An International Forensic Perspective of the Determinants of Bank CDS spreads*

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Abstract

Against the backdrop of the Great Recession, investigating the differences in institutional frameworks became important to explain the heterogeneity in the market perception about the credit quality and default risk of banks in different countries. Using data for 118 banks of 30 countries over the period 2004-2011, we find that an improvement of the quality of economic and legal institutions can help in reducing banks' CDS spreads, as banks operating in countries where the regulatory quality is stronger tend to be less affected by spikes in financial stress of 2008-2009. Considering a series of indicators of the financial structure of the banking system, our results reveal that more concentration of the banking sector, a stronger presence of foreign banks, a deterioration of the banking sector health or the lack of alternative means of finance is associated with higher CDS spreads of banks. We also show that the dynamics of bank CDS spreads accrue to: (i) the quality of banks' balance sheet; (ii) (il)liquidity of banks' assets; (iii) how profitable banks' operations are; and (iv) the banks' leverage ratios. Finally, higher CDS spreads of banks tend to be associated with periods of high inflation and low GDP growth.

Keywords: Bank CDS, leverage, capital requirements, liquidity, macroeconomic-, political- and institutional-factors, financial structure.
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1. Introduction

In the wake of the recent global financial crisis, understanding bank credit risk has become an important research question which some studies have addressed by mainly considering bank-level balance sheet characteristics or country-level macroeconomic factors. Yet, the role played by differences in institutional frameworks in explaining the heterogeneity in bank CDS spreads in different countries remains, to some extent, unexplored. Economic, legal and political institutions are important because poor quality of institutions can raise concerns about the ability of banks to fulfil the repayment of their debt, as well as about the mechanisms put in place in the country to enforce it. This is likely to be reflected in higher bank CDS spreads and has the potential of raising firms' financing costs, with deleterious effects on investment decisions.

The typical CDS is a credit protection contract in which the buyer pays a premium - i.e. the spread - for the insurance against the event of the borrower's (i.e. the seller's) failure to meet its debt obligations. When traded over the counter, the CDS also implies some counterparty risk, as the seller can go bankrupt during the life of the contract (Giglio, 2014).

In the case of a bank's CDS, the spread is typically considered as a measure of the market perception about the credit quality and default risk of a bank. Yet, the extent to which the bank's characteristics along with the country-level macroeconomic and financial environment, and the political and institutional frameworks in which the bank operates are reflected in banks' CDS spreads - as macro-financial and other factors are generally priced in equity premium - remains an empirical question to be explored.[1]

During the Global Financial Crisis of 2008-2009, large banks, which were considered to be 'too big to fail' and 'too important to fail', had to be rescued through government bailouts using taxpayers' money. The so called 'Great Recession' was indeed characterized by a considerable loss in output and a dramatic increase in the level of unemployment. Thus, in the aftermath of the crisis, there was a general consensus that financial stability should be enhanced in order to limit the occurrence of economic disruptions. And while it is well known that weak institutions can create the scope for banks to take excessive risks, the empirical literature has brought little focus on how country-level variation in the quality of such institutional framework affects banks' CDS spreads.

[1] Fostel and Geanakoplos (2012) provide a theoretical framework whereby financial innovation (in particular, tranching and leverage) first raises the value of the underlying asset and CDS contracts lower it afterwards. Salomão (2016) also presents a theoretical model that shows that sovereign CDS contracts increase lenders' bargaining power during debt renegotiation. Thus, in order to compensate lenders for lower expected insurance payments, countries increase the debt share repaid in renegotiation. Consequently, countries commit not to default more often, and have lower debt financing costs and higher equilibrium debt levels.

Against this backdrop, our paper addresses an important question: did the quality of country-level institutions dampen the rise in banks' CDS spreads during the financial crisis of 2008-2009? As a by-product, it also investigates how relevant bank-level characteristics, country-level macroeconomic and political factors, as well as the financial structure of the banking system, are in explaining the dynamics of bank CDS spreads.

Using a unique sample of 118 bank CDS spreads of 30 countries over the period 2004-2011 and relying on a Tobit regression and an outlier-robust Fixed-Effects estimator, our findings give support to the idea that the financial crisis of 2008-2009 was a global event (Castro, 2013): the outlier-robust Fixed-Effects estimates suggest that banks' CDS spreads in 2008-2009 were 165-514 points higher than average banks' CDS spreads over the 2004-2011 period for the full sample of countries included in the analysis.

Despite this, its impact on banks' CDS spreads is largely mitigated once we control for the quality of economic and legal institutions: our results show that, conditioning the impact of the Global Financial Crisis on the quality of economic and legal institutions, banks' CDS spreads on average would be between 262 and 702 points lower in 2008-2009. Thus, banks where the country-level quality of the regulatory framework is high tend to be less affected by spikes in financial stress such as the one that occurred during the Great Recession. Additionally, some variables characterizing the quality of political institutions - e.g. the tenure of the political system and the number of years that a cabinet has been in power - convey some relevant information about the dynamics of banks' CDS spreads.

Looking at a series of indicators of the financial structure of the banking sector, our empirical results also suggest that higher concentration of the banking sector (as proxied by the asset's share of the five largest banks) and stronger presence of foreign banks (as identified by a high share of foreign banks' assets) are associated with higher banks' CDS spreads. Similarly, a deterioration of the health of the banking system (as expressed by a fall in banks' net interest margins) or a lack of alternative means of finance is linked with higher bank CDS spreads.

We also find that bank-level characteristics are important. In particular, banks' CDS spreads display a positive and significant relationship with: (i) a deterioration of banks' asset quality; (ii) the degree of banks' leverage; and the insufficiency of regulatory capital. Finally, we show that the macroeconomic environment plays a role: periods of high inflation or low growth, as well as worsening fiscal conditions - for instance, an increase in the debt-to-GDP ratio or a fall in the budget balance (as percentage of GDP) - are typically associated with an increase in banks' CDS spreads.

The research presented in this paper contributes to the literature on credit default swaps. Using a sample of 35 developing countries, Boubakri et al. (2011) find evidence that while unconstrained presidential systems and political fragmentation raise sovereign bond spreads, higher competition for political contest, and political stability tend to reduce them. Therefore, political institutions explain a large fraction of the variations in sovereign bond spreads. Focusing on U.K. companies, Kajurova (2015) shows that leverage, liquidity, stock market returns and volatility, risk-free interest rate, and slope of term structure are important drivers of CDS spreads, but their role has changed before, during and after the financial crisis. Pires et al. (2015) investigate the determinants of U.S. and European CDS spreads via the estimation of quantile regressions. The authors show that CDS premia (especially, those for high-risk firms) can be explained by CDS illiquidity costs (as proxied by absolute bid-ask spreads), as well as implied volatility, leverage, past stock returns, profitability, put skew and ratings.[2] Focusing on five Euro area peripheral countries, Blommenstein et al. (2016) highlight that the key drivers of changes in the sovereign CDS spreads are global and EMU-related. These are, in turn, regime-dependent, as they accrue to the level of market uncertainty.

Our paper tries to complement this literature and its main contributions are threefold. First, we focus on the key effect of the quality of economic and legal institutions (i.e. the regulatory environment) as a mechanism for dampening banks' CDS spreads during the financial turmoil of 2008-2009. Second, we assess the importance of the financial structure of the banking system, i.e. the size and the concentration and the health of the banking sector, and the availability of alternative means of finance. And, third, we investigate the role played by bank-level characteristics and country-level macroeconomic, political and institutional factors in explaining the dynamics of banks' CDS spreads.

The rest of the paper is organized as follows. Section 2 looks at the related literature. Section 3 presents the econometric methodology and describes the data. Section 4 discusses the empirical results and provides the sensitivity analysis. Finally, Section 5 concludes.

2. Literature Review

In this section, we provide a summary of the research on the determinants of banks' CDS spreads and, more generally, credit quality and default risk.

An important strand of the literature looks at the role played by bank-level characteristics, such as leverage or liquidity. From a theoretical point of view, Gorton and Haubrich (1990) show that the off-balance sheet operations and loan trading activities help financial institutions escape

[2] Pereira da Silva et al. (2015) also emphasise that the willigness of CDS investors to incur on inventory risk is lower when counterparty risk and funding costs are higher, and market-wide illiquidity shocks reduce the open interest.

high capital requirements and high regulatory tax payments. Bernanke and Gertler (1995) show that pro-cyclical leverage plays a pivotal role in the amplification mechanism which transfers shocks into the real economy. Akhavein et al. (1997) find that systemically important banks that undergo a merger have the tendency to lower their capital and raise their lending operations. Fostel and Geanakoplos (2008) find that, following negative news, leveraged investors have the tendency to liquidate their assets, which can cause financial contagion. From an empirical perspective, Diamond and Rajan (2005) find evidence that bank failures have the tendency to dramatically decrease liquidity levels, thus, decreasing the already short liquidity pools. This, in turn, increases the risk of credit default and can cause contagion. Aunon-Nerin et al. (2002) highlight that leverage, along with other variables including credit ratings and stock market capitalization, have a significant explanatory power. Ericsson et al. (2009) show that leverage and volatility explain 23% of CDS spread fluctuations. Calice et al. (2013) look at liquidity spillovers in sovereign bond and CDS markets. Their findings indicate that for European countries, including Greece, Ireland and Portugal, liquidity of the sovereign CDS market has a significant time-dependent influence on sovereign credit spreads. Wu et al. (2016) show that regional contagion of sovereign credit risk is fast and spillovers of sovereign CDS spreads are driven by both global (i.e. the level of debt and investors' risk appetite) and regional factors (such as, economic fundamentals).

Another relevant body of the literature on CDS spreads emphasizes the importance on market micro-structure, and several authors look at their dynamics using high-frequency data, namely, daily frequency (Dullman and Sosinska, 2007; Alexander and Kaeck, 2008; Ismailescu and Kazemi, 2010; Alter and Schüler, 2012; Calice et al., 2012; Dieckmann and Plank, 2012; Fender et al., 2012; Gómez-Puig and Sosvilla-Rivero, 2013; Peltonen et al., 2014; Acharya et al., 2015). Yet, to be able to price macroeconomic fundamentals in the dynamics of CDS spreads, one has to rely on low-frequency data (Aizenman et al., 2013). Consequently, a key line of investigation considers the macro-financial determinants of CDS spreads through the lens of monthly (Delatte et al., 2014; Camba-Méndez et al., 2016; Galariotis et al., 2016) or quarterly data (Haugh et al., 2009; Oliveira et al., 2012; Thalassinos et al., 2014). As in our paper, other studies have relied on annual-frequency CDS data. For instance, Aizenman et al. (2013) use data for a panel of 50 countries over the period 2005-2010, and find that sovereign CDS spreads can be predicted with fiscal space variables (i.e. the debt-to-tax ratio and the deficit-to-tax ratio), as well as other macroeconomic variables. Using annual data for 21 OECD countries from 1980 to 2012, Bordon et al. (2014) confirm that there was a pronounced overpricing of sovereign bonds for Greece, Ireland, Italy, Portugal and Spain (i.e. the so-called GIIPS countries) during the

financial crisis.[3] Thalassinos (2016) also rely on low-frequency data (namely, quarterly data) over the period 2008-2013 to determine the factors responsible for the market pricing of sovereign default risk and to analyze the drivers of CDS spreads.[4]

In this context, early studies in the field suggest that the risk-free rate and the yield spread are significant drivers of the CDS spread or, more generally, default risk in the financial markets (Fama, 1984; Estrella and Hardouvelis, 1991; Friedman and Kuttner, 1992). Some studies also looked at the impact of volatility on credit spreads (Benkert, 2004) or re-assessed the role played by bond yields (Hull et al., 2004). Mellios and Paget-Blanc (2006) focus on the debt-to-GDP ratio and highlight that if public debt comprises a large share of GDP, then, the higher this ratio, the higher the probability of a liquidity crisis. In addition, high inflation induces an increase in credit risk.[5] Asset market activity can also be represented by relevant variables, such as the house price and the stock price, which may ultimately impact on bank CDS spreads (Benbouzid and Mallick, 2013).[6] Castro (2013) also shows that bank credit risk is significantly affected by the macroeconomic environment, and Kim et al. (2015) find that while good macroeconomic news from major economies (i.e. China, the Eurozone and the U.S.) lead to a fall in sovereign CDS spreads, bad news have the opposite impact.

Following the failure of big players in the chain of insurance companies, such as AIG, Bear Sterns and Lehman Brothers, a new stream of research has emerged linking the CDS market to systemic stability. This has highlighted that political stability is closely related to financial market stability, as countries with a stable political environment typically have a more robust regulatory framework to supervise banks, which, in turn, reduces the likelihood of spikes in credit risk and, hence, reduces the default probability and the CDS spreads. In this context, Boubakri et al. (2012) find evidence corroborating the existence of a positive effect of the establishment of a political connection on firms' performance and risk-taking, as access to credit becomes easier.

[3] Related studies like the work of Silvia et al. (2007) also rely on annual data over the period 1975-2002 to show that an increase of public debt and a deterioration of the fiscal balance lead to a rise in long-term interest rates. Gartner et al. (2011) use annual data for 26 OECD countries over the period 1999-2010 to illustrate that the Global Financial Crisis has changed the role of macroeconomic fundamentals in explaining the dynamics of sovereign risk. Bernoth et al. (2012) make use of annual data for 14 EU countries covering the period 1993-2005, and find that the debt ratio, the deficit ratio and the debt-service ratio explain the yield differentials between Euro and US dollar' denominated government bonds.

[4] Even some bank-level characteristics (such as capital ratios, liquidity ratios, asset quality ratios or operations ratios) - which are key determinants of banks' CDS spreads can be retrieved from financial statements and banks' balance sheets -, are only available at a low-frequency. For example, Fontana and Scheicher (2010) show that sizable heterogeneity across Eurozone CDS markets in the difference between CDS spreads and the spreads on the underlying government bonds can be explained by limits to arbitrage and slow moving capital.

[5] For an empirical assessment of the reaction of monetary policy to changes in financial conditions, see Castro (2011).

[6] For instance, Kanagaretnam et al. (2016) show that one of the main risks for U.S. bank holding corporations (BHCs) during the Global Financial Crisis (GFC) was real estate risk, so credit risk was higher for BHCs with more real estate loans.

Boubakri et al. (2013) also show that political institutions have an important impact on corporate decision-making. In particular, sound political institutions are positively linked with corporate risk-taking and close ties to the government favour riskier investments. Liu et al. (2016) uncover a positive link between CDS spreads and explicit deposit insurance systems and Benbouzid et al. (2017) highlight the importance of country-level financial structures in explaining bank-level CDS spreads. More specifically, the authors show that bank-level credit risk is positively associated with country-level financial depth and negatively linked with country-level financial stability. No significant relationship exists between country-level financial access and efficiency and bank-level CDS spreads.

3. Econometric Methodology and Data

We investigate the main determinants of banks' credit default swaps by estimating the following equation:

$$CDS_{i,j,t} = \mathbf{B}'_{i,j,t}\Gamma + \mathbf{M}'_{i,t}\beta + \mathbf{FS}'_{i,t}\delta + \mathbf{PI}'_{i,t}\alpha + \gamma_i + \theta_t + \varepsilon_{i,j,t} \quad (1)$$

where $CDS_{i,j,t}$ denotes the credit default swap spread of bank i in country j at time t, $\boldsymbol{B}_{i,j,t}$ is a vector of bank-level characteristics, $\boldsymbol{M}_{i,t}$, $\boldsymbol{FS}_{i,t}$ and $\boldsymbol{PI}_{i,t}$ are macroeconomic factors, financial structure indicators and political and institutional control variables observed at the country-level, γ_i denotes bank fixed effect and θ_t refers to time fixed effect, and $\varepsilon_{i,j,t}$ is the error term.[7]

Our model specification is very close in spirit to the studies of Gartner et al. (2011), Aizenman et al. (2013), Bordon et al. (2014) and Thalassinos (2016) for the case of sovereign CDS spreads or sovereign risk, or Silvia et al. (2007) and Bertoth et al. (2012) to explain the behaviour of long-term government bond yields. Yet, we extend the existing frameworks by considering the role of a number of political factors and by addressing the specific question about the importance of the institutional environment in explaining the dynamics of banks' CDS spreads, especially, during the Global Financial Crisis.

We estimate the above mentioned model using two main econometric methods: 1) the Tobit regression; and 2) the outlier-robust Fixed-Effects (FE) estimator. As our dependent variable is bounded by zero from below (i.e. it is always non-negative), one could argue that a baseline econometric methodology would suffer from a downward bias (in the case of the slope coefficients) and an upward-bias (in the case of the intercept). These biases can also be related

[7] As many of the papers highlighted in Section 2, our work considers banks' CDS spreads as the dependent variable in the econometric analysis. This is in line with the standard approach in the literature, which is to fit a statistical regression-based model or to assess the determinants of banks' CDS spreads through the lens of a structural or reduced-form model. In contrast, Berndt (2014) proposes a model-free framework, where the author decomposes the variation in CDS spreads into (i) an expected loss component, (ii) an excess spread component and (iii) a residual component. He shows that the first two components explain less than 45% of the variation in CDS spreads, which suggests that the residual component is large.

with the fact that the number of observations of small (or close to zero) bank's CDS spreads is particularly large compared to the number of cases in which it takes a large value. Put it differently, there is considerable dispersion in banks' CDS spreads (Giglio, 2014). Thus, to overcome this econometric issue, we use the Tobit regression and a maximum likelihood estimator (Miranda and Rabe-Hesketh, 2006; Finlay and Magnusson, 2009) as one of the econometric methods of the empirical analysis, with robust standard errors clustered by bank to account for heteroscedasticity.

To control for unobserved heterogeneity at bank-level or country-level characteristics, we also consider a Fixed-Effects estimator. However, given the presence of particularly high (extreme) values for banks' CDS spreads during the Great Recession period, we also account for potential outliers and, thus, use an outlier-robust Fixed-Effects estimator. The estimation consists of two stages. In the first stage, we regress a quantile regression and collect the estimated residuals. In the second stage, we keep all the observations for which the estimated residual lies within two standard deviations of the mean and regress the model using a Fixed-Effects estimator with robust standard errors. This is equivalent to the use of a Least Absolute Deviation (LAD) robust estimator.

Finally, following the theoretical exposure in Merton (1974), Avellaneda and Zhu (2001), Pan and Singleton (2008), Stulz (2010), Nagel and Purnanandam (2015) and Pires et al. (2015) among others, and the empirical applications by Zhu (2004), Blanco et al. (2005), Alexander and Kaeck (2008) and Pires et al. (2015), we take into account the possibility that the payoff structure with default risk can inherently be non-linear. Therefore, we add the lagged banks' CDS spreads and its squared term to the set of control variables, which is a way of capturing such nonlinearity.

We use annual CDS data for a panel of 118 banks for 30 countries over the period 2004-2011 for which a variety of bank-level characteristics ($\boldsymbol{B}_{i,j,t}$) and country-level characteristics (i.e. macroeconomic factors ($\boldsymbol{M}_{i,t}$), financial structure indicators ($\boldsymbol{FS}_{i,t}$) and political and institutional determinants ($\boldsymbol{PI}_{i,t}$)) have been collected.[8] The CDS data was obtained from Thomson Reuters Datastream, published by the Credit Market Analysis (CMA) Group. The CDS bank-level data were first launched by the CMA group in 2004. This dataset is unique as it allows us to uncover the behaviour of CDS before and after the financial crisis, including the period of economic expansion. This is a 5-Year Credit Default Swap Index as a proxy for credit risk as it is considered to be the most liquid type of CDS index. Specifically, the CDS spread is expressed in basis points as 'CDS Premium Mid', which corresponds to the average of 'CDS premium bid'

[8] The countries included in the sample are: Australia, Austria, Belgium, Cayman Islands, China, Denmark, France, Germany, Greece, Hong Kong, India, Ireland, Italy, Japan, Kazakhstan, Malaysia, the Netherlands, Norway, Portugal, Russia, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, United Arab Emirates, UK and USA.

and 'CDS premium offered'. The CDS spread reflects the mid-rate spread between the entity and the relevant benchmark curve.[9]

Bank-level characteristics ($\boldsymbol{B}_{i,j,t}$) are sourced from Datastream, and include:

- the asset quality ratio, such as the ratio of loan losses to gross loans and the ratio of equity to total assets;
- the liquidity ratio, namely, the ratio of liquid assets to total deposits and borrowings;
- the leverage ratio, i.e. the ratio of long-term debt to common equity; and
- the capital ratio, namely, the Tier 2 capital ratio.

Macroeconomic factors ($\boldsymbol{M}_{i,t}$) are obtained from the World Economic Outlook (WEO) of the International Monetary Fund (IMF), the Historical Public Debt Database assembled by the IMF, and the Datastream, and include:

- the house price index;
- the volatility of MSCI share price index;
- the sovereign CDS;
- the inflation rate;
- the GDP growth rate;
- the public debt (as percentage of GDP); and
- the budget balance (as percentage of GDP).

In what concerns the financial structure indicators ($\boldsymbol{FS}_{i,t}$), we consider three broad categories:

- the size and concentration of the banking sector, where we look at (i) the assets' share of the five largest banks, (ii) the share of foreign bank assets and (iii) the number of credit institutions per a million adult population. Data for the assets' share of the five largest banks and the share of foreign bank assets are sourced from the Federal Reserve Bank of St Louis. The number of credit institutions is gathered by the European Banking Authority, while population data come from the World Bank's World Development Indicators (WDI) database;

[9] In the past, the lack of availability of data and the complexity of the financial instruments on which the credit default swap (CDS) contracts were written made it hard for researchers to explore the drivers of credit risk in the financial system. Before the financial crisis, most of the studies on CDS spreads were primarily focused on explaining why CDS spreads could be considered as a better measure of credit default risk compared to bond spreads including: (i) the ease with which CDS spreads can be observed, without the need of approximating them with a risk-free interest rate, as it is the case with bond spreads (Houweling and Vorst, 2005); and (ii) the fact that bond spreads are a lagging indicator of default risk, as they reflect various financial market and credit ratings information with a delay compared to CDS spreads (Hull et al., 2004).

- the banking sector health, which includes (i) non-performing loans (as percentage of total gross loans) and (ii) the net interest margin of the banking sector. Data for non-performing loans are sourced from the World Bank's WDI database, while the information about the net interest margin of the banking sector comes from the Federal Reserve Bank of St Louis; and
- the availability of alternative means of finance, which is assessed from data on (i) the publicly traded firms per capita, (ii) the stock market capitalisation (as percentage of GDP) and (iii) the domestic credit provided by financial sector (as percentage of GDP). All information is sourced from the World Bank's World Development Indicators (WDI) database.

Finally, political and institutional determinants ($\boldsymbol{PI}_{i,t}$) are retrieved from the Database of Political Institutions (DPI) of the World Bank and the Institutional Quality Dataset of Kuncic (2014), which include:

- *tensys*, which corresponds to the tenure of system of government if democratic or the tenure of chief executive otherwise;
- *stabs*, which counts the percentage of veto players who drop from the government in a specific year and, as such, it provides information about the veto points in the decision making process and the constraints that governments face in the course of policy implementation;
- *checks*, which counts the number of veto players in a political system, adjusting for whether these veto players are independent of each other, as determined by the level of electoral competitiveness in a system, their respective party affiliations, and the electoral rules;
- *durable*, which counts the number of years that a cabinet has been in power, up to the current year. A cabinet that falls during its first year in power is counted as 1. Every time there is a government termination, the variable is reset to 1 the year after the termination;
- the quality of economic institutions, which covers characteristics such as financial freedom, business freedom, regulatory quality, economic environment, freedom to own foreign currency bank accounts, credit market regulations, labour market regulations, business regulations, foreign ownership/investment restrictions, capital controls and investment profile;

- the quality of legal institutions, which captures features of property rights, legal environment, civil liberties, judicial independence, impartial courts, protection of property rights, law and order, religion in politics and rule of law; and
- the quality of political institutions, which addresses issues related to political environment, political rights, checks and balances, democratic accountability, corruption, bureaucratic quality, internal conflict, military in politics, control of corruption, corruption perceptions and political terror.

Table 1 provides a summary of the descriptive statistics of the dependent variable and all explanatory variables included in the econometric analysis.

[INSERT TABLE 1 HERE.]

4. Empirical Results

4.1. Bank-level characteristics and macroeconomic factors

We start by estimating the baseline model with the bank-level characteristics to which we add key macroeconomic factors.[10] The results are summarized in Tables 2-3, which report the main findings using the two econometric methodologies (i.e. the Tobit regression and the outlier-robust Fixed-Effects estimator, respectively).

It can be seen that the ratio of loan losses to gross loans has a significant and positive link with banks' CDS spreads: considering both econometric frameworks, and controlling for other factors, a one percentage point increase in this ratio is associated with a rise in banks' CDS spreads of 300-436 basis points. Indeed, the higher the ratio, the more problematic the loans will be and, thus, the positive coefficient of this ratio reflects the deterioration of asset quality. In contrast, the coefficient associated with the other asset quality ratio (i.e. the ratio of equity to total assets) is not statistically significant. We also uncover a very weakly significant association between liquidity ratio and banks' CDS spreads. With regard to the leverage ratio - which is captured by the ratio of long-term debt to common equity - our findings show that this variable has a positive and significant coefficient: the Tobit regression suggests that a one percentage

[10] We also assess the sensitivity of the benchmark model to the choice of bank characteristics. More specifically, we: (i) replace the ratio of loan losses to gross loans with the ratio of impaired loans to gross loans, as a measure of asset quality; (ii) replace the ratio of liquid assets to total deposits and borrowings with the ratio of liquid assets to deposits and short-term funding, as a measure of liquidity; (iii) add the Tier 1 ratio to the set of explanatory variables (Column 4); and (iv) consider operations ratios, such as the return on average assets and the return on average equity among the set of regressors. The results, which are available upon request, show that the main findings remain unchanged. In addition, they suggest that the Tier 1 capital ratio is positively linked with bank CDS spreads. By being forced to keep a certain percentage of capital as a cushion in case there is a negative credit event, a bank's investment may be reduced, which decreases its competitiveness in financial markets. Our results also confirm the importance of better operating ratios in eroding credit risk, as both ratios have a negative and significant effect on bank CDS.

point increase in the leverage ratio is associated with a rise in banks' CDS spreads of between 88 and 155 points. This result is in accordance with the studies of Aunon-Nerin et al. (2002) and Ericsson et al. (2009), who also highlight the role played by leverage in explaining the dynamics of CDS spreads. Regarding the capital ratio - i.e. the Tier 2 capital ratio - the empirical findings reveal that the sign of the coefficient associated with this variable tends to be negative: a one percentage point increase in the Tier 2 capital ratio is associated with a fall in CDS spreads of 189-510 basis points. This suggests that an increase in the regulatory capital ratio is linked with lower CDS spreads.

As for the other variables added to the baseline model,[11] we find: (i) house prices do not have a consistent effect on banks' CDS spreads, despite some literature suggesting that such impact may differ over time for a specific market (i.e. during boom and crisis periods) (see Benbouzid and Mallick (2013) for the case of the UK); (ii) banks' CDS spreads and sovereign CDS spreads can share a positive link, partly reflecting the country-level fiscal and debt positions;[12] and (iii) an increase in the volatility of the stock market is associated with higher CDS spreads.

We now turn to other relevant macroeconomic factors, such as the inflation rate, the GDP growth, the change in the public debt-to-GDP ratio and the change in the budget balance-to-GDP ratio. Despite some heterogeneity across econometric methodologies regarding the statistical significance of these variables, the empirical findings suggest that, in line with the studies of Aizenman et al. (2013) and Thalassinos (2016), the coefficient associated with inflation is positive, which points to an increase of tensions in the banking sector during periods of high inflation: a one percentage point increase in the inflation rate is associated with a rise in banks' CDS spreads of 136-154 points. A one percentage point increase in real GDP growth is linked with a decline in banks' CDS spreads of 76 basis points, even though the relationship is only statistically significant in the case of the Tobit model. Additionally, the coefficient associated with the change in the debt-to-GDP ratio is positive while the coefficient linked with the change

[11] We also evaluate the extent to which the geographical dimension helps explain bank CDS. In particular, we add a dummy variable denoting OECD membership to the set of explanatory variables. We also consider several geographical dummy variables, namely: Asia and Pacific, Europe, Middle East and North America. Our empirical findings do not corroborate the existence of a significant difference in the behaviour of bank CDS spreads between OECD and non-OECD countries. As for the geographical dummy variables, we only find some evidence of a positive and significant effect of the dummy variable associated with Asia and Pacific and, particularly, the Middle East, where location helps explain credit risk. This possibly reflects the geopolitical instability that typically characterizes this geographical location. These results are available upon request.

[12] In the same spirit of Aizenman et al. (2013), we also consider the impact of fiscal austerity measures on bank CDS spreads. We find that the implementation of a fiscal consolidation program is associated with a rise in banks' default risk, as the negative growth effect due to expenditure-driven consolidation probably outweighs positive expectations of lower sovereign debt default. This effect is particularly strong when the duration of the period over which fiscal adjustments are put in place is especially long. These findings are not presented here to save space, but they are available upon request.

in the budget balance-to-GDP ratio is negative, suggesting a rise in banks' CDS spreads when the fiscal stance deteriorates. This evidence is close in spirit with that reported by Aizenman et al. (2013) and Thalassinos (2016), who show the "fiscal space", as captured by the public debt-to-tax base ratio and the fiscal balance-to-tax base ratio, is a key driver of CDS spreads. The results remain consistent with the economic intuition that banks' CDS spreads vary strongly over time, as macroeconomic and financial conditions change.

[INSERT TABLE 2 HERE.]

[INSERT TABLE 3 HERE.]

4.2. Financial structure

In this sub-section, we control for the importance of different financial structure indicators. The choice of the variables - which encompass (i) the size and concentration of the banking sector, (ii) the banking sector health and (iii) the availability of alternative means of finance - is in line with the work of Elbourne and de Haan (2006) who investigate the extent to which monetary policy transmission is related to financial structure indicators. From a different perspective, Judge (2006a, 2006b) also investigates the determinants of foreign currency hedging, while Clark and Judge (2005) analyze the drivers of corporate hedging. Clark and Judge (2008, 2009) argue that foreign currency debt induces a bias in foreign currency hedging. Castro (2011) shows that monetary policy reaction functions display nonlinearity, as central banks respond to financial conditions.

The results are summarized in Tables 4-5. While the Tobit model does not uncover any statistical significance on the various financial structure indicators, the outlier-robust Fixed-Effects estimator shows that: (i) higher concentration of the banking sector (as proxied by the asset's share of the five largest banks) and stronger presence of foreign banks are associated with higher banks' CDS spreads; and (ii) a rise in the number of credit institutions per million people is associated with lower bank CDS spreads. Regarding the indicators of banking sector health, the results suggest that a fall in the banks' net interest margin is associated with a significant rise in banks' CDS spreads: a one percentage point fall in the banks' net margin is linked with a rise in banks' CDS spreads of 309 basis points. Finally, as per the alternative means of finance, we show that the stock market capitalization is negatively associated with banks' CDS spreads, while domestic credit provided by the financial sector displays a positive and significant link with banks' CDS spreads.

[INSERT TABLE 4 HERE]

[INSERT TABLE 5 HERE]

4.3. Political and Institutional Factors

We now use data from the Institutional Quality dataset (Kuncic, 2014) and assess the role played by the quality of economic, legal and political institutions in explaining the dynamics of banks' CDS spreads. We also add a dummy variable for the financial crisis of 2008-2009 to the set of explanatory variables and interact it with the quality of institutions. The idea is to analyze the extent to which an improvement in the regulatory framework (i.e. the quality of economic and legal institutions) counterbalances the spike in banks' CDS spreads registered during the Great Recession.

The results are presented in Tables 6-7. We can see that the dummy variable for the period 2008-2009 is statistically significant and has a positive coefficient: controlling for other factors, the Tobit regressions suggest that banks' CDS spreads in 2008-2009 were 85-886 points higher than average banks' CDS spreads over the 2004-2011 period for the full sample; and the outlier-robust Fixed-Effects estimates indicate that banks' CDS spreads in 2008-2009 were 165-514 points higher than average banks' CDS spreads. This finding is not surprising given that the financial crisis was a global event and credit risk went up for all countries, including those where the institutional framework was strong.

We also show that the shorter the tenure of the system of government if democratic or the tenure of chief executive and the larger the number of years that a cabinet has been in power, the higher the banks' CDS spreads. This result suggests that when a cabinet has been in power for a relatively longer time, it is more likely that it will guarantee a more stable political environment.

Finally, for the quality of economic and legal institutions, the coefficient is either weakly significant or not significant. Thus, in general, an improvement in the institutional quality is not associated with a reduction in banks' CDS spreads *per se*. However, conditioning the above mentioned effect on the occurrence of the financial crisis i.e. interacting the quality of economic and legal institutions with the dummy variable for 2008-2009, helps explain banks' CDS spreads. In particular, during the Great Recession period, banks operating in countries with better quality institutions suffered a significantly lower impact on their CDS spreads than banks in lower quality institutional settings. Our estimates show that, conditioning the impact of the Global Financial Crisis on the quality of economic and legal institutions, average banks' CDS spreads would be between 262 and 702 points lower in 2008-2009.

[INSERT TABLE 6 HERE]

[INSERT TABLE 7 HERE]

5. Conclusion

This paper explores the key drivers of bank CDS spreads by focusing on bank-level characteristics and country-level macroeconomic, political and institutional factors. Using data for 118 bank CDS spreads of 30 countries over the period 2004-2011, we find that bank-level characteristics, such as the quality and the (il)liquidity of their assets, how leveraged banks are and their regulatory capital holdings, explain the dynamics of banks' CDS spreads.

We also provide evidence showing that a rise in inflation, a deterioration of GDP growth and a worsening of a country's fiscal and debt positions are associated with higher banks' CDS spreads. When considering the financial structure of the banking sector, our empirical findings suggest that (i) higher concentration of the banking sector, (ii) stronger presence of foreign banks, (iii) deteriorating banking sector health conditions, and (iv) the lack of alternative means of finance tend to be linked with higher banks' CDS spreads.

Finally, we show that, while the financial crisis of 2008-2009 was associated with a rise in banks' CDS spreads (Castro, 2013), it did not affect the impact of the quality of institutions on the latter. However, banks where the country-level quality of the regulatory framework was particularly high seemed to be less vulnerable to the spike in financial stress that took place during the Great Recession even though the effects that we uncover are relatively small in magnitude.

From a policy perspective, our findings give support to the idea that the country-level quality of the institutional framework goes in tandem with banks' CDS spreads. More specifically, the existence of strong economic and legal institutions (i.e. a strong regulatory environment) can be relevant at shielding against disruptions in the market perception about credit quality during periods of financial stress.

A close monitoring of the asset quality, the degree of leverage and the holdings of regulatory capital by banks can also provide useful information about the perception of banks' default risk. Similarly, certain dimensions of the financial structure of a country, such as the size and the concentration of the banking sector or the availability of alternative means of finance, can contribute to our understanding of the dynamics of banks' CDS spreads. And, more generally, a more sound macroeconomic environment appears to be associated with optimistic market perceptions about credit quality. This goes without saying that the current data limitations and the need for further research on the topic of this paper remain important caveats.

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List of Tables

Table 1: Descriptive statistics.

	Observations	Mean	Standard deviation	Minimum	Maximum
bank CDS spreads	601	159.33	263.31	2.25	2899.30
Bank-level characteristics ($\boldsymbol{B}_{i,t}$)					
loan losses to gross loans ratio	585	2.59	2.48	0.01	27.51
equity to total assets ratio	620	6.81	6.15	-0.24	96.31
liquid assets to total deposits and borrowings ratio	614	23.15	20.29	0.64	158.66
long-term debt to common equity ratio	392	3.17	3.47	0.06	31.52
tier 2 capital ratio	526	3.38	1.65	0.03	12.10
Macroeconomic factors ($\boldsymbol{M}_{i,t}$)					
housing price index	632	222.85	247.94	74.10	960.40
sovereign CDS spreads	391	127.15	139.77	8.00	843.97
volatility of MSCI share price index	695	1021.04	204.91	524.47	1367.79
inflation	866	3.17	3.28	-12.73	18.07
GDP growth	860	2.46	3.76	-7.80	15.06
change in debt-to-GDP ratio	484	1.52	6.10	-11.90	20.66
change in budget balance-to-GDP ratio	461	-0.86	2.45	-9.59	5.08
Financial structure indicators ($\boldsymbol{FS}_{i,t}$)					
5 largest banks' asset concentration	882	73.72	18.04	29.73	100.00
share of foreign bank assets	631	11.98	12.08	0.00	92.00
number of credit institutions per million people	448	15.46	20.39	3.20	96.67
non-performing loans (percentage of total loans)	862	3.73	2.95	0.08	20.93
banks' net margin	928	2.14	1.36	0.26	9.52
publicly traded firms per capita	910	28.80	30.82	1.06	208.16
stock market capitalization (percentage of GDP)	864	80.69	58.38	9.13	606.00
domestic credit provided by financial sector (percentage of GDP)	859	144.08	63.23	20.81	338.09
Political and institutional determinants factors ($\boldsymbol{PI}_{i,t}$)					
institutional quality (economic+legal)	755	0.77	0.79	-1.13	1.84
dummy variable for 2008-2009	944	0.25	0.43	0.00	1.00
institutional quality * dummy variable for 2008-2009	755	0.22	0.54	-1.08	1.79
tenure of the political system	756	46.03	26.10	1.00	80.00
percentage of veto players who drop from the government	756	0.13	0.28	0.00	1.00
number of veto players in a political system	756	3.99	2.44	1.00	17.00
number of years that a cabinet has been in power	832	60.93	49.23	0.00	202.00

Table 2: Bank-level characteristics and macroeconomic factors – Tobit regression.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
lagged bank CDS spreads	1.170***	0.671**	-0.208	1.359***	1.287***	1.206***	1.204***	1.142***
	(0.314)	(0.295)	(0.384)	(0.380)	(0.344)	(0.291)	(0.346)	(0.361)
lagged bank CDS spreads (squared)	-0.094**	0.026	0.072	-0.111***	-0.108***	-0.090***	-0.120***	-0.113**
	(0.036)	(0.115)	(0.081)	(0.038)	(0.039)	(0.030)	(0.045)	(0.048)
loan losses to gross loans ratio	0.399***	0.436**	0.401***	0.414***	0.409***	0.322***	0.344**	0.344**
	(0.119)	(0.190)	(0.139)	(0.120)	(0.113)	(0.108)	(0.158)	(0.150)
equity to total assets ratio	-0.038	-0.065	-0.062	-0.040	-0.104*	-0.025	0.032	0.035
	(0.051)	(0.055)	(0.060)	(0.051)	(0.059)	(0.045)	(0.043)	(0.042)
liquid assets to total deposits and borrowings ratio	-0.009	-0.013*	0.004	-0.011	-0.005	-0.013*	0.003	0.004
	(0.006)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)
long-term debt to common equity ratio	0.128***	0.088*	0.129**	0.118***	0.130***	0.120***	0.153**	0.155***
	(0.035)	(0.046)	(0.061)	(0.031)	(0.039)	(0.033)	(0.060)	(0.060)
tier 2 capital ratio	-0.060	-0.195*	-0.189**	-0.039	-0.120	-0.040	0.124*	0.143**
	(0.098)	(0.102)	(0.095)	(0.094)	(0.102)	(0.088)	(0.064)	(0.061)
housing price index		-0.000	-0.000					
		(0.000)	(0.001)					
sovereign CDS spreads			0.010**					
			(0.004)					
volatility of MSCI share price index				0.001*				
				(0.001)				
inflation					0.154***			
					(0.053)			
GDP growth						-0.076**		
						(0.034)		
change in debt-to-GDP ratio							0.010	
							(0.023)	
change in budget balance-to-GDP ratio								-0.054
								(0.057)
constant	-0.301	0.649	0.289	-1.956**	-0.380	-0.022	-1.689***	-1.823***
	(0.499)	(0.559)	(0.699)	(0.850)	(0.477)	(0.465)	(0.628)	(0.615)
observations	240	214	142	234	228	228	146	145
R-squared	0.134	0.179	0.219	0.140	0.154	0.149	0.196	0.198

Note: Robust standard errors in brackets. ***, ** and * - statistically significant at 1%, 5% and 10%, respectively.

Table 3: Bank-level characteristics and macroeconomic factors – Outlier-robust Fixed-Effects.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
lagged bank CDS spreads	0.719***	0.872***	0.457**	0.828***	0.862***	0.749***	0.071	0.070
	[0.150]	[0.161]	[0.178]	[0.154]	[0.174]	[0.150]	[0.384]	[0.455]
lagged bank CDS spreads (squared)	-0.090***	-0.090***	-0.051***	-0.098**	-0.103***	-0.0908***	0.173*	0.131
	[0.017]	[0.018]	[0.017]	[0.017]	[0.019]	[0.014]	[0.100]	[0.113]
loan losses to gross loans ratio	0.334***	0.365***	0.183	0.342***	0.409***	0.300***	0.125	0.062
	[0.086]	[0.103]	[0.186]	[0.090]	[0.111]	[0.074]	[0.135]	[0.143]
equity to total assets ratio	-0.086	-0.211*	-0.234	-0.064	-0.089	-0.102	-0.087	-0.080
	[0.111]	[0.120]	[0.157]	[0.106]	[0.093]	[0.104]	[0.088]	[0.103]
liquid assets to total deposits and borrowings ratio	-0.013	-0.012*	0.037**	-0.015	-0.010	-0.012	-0.007	-0.011
	[0.009]	[0.007]	[0.018]	[0.009]	[0.008]	[0.009]	[0.007]	[0.007]
long-term debt to common equity ratio	0.017	0.019	-0.069**	0.018	0.017	0.020	0.034	0.037
	[0.041]	[0.035]	[0.028]	[0.041]	[0.032]	[0.038]	[0.021]	[0.032]
tier 2 capital ratio	-0.060	-0.275***	-0.510***	-0.031	-0.082	-0.059	0.068	0.087
	[0.120]	[0.072]	[0.130]	[0.124]	[0.113]	[0.109]	[0.079]	[0.079]
housing price index		0.011***	0.008***					
		[0.003]	[0.003]					
sovereign CDS spreads			-0.000					
			[0.001]					
volatility of MSCI share price index				0.001**				
				[0.000]				
Inflation					0.136***			
					[0.035]			
GDP growth						-0.034		
						[0.023]		
change in debt-to-GDP ratio							0.064***	
							[0.018]	
change in budget balance-to-GDP ratio								-0.186***
								[0.044]
constant	0.889	-0.417	1.439	-0.128	0.208	1.067	0.330	0.475
	[0.942]	[0.918]	[1.379]	[0.982]	[0.784]	[0.843]	[0.499]	[0.528]
observations	234	210	138	228	223	222	141	141
R-squared	0.408	0.575	0.400	0.430	0.504	0.440	0.636	0.630

Note: Robust standard errors in brackets. ***, ** and * - statistically significant at 1%, 5% and 10%, respectively.

Table 4: Financial structure – Tobit regression.

	[1])	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
lagged bank CDS spreads	1.170***	1.247***	0.996***	1.165***	1.188***	1.171***	1.171***	1.275***	1.274***
	(0.314)	(0.327)	(0.249)	(0.189)	(0.270)	(0.317)	(0.321)	(0.332)	(0.331)
lagged bank CDS spreads (squared)	-0.094**	-0.097***	-0.101***	-0.124***	-0.079**	-0.095**	-0.096***	-0.098***	-0.099***
	(0.036)	(0.036)	(0.035)	(0.014)	(0.031)	(0.039)	(0.037)	(0.035)	(0.037)
loan losses to gross loans ratio	0.399***	0.379***	0.412***	0.154**	0.160	0.400***	0.425***	0.354***	0.375***
	(0.119)	(0.117)	(0.147)	(0.068)	(0.122)	(0.121)	(0.129)	(0.123)	(0.116)
equity to total assets ratio	-0.038	-0.017	0.034	-0.028	-0.041	-0.042	-0.041	-0.038	-0.036
	(0.051)	(0.041)	(0.038)	(0.042)	(0.049)	(0.059)	(0.051)	(0.051)	(0.043)
liquid assets to total deposits and borrowings ratio	-0.009	-0.009	0.001	-0.010**	-0.002	-0.009	-0.009	-0.008	-0.010
	(0.006)	(0.006)	(0.006)	(0.004)	(0.006)	(0.007)	(0.006)	(0.007)	(0.007)
long-term debt to common equity ratio	0.128***	0.126***	0.147**	0.117**	0.127***	0.128***	0.135***	0.124***	0.131***
	(0.035)	(0.033)	(0.058)	(0.055)	(0.035)	(0.035)	(0.037)	(0.036)	(0.034)
tier 2 capital ratio	-0.060	-0.033	0.101	-0.007	-0.061	-0.062	-0.052	-0.048	-0.047
	(0.098)	(0.086)	(0.066)	(0.061)	(0.090)	(0.099)	(0.095)	(0.099)	(0.092)
5 largest banks' asset concentration		0.008							
		(0.007)							
share of foreign bank assets			0.006						
			(0.006)						
number of credit institutions per million people				-0.001					
				(0.002)					
non-performing loans (percentage of total loans)					0.205				
					(0.149)				
banks' net margin						0.014			
						(0.130)			
publicly traded firms per capita							0.003		
							(0.003)		
stock market capitalization (percentage of GDP)								-0.001	
								(0.002)	
domestic credit provided by financial sector (percentage of GDP)									0.001
									(0.003)
constant	-0.301	-1.055*	-1.674**	0.051	-0.637	-0.307	-0.480	-0.187	-0.535
	(0.499)	(0.585)	(0.667)	(0.430)	(0.472)	(0.529)	(0.486)	(0.473)	(0.400)
observations	240	237	155	127	229	240	231	229	226
R-squared	0.134	0.142	0.183	0.326	0.154	0.134	0.134	0.141	0.141

Note: Robust standard errors in brackets. ***, ** and * - statistically significant at 1%, 5% and 10%, respectively.

Table 5: Financial structure – Outlier-robust Fixed-Effects.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
lagged bank CDS spreads	0.719***	0.788***	0.195	0.876***	0.663***	0.700***	0.793***	0.743***	0.559***
	[0.150]	[0.160]	[0.301]	[0.171]	[0.169]	[0.159]	[0.159]	[0.145]	[0.182]
lagged bank CDS spreads (squared)	-0.090***	-0.088***	0.095	-0.084***	-0.075***	-0.090***	-0.093***	-0.080***	-0.064***
	[0.017]	[0.014]	[0.098]	[0.015]	[0.015]	[0.018]	[0.016]	[0.013]	[0.016]
loan losses to gross loans ratio	0.334***	0.261***	0.385***	0.235*	0.197**	0.342***	0.306***	0.261***	0.248***
	[0.086]	[0.074]	[0.125]	[0.124]	[0.078]	[0.094]	[0.085]	[0.059]	[0.075]
equity to total assets ratio	-0.086	-0.099	-0.086	-0.196*	-0.083	-0.072	-0.088	-0.016	-0.077
	[0.111]	[0.111]	[0.100]	[0.106]	[0.106]	[0.110]	[0.109]	[0.090]	[0.097]
liquid assets to total deposits and borrowings ratio	-0.013	-0.008	-0.024***	-0.018***	-0.012	-0.009	-0.013	0.000	0.002
	[0.009]	[0.010]	[0.005]	[0.006]	[0.009]	[0.010]	[0.009]	[0.008]	[0.010]
long-term debt to common equity ratio	0.017	0.020	0.048**	0.031	0.027	0.021	0.021	0.013	0.022
	[0.041]	[0.040]	[0.023]	[0.026]	[0.036]	[0.040]	[0.039]	[0.031]	[0.040]
tier 2 capital ratio	-0.060	-0.061	-0.016	-0.143*	-0.026	-0.061	-0.045	-0.041	0.014
	[0.120]	[0.121]	[0.096]	[0.072]	[0.111]	[0.114]	[0.124]	[0.106]	[0.092]
5 largest banks' asset concentration		0.029*							
		[0.015]							
share of foreign bank assets			0.035***						
			[0.010]						
number of credit institutions per million people				-1.708***					
				[0.373]					
non-performing loans (percentage of total loans)					0.117				
					[0.081]				
banks' net margin						-0.309**			
						[0.126]			
publicly traded firms per capita							0.007		
							[0.030]		
stock market capitalization (percentage of GDP)								-0.013***	
								[0.002]	
domestic credit provided by financial sector (percentage of GDP)									0.023***
									[0.006]
constant	0.889	-1.094	0.175	25.743***	0.663	1.347	0.654	1.351	-2.736**
	[0.942]	[1.338]	[0.685]	[5.252]	[0.893]	[0.912]	[1.183]	[0.815]	[1.161]
observations	234	231	149	125	223	234	225	223	219
R-squared	0.408	0.429	0.570	0.771	0.448	0.433	0.425	0.538	0.521

Note: Robust standard errors in brackets. ***, ** and * - statistically significant at 1%, 5% and 10%, respectively.

Table 6: Quality of institutions and Great Recession – Tobit regression.

	[1]	[2]	[3]	[4]
lagged bank CDS spreads	1.170***	1.166***	0.974***	0.975***
	(0.314)	(0.316)	(0.180)	(0.177)
lagged bank CDS spreads (squared)	-0.094**	-0.094***	-0.087***	-0.086***
	(0.036)	(0.036)	(0.015)	(0.014)
loan losses to gross loans ratio	0.399***	0.399***	0.259***	0.272***
	(0.119)	(0.120)	(0.079)	(0.076)
equity to total assets ratio	-0.038	-0.038	0.005	-0.011
	(0.051)	(0.051)	(0.046)	(0.047)
liquid assets to total deposits and borrowings ratio	-0.009	-0.009	-0.006	-0.008
	(0.006)	(0.007)	(0.006)	(0.005)
long-term debt to common equity ratio	0.128***	0.127***	0.104**	0.108**
	(0.035)	(0.035)	(0.050)	(0.051)
tier 2 capital ratio	-0.060	-0.063	-0.056	-0.080
	(0.098)	(0.092)	(0.071)	(0.068)
institutional quality (economic+legal)			-0.492**	-0.196
			(0.241)	(0.180)
dummy variable for 2008-2009		0.085	0.408**	0.886***
		(0.270)	(0.181)	(0.332)
institutional quality * dummy variable for 2008-2009				-0.702**
				(0.311)
tenure of the political system			0.011**	0.010*
			(0.006)	(0.006)
percentage of veto players who drop from the government			0.954	1.026*
			(0.590)	(0.600)
number of veto players in a political system			-0.016	-0.021
			(0.022)	(0.021)
number of years that a cabinet has been in power			-0.001	0.000
			(0.002)	(0.002)
Constant	-0.301	-0.320	-0.541	-0.541
	(0.499)	(0.536)	(0.462)	(0.445)
Observations	240	240	205	205
R-squared	0.134	0.134	0.191	0.206

Note: Robust standard errors in brackets. ***, ** and * - statistically significant at 1%, 5% and 10%, respectively.

Table 7: Quality of institutions and Great Recession – Outlier-robust Fixed-Effects.

	[1]	[2]	[3]	[4]
lagged bank CDS spreads	0.719***	0.703***	0.484**	0.472***
	[0.150]	[0.151]	[0.186]	[0.147]
lagged bank CDS spreads (squared)	-0.090***	-0.090***	-0.048***	-0.050***
	[0.017]	[0.016]	[0.016]	[0.012]
loan losses to gross loans ratio	0.334***	0.346***	0.167**	0.178***
	[0.086]	[0.086]	[0.082]	[0.057]
equity to total assets ratio	-0.086	-0.090	-0.067	-0.054
	[0.111]	[0.108]	[0.070]	[0.066]
liquid assets to total deposits and borrowings ratio	-0.013	-0.009	0.004	0.001
	[0.009]	[0.010]	[0.009]	[0.010]
long-term debt to common equity ratio	0.017	0.013	0.018	0.020
	[0.041]	[0.040]	[0.032]	[0.035]
tier 2 capital ratio	-0.060	-0.079	0.062	0.006
	[0.120]	[0.114]	[0.077]	[0.075]
institutional quality (economic+legal)			0.080	0.191
			[0.549]	[0.627]
dummy variable for 2008-2009		0.165	0.263***	0.514***
		[0.126]	[0.092]	[0.157]
institutional quality * dummy variable for 2008-2009				-0.262*
				[0.153]
tenure of the political system			0.215***	0.193***
			[0.033]	[0.038]
percentage of veto players who drop from the government			0.047	0.0434
			[0.171]	[0.177]
number of veto players in a political system			0.003	-0.012
			[0.016]	[0.021]
number of years that a cabinet has been in power			0.011**	0.018***
			[0.004]	[0.006]
constant	0.889	0.832	-11.460***	-10.636***
	[0.942]	[0.927]	[1.753]	[1.871]
observations	234	234	196	198
R-squared	0.408	0.417	0.715	0.705

Note: Robust standard errors in brackets. ***, ** and * - statistically significant at 1%, 5% and 10%, respectively.