

Insert Table 2, Panel B here

5.2.2. Alternative methodologies

Next, I check if my results are robust to alternative methodologies. First, I employ a Probit model and re-estimate the likelihood of a bank to receive financial assistance. Also, I use an alternative dependent variable for the Tobit model, by re-estimating the effects of culture on the size of bank bailouts as share in total assets instead of GDP. I obtain that the main results are robust to this methodology[11]

5.2.3. Additional controls

To further check the validity of my findings, I include other potential determinants of bank bailouts that were previously exploited in the literature. Dam and Koetter (2012) brought evidence that the rate of non-performing loans and the liquidity asset share impact positively the expectation of bank bailouts. In the research conducted by Berger et al. (2021) shows that fiscal capacity is also an important factor of providing bailouts. Considering these potential determinants of bailouts, I include in my analysis the following variables: Bank cost to income ratio, Liquid assets to Deposits and short time funding, Provisions to Non-performing loans, Financial system deposits to GDP, Government deficit to GDP. Also, I include a dummy variable for East-European

[11] The results are available at request.

countries to control for differences in the fiscal capacity of the governments across emerging versus developed countries from Europe. The main results remain robust[12].

5.2.4. Re-estimation using subsamples

Finally, I re-run my empirical strategies for different subsamples. I eliminate the period corresponding to the Global Financial crisis to avoid the interferences caused by the crisis. Then, I eliminate the period corresponding to the European Sovereign Debt crisis. In the last phase, I exclude the countries affected by the European Sovereign Debt crisis to eliminate the possibility that the results are driven by the effects of the Sovereign Debt crisis. In all of the three situations, I obtain that my results are robust[13].

5.3. Additional analysis (channels)

As a last step of my empirical setting, I investigate the channels that might affect the influence of national culture on the government likelihood to provide bailouts to the banking sector, as well as on the size of the financial packages. Firstly, I consider the quality of institutions. Secondly, I examine the effects of the supervisory and regulatory framework.

5.3.1. The effects of institutional framework

The institutional framework influences significantly the risks and the profitability of the banks (Arias et al., 2020; Berger et al., 2021). Therefore, I interact the cultural traits with proxies of institutional framework. The variables that reflect the institutional dimension are collected from World Governance Indicators dataset and consist of: 1) *Control of corruption*, an index that measures the extent to which public power is exercised for private gain, 2) *Government Effectiveness,* an index that captures perceptions of the quality of public services and of civil service, and the degree of their independence from political pressures, 3) *Political Stability*, an index that reflects the perception of the likelihood of political instability, 4) *Rule of law,* an index that identifies the perceptions of the extent to which agents have confidence in and abide by the rules of society, 5) *Voice and Accountability* an index that measures the extent to which

[12] The results are available at request
[13] The results are available at request.

citizens are able to participate in selecting their government, and freedom of expression, and 6) *Regulatory Quality* an index that measures the extent to which government is able to formulate and implement sound policies and regulations.

Results from Table 3, columns (1)-(2), (5)-(6), …, (21)-(22) indicate that better institutions mitigate the negative effect of masculinity on bailouts. In more masculine countries the likelihood of the government to intervene is less reduced if the quality of institutions is higher, as indicated by the coefficients on the interaction terms *Masculinity x Mitigating factor*, that are positive and statistically significant for all institutional variables. Also, the size of the financial aid is greater in more masculine countries with better institutions. Further, results show in columns (4), (8), …, (24) that in more hierarchical societies the government is more prone to provide a greater size of financial assistance when the quality of institutions is higher. The high hierarchical cultures are identified by conservativism. That is why in the presence of clear rules, the regulatory authorities may be more willing to implement new rescuing measures. In turn, in countries with a higher affective autonomy, the government is less incentivized to save banks when institutions variables like control of corruption, government effectiveness, rule of law, and voice and accountability are better. Also, the size of the financial assistance is lower in more affective autonomous countries with these types of cultural values. A possible explanation could be that the regulatory authorities will have clear rules about the situations when they should rescue the troubled banks. They may be less prone to encourage banks to involve in risky decisions.

Further, I observe that the other three cultural traits of Hofstede (power distance, individualism, and uncertainty avoidance) are statistically significant in the presence of the institutional framework. Firstly, a higher quality of institutions diminishes the effects of power distance on bailouts. Due to this fact, the size of bailouts is higher when the quality of control of corruption, government effectiveness, political stability and voice and accountability is better. I can explain this by considering the fact that a low power distance culture will treat equally the troubled banks and the regulatory authorities will rescue the weak ones. Secondly, I observe in columns (10), (14), and (18) that a higher quality of institutional framework in regards to political stability, regulatory quality, and rule of law diminishes the size of bailouts in more individualistic countries. A possible explanation is that the overoptimism of high individualism cultures will decrease in the presence of clear regulations and the authorities will not

risky the taxpayers' money to save the weak banks. Thirdly, the effect of uncertainty avoidance can be mitigated when the quality of institutional framework is higher. In the presence of institutional framework, the coefficients of uncertainty avoidance are positive and statistically significant. In more uncertainty avoidant cultures, the bailout's size is higher as indicated by the coefficients on the interaction terms *Uncertainty avoidance x Mitigating factor,* that are negative and statistically significant for all institutional variables. We can explain this by considering the fact that the authorities will analyse in detail the causes of financial difficulties of weak banks and will intervene in the presence of a better institutional framework.

Insert Table 3 here

5.3.2. The effects of supervisory and regulatory framework

Finally, I investigate the effects of the supervisory and regulatory framework on the relation between culture and government interventions. I consider the following variables extracted from World Bank Survey of Bank Regulation and Supervision: 1) *Independence of Supervisory Authority*, an index that identifies if the supervisory authority is independent from the government and legally protected from the banking industry, 2*) Prompt Corrective Power,* an index that measures the extent to which a law establishes predetermined levels of bank solvency deterioration that force automatic actions, such as intervention, and 3) *Capital Regulatory Index, that* reflects whether the capital requirement reflects certain risk elements and whether certain funds may be used to initially capitalize a bank.

Results from Table 4 columns (1)-(4) provide evidence that the Independence of Supervisory mitigates the effects of masculinity. The more masculine cultures are identified by a higher probability of governments to intervene and the size of bailouts is higher. Then, we obtain that coefficients of *Hierarchy x Mitigating factor*, respectively *Affective autonomy x Mitigating* factor are statistically insignificant. In opposition, the coefficients of power distance become statistically significant. The high power distance cultures are represented by a higher size of bank bailouts.

Columns (5)-(8) bring evidence that Prompt Corrective Power diminishes the effects of hierarchy and affective autonomy. I obtain that likelihood of bank bailouts is higher when the quality of supervision is higher in more hierarchical societies. Further, when the government decides to intervene, the size of bailouts is also greater in this type of

societies. In the same direction, the effects of affective autonomy can be mitigated in the presence of better regulation. in countries with a higher affective autonomy, the government is less incentivized to save banks when prompt corrective power is better. Also, when the government decides to intervene, the size of bailout support will be lower.

Columns (9)-(12) show that a better Capital Regulatory Index can impact significantly the bank bailouts' likelihood in high hierarchical societies, respectively high affective autonomy cultures. In more hierarchical cultures, the government is more willing to rescue the troubled banks. Moreover, the size of bailouts is higher based on the fact that there are clear regulations. The authorities may be encouraged to intervene in due time to impede the spill-overs created in the financial system. In respect to affective autonomy, it can be noticed that the probability, respectively the size of bank bailouts is lower in high affective autonomy cultures.

Insert Table 4 here

6. Conclusions

With this study, I bring new insights in respect to the connection between national culture and bank bailouts. As far as I know, there is no previous study that analysed the impact of cultural traits on the likelihood of government to offer financial assistance, although many other determinants and effect of bank bailouts were researched.

I analyse the cultural factors of bank bailouts using a sample of 28 countries (EU countries and UK) during the period 2008-2018. The main aim of my research is to investigate which cultural traits have a significant influence on the probability of governments to intervene and on the size of financial assistance. Also, I investigate through which channels the culture impacts the bailouts provided by governments to the banking sector.

I obtain that masculinity affects negatively the probability of bank bailouts. An explanation is that the representatives of these cultures are less likely to save the weak ones and the predominant value of these societies is personal achievement. Then, hierarchy influences negatively the likelihood of governments to intervene due to the fact that individuals of these culture tend to be conservative and less prone to apply new measures of bailout support. Further, affective autonomy impacts positively the

probability of bank bailouts as the society's members are interested about the welfare of everyone. Finally, the other introduced cultural traits, power distance, individualism, uncertainty avoidance, and mastery, do not affect significantly the likelihood of regulatory authorities to intervene.

These results are robust to different methodologies such as instrumental variable analysis, different estimation models, additional controls and cross different subsamples.

Regarding the policy implications, my findings suggest that the culture can have a significant impact on the likelihood of bank bailouts. Therefore, the cultural factors should be taken into consideration when the regulatory authorities implement new measures to rescue the weak banks. For example, to mitigate the effects of masculinity, the governments can introduce clear regulations about the conditions under which the weak banks should be rescued. In this way, the rescuing process may be more transparent and the masculine cultures would not be biased so much. To counter the effects of hierarchy, the regulatory authorities should be encouraged to apply innovative measures and the policy makers should check regularly if the authorities intervene in due time. Regarding the impact of affective autonomy, the regulatory forces should be stricter and analyse better the activities of rescued banks, as the members of these societies avoid to analyse in detail the risks involved by the stressed banks.

Regarding the role of institutions, I obtain that the effects of masculinity, hierarchy, and affective autonomy can be mitigated in the presence of better institutional framework. Moreover, it can be noticed that the other cultural traits become statistically significant in the presence of institutional variables. In respect to the regulatory, we obtain similar results. The impact of masculinity, hierarchy, and affective autonomy can be diminished when the quality of regulatory improves. In turn, the other introduced cultural traits have an influence on the relation between national culture and the likelihood of governments to offer financial assistance to the weak banks.

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Table 1. Difference in means analysis

Cultural indices	Size of bailouts in countries with low value of cultural indices			Size of bailouts in countries with high value of cultural indices			Difference in means in countries with high value vs. low value of cultural indices	
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.		
Power distance	121	0.55	1.79	116	0.39	0.81	-0.16	
Individualism	134	0.29	0.74	103	0.70	1.92	0.41	**
Masculinity	129	0.24	0.60	108	0.76	1.93	0.52	***
Uncertainty avoidance	117	0.55	1.82	120	0.39	0.79	-0.16	
Hierarchy	113	0.55	0.95	93	0.16	0.37	-0.40	***
Mastery	109	0.24	0.36	97	0.53	1.04	0.30	***
Affective autonomy	105	0.22	0.40	101	0.54	1.00	0.32	***

Note: This table presents descriptive statistics of the difference in means of the Size of bailouts to GDP in countries with low versus coutries with high values of cultural indices for a sample of 28 countries (EU countries and United Kingdom) during 2008-2018.

Table 2. Results

Panel A. OLS Results

Variables	(1) Logit Dummy bailout	(2) Tobit Size of bailouts to GDP	(3) Logit Dummy bailout	(4) Tobit Size of bailouts to GDP
Cultural indices				
Power distance	-0.029	-0.004		
	(-1.467)	(-0.389)		
Individualism	0.014	0.013		
	(0.510)	(1.173)		
Masculinity	-0.058***	-0.020**		
	(-3.118)	(-2.268)		
Uncertainty avoidance	-0.005	-0.035**		
	(-0.190)	(-2.357)		
Hierarchy			-4.802**	-1.725***
			(-2.456)	(-4.716)
Mastery			-1.726	0.195
			(-0.900)	(0.417)
Affective autonomy			3.732***	1.159***
			(3.078)	(3.774)
Controls				
Bank capital to Total assets	-0.139***	-0.066**	-0.107***	-0.032**
	(-3.713)	(-2.124)	(-3.316)	(-2.235)
Bank credit to Bank deposits	-0.019**	-0.022***	-0.012	-0.003
	(-2.100)	(-3.571)	(-1.367)	(-1.592)
Bank noninterest income to Total income	0.095***	0.035	0.019	0.004
	(3.204)	(1.151)	(0.706)	(0.455)
Bank Non-performing loans to Gross loans	0.016	0.043	-0.029	-0.000
	(0.337)	(1.279)	(-0.710)	(-0.030)
Bank return on assets	-0.430	-0.501**	-0.274	-0.112
	(-1.624)	(-2.244)	(-1.059)	(-1.095)
Politically connected banks	0.088***	0.047***	0.058***	0.012**
	(4.691)	(2.912)	(2.737)	(2.280)
Inflation	-0.032	0.170	-0.189	0.035
	(-0.201)	(1.451)	(-1.256)	(0.513)
Private credit to GDP	0.038***	0.040***	0.039***	0.012***
	(2.813)	(3.084)	(3.540)	(4.390)
GDP growth	-0.018	-0.024	0.063	-0.099*
	(-0.177)	(-0.361)	(0.540)	(-1.859)
Government consolidated gross debt	0.030***	0.010*	-0.005	0.000
	(2.836)	(1.900)	(-0.334)	(0.069)
Regulatory Quality	-1.715	-1.710*	-4.054***	-1.266***
	(-1.016)	(-1.750)	(-2.822)	(-4.165)
Constant	1.888	2.648	7.181	-0.501
	(0.493)	(1.101)	(0.809)	(-0.239)
Year fixed effects	YES	YES	YES	YES
Cluster	Country×Year	Country×Year	Country×Year	Country×Year
Observations	237	237	206	206
Pseudo R-squared	0.518	0.213	0.592	0.314
Log-likelihood	-77.320	-257.200	-55.530	-162.400

Panel B. IV Results

Variables	(1) IV Probit Dummy bailout	(2) IV Tobit Size of bailouts to GDP	(3) IV Probit Dummy bailout	(4) IV Tobit Size of bailouts to GDP
Cultural indices				
Power distance	0.473*	0.331*		
	(1.908)	(1.828)		
Individualism	-0.107	-0.195*		
	(-0.801)	(-1.893)		
Masculinity	-0.128***	-0.072**		
	(-2.772)	(-2.195)		
Uncertainty avoidance	0.008	-0.033		
	(0.082)	(-0.392)		
Hierarchy			-46.393***	-14.876***
			(-2.870)	(-4.387)
Mastery			37.056*	6.622
			(1.847)	(1.644)
Affective autonomy			17.188***	5.250***
			(2.695)	(3.960)
Controls				
Bank capital to Total assets	0.126	-0.043	-0.815*	-0.061
	(0.850)	(-0.262)	(-1.698)	(-0.688)
Bank credit to Bank deposits	0.059	0.037	-0.120***	-0.027***
	(1.261)	(1.018)	(-2.975)	(-3.813)
Bank noninterest income to Total income	0.116	0.128**	0.293**	0.046*
	(1.465)	(2.174)	-2.196	-1.77
Bank Non-performing loans to Gross loans	0.452**	0.265*	0.167	0.005
	(2.264)	(1.862)	-1.184	-0.162
Bank return on assets	-0.243	-0.258	-0.755	-0.039
	(-0.568)	(-0.745)	(-1.024)	(-0.283)
Politically connected banks	0.278***	0.146**	-0.011	-0.024
	(2.661)	(2.492)	(-0.206)	(-1.569)
Inflation	0.091	0.427	1.050*	0.141
	(0.237)	(1.410)	-1.712	-1.313
Private credit to GDP	-0.042	-0.029	0.149***	0.034***
	(-0.813)	(-0.709)	-3.138	-4.234
GDP growth	0.195	-0.062	0.312	-0.046
	(0.800)	(-0.326)	-0.958	(-0.592)
Government consolidated gross debt	0.124**	0.086**	-0.304***	-0.059***
	(2.334)	(2.224)	(-2.835)	(-3.444)
Regulatory Quality	22.747*	17.605*	-21.609***	-5.243***
	(1.734)	(1.786)	(-2.897)	(-4.273)
Constant	-59.390*	-35.347	-82.823	-8.259
	(-1.931)	(-1.564)	(-1.336)	(-0.642)
Year fixed effects	YES	YES	YES	YES
Cluster	Robust	Robust	Robust	Robust
Observations	206	206	195	195
Wald exogeneity test	17.35	118.8	21.14	55.38
Wald exogeneity test p-value	0.002	0.000	0.000	0.000
Anderson-Rubin weak instrument F-test	19.599	76.263	20.684	28.333
Anderson-Rubin weak instrument F-test p-value	0.001	0.000	0.001	0.000
Hansen's J test	0.003	0.027	0.794	1.418
Hansen's J test p-value	0.956	0.870	0.672	0.492

Note: Panel A reports the coefficients that reflect the determinants of the government's probability to provide bailouts to banks (columns (1) and (3)) and of the size of bailouts provided to the banking sector within a country as share of GDP (columns (2) and (4)). The methods used are Logit in columns (1) and (3) and Tobit in columns (2) and (4). Panel B reports the coefficients that reflect the determinants of the government's probability to provide bailouts to banks (columns (1) and (3)) and of the size of bailouts provided to the banking sector within a country as share of GDP (columns (2) and (4)). The robustness method used is instrumental variables regression with 2SLS, IV Probit in columns (1) and (3) and Tobit model in columns (2) and (4). The dependent variable for Probit model is represented by a dummy variable that takes the value 1 if the government bailed out the financial sector within a country in a given year, and 0 otherwise. National cultural values of Hofstede are instrumented by Pronoun drop, Ethical fractionalisation, Population in 1990, Gender inequality and Democracy index. National cultural values of Schwartz are instrumented by Pronoun drop, Ethical fractionalisation, Population in 1990, Gender inequality and Political rights index. All instrumental variables are lagged two years. The sample includes 28 countries (European countries and United Kingdom). Estimation period is 2008-2018. Country×Year level clustered standard errors are reported in parentheses. Explanatory variables are winsorized at 1st and 99th percentiles and lagged by one time period. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Bailouts, culture, and institutions

Variables	(1) Logit Dummy bailout	(2) Tobit Size of bailouts to GDP	(3) Logit Dummy bailout	(4) Tobit Size of bailouts to GDP	(5) Logit Dummy bailout	(6) Tobit Size of bailouts to GDP	(7) Logit Dummy bailout	(8) Tobit Size of bailouts to GDP
Mitigating factors	**Control of corruption**				**Government effectiveness**			
Mitigating factor	5.526	2.613	-19.194*	0.234	9.300	3.460	-4.890	-0.474
	(1.190)	(1.065)	(-1.809)	(0.056)	(1.547)	(0.867)	(-0.315)	(-0.081)
Cultural indices x Mitigating factor								
Power distance	0.027	-0.098*			-0.217**	-0.207**		
	(0.455)	(-1.968)			(-2.188)	(-2.469)		
Power distance x Mitigating factor	0.112**	0.114***			0.289***	0.188***		
	(2.152)	(2.833)			(3.047)	(3.044)		
Individualism	0.117*	0.044*			0.143**	0.084**		
	(1.923)	(1.797)			(2.090)	(2.045)		
Individualism x Mitigating factor	-0.046	-0.036*			-0.067	-0.064*		
	(-1.120)	(-1.839)			(-1.232)	(-1.952)		
Masculinity	-0.192***	-0.114***			-0.309***	-0.174***		
	(-3.925)	(-4.578)			(-5.062)	(-4.229)		
Masculinity x Mitigating factor	0.113***	0.093***			0.197***	0.136***		
	(3.923)	(4.520)			(4.481)	(4.112)		
Uncertainty Avoidance	0.152**	0.126***			0.433***	0.222***		
	(2.422)	(2.874)			(4.192)	(3.830)		
Uncertainty Avoidance x Mitigating factor	-0.160***	-0.151***			-0.385***	-0.226***		
	(-2.860)	(-4.001)			(-4.304)	(-4.422)		
Hierarchy			-6.004**	-3.457***			-4.095	-6.900***
			(-2.369)	(-2.767)			(-1.432)	(-2.655)
Hierarchy x Mitigating factor			2.735	1.992*			1.320	4.873**
			(1.207)	(1.894)			(0.410)	(2.356)
Mastery			-6.285*	0.629			-9.268**	-0.200
			(-1.937)	(0.628)			(-2.178)	(-0.124)
Mastery x Mitigating factor			6.490***	-0.116			8.692***	0.806
			(2.602)	(-0.159)			(2.740)	(0.633)
Affective autonomy			10.654***	2.432***			14.484***	4.458***
			(3.851)	(3.628)			(3.651)	(4.571)
Affective autonomy x Mitigating factor			-3.660***	-1.084*			-8.710**	-3.075***
			(-2.753)	(-1.867)			(-2.351)	(-4.125)
Constant	-16.343**	-1.446	4.437	-4.478	-17.739**	-1.464	-1.658	-3.382
	(-2.086)	(-0.345)	(0.352)	(-1.021)	(-2.118)	(-0.288)	(-0.100)	(-0.484)
Banking controls	YES	YES	YES	YES	YES	YES	YES	YES
Country controls	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear
Observations	237	237	206	206	237	237	206	206
Pseudo R-squared	0.578	0.318	0.646	0.333	0.612	0.295	0.634	0.335
Log-likelihood	-67.720	-223.100	-48.180	-157.800	-62.260	-230.500	-49.830	-157.400

Variables	(5) Logit Dummy bailout	(6) Tobit Size of bailouts to GDP	(7) Logit Dummy bailout	(8) Tobit Size of bailouts to GDP	(9) Logit Dummy bailout	(10) Tobit Size of bailouts to GDP	(11) Logit Dummy bailout	(12) Tobit Size of bailouts to GDP	(13) Logit Dummy bailout	(14) Tobit Size of bailouts to GDP	(15) Logit Dummy bailout	(16) Tobit Size of bailouts to GDP	(17) Logit Dummy bailout	(18) Tobit Size of bailouts to GDP	(19) Logit Dummy bailout	(20) Tobit Size of bailouts to GDP
Mitigating factors	**Political stability**				**Requlatory quality**				**Rule of law**				**Voice and accountability**			
Mitigating factor	36.943***	26.077***	-34.907	11.719**	-4.808	7.410*	-57.786**	-0.789	18.863***	9.158***	-22.541	-1.807	6.961	6.510	-99.156***	-13.298
	(3.714)	(2.815)	(-1.443)	(2.483)	(-0.536)	(1.668)	(-2.394)	(-0.091)	(2.861)	(2.673)	(-1.328)	(-0.336)	(0.469)	(1.038)	(-2.864)	(-1.136)
Cultural indices x Mitigating factor																
Power distance	-0.371*	-0.322***			-0.228*	-0.157*			-0.130	-0.117			-0.532**	-0.397***		
	(-1.692)	(-2.831)			(-1.756)	(-1.765)			(-1.130)	(-1.632)			(-2.040)	(-2.776)		
Power distance x Mitigating factor	0.356	0.302***			0.120	0.095			0.217**	0.110**			0.601**	0.364***		
	(1.544)	(2.927)			(1.256)	(1.513)			(2.382)	(2.379)			(2.499)	(3.150)		
Individualism	0.300***	0.218***			0.041	0.169***			0.291***	0.144***			0.056	0.090		
	(3.210)	(2.688)			(0.376)	(3.487)			(3.739)	(3.798)			(0.369)	(1.481)		
Individualism x Mitigating factor	-0.339***	-0.240***			0.089	-0.072**			-0.139**	-0.086***			0.025	-0.075		
	(-3.328)	(-2.872)			(1.137)	(-2.031)			(-2.575)	(-3.148)			(0.178)	(-1.394)		
Masculinity	-0.266***	-0.186***			-0.390***	-0.289***			-0.437***	-0.228***			-0.621***	-0.319***		
	(-3.247)	(-3.299)			(-4.121)	(-5.236)			(-5.145)	(-5.355)			(-4.992)	(-5.143)		
Masculinity x Mitigating factor	0.212***	0.179***			0.233***	0.202***			0.260***	0.166***			0.473***	0.271***		
	(3.096)	(2.943)			(4.169)	(4.929)			(5.087)	(5.122)			(4.572)	(4.981)		
Uncertainty Avoidance	0.596***	0.425***			0.448***	0.364***			0.567***	0.306***			0.869***	0.518***		
	(3.009)	(2.735)			(2.938)	(3.573)			(4.439)	(4.186)			(3.975)	(3.975)		
Uncertainty Avoidance x Mitigating factor	-0.635***	-0.463***			-0.319***	-0.290***			-0.464***	-0.257***			-0.759***	-0.485***		
	(-3.221)	(-3.047)			(-3.072)	(-3.902)			(-4.697)	(-4.737)			(-4.151)	(-4.324)		
Hierarchy			-4.126**	-3.079***			-9.258	-6.137**			-5.865*	-7.725***			-8.371*	-17.498***
			(-1.992)	(-3.298)			(-1.499)	(-2.334)			(-1.788)	(-3.294)			(-1.756)	(-4.309)
Hierarchy x Mitigating factor			-2.035	1.276			4.688	3.830			1.580	4.849***			4.309	13.740***
			(-0.282)	(1.274)			(0.591)	(1.618)			(0.605)	(2.759)			(0.760)	(4.062)
Mastery			-7.838**	1.673**			-19.011***	0.150			-13.779***	0.551			-31.832***	2.033
			(-2.548)	(2.362)			(-3.064)	(0.090)			(-2.908)	(0.390)			(-3.506)	(0.910)
Mastery x Mitigating factor			11.359**	-1.584			17.484***	0.809			12.347***	0.740			29.828***	-0.557
			(2.538)	(-1.575)			(2.977)	(0.509)			(3.364)	(0.617)			(3.444)	(-0.284)
Affective autonomy			4.952	2.361***			13.189***	4.386***			17.825***	5.648***			15.612*	5.315***
			(1.643)	(3.830)			(3.087)	(2.817)			(4.012)	(5.359)			(1.919)	(3.259)
Affective autonomy x Mitigating factor			-2.106	-2.313***			-6.238*	-2.727*			-8.730***	-2.984***			-8.602	-3.458**
			(-0.659)	(-3.914)			(-1.892)	(-1.961)			(-2.756)	(-5.360)			(-1.200)	(-2.414)
Constant	-32.054***	-22.589**	25.542	-9.647***	-1.220	-8.917	52.110**	-4.646	-34.346***	-12.041**	9.604	-7.759	-22.269	-5.769	98.559**	8.939
	(-3.042)	(-2.357)	(1.169)	(-2.752)	(-0.103)	(-1.403)	(2.211)	(-0.493)	(-3.430)	(-2.156)	(0.533)	(-1.435)	(-1.355)	(-0.741)	(2.505)	(0.684)
Banking controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear
Observations	237	237	206	206	237	237	206	206	237	237	206	206	237	237	206	206
Pseudo R-squared	0.688	0.319	0.618	0.351	0.614	0.335	0.651	0.336	0.639	0.348	0.657	0.359	0.626	0.353	0.672	0.393
Log-likelihood	-49.960	-222.800	-52.040	-153.500	-61.950	-217.400	-47.470	-157.100	-57.830	-213.300	-46.750	-151.700	-59.910	-211.400	-44.710	-143.700

Note: This table reports the coefficients that reflect the determinants of the government's probability to provide bailouts to banks (columns (1), (3))..., (19)) and of the size of bailouts provided to the banking sector within a country as share of GDP (columns (2), (4),...,(20)) by considering the effects of institutional framework. The methods used are Logit in columns (1), (3),.., (19) and Tobit in columns (2), (4), ...,(20). .The dependent variable for Logit model is represented by a dummy variable that takes the value 1 if the government bailed out the financial sector within a country in a given year, and 0 otherwise. The sample includes 28 countries (European countries and United Kingdom). Estimation period is 2008-2018. CountryxYear level clustered standard errors are reported in parentheses. Explanatory variables are winsorized at 1st and 99th percentiles and lagged by one time period. *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Bailouts, culture, and regulatory framework

Variables	(1) Logit Dummy bailout	(2) Tobit Size of bailouts to GDP	(3) Logit Dummy bailout	(4) Tobit Size of bailouts to GDP	(5) Logit Dummy bailout	(6) Tobit Size of bailouts to GDP	(7) Logit Dummy bailout	(8) Tobit Size of bailouts to GDP	(9) Logit Dummy bailout	(10) Tobit Size of bailouts to GDP	(11) Logit Dummy bailout	(12) Tobit Size of bailouts to GDP
Mitigating factors	**Independence of supervisory authority**				**Prompt corrective power**				**Capital regulatory index**			
Mitigating factor	-15.369*	-9.429**	-36.499*	2.797	1.930	-0.584	21.433**	3.171	-3.971*	-2.932***	-5.983	0.404
	(-1.707)	(-2.254)	(-1.695)	(0.361)	(0.660)	(-0.937)	(2.225)	(1.100)	(-1.796)	(-3.503)	(-0.378)	(0.154)
Cultural indices x Mitigating factor												
Controls												
Power distance	0.053	-0.234***			0.265*	0.097**			-0.841***	-0.016		
	(0.522)	(-3.188)			(1.735)	(2.251)			(-3.061)	(-0.396)		
Power distance x Mitigating factor	0.002	0.128***			-0.088**	-0.014*			0.142***	0.013*		
	(0.047)	(3.751)			(-1.965)	(-1.676)			(3.153)	(1.945)		
Individualism	-0.301	-0.020			0.052	0.039			-0.109	-0.054		
	(-1.568)	(-0.377)			(0.446)	(0.881)			(-0.595)	(-1.209)		
Individualism x Mitigating factor	0.093	-0.001			-0.014	-0.006			0.017	0.009		
	(1.302)	(-0.022)			(-0.461)	(-0.838)			(0.662)	(1.454)		
Masculinity	-0.303**	-0.140*			-0.014	0.049			-0.075	0.054		
	(-2.379)	(-1.808)			(-0.099)	(1.150)			(-0.539)	(1.273)		
Masculinity x Mitigating factor	0.113**	0.090**			-0.017	-0.002			0.017	-0.001		
	(2.006)	(2.254)			(-0.441)	(-0.175)			(0.845)	(-0.169)		
Uncertainty Avoidance	-0.326	-0.065			-0.142	-0.096**			0.285	-0.183***		
	(-1.243)	(-0.572)			(-0.661)	(-2.018)			(1.610)	(-3.361)		
Uncertainty Avoidance x Mitigating factor	0.050	-0.019			0.057	0.022**			-0.062**	0.020***		
	(0.714)	(-0.420)			(0.905)	(2.228)			(-2.024)	(2.683)		
Hierarchy			46.385***	-5.734			24.404***	-8.164***			54.188***	14.823***
			(3.656)	(-0.771)			(3.641)	(-3.330)			(3.335)	(5.113)
Hierarchy x Mitigating factor			-6.265	3.004			-2.075*	1.138**			-5.034***	-2.354***
			(-0.866)	(1.191)			(-1.919)	(2.609)			(-4.147)	(-5.282)
Mastery			-38.835***	3.450			-8.072	1.063			-75.982**	-11.816***
			(-3.177)	(0.819)			(-1.376)	(0.462)			(-2.263)	(-3.329)
Mastery x Mitigating factor			4.240	-1.412			-1.247	-0.418			12.604**	1.194**
			(0.833)	(-0.857)			(-0.502)	(-1.111)			(2.482)	(2.510)
Affective autonomy			0.264	2.039			26.042***	7.041***			71.202***	4.421***
			(0.067)	(1.036)			(3.647)	(2.684)			(4.306)	(3.273)
Affective autonomy x Mitigating factor			7.902***	-0.776			-3.220***	-0.936*			-8.961***	-0.225
			(2.624)	(-1.586)			(-2.712)	(-1.892)			(-3.595)	(-0.971)
Constant	54.411*	20.819**	39.032	-15.603	-20.812**	-15.998**	-105.556***	-21.181	19.970	2.528	-67.697	-2.217
	(1.725)	(2.382)	(0.859)	(-0.836)	(-2.443)	(-2.090)	(-3.448)	(-1.401)	(1.094)	(0.285)	(-0.621)	(-0.128)
Banking controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear	CountryxYear
Observations	195	195	165	165	185	185	165	165	195	195	165	165
Pseudo R-squared	0.759	0.398	0.876	0.498	0.759	0.396	0.818	0.519	0.692	0.391	0.831	0.514
Log-likelihood	-31.300	-169.200	-13.550	-96.150	-28.880	-166.600	-19.960	-92.230	-40.020	-171.200	-18.590	-93.200

Note: This table reports the coefficients that reflect the determinants of the government's probability to provide bailouts to banks (columns (1),...,(11)) and of the size of bailouts provided to the banking sector within a country as share of GDP (columns (2),..,(12)). by considering the effects of regulatory and supervisory framework. The methods used are Logit in columns (1), (3),.., (11) and Tobit in columns (2), (4), ...,(12). The dependent variable for Logit model is represented by a dummy variable that takes the value 1 if the government bailed out the financial sector within a country in a given year, and 0 otherwise. The sample includes 28 countries (European countries and United Kingdom). Estimation period is 2008-2018. Country×Year level clustered standard errors are reported in parentheses. Explanatory variables are winsorized at 1st and 99th percentiles and lagged by one time period. *** p<0.01, ** p<0.05, * p<0.1.

Appendix A.1. Definitions of variables

Variables	Unit	Definition	Source
Dependent variable			
Dummy bailout	0/1	Dummy variable that takes the value 1 if the government bailed out the financial sector within a country in a given year, and 0 otherwise.	European Comission
Size of bailouts to GDP	%	The size of bailouts provided by government to the financial sector as percentage of GDP (current prices).	European Comission
Size of bailouts to TA	%	The size of bailouts provided by governmentas percentage of total assets of the banking system.	Own calculations
Cultural indices			
Power distance	Units	Hofstede's cultural index related to the acceptance of the human inequality. Higher values imply greater acceptance of human inequality.	Hofstede Website
Individualism	Units	Hofstede's cultural index related to the interdependent relationships within a society. Higher values imply the higher importance of personal interest even at the cost of the others.	Hofstede Website
Masculinity	Units	Hofstede's cultural index related to the fundamentals of success. Higher values reflect increased competition and personal achievement.	Hofstede Website
Uncertainty avoidance	Units	Hofstede's cultural index related to the society's tolerance for unknown. Higher values imply the acceptance of unpredictability within the society.	Hofstede Website
Hierarchy	Units	Schwartz's cultural index related to inequality of responsabilities and resources. Higher values imply that the improtant decisions within society are taken by the high ranking individuals.	Schwartz(2007)
Mastery	Units	Schwartz's cultural index related to self-assertion. Higher values imply the achievemnet of personal interests by changing the social world.	Schwartz(2007)
Affective autonomy	Units	Schwartz's cultural index related to affectively positive experiences. Higher values imply the desire of individuals to express their own ideas and preferences.	Schwartz(2007)
Control variables			
Bank capital to Total assets	%	The ratio of bank capital and reserves to total assets.	World Development Indicators
Bank credit to Bank deposits	%	The ratio of private credit to deposits by deposit money banks.	World Development Indicators
Bank noninterest income to Total income	%	The ratio of noninterest income and total income. The index is calculated when net-interest income is not negative.	World Development Indicators
Bank Non-performing loans to Gross loans	%	The value of nonperforming loans to the total value of the loan portfolio (including nonperforming loans before the deduction of specific loan-loss provisions).	World Development Indicators
Bank return on assets	%	The ratio of income after tax to total assets.	World Development Indicators
Politically connected banks	%	The ratio of politically connected banks that had a former politician on their boards and the total banks within a country.	Braun, M., & Raddatz, C., (2010)
Inflation	%	The consumer price index reflecting the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services.	World Development Indicators
Private credit to GDP	%	Private credit by deposit money banks and other financial institutions to GDP.	World Development Indicators
GDP growth	%	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars.	World Development Indicators
Government consolidated gross debt	%	The ratio of government debt outstanding at the end of the year to GDP at current market prices.	Eurostat
Regulatory Quality	Units	An index that reflects the perceptions on the ability of the government to formulate and implement sound policies and regulations. Higher values reflect the capacity of the state to promote the private sector development by implementing efficient regulations.	Worldwide Governance Indicators
Bank cost to Income ratio	%	The ratio of bank costs to income.	World Development Indicators
Liquid assets to Deposits and short term funding	%	The ratio of liquid assets to deposits and short term funding.	World Development Indicators
Provisions to Non-performing loans	%	Amounts alocated to loans overdue for more than a certain number of days (e.g., usually more than 90 days)	World Development Indicators
Financial system deposits to GDP	%	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP.	World Development Indicators
Government deficit to GDP	%	Equals government revenue minus expense, minus net investment in nonfinancial assets.	World Development Indicators
Dummy Eastern European country	0/1	Dummy variable that takes the value 1 if the country is from Eastern Europe, and 0 otherwise.	Own calculations
Other controls			
Control of corruption	Units	An index that captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. Higher values imply a greater importance of the public gain and the avoidance of authorities to achieve private gain.	Worldwide Governance Indicators
Government effectiveness	Units	An index that captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	Worldwide Governance Indicators
Political stability	Units	An index that captures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	Worldwide Governance Indicators
Rule of law	Units	An index that captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, the likelihood of crime and violence.	Worldwide Governance Indicators
Voice and accountability	Units	An index that captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, freedom of expression, freedom of association, and a free media.	Worldwide Governance Indicators
Independence of supervisory authority	Units	An index that measures the extent to which the supervisory authority is independent from the government and legally protected from the banking industry.	World Bank Survey of Bank Regulation and Supervision
Prompt corrective power	Units	An index that captures whether a law establishes predetermined levels of bank solvency deterioration that force automatic actions, such as intervention.	World Bank Survey of Bank Regulation and Supervision
Capital regulatory index	Units	An index that captures whether the capital requirement reflects certain risk elements and whether certain funds may be used to initially capitalize a bank.	World Bank Survey of Bank Regulation and Supervision
Instrumental variables			
Pronoun drop	%	The share of a country's population that speaks a language in which first-person singular pronoun drop is allowed.	Davis, L. S., & Abdurazokzoda, F. (2016)
Ethnical fractionalisation	%	The probability that two randomly selected individuals from a population belong to a different ethnicity.	Alesina et al., (2003)
Population 1990	Units	The natural logarithm of a country's population.	Eurostat
Gender inequality	Units	The index of gender inequality, averaged over the the period 1990-2007. It is interpreted as a combined loss to achievements in reproductive health, empowerment and labour market participation due to gender inequalities	International Monetary Fund (IMF) Indicators
Democracy index	Units	An index that measures the quality of democracies, especially related to voter participation, perception of human rights protection and freedom to form organizations and parties.	Database of Economist Inteligence Unit
Political rights index	Units	An index that measures the extent to which the political and civil rights of society's members are respected.	Database of Freedom House

IMPACTUL PANDEMIEI DE CORONAVIRUS ASUPRA PERFORMANȚEI SECTORULUI BANCAR DIN UNIUNEA EUROPEANĂ[1]

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Abstract

În această lucrare am examinat impactul pandemiei de COVID-19 asupra reacției investitorilor din sistemul bancar, utilizând o bază de date ce cuprinde cotațiile bursiere ale unui eșantion larg de bănci din Uniunea Europeană. Analiza empirică este realizată sub forma unui studiu de eveniment și se concentrează pe compararea rentabilităților anormale pe diferite ferestre de timp, între țări, dar și între diferite subgrupe determinate pe baza indicilor de reglementare bancară, a apartenenței la zona euro și a capacității fiscale a statelor. Rezultatele empirice arată că reacția investitorilor per ansamblu este una negativă. Investitorii au avut o reacție mai puternică în cazul băncilor din țări din afara zonei euro, comparativ cu cele din zona euro. Investitorii băncilor situate în țări periferice și semiperiferice au reacționat mai puternic decât în cazul invetitorilor băncilor din țări centrale. Din perspectiva reglementării, investitorii au avut o reacție negativă sporită în cazul băncilor din jurisdicții în care restricțiile de activitate și puterea de supraveghere sunt mai reduse, iar cerințele de capital sunt mai stringente.

[1] Această lucrare conține 25 de pagini, excluzând pagina de titlu și bibliografia.

Introducere

În această lucrare mi-am propus să prezint impactul pandemiei provocate de virusul SARS-CoV-2 asupra rentabilităților acțiunilor băncilor din Uniunea Europeană, având ca bază teoretică o serie de articole științifice referitoare la reacțiile sistemului bancar și la consecințele unei astfel de crize. Importanța cunoașterii efectelor rezultate din gestionarea situației este categorică pentru cercetători din sfera de specialitate, instituțiile de supraveghere, populația largă, investitori și manageri interesați de performanțele băncilor. Deși este ușor de observat că repercusiunile pandemiei sunt reale și au efecte negative la nivel global, în sistemul educațional, în sistemul sanitar, dar și în economie, în lucrarea de față voi prezenta informații concrete, pe date, extrem de relevante în contextul actual. Astfel este necesară stabilirea măsurii în care rentabilitățile acțiunilor băncilor sunt afectate după anunțarea pandemiei de coronavirus la nivel global și reacția investitorilor în ansamblu. Motivația alegerii acestei teme constă în actualitatea acesteia, în utilizarea unei astfel de situații nefaste ca pe o oportunitate de cercetare pentru dezvoltare științifică și în faptul că, poate reprezenta o înțelegere mai bună a situației actuale și a anvergurii acesteia.

Ca metodologie de lucru am abordat atât ramura teoretică, cât și studiul empiric prin prisma unui studiu de eveniment realizat pe cotațiile bursiere ale băncilor comerciale listate din Uniunea Europeană, folosind rentabilitățile acțiunilor acestora. Baza de date cuprinde rentabilitățile acțiunilor a 141 de bănci din 21 de țări membre ale Uniunii Europene pe o perioadă de aproximativ 2 ani. Data evenimentului este 11 martie 2020, dată la care a fost declarată pandemia la nivel global de către Organizația Mondială a Sănătății. Pentru a surprinde reacția investitorilor, am calculat rentabilitățile anormale folosind modelul de piață, și modelul CAPM, unele dintre cele mai utilizate modele pentru calcularea rentabilităților anormale. De asemenea, am calculat rentabilitățile anormale agregate pentru fiecare țară, am folosit indici de reglementare și supraveghere, statutul apartenenței la zona euro, poziția regională din cadrul teoriei sistemelor mondiale, pentru a separa băncile în subgrupe și pentru a vedea dacă rezultatele sunt consecvente pe toate subgrupele și pentru toate țările.

Lucrarea este structurată în patru capitole, astfel primul capitol cuprinde revizuirea literaturii privind reacția sectorului bancar la impactul generat de pandemie, cel de-al doilea capitol cuprinde un studiu de eveniment în care am utilizat

rentabilitățile acțiunilor băncilor listate din Uniunea Europeană, cel de-al treilea capitol cuprinde rezultatele, iar ultimul capitol este constituit de concluzii.

1. Revizuirea literaturii

1.1 Prezentare generală

Cauzele care duc la pandemii sunt fenomene biologice recurente și nu pot fi prevenite în mod realist. Pandemiile apar la un interval de la 10 până la 50 de ani ca urmare a apariției unor noi subtipuri de virus din amestecarea materialului genetic al unui alt virus (Potter, 2001). Cu toate acestea, ritmul de răspândire al acestui agent patogen și globalizarea acestuia par a fi elementele de noutate, de aceea impactul final asupra pieței de capital, asupra sistemului bancar și în general, asupra întregii economii este greu de cuantificat și previzionat.

Incertitudinea globală a atins niveluri fără precedent la începutul focarului COVID-19. Indicele mondial de incertitudine - o măsură trimestrială a incertitudinii economice și politice globale, care acoperă 143 de țări - arată că, deși incertitudinea a scăzut cu aproximativ 60% din maximul observat la debutul pandemiei COVID-19 în primul trimestru al anului 2020, rămâne cu aproximativ 50% peste media sa istorică în perioada 1996-2010 (Hites Ahir, Nicholas Bloom, Davide Furceri - FMI Blog). Pandemia de COVID-19 a forțat multe companii să își închidă activitatea, ducând la o întrerupere fără precedent a comerțului în majoritatea sectoarelor industriale. Mai mult, pandemia COVID-19 a generat un proces brusc de „deglobalizare” prin închiderea granițelor multor țări. (Elnahass, Trinh, Li, 2021).

Potrivit Eichengreen (2020), implicațiile economice ale acestei pandemii au fost etichetate drept „Coronanomics”. Întreaga lume a intrat într-o „gripă macroeconomică” (Baldwin, di Mauro, 2020), un șoc temporar negativ al ofertei și a cererii. Încetinirea economiei a reprezentat un mare șoc pentru sectorul corporativ, care a trebuit să găsească resurse financiare pentru a acoperi costurile de exploatare ca urmare a deficitului de venituri.

În aceste circumstanțe fără precedent, băncile centrale și guvernele au adoptat o gamă largă de intervenții politice. În timp ce unele măsuri au urmărit reducerea înăspririi bruște a condițiilor financiare pe termen scurt, altele au căutat să sprijine fluxul de credit către firme, fie prin intervenția directă (de exemplu, linii de credit

sponsorizate de guvern și garanții ale datoriilor), fie prin relaxarea constrângerilor băncilor cu privire la rezervele de capital (Kunt, Pedraza, Ortega, 2020).

Majoritatea guvernelor au răspuns imediat pentru a gestiona șocurile economice și financiare prin furnizarea de stimuli fiscali, monetari și macrofinanciari. Cu toate acestea, plasările în carantină, amânările plăților împrumuturilor și perspectiva politică incertă au crescut vulnerabilitatea sistemică a sectorului bancar, experții susținând chiar că „Vulnerabilitățile pe piețele de credit, țările emergente și băncile ar putea provoca chiar o nouă criză financiară ” (Adrian, T., Natalucci, F., 2020).

În timp ce instituțiile de credit sunt somate să joace un rol anticiclic important pentru a susține sectorul real, aceste acțiuni au, de asemenea, o serie de implicații pentru rezistența sectorului bancar, de exemplu, pe măsură ce creditorii își epuizează rezervele existente, s-ar putea, de asemenea deteriora calitatea activelor, amenințând stabilitatea sistemelor bancare (Kunt, Pedraza, Ortega, 2020).

1.2 Sistemul bancar în Uniunea Europeană și impactul COVID-19

Principalele obiective macroeconomice ale băncilor centrale sunt în mare parte menținerea stabilității prețurilor, promovarea ocupării depline a forței de muncă și promovarea creșterii economice.

Datorită reformelor apărute după criza financiară din 2008, băncile europene sunt mai puternice și mai stabile în prezent decât erau atunci. Rezistența băncilor în acest mediu economic fără precedent, depinde în primul rând de accesul lor la lichiditatea băncii centrale. BCE a răspuns în conformitate cu alte bănci centrale și a evitat riscul ca băncile să rămână fără lichiditate. Dar rezistența celor din urmă depinde și ea foarte mult de capacitatea lor de a absorbi pierderile și, prin urmare, de nivelul capitalului lor. (Jézabel Couppey-Soubeyran, Erica Perego, Fabien Tripier, 2020).

În urma recomandărilor acordului Basel 3, semnat în 2010 și finalizat în 2017, cerințele de capital au fost consolidate, au fost introduse cerințe de lichiditate și o nouă rată de capital mai simplă, ce nu depinde de activele ponderate la risc. Două instrumente noi, unul ajustând cerința de capital la ciclul financiar și cealaltă la factorul sistemic al instituțiilor, au adăugat, de asemenea, o notă macro-prudențială cadrului anterior exclusiv micro-prudențial, adică dedicat prevenirii riscurilor individuale ale băncii (riscul de credit, riscul de piață și riscuri operaționale) mai degrabă decât prevenirii riscului sistemic. Andrea Enria (2020), președintele Consiliului de supraveghere al BCE afirmă că „spre deosebire de criza financiară din 2008, băncile

nu reprezintă sursa problemei de această dată, dar trebuie să ne asigurăm că pot fi parte a soluției”.

UE a adoptat temporar norme bancare pentru a maximiza capacitatea băncilor de a acorda împrumuturi și a sprijini astfel gospodăriile și întreprinderile să își revină în urma crizei provocate de COVID-19. Aceste modificări au permis instituțiilor de credit să își joace pe deplin rolul de gestionare a șocului economic provocat de pandemia de COVID-19, prin favorizarea fluxurilor de credit. Pachetul de măsuri a fost adoptat de Parlamentul European la 19 iunie 2020.

1.3 Sistemul bancar în contextul pieței de capital

În timp ce șocul COVID-19 a reprezentat o lovitură puternică în întreaga lume în primul trimestru al anului 2020, efectele pandemiei s-au manifestat rapid pe pieţele financiare (Godell, 2020).

Pieţele financiare la nivel global au răspuns negativ la frământările COVID-19. De exemplu, SandP 500, Dow Jones, Russell 2000, Nasdaq Composite, FTSE 100 și Nikkei 225 au scăzut cu aproximativ 30-40% până la sfârșitul lunii martie din valorile lor din ianuarie (Elnahass, Trinh, Li 2021). Criza COVID-19 a avut efecte majore asupra multor bănci din întreaga lume și efecte multiple asupra pieţelor de capital. Multe dintre acestea au înregistrat cea mai rapidă scădere a prețurilor din istorie. Bursele din Europa, Africa și Asia au avut de asemenea, o scădere bruscă. (Ashraf, 2020; Ozili, 2020; Zhang și colab., 2020).

Măsurile luate de guverne pentru a contracara răspândirea virusului precum distanțarea socială și închiderea temporară a activităților comerciale care nu sunt esențiale, au condus la o nevoie externă de finanțare, situație în care băncile joacă un rol primordial.

Rezultatele articolului publicat de Asli Demirguc-Kunt, Alvaro Pedraza, Claudia Ruiz-Ortega (2020) sugerează că impactul negativ al șocului COVID-19 asupra băncilor a fost mult mai pronunțat și de lungă durată decât asupra companiilor din alte sectoare, precum și asupra altor instituții financiare nebancare, dezvăluind așteptarea ca băncile să absoarbă cel puțin o parte din șocul din sectorul corporativ. În plus, băncile mai mari, băncile publice și, într-o oarecare măsură, băncile mai bine capitalizate au suferit reduceri mai mari ale randamentelor lor, reflectând rolul lor anticipat în gestionarea crizei.

1.4 Cadrul instituțional și de reglementare

Motivul concentrării atenției în direcția reglementării și supravegherii bancare este acela că toate crizele semnalează probleme la nivel de reglementare și supraveghere. Se poate indica criza bancară globală din 2007-2009, problemele bancare care încă afectează multe țări europene în 2013 și peste 100 de crize bancare sistemice care au devastat economii din întreaga lume din 1970 (James R. Barth, Gerard Caprio, Jr., Ross Levine, 2013). "Sondajul privind reglementarea și supravegherea băncilor din întreaga lume" comasează o serie de date într-o bază de date pentru a permite comparații internaționale ale diferitelor caracteristici ale reglementării bancare.

Datele incluse și măsurile se bazează pe răspunsuri la sute de întrebări, inclusiv informații despre activitățile bancare admise, cerințele de capital, puterea de supraveghere, mecanisme de guvernanță externe, asigurare a depozitelor, bariere la intrare pe piață și acordarea de credite. Setul de date oferă, de asemenea, informații despre organizarea autorităților de reglementare și dimensiunea, structura și performanța activităților sistemelor bancare.

Pentru că reglementările reprezintă un factor important, am acordat atenție cadrului general instituțional și de reglementare. Principalele variabile de reglementare și instituționale utilizate în acest studiu provin din chestionarul realizat de Barth, Caprio și Levine (2008). Au fost realizate mai multe chestionare: în anii 1999, 2003, 2005 și 2012. Întrucât reglementările la nivel de țară se schimbă în timp, folosim datele ultimului sondaj disponibil, cel din 2012.

Cei mai utilizați indici sunt împărțiți în două grupuri de variabile (e.g. Deniz Anginer, Asli Demirguc-Kunt, Min Zhu, 2013).

Primul grup de variabile de reglementare sunt legate de politicile de stat care permit sau restricționează concurența. Indicele barierei de intrare măsoară cerințele de intrare pe piață a unei bănci și este construit pe baza a opt întrebări din sondajul Barth, Caprio și Levine cu privire la cerințele legale necesare pentru obținerea unei licențe bancare într-o anumită țară. Respingerea cererii este procentul de cereri pentru înființarea unei bănci care au fost refuzate în ultimii cinci ani. Proprietatea guvernamentală măsoară raportul băncilor care sunt deținute în proporție de 50% sau mai mult de guvern.

Al doilea grup de variabile măsoară supravegherea și reglementarea bancară. Indicele restricțiilor de activitate măsoară gradul în care autoritățile de reglementare

permit băncilor să se angajeze în afaceri cu valori mobiliare, asigurări și imobiliare. Indicele de stringență a capitalului măsoară suma de capital pe care o bancă trebuie să o mențină. Indicele puterii de supraveghere indică dacă autoritățile de supraveghere au puterea și autoritatea de a întreprinde acțiuni specifice preventive și corective. Indicele de diversificare surprinde dacă există orientări explicite, verificabile, cuantificabile pentru diversificarea activelor bancare și dacă băncilor le este permis să facă împrumuturi în afara granițelor naționale.

2. Metodologie și date

2.1 Prezentarea eșantionului și data evenimentului

Pentru studiul de caz, am utilizat un set de date colectate de pe investing.com, constând în prețurile acțiunilor băncilor din Uniunea Europeană, pe o perioada de 2 ani, mai exact 547 de zile de tranzacționare, din martie 2019 până în 5 aprilie 2021. Din cele 158 de bănci considerate inițial, am eliminat 17 bănci care nu aveau date suficiente pentru studiul de caz.

Tabel 1. Țările incluse în studiu

Tabelul raportează țările și numărul de bănci din fiecare țară, respectiv rentabilitatea medie calculată pentru întreaga perioadă.

	Țara	Nr. Bănci	Rentabilitatea medie(%)
1.	Austria	6	-0.033
2.	Belgia	1	-0.006
3.	Bulgaria	2	-0.149
4.	Cehia	2	-0.285
5.	Cipru	2	-0.025
6.	Danemarca	22	0.053
7.	Finlanda	5	0.071
8.	Franta	18	-0.021
9.	Germania	12	-0.050
10.	Grecia	6	0.079
11.	Irlanda	3	-0.081
12.	Italia	17	0.020
13.	Malta	2	-0.108
14.	Olanda	8	0.015
15.	Polonia	12	-0.118
16.	Portugalia	1	-0.137
17.	Romania	3	0.055
18.	Slovenia	1	-0.042
19.	Spania	8	-0.051
20.	Suedia	8	0.026
21.	Ungaria	2	-0.003

Cronologia unui studiu de eveniment este alcătuită dintr-o dată a evenimentului înconjurată de diferite perioade sau ferestre de timp. Data evenimentului este adesea

denumită ziua 0, care reprezintă data apariției evenimentului propriu zis investigat în studiu. În general, cercetătorii definesc data evenimentului ca primul anunț public al evenimentului. Cum studiile de eveniment se bazează pe premisa eficienței pieței, orice informație apărută în urma unui eveniment, va fi rapid încorporată în prețul acțiunilor, în urma primului anunț oficial.

În data de 7 ianuarie 2020 oficialii Chinei au identificat noul coronavirus, în data de 13 ianuarie a fost raportat primul caz în afara Chinei, pe 30 ianuarie Organizația Mondială a Sănătății a declarat epidemia o urgență de sănătate publică de nivel internațional, urmând ca în date de 11 martie 2020 să fie declarată oficial de către OMS ca pandemie la nivel mondial.

Din această cauză am considerat relevant să folosesc data de 11 martie 2020 ca data evenimentului a acestui studiu.

2.2 Calculul rentabilităților anormale

Studiile de evenimente încearcă să măsoare diferențele dintre rentabilitățile așteptate ale prețurilor acțiunilor și rentabilitățile reale ale prețurilor acestora. Această diferență este numită în literatură rentabilitate anormală. Rentabilitățile anormale sunt sinonime cu rentabilități în exces, erori de predicție și reziduuri (Skrepnek, Lawson, 2001). Dacă nu se produce nicio mișcare anormală a prețului până la data evenimentului, rentabilitatea anormală așteptată ar trebui să fluctueze aleatoriu în jurul valorii de zero. Dimpotrivă, dacă există un răspuns de piață la eveniment, rentabilitățile anormale ar trebui să devină măsurabile. (Skrepnek, Lawson, 2001)

Au fost dezvoltate mai multe metode pentru a estima rentabilitățile anormale. În literatură cele mai folosite modele pentru compararea rentabilităților anormale sunt modelul de piață, Capital Asset Princing Model și modelele factoriale Fama French. Ca prim model pentru estimarea rentabilităților așteptate voi utiliza modelul de piață redat prin următoarea ecuație:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

Unde R_{it} este rentabilitatea logaritmică a prețului acțiunii băncii i la momentul t, α_i este constanta, β_i reprezintă panta, R_{mt} este rentabilitatea portofoliului de piață la momentul t, iar ε_{it} reprezintă reziduurile (rentabilitatea specifică firmei), care presupunem că sunt independente, distribuite identic (iid). Ca portofoliu de piață voi folosi indicele Euro STOXX50.

Prin ipoteze inerente structurii modelului de piață, rentabilitatea specifică întreprinderii este independentă de piața globală și are o valoare așteptată egală cu zero. Prin urmare, rentabilitatea așteptată în ziua evenimentului, condiționată de rentabilitatea pieței este:

$$E(R_0|R_{m0}) = \alpha_i + \beta_i R_{m0} \quad (2)$$

Ajustarea rentabilității observate prin scăderea rentabilității așteptate generează rentabilitatea anormală. Rentabilitatea anormală pentru fiecare țară i la momentul t va fi determinată în baza ecuației:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (3)$$

Unde AR_{it} este rentabilitatea anormală a băncii *i* la momentul *t*. Dacă rentabilitatea anormală este pozitivă înseamnă că valoarea reală este mai mare decât cea previzionată, adică investitorii reacționează în mod pozitiv, iar valoarea de piață a băncii a crescut. Dacă rentabilitatea anormală este negativă înseamnă că valoarea reală este mai mică decât cea previzionată, adică investitorii reacționează în mod negativ, iar valoarea de piață a băncii a scăzut.

Pornind de la metodologia folosită de Alin Marius Andrieș, Simona Nistor, Steven Ongenac și Nicu Sprincean în articolul „On Becoming an O-SII" (2019) voi utiliza un al doilea model, modelul CAPM propus de Bekaert și colab. (2009). Acest model ia în considerare problema integrării piețelor, folosind simultan 2 factori, unul global si unul regional. Pentru că am folosit un eșantion ce cuprinde țări din Europa, voi proceda într-o manieră asemănătoare cu cea aplicată în articolul menționat anterior și voi folosi indicele global MSCI, indicele regional Euro STOXX 50 în următoarea ecuație:

$$R_{it} - r_{ft} = \alpha_i + \beta_i\left(R_{mt_1} - r_{ft}\right) + \delta_i\left(R_{mt_2} - r_{ft}\right) + \varepsilon_{it} \quad (4)$$

Unde $R_{it} - r_{ft}$ este rentabilitatea în exces a băncii *i* la momentul *t*, α_i este constanta, $R_{mt_1} - r_{ft}$ este rentabilitatea în exces a indicelui global MSCI la momentul *t*, $R_{mt_2} - r_{ft}$ este rentabilitatea în exces a indicelui regional STOXX 50, r_{ft} este rata fără risc, iar ε_{it} reprezintă reziduurile, care presupunem că sunt independente, distribuite identic, cu media zero și o varianță constantă. Pentru rata fără risc am folosit 1M EURIBOR.

Pentru a calcula rentabilitățile anormale voi folosi ecuația:

$$AR_{it} = R_{it} - r_{ft} - \left[\alpha_i + \beta_i\left(R_{mt_1} - r_{ft}\right) + \delta_i\left(R_{mt_2} - r_{ft}\right)\right], \quad (5)$$

unde AR_{it} este rentabilitatea anormală a băncii *i* la momentul *t*.

Urmărind în continuare metodologia, voi calcula media rentabilităților anormale (AAR), rentabilitățile anormale cumulate (CAR), și rentabilităților anormale cumulate medii (CAAR). Conform Brown și Warner (1985), voi calcula media rentabilităților anormale după formula:

$$AAR_T = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \quad (6)$$

Precum Morgan și colab. (2014) însumez toate rentabilitățile anormale obținute în orice interval în fereastra de eveniment ($[t_1; t_2]$) pentru a obține rentabilitățile anormale cumulate folosind următoarea formulă:

$$CAR_i\ [t_1; t_2] = \sum_{t=t_1}^{t_2} AR_{it} \quad (7)$$

Mai departe voi calcula rentabilităților anormale cumulate medii folosind formula propusă de MacKinlay (1997):

$$CAAR\ [t_1; t_2] = \sum_{t=t_1}^{t_2} AAR_t \quad (8)$$

Studiul de eveniment este efectuat cu o fereastră de estimare anterioară evenimentului de 250 de zile de tranzacționare, mai exact [-11; -260], unde $T = 0$ este ziua evenimentului. MacKinlay (1997) subliniază faptul că acest interval este suficient pentru realizarea unui studiu de eveniment în care sunt folosite date zilnice. Pentru a măsura performanțele anormale voi considera mai multe seturi ca și ferestre de eveniment. Voi stabili următoarele ferestre pentru a reda atât efectele imediate: [-1; 1], [-3; 3], [-5; 5], [0; 0], cât și schimbările produse în urma evenimentului: [1; 1], [1; 5].

2.3 Testarea semnificației statistice

Cele mai vechi studii de evenimente au folosit doar metode grafice de raportare a rezultatelor. Drept exemplu, Fama, Fisher, Jensen și Roll (1969) nu a efectuat teste statistice de semnificaţie; au fost raportate numai statistici descriptive. Cu toate că metodele grafice continuă să rămână utile în raportarea rezultatelor, testele statistice adecvate au devenit pilonul principal în metodologia studiilor de eveniment. Cu toate acestea, alegerea procedurilor de testare statistică variază de la studiu la studiu. Sunt disponibile mai multe metode pentru testarea semnificației statistice a rentabilităților anormale. Studiile anterioare au testat CAR-urile folosind testul t, definit ca rentabilitatea anormală (sau rentabilitatea anormală cumulată) împărțită la deviația standard. Am procedat în mod similar pentru testarea rezultatelor și am folosit testul t.

2.4 Indici instituționali și de reglementare

Deoarece studiul de caz are două direcții, prima include efectele pandemiei asupra rentabilității prețurilor acțiunilor băncilor, a doua combină rentabilitățile prețurilor bursiere cu date disponibile la nivel global referitoare la reglementare. Pentru o înțelegere mai bună a rezultatelor și a implicațiilor reglementării, analizăm în cross-section variațiile rentabilităților. Interesul se manifestă atât asupra răspunsului agregat al prețurilor bursiere la impactul provocat de un anumit anunț, cât și asupra efectelor diferențiate la nivelul băncilor, ce prezintă caracteristici diferite.

Pentru a identifica diferențele dintre bănci, am folosit măsurile reglementării și supravegherii bancare puse la dispoziția publicului larg într-o bază de date realizată prin intermediul chestionarului condus de Barth, Caprio, Jr. și Levine (2012).

Indicii folosiți în studiul de față sunt:

- Restricții generale cu privire la activitățile bancare - aceste restricții se referă la activități de tranzacționare cu valori mobiliare, activități în domeniul imobiliar, activități din domeniul asigurărilor. Valori mai ridicate ale acestei măsuri indică restricții mai mari.
- Puterea supravegherii – măsoară dacă autoritățile de supraveghere au autoritatea de a întreprinde acțiuni specifice pentru prevenirea și corectarea problemelor. Valori mai mari indică o putere de supraveghere mai mare.
- Stringența generală a capitalului – măsoară dacă cerințele de capital reflectă anumite elemente de risc și deduc anumite pierderi din valoarea de piață din capital înainte de a se determina adecvarea minimă a capitalului. O valoare mai mare indică o stringență mai mare.

Pentru a compara țările cu diferite caracteristici, le-am grupat în câte două subgrupe după mediană, pentru fiecare măsură, având în final 6 grupe: țări cu restricții de activitate reduse, țări cu restricții de activitate ridicate, țări cu putere de supraveghere redusă, țări cu putere de supraveghere ridicată, țări cu stringență a capitalului redusă, țări cu stringență a capitalului ridicată.

Tabel 2. Indici de reglementare și supraveghere

Tabelul raportează principalele valori ale indicilor de reglementare și supraveghere bancară în funcție de țară furnizați de World Bank (Bank Regulation and Supervision Survey). Prima coloană raportează țara la care fac referire indicii, a doua coloană prezintă indicele restricțiilor de activitate, a treia coloană raportează puterea de supraveghere, iar a patra coloană raportează indicele de stringență a capitalului.

Țară	Indicele restricțiilor de activitate	Indicele puterii de supraveghere	Indicele de stringență a capitalului
Austria	4	12	2
Belgia	5	11	5
Bulgaria	5	11	6
Cipru	7	11	6
Cehia	n.a.	n.a.	n.a.
Danemarca	7	11	4
Finlanda	5	5	5
Franța	8	10	6
Germania	n.a.	11	6
Grecia	6	8	6
Ungaria	5	13	2
Irlanda	4	6	7
Italia	7	13	5
Malta	8	12	6
Olanda	5	11	6
Polonia	11	11	6
Portugalia	5	12	2
Romania	4	12	6
Slovenia	6	14	5
Spania	5	9	6
Suedia	n.a.	n.a.	n.a.

2.5 Grupările după capacitatea fiscală

În ceea ce privește capacitatea fiscală, am ales să împart țările după două criterii: zona euro și regiunea din care fac parte. În prezent, 19 din cele 27 fac parte din zona euro. Din studiul nostru fac parte din zona euro: Austria; Belgia; Cipru; Finlanda; Franța; Germania; Grecia; Irlanda; Italia; Malta; Olanda; Portugalia; Slovenia; Spania. Țările care nu fac parte din această categorie sunt: Bulgaria; Cehia; Danemarca; Polonia; România; Suedia; Ungaria. Prin urmare băncile vor face parte din una din aceste subgrupe, în funcție de țara de care aparțin.

În teoria sistemelor mondiale țările pot fi grupate în două mari grupe, țări centrale și țări periferice sau semiperiferice. Țările centrale sunt țări puternic industrializate de care depind țările periferice și semiperiferice. Din categoria țărilor centrale din studiul de față fac parte conform Chase-Dunn, Kawano, Brewer (2000): Austria; Belgia;

Danemarca; Finlanda; Franța; Germania; Irlanda; Italia; Olanda; Portugalia; Spania; Suedia, iar din categoria țărilor periferice și semiperiferice fac parte: Bulgaria; Cehia; Cipru; Grecia; Malta; Polonia; România; Slovenia; Ungaria.

3. Rezultate

3.1 Statistici descriptive

Statisticile descriptive arată o rentabilitate medie a băncilor pe întreaga perioadă de -0,12% cu cea mai mică rentabilitate înregistrată de -25,18% și maximul de 27,41% și o deviație standard de 0,0319. Tabelul 3 prezintă statisticile descriptive pentru perioada dinaintea anunțului oficial al pandemiei la nivel global și pentru perioada de după anunț. Se poate observa că rentabilitatea medie înainte de anunț este -0,0686%, iar după este 0,0514. Deși rentabilitatea medie a crescut, se poate vedea o creștere a deviației standard, de la 0,0257 la 0,0368, cee ce înseamnă o creștere a riscului. Se poate observa că valoarea minimă înainte de anunț este -25,60%, iar după anunț este -251,80%, iar valoarea maximă înainte de anunț este 274,08%, iar după anunț este 83,41%.

Tabel 3. Statistici descriptive pentru întregul eșantion

Tabelul raportează statistici descriptive pentru rentabilitățile zilnice ale acțiunilor băncilor cuprinse în acest studiu.

Variable	Obs	Mean	Std. Dev.	Min	Max
Rentabilitate	72,877	-0.0001204	0.0318725	-2.517979	2.74084

Tabel 4. Statistici descriptive înainte și după anunțarea evenimentului

Tabelul raportează statistici descriptive pentru rentabilitățile zilnice ale acțiunilor băncilor cuprinse în acest studiu după variabila dummy eveniment_covid. Variabila ia valoarea 0 pentru perioada înainte de anunțul oficial al pandemiei și valoarea 1 pentru ziua evenimentului și perioada următoare.

Eveniment-Covid	N	Mean	SD	Min	Max
0	35576	-0.0007855	0.0257462	-0.2560339	2.74084
1	37301	0.000514	0.0367675	-2.517979	0.8341331
Diferența rentabilităților după vs. înaintea evenimentului Covid		-0.0012995	0.0002362		
p-value		0.0000			

3.2 Rentabilități anormale cumulate agregate

În acest subcapitol voi prezenta rentabilitățile normale cumulate agregate pentru toate cele 141 de bănci. Voi prezenta în paralel rezultatele pentru rentabilitățile anormale calculate prin modelul de piață, dar și pentru cele calculate prin CAPM.

Tabel 5. Rentabilitățile anormale cumulate agregate
Acest tabel raportează rentabilitățile anormale cumulate agregate și valoarea p-value aferentă pentru fiecare fereastră de timp. Pe coloană se pot vedea cele șase ferestre de timp pentru care au fost calculate rentabilitățile cumulate.

	CAAR (-1,1)	CAAR (-3,3)	CAAR (-5,5)	CAAR (0,0)	CAAR (1,1)	CAAR (1,5)
CAAR (model MM)	-0.0513***	-0.1236***	-0.1612***	-0.0120***	-0.0474***	-0.0903***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAAR (model CAPM)	-0.0464***	-0.1081***	-0.1465***	-0.0013	-0.0429***	-0.0782***
	0.0000	0.0000	0.0000	0.5207	0.0000	0.0000

CAAR-urile sunt utile pentru studierea efectului agregat al rentabilităților anormale asupra întregului eșantion sau sub-eșantioane. Tabelul 3 prezintă rentabilitățile anormale medii cumulate ale prețurilor acțiunilor, împreună cu valorile p-value asociate, utilizate pentru a evalua semnificația pentru întregul eșantion. CAAR-urile sunt prezentate pe cele șase ferestre de timp, pentru care am calculat rentabilitățile anormale: [-1; 1], [-3; 3], [-5; 5], [0; 0], [1;1] și [1; 5]. CAAR-urile [0; 0] și [1; 1] sunt rentabilitățile anormale medii în ziua evenimentului și, respectiv, la o zi după eveniment.

În toate ferestrele de timp analizate, inclusiv în timpul datei oficiale (11 martie 2020) la care a fost anunțată pandemia globala de coronavirus, piața financiară a reacționat în mod negativ, indicând un comportament pesimist al investitorilor. Acest aspect rezultă din semnul negativ al rentabilităților. Rentabilitățile anormale negative sunt semnificative pentru toate intervalele. Aceste rezultate sunt valabile atât pentru rentabilitățile anormale calculate prin modelul de piață, cât și pentru cele calculate prin modelul CAPM cu 2 factori. Rentabilitațile anormale sunt similare pentru ambele metode de calcul.

Rezultatele empirice arată că anunțarea oficială a pandemiei la nivel global a generat un „efect de stigmatizare” atât înainte de eveniment, cât și în ziua evenimentului și după anunțul oficial. Participanții de pe piață au perceput acest

eveniment ca fiind unul nociv pentru bănci, iar prin urmare, a scăzut averea investitorilor. Aceștia nu au avut o reacție negativă doar în ziua evenimentului, ci au și anticipat acest eveniment, lucru care ar putea fi cauzat de creșterea îngrijorătoare a numărului de îmbolnăviri cu noul coronavirus la nivel global.

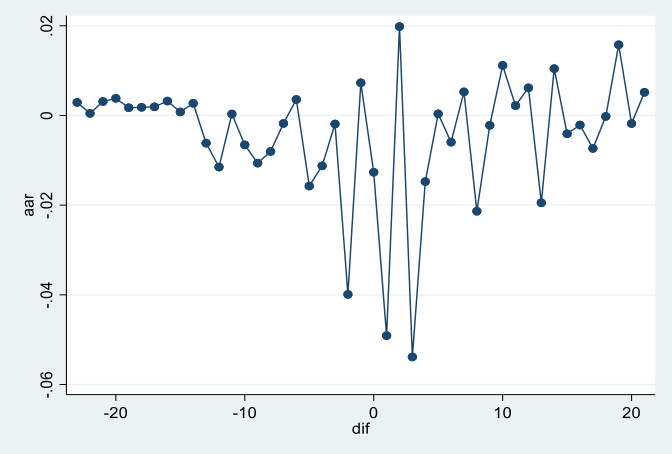

Figura 1. Rentabilitățile anormale medii

Figura prezintă evoluția rentabilității anormale medii pe o fereastră de timp de [-20; 20], ziua 0 fiind ziua anunțului oficial al pandemiei de coronavirus. Rentabilitățile anormale sunt calculate prin modelul de piață.

Din figura de mai sus se poate observa o creștere a volatilității rentabilităților anormale medii în jurul zilei 0. Mai putem observa că înainte de 25 februarie, rentabilitățile anormale medii fluctuează în jurul lui 0, iar după această dată începe să crească volatilitatea, atingând o volatilitate extremă în jurul anunțului oficial. Fluctuațiile care încep după data de 25 februarie pot fi asociate cu anunțul făcut de Centrul pentru Prevenirea și Controlul Bolilor în care explică ce înseamnă o pandemie și faptul că epidemia de COVID-19 se îndreaptă în acea direcție.

3.3 Comparații între rentabilitățile anormale cumulate agregate la nivel de țară

Deoarece am ales să rrealizez acest studiu pentru țările din Uniunea Europeană, o comparație între fiecare țară nu este doar posibilă, dar reprezintă un aspect de interes și oferă o perspectivă asupra reacției investitorilor pentru fiecare piață.

Tabel 6. Rentabilitățile anormale cumulate pentru fiecare țară calculate prin modelul de piață

Tabelul raportează rentabilitățile anormale cumulate pentru fiecare țară pentru toate cele șase ferestre de timp. [2]

	CAAR (-1,1)	CAAR (-3,3)	CAAR (-5,5)	CAAR (0,0)	CAAR (1,1)	CAAR (1,5)
Austria	-0.0668***	-0.1550***	-0.2715***	-0.0254***	-0.0489***	-0.2094***
	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
Belgia	-0.0114	-0.1088***	-0.0092	0.0122	-0.0629***	-0.0889***
	0.6088	0.0049	0.8404	0.2616	0.0000	0.0023
Bulgaria	-0.1422***	-0.4482***	-0.5632***	-0.0160	-0.1305***	-0.3653***
	0.0003	0.0000	0.0000	0.4008	0.0000	0.0000
Cehia	-0.0559***	-0.1890***	-0.3550***	-0.0166*	-0.0437***	-0.2986***
	0.0018	0.0000	0.0000	0.0551	0.0003	0.0000
Cipru	-0.0658**	-0.3317***	-0.4024***	0.0163	-0.0872***	-0.2692***
	0.0324	0.0000	0.0000	0.2736	0.0000	0.0000
Danemarca	-0.0534***	-0.1143***	-0.1380***	-0.0116**	-0.0426***	-0.0806***
	0.0000	0.0000	0.0000	0.0401	0.0000	0.0000
Finlanda	-0.1348***	-0.2322***	-0.2707***	-0.0485***	-0.0700***	-0.1358***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Franta	-0.0657***	-0.2142***	-0.2276***	-0.0065	-0.0686***	-0.1355***
	0.0000	0.0000	0.0000	0.1987	0.0000	0.0000
Germania	-0.0239	-0.0443	-0.0883***	-0.0060	-0.0291***	-0.0616***
	0.1442	0.1162	0.0090	0.4483	0.0088	0.0040
Grecia	0.0690	-0.0895	-0.2218	-0.0590*	0.0193	-0.0898
	0.3465	0.4776	0.1412	0.0982	0.6955	0.3462
Irlanda	0.0901**	0.0014	-0.2330***	0.0205	0.0153	-0.2461***
	0.0226	0.9835	0.0042	0.2849	0.5633	0.0000
Italia	-0.0359*	-0.0023	-0.0542	0.0188**	-0.0294**	0.0391
	0.0642	0.9456	0.1725	0.0461	0.0247	0.1202
Malta	-0.0352	-0.0432	-0.1405**	0.0058	-0.0314*	-0.1139***
	0.1887	0.3481	0.0112	0.6551	0.0830	0.0012
Olanda	-0.0484***	-0.1364***	-0.1540***	0.0001	-0.0444***	-0.1113***
	0.0002	0.0000	0.0000	0.9842	0.0000	0.0000
Polonia	-0.1428***	-0.2155***	-0.1644***	-0.0618***	-0.0971***	-0.0229
	0.0000	0.0000	0.0006	0.0000	0.0000	0.4439
Portugalia	0.1302***	0.0159	-0.0137	0.0004	0.0675***	0.0388
	0.0002	0.7853	0.8451	0.9796	0.0036	0.3815
Romania	-0.0607***	-0.1612***	-0.1922***	-0.0464***	-0.0349***	-0.0873***
	0.0005	0.0000	0.0000	0.0000	0.0028	0.0001
Spania	-0.0276	-0.1001**	-0.1346***	0.0198*	-0.0475***	-0.1093***
	0.2249	0.0110	0.0042	0.0738	0.0022	0.0003
Slovenia	-0.1018***	-0.3029***	-0.3381***	-0.0221**	-0.0997***	-0.2310***
	0.0000	0.0000	0.0000	0.0499	0.0000	0.0000
Suedia	-0.0650***	-0.1026***	-0.1502***	-0.0038	-0.0587***	-0.1380***
	0.0009	0.0022	0.0002	0.6819	0.0000	0.0000
Ungaria	-0.1845***	-0.2970***	-0.3472***	-0.0960***	-0.1050***	-0.2027***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

[2] Pentru același eșantion am rulat modelul CAPM hibrid și am obținut rezultate similare.

Piețele din Austria, Cehia, Cipru, Danemarca, Finlanda, România, Slovenia și Ungaria prezintă rentabilități anormale cumulate negative pe toate ferestrele, ceea ce înseamnă că investitorii de pe aceste piețe au reacționat negativ. Pe piața din Belgia CAAR-urile sunt negative, dar pe ferestrele [-1;1], [-5;5], [0;0] nu sunt semnificative. Atât pentru Bulgaria, cât și pentru Franța rezultatele sunt negative și semnificative, mai puțin pentru ziua evenimentului, iar pentru Germania rezultatele sunt negative, dar nesemnificative pe [-1; 1], [-3; 3], [0; 0]. Grecia are un singur rezultat semnificativ, în ziua evenimentului, iar acesta este negativ. Irlanda are rentabilități anormale cumulate pozitive, dar din acestea doar pe fereastra [-1; 1] CAR este pozitivă. Pe [-3; 3] și [0; 0] rentabilitățile sunt tot pozitive, dar nesemnificative. Pe piața din Italia pe fereastra [0; 0] CAR este pozitivă și semnificativă, iar acest lucru înseamnă că investitorii au avut o reacție pozitivă în ziua evenimentului. Malta și Olanda prezintă CAR pozitiv în ziua evenimentului, dar acestea nu sunt semnificative. Polonia are rezultate negative și semnificative, mai puțin pe ultima fereastră, iar în Suedia CAR este negativă și semnificativă pe toate ferestrele cu excepție în ziua evenimentului. Și pentru Portugalia există reacții pozitive și semnificative pe [-1; 1] și [1; 1]. Pe piața din Spania în ziua evenimentului CAR este pozitivă și semificativă, iar pe restul ferestrelor CAR este negativă.

3.4 Comparații între rentabilitățile anormale cumulate agregate după capacitatea fiscală

În ceea ce privește capacitatea fiscală, am ales să împart țările după două criterii: zona euro și regiunea din care fac parte. Zona euro este formată din statele membre UE, care au ca și monedă oficială euro (EUR). În teoria sistemelor mondiale țările pot fi grupate în două mari grupe, țări centrale și țări periferice sau semiperiferice. Țările centrale sunt țări puternic industrializate de care depind țările periferice și semiperiferice.

Tabel 7. Rentabilitățile anormale cumulate agregate după capacitatea fiscală, calculate prin modelul de piață

Tabelul raportează rentabilitățile anormale cumulate pentru subgrupe împărțite după 2 criterii: țări din zona euro/țări din afara zonei euro și țări centrale/țări periferice. Pe coloane sunt prezentate rezultatele pe fiecare fereastră de eveniment. Modelul de estimare al rentabilităților anormale este modelul de piață. [3]

	CAAR (-1,1)	CAAR (-3,3)	CAAR (-5,5)	CAAR (0,0)	CAAR (1,1)	CAAR (1,5)
Euro vs. Non-euro						
Țări din zona euro	-0.0220*	-0.1216***	-0.1798***	-0.0053	-0.0356***	-0.1214***
	0.0644	0.0000	0.0000	0.3614	0.0000	0.0000
Țări din afara zonei euro	-0.1003***	-0.2176***	-0.2725***	-0.0360***	-0.0730***	-0.1704***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Diferența (țări din zona euro-țări din afara zonei euro)	-0.0491***	-0.0488**	-0.0159	-0.0239***	-0.0229**	-0.0056
	0.0008	0.0397	0.5840	0.0002	0.0216	0.8179
Țări centrale vs. țări periferice						
Țări centrale	-0.0252**	-0.0976***	-0.1434***	-0.0025	-0.0342***	-0.1021***
	0.0361	0.0000	0.0000	0.6687	0.0000	0.0000
Țări periferice	-0.0808***	-0.2327***	-0.3045***	-0.0328***	-0.0686***	-0.1878***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Diferența (Țări centrale-Țări periferice)	-0.0331*	-0.0948***	-0.0947***	-0.0430***	-0.0197*	-0.0284
	0.0525	0.0004	0.0039	0.0000	0.0874	0.3091

Se poate observa din Tabelul 7 că pe termen scurt există diferențe semnificative între rentabilitățile anormale cumulate pentru băncile din țări din zona euro și cele ale băncilor din țări din afara zonei euro. Diferențele sunt semnificative pe toate ferestrele, mai puțin pe [-5; 5] și [1; 5]. Rentabilitățile anormale cumulate sunt mai puternic

[3] Folosind aceleași grupări, am rulat modelul CAPM hibrid și am obținut rezultate similare.

negative pentru băncile din țări din afara zonei euro. Acest lucru se poate datora faptului că pentru țările din zona euro investitorii se așteaptă ca băncile să primească un sprijin mai puternic din partea Băncii Centrale Europene comparativ cu băncile din zona non-euro. Faptul că pe fereastra [1; 5] diferența nu mai este semnificativă, înseamnă că pe termen lung investitorii reacționează similar, indiferent de apartenența băncii la o țară din zona euro sau din afara ei.

Și referitor la regiunea din care țările fac parte se pot observa diferențe semnificative, băncile din țări periferice sau semiperiferice având rentabilități anormale mai puternic negative decât cele din țări centrale. Cu toate acestea pe termen mai lung nu mai există diferențe semnificative între băncile din cele două regiuni.

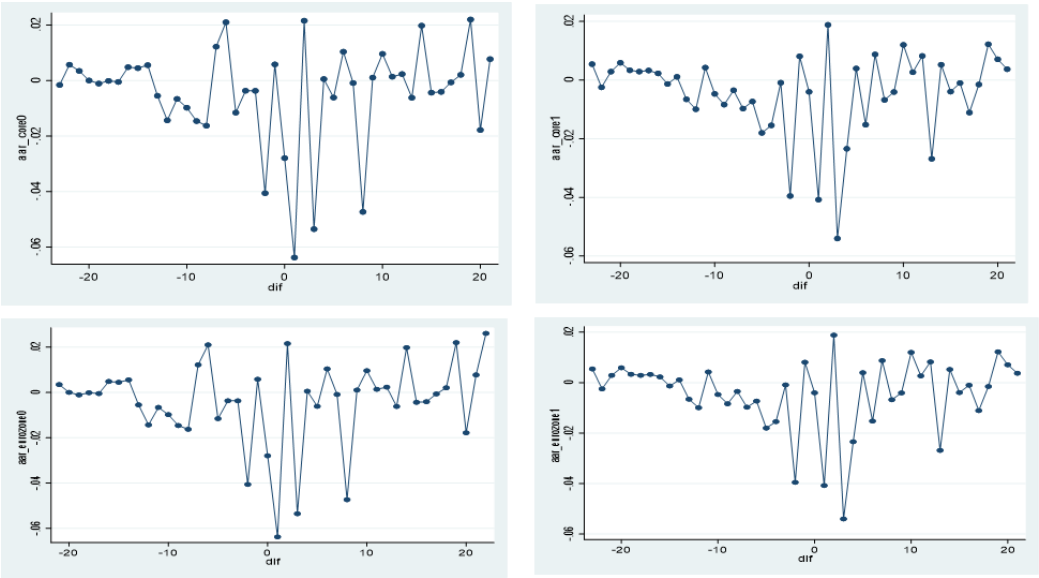

Figura 2. Rentabilitățile anormale medii după regiune respectiv după apartenența la zona euro

Figura prezintă evoluția rentabilităților anormale medii pe o fereastră de timp de [-20; 20], ziua 0 fiind ziua anunțului oficial al pandemiei de coronavirus. În partea de sus sunt rentabilitățile anormale medii pentru țările periferice respectiv pentru țările centrale. În partea de jos sunt rentabilitățile anormale medii pentru țările din afara zonei euro, respectiv pentru țările din zona euro. Rentabilitățile anormale sunt calculate prin modelul de piață.

În graficele de mai sus se pot vedea rentabilitățile anormale medii pentru bănci din regiunea centrală, respectiv pentru bănci din țări periferice sau semiperiferice. Se poate observa o volatilitate mai ridicată pe o perioadă mai lungă pentru rentabilitățile anormale ale băncilor din țările periferice și semiperiferice față de țările centrale. În cazul băncilor din țări din afara zonei euro și respectiv din țări din zona euro, se observă un comportament similar cu cel descris anterior.

3.5 Rentabilitățile anormale în funcție de cadrul de reglementare și supraveghere

Pentru a identifica diferențele băncilor, am folosit măsurile reglementării și supravegherii bancare puse la dispoziția publicului larg într-o bază de date realizată prin intermediul chestionarului condus de Barth, Caprio, Jr. și Levine (2012).

Indicii folosiți în studiul de față sunt:

- Restricții generale cu privire la activitățile bancare - aceste restricții se referă la activități de tranzacționare cu valori mobiliare, activități în domeniul imobiliar, activități din domeniul asigurărilor. Valori mai ridicate ale acestei măsuri indică restricții mai mari.
- Puterea supravegherii – măsoară dacă autoritățile de supraveghere au autoritatea de a întreprinde acțiuni specifice pentru prevenirea și corectarea problemelor. Valori mai mari indică o putere de supraveghere mai mare.
- Stringența generală a capitalului – măsoară dacă cerința de capital reflectă anumite elemente de risc și deduce anumite pierderi din valoarea de piață din capital înainte de a se determina cerința minimă a capitalului. O valoare mai mare indică o stringență mai mare.

Tabel 8. Rentabilitățile anormale agregate după reglementare, calculate prin modelul de piață

Tabelul raportează rentabilitățile anormale cumulate pentru subgrupe împărțite după mediana fiecărui indice. Primele două linii se referă la restricțiile de activitate, următoarele două se referă la puterea de supraveghere, iar ultimele la stringența capitalului. Pe coloane sunt prezentate rezultatele pe fiecare fereastră de eveniment. Modelul de estimare al rentabilităților anormale este modelul de piață.[4]

	CAAR (-1,1)	CAAR (-3,3)	CAAR (-5,5)	CAAR (0,0)	CAAR (1,1)	CAAR (1,5)
Restricții de activitate						
Restricții de activitate reduse	-0.0438***	-0.1584***	-0.2155***	-0.0180***	-0.0445***	-0.1495***
	0.0004	0.0000	0.0000	0.0027	0.0000	0.0000
Restricții de activitate ridicate	-0.0500***	-0.1523***	-0.2103***	-0.0142***	-0.0500***	-0.1249***
	0.0000	0.0000	0.0000	0.0074	0.0000	0.0000

[4] Folozind modelul CAPM am obținut rezultate similare.

Diferența (restricții de activitate ridicate-restricții de activitate reduse)	-0.0036	-0.0274	-0.0610**	0.0010	-0.0024	-0.0889***
	0.8112	0.2542	0.0358	0.8800	0.8176	0.0002
Puterea de supraveghere						
Putere de supravhegh here redusă	-0.0454***	-0.1674***	-0.2152***	-0.0117**	-0.0529***	-0.1417***
	0.0001	0.0000	0.0000	0.0410	0.0000	0.0000
Putere de supravegh ere ridicată	-0.0472***	-0.1245***	-0.1784***	-0.0221***	-0.0370***	-0.1009***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Diferența (putere de supravegh ere ridicată-putere de supravegh ere redusă)	-0.0037	-0.0617***	-0.0522*	-0.0077	-0.0142	-0.0535**
	0.8027	0.0082	0.0673	0.2328	0.1522	0.0250
Stringența capitalului						
Stringența capitalului redusă	-0.0539***	-0.1619***	-0.2036***	-0.0181***	-0.0508***	-0.1220***
	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
Stringența capitalului ridicată	0.0901**	0.0014	-0.2330***	0.0205	0.0153	-0.2461***
	0.0226	0.9835	0.0042	0.2849	0.5633	0.0000
Diferența (stringența capitalului ridicată-stringența capitalului redusă)	-0.1478***	-0.1342*	0.0633	-0.0338	-0.0658**	0.1519*
	0.0026	0.0901	0.5118	0.1182	0.0487	0.0595

Din tabelul 8 se poate observa că în cazul restricțiilor de activitate există diferențe semnificative doar pe ferestrele [-5; 5] și [1; 5], acest lucru însemnând că

investitorii reacționează puțin mai lent la anunțul oficial în ceea ce privește restricțiile de activitate. Rentabilitățile anormale cumulate sunt mai puternic negative pentru băncile cu indicele restricțiilor de activitate mai redus. Așadar investitorii au o reacție mai puțin negativă pentru băncile care activează în țările cu restricții privind activitatea mai ridicate. O posibilă explicație ar fi faptul că percep băncile din astfel de jurisdicții ca fiind mai stabile și mai puțin afectate de evenimentele neprevăzute.În ceea ce privește puterea de supraveghere, se poate observa o reacție mai puternic negativă a investitorilor pentru băncile cu indicele puterii de supraveghere mai redus. Așadar, în jurisdicțiile unde puterea de supraveghere este mai mică, investitorii reacționează mai puternic negativ, ascociind acest lucru cu o reducere a stabilității la nivel de scetor bancar și o creștere a probabilității de faliment. Se pot observa diferențe semnificative pe ferestrele [-3; 3] [-5; 5] și [1; 5]. În cazul indicelui de stringență a capitalului, există diferențe semnificative între cele două categorii de bănci pe intervalele [-1; 1], [-3; 3], [1; 1] și [1; 5]. Se poate observa cum pe ultima fereatră, [1; 5], reacția investitorilor pe piețe care au stringența capitalului mai ridicată este mult mai negativă decât a celor care investesc pe piețe cu o stringență mai redusă a cerințelor de capital, deși reacția imediată a investitorilor este una pozitivă pentru cei care investesc pe piețe cu o stringență a capitalului mai ridicată. Cântărind costurile pe o perioadă mai lungă de timp, investitorii se așteaptă la o înăsprire a cerințelor de capital în aceste țări, ceea ce implică costuri mai mari privind adecvarea capitalului și prin urmare reducerea profitabilității băncilor.

Din Figura 3 putem vedea că rentabilitățile anormale medii în cazul restricțiilor de activitate, sunt mai puternic negative pentru băncile cu restricții de activitate mai reduse, lucru desprins și din interpretarea rentabilităților anormale cumulate. În cazul puterii de supraveghere se poate observa același lucru, acela că rentabilitățile anormale medii sunt mai puternic negative la băncile cu un indice al puterii de supraveghere mai redus. Pentru ultima categorie de indici, stringența capitalului se poate observa că reacția investitorilor pe piețe care au stringența capitalului mai ridicată este mult mai negativă decât a celor care investesc pe piețe cu o stringență mai redusă a cerințelor de capital, deși reacția imediată a investitorilor este una pozitivă pentru cei care investesc pe piețe cu o stringență a capitalului mai ridicată.

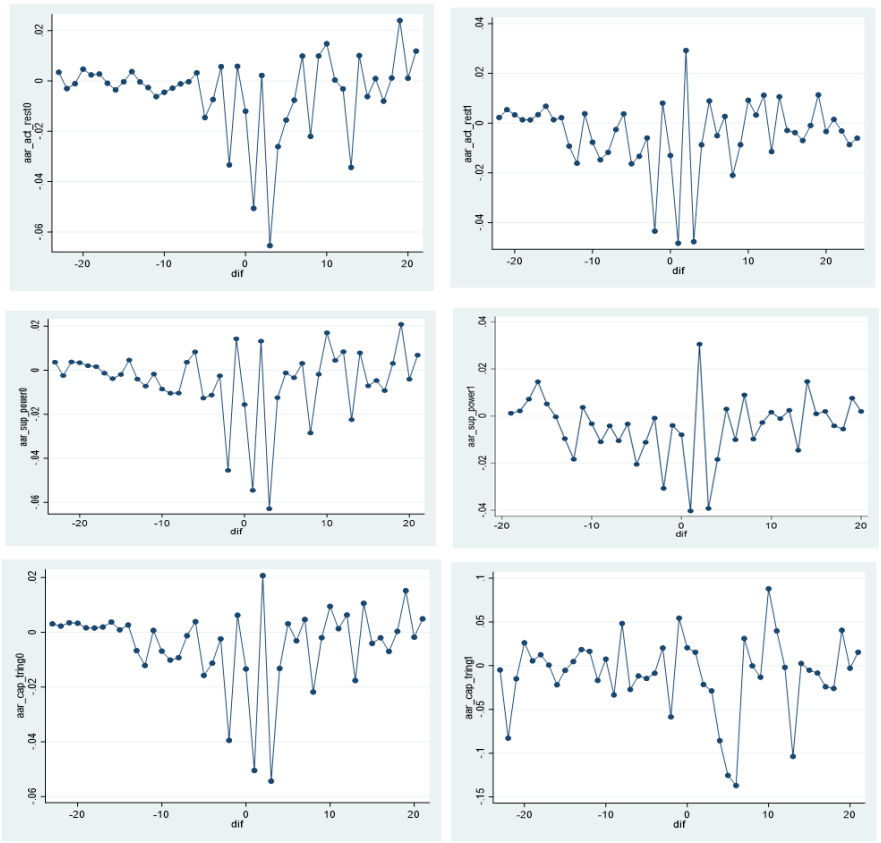

Figura 3. Rentabilitățile anormale medii după indici de reglementare și supraveghere
Figura prezintă evoluția rentabilităților anormale medii pe o fereastră de timp de [-20; 20], ziua 0 fiind ziua anunțului oficial al pandemiei de coronavirus. În partea de sus sunt rentabilitățile anormale medii pentru țările cu indicele restricțiilor de activitate scăzut, respectiv ridicat. În partea de mijloc sunt rentabilitățile anormale medii pentru țările cu indicele puterii de supraveghere scăzut, respectiv ridicat. În partea de jos sunt rentabilitățile anormale medii pentru țările cu indicele stringenței capitalului scăzut, respectiv ridicat. Rentabilitățile anormale sunt calculate prin modelul de piață.

Concluzii

În această lucrare am abordat atât ramura teoretică, cât și cea empirică, pentru a observa reacția investitorilor pe piețele de capital din Uniunea Europeană, relativ la sectorul bancar, în urma anunțului oficial al pandemiei de coronavirus la nivel global. Contextul acestui studiu este unul interesant, abordând un subiect de interes actual cu privire la dezbaterile pe tema influenței pandemiei asupra economiei.

Implicând metodologia studiului de eveniment prin măsurarea rentabilităților anormale prin două metode diferite, pentru un set de date ce cuprinde 141 de bănci din 21 de țări diferite, în concordanță cu așteptările, am descoperit că pandemia a avut un impact negativ raportat la reacția investitorilor de pe piața de capital, în sectorul bancar. Acest lucru înseamnă un impact negativ asupra sectorului bancar, ca urmare a scăderii valorii de piață a băncilor. Aceste rezultate sunt observate pentru toate cele

21 de țări abordate în acest studiu, pentru toate cele 6 subgrupe realizate în funcție de indicii de reglementare și supraveghere.

Cu toate acestea există diferențe semnificative ale amplorii impactului în funcție de reglementare, capacitatea fiscală și regiune. Investitorii de pe piețele din afara zonei euro au avut o reacție mai puternic negativă față de cei de pe piețele din zona euro. Investitorii de pe piețele periferice și semiperiferice au avut o reacție mai puternic negativă, decât cei de pe piețele centrale. Din punct de vedere al reglementării, investitorii de pe piețele cu un indice al restricțiilor de activitate mai redus, au reacționat mai puternic negativ, cei de pe piețele cu un indice al puterii de supraveghere mai redus au reacționat mai puternic negativ, iar cei de pe piețele cu un indice al stringenței capitalului mai ridicat au reacționat mai puternic negativ și cu o oarecare întârziere.

Rezultatele principale, conform cărora anunțul pandemiei a avut un impact negativ asupra sectorului bancar se mențin pe parcursul utilizării celor două metode de estimare a rentabilităților așteptate, modelul de piață și CAPM cu doi factori, unul regional și unul global.

Rezultatele acestui studiu contribuie la dezbaterea asupra efectelor pandemiei de coronavirus asupra economiei. În timp ce efectele pandemiei sunt ușor de observat și se fac din ce în ce mai resimțite la nivel macroeconomic, impactul acestei pandemii asupra sectorului bancar în cadrul pieței de capital se poate observa pe eșantionul folosit în acest studiu.

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Anexe

Anexa 1. Lista băncilor cuprinse în studiu

Țara	Banca	Țara	Banca
Austria	Addiko Bank AG	Germania	Deutsche Bank AG NA O.N.
Austria	BAWAG P.S.K.	Germania	Deutsche Pfandbriefbank AG
Austria	BKS Bank AG	Germania	Grenke N AG
Austria	Erste Group Bank AG	Germania	Merkur Bank KGaA
Austria	Oberbank AG ST	Germania	ProCredit Holding AG & Co KGaA
Austria	Raiffeisen Bank International AG	Germania	Quirin Privatbank AGÂ
Belgia	KBC Groep NV	Germania	Varengold Bank AG
Bulgaria	CB Central Cooperative Bank AD	Germania	Wirecard AG
Bulgaria	CB First Investment Bank AD	Germania	flatexDEGIRO AG
Cehia	Komercni Banka	Germania	Alpha Bank SA
Cehia	Moneta Money Bank AS	Germania	Attika Bank S.A.
Cipru	Bank Of Cyprus Holdings PCL	Grecia	Bank of Greece
Cipru	Hellenic Bnk	Grecia	Eurobank Ergasias SA
Danemarca	Alm. BrandÂ	Grecia	National Bank of Greece SAÂ
Danemarca	BankNordik P/F	Grecia	Piraeus Bank SAÂ
Danemarca	Danske Andelskassers Bank A/S	Grecia	AIB Group PLC
Danemarca	Danske Bank A/S	Grecia	Bank of Ireland Group PLCÂ
Danemarca	Den Jyske Sparekasse A/S	Irlanda	Permanent TSB Group Holdings PLC
Danemarca	Djurslands Bank	Irlanda	Banca Finnat
Danemarca	Fynske Bank A/S	Irlanda	Banca Generali
Danemarca	Hvidbjerg Bank	Italia	Banca Mediolanum SpAÂ
Danemarca	Jutlander Bank A/S	Italia	Banca Monte dei Paschi di Siena SpA
Danemarca	Jyske Bank A/S	Italia	Banca Piccolo Credito Valtellinese SpAÂ
Danemarca	Kreditbanken	Italia	Banca Popolare di Sondrio ScpA
Danemarca	Lan og Spar Bank	Italia	Banca Profilo
Danemarca	Lollands Bank	Italia	Banca Sistema SpaÂ
Danemarca	Mons Bank	Italia	Banco Bpm SpA
Danemarca	Nordfyns Bank	Italia	Banco Di Desio E Brianza
Danemarca	Ringkjoebing Landbobank A/S	Italia	Bper Banca SpA
Danemarca	Skjern Bank	Italia	Credito EmilianoÂ
Danemarca	Spar Nord Bank	Italia	FinecoBank Banca Fineco SpA
Danemarca	Sparekassen Sjaelland	Italia	Intesa Sanpaolo SpA
Danemarca	Sydbank	Italia	Mediobanca Banca di Credito Finanziario SpA
Danemarca	Totalbanken	Italia	UniCredit SpA
Danemarca	Vestjysk Bank	Italia	illimity Bank SpA
Finlanda	Aktia Bank Abp	Italia	Bank of Valletta PLC
Finlanda	Alandsbanken Abp AÂ	Italia	HSBC Bank Malta PLC
Finlanda	Evli Pankki Oyj	Malta	ABN AMRO Group NV
Finlanda	Nordea Bank Abp	Malta	ASR Nederland NVÂ
Finlanda	Oma Saastopankki Oyj	Olanda	Adyen NV
Franta	Amundi SA	Olanda	Aegon NV
Franta	BNP Paribas SA	Olanda	ING Groep NV
Franta	CRCAM Atlantique	Olanda	NIBC Holding NVÂ

	Vendee CCI		
Franta	CRCAM Brie Picardie 2 CCI	Olanda	NN Group NV
Franta	CRCAM Langued CCI	Olanda	Van Lanschot NV
Franta	CRCAM Nord CCI	Olanda	Alior Bank SA
Franta	Caisse RÃ©gionale du CrÃ©dit Agricole Alpes Provence	Olanda	BNP Paribas Bank Polska SAÂ
Franta	Crcam Ille-Vil	Polonia	Bank Handlowy w Warszawie SA
Franta	Crcam Loire Ht	Polonia	Bank Millennium SA
Franta	Crcam Morbihan	Polonia	Bank Ochrony Åšrodowiska SAÂ
Franta	Crcam Norm.Sei	Polonia	Bank Polska Kasa Opieki SAÂ
Franta	Crcam Paris Et	Polonia	Getin Noble Bank SAÂ
Franta	Crcam Sud RA	Polonia	ING Bank ÅślÄ…ski SA
Franta	Crcam TouraineÂ	Polonia	Idea Bank SA
Franta	Credit Agricole SA	Polonia	Powszechna Kasa Oszczednosci Bank Polski SA
Franta	Natixis	Polonia	Santander Bank Polska SAÂ
Franta	Rothschild & Co SCA	Polonia	mBank SAÂ
Franta	Societe Generale SAÂ	Polonia	Banco Comercial PortuguesÂ
Germania	Aareal Bank AG	Polonia	BRD Groupe Societe Generale SA
Portugalia	Banca Transilv	Spania	Unicaja Banco SA
Romania	Patria Bank SA	Suedia	Avanza Bank Holding AB
Romania	NLB DD	Suedia	Collector AB
Romania	Banco Bilbao Vizcaya Argentaria SA	Suedia	Hoist Finance ABÂ
Slovenia	Banco Santander	Suedia	Resurs Holding AB
Spania	Banco de Sabadell SA	Suedia	Skandinaviska Enskilda Banken AB A
Spania	Banco Santander	Suedia	Svenska Handelsbanken AB AÂ
Spania	Banco de Sabadell SA	Suedia	Swedbank AB ser A
Spania	Bankinter	Suedia	TF Bank AB
Spania	Caixabank SA	Ungaria	OTP Bank Nyrt
Spania	Liberbank SA	Ungaria	Takarek Mortgage Bank CO PLC
Spania	Renta 4 Banco SA		