Government's effect on too big to fail guarantees

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Abstract

After a period of bank crises around Europe, it is now the government's around Europe that are facing financial and economical difficulties. Coming from a period where bank bailouts became common practice, the European debt crisis now raises doubts about ability of governments to rescue failing banks. With a sample of large European banks from 17 countries in the years 2004-2012, we set out to investigate whether the financial and sovereign turmoil of the past few years have affected bank guarantees, as measured by their credit rating uplift. We find that the guarantees afforded to banks have changed dramatically over the sample period, and that countries in crisis affords their banks less extensive guarantees. Further we show that bank size, a government's debt level and the yields on government bond is negatively related to bank guarantees. We also find that the macroeconomic conditions in a country seem to have little effect on the guarantees, unless economic inertia is considered. We conclude that the extent of bank guarantees, seem to be affected by governments' fiscal capacity, and that both bank size and government ability can render banks too large to save.

Keywords: Banking, government, sovereign crisis, too big to fail, too big to save

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1 Introduction

In May of 1984 Continental Illinois, the seventh largest bank in the United States at the time (Stern and Feldman, 2004) was rescued from defaulting on its debt obligations by the United States government. The $1 billion rescue package not only protected depositors, but also the bank's stock- and bondholders (Morgan and Stiroh, 2005). The Comptroller of the Currency, Todd C. Conover , who engineered the bailout received criticism for what many observers considered an exceptionally generous protection (Stern and Feldman, 2004). Following the controversy, Conover was called to a hearing at the United States Congress in September 1984 to testify. After admitting that other large banks might be eligible for government support, Congressman Stewart McKinney asserted that:

> *"Mr. Chairman, let us not bandy words. We have a new kind of bank. It is called too big to fail. TBTF, and it is a wonderful bank."*[1]

While Conover never explicitly named which other banks that would receive government support, he admitted that this policy would apply to America's eleven largest banks. O'Hara and Shaw (1990) used event study methodology to test the effect of Conover's testimony on the stock market and found significant positive wealth effects for the eleven largest banks. Since O'Hara and Shaw (1990) the topic have been expanded, with research further confirming the existence of too big to fail (henceforth TBTF), examining its implications and its cost, and what determines whether a bank is considered TBTF. The topic has seen a revival since the global financial crisis of 2008, which saw governments around the world making explicit the implicit guarantees to large banks. The financial turmoil that followed, especially in small countries like Iceland and Ireland, raised new questions related to TBTF: were banks outgrowing their sovereigns? Had they become

[1] Stern and Feldman (2004, p. 13)

too big to save (TBTS)? Several studies (Brown and Dinc, 2011; Demirgüç-Kunt and Huizinga, 2012, e.g.) have shown that the relative size of banks in relation to their sovereign could have a negative effect on the protection banks receive. There seem to be a connection, then, between the level of support, and the size of the economy.

In this paper we set out to answer whether a government's financial position and the economic situation affects the implicit guarantees that TBTF entails. More specifically, we ask: *have the financial and sovereign turmoil of the past few years affected the guarantees afforded to large European banks?* Employing a panel data approach with fixed effects estimations, we examine large banks in 17 European countries over the nine-year period between 2004 and 2012; a period characterized by both a time of stability and growth, a time of financial turmoil, and lately a sovereign debt crisis in parts of Europe. We proxy for TBTF by using Moody's credit ratings, and derive the implicit guarantee as the difference between a bank's long-term credit rating (which takes into account external support) and its stand-alone credit rating (which measures a banks intrinsic capacity), following Bijlsma and Mocking (2013), and Schich and Lindh (2012).

We find that guarantees received by banks have changed dramatically over our sample period: from a stable and low level pre-crisis, to dramatically increasing during the financial crisis, and finally declining during the European debt crisis. Further, our results show that there is a clear difference between the implicit guarantees afforded to banks in the five crisis-economies Greece, Italy, Portugal, Spain and Ireland (Castro, 2013), and the rest of Europe. These results suggest that the economic climate and the state of a sovereign affect the guarantees it can afford its banks.

We further find that the implicit guarantees has a significantly negative relation to a government's ability to raise funds, as measured by its debt level and

the yield on government bonds. We also find that bank size has a negative impact on government guarantees. This is in line with the TBTS hypothesis, that large banks face smaller bailout prospects in fiscally strained countries (Demirgüç-Kunt and Huizinga, 2012), suggesting that TBTF banks can become TBTS when the financial and economic situation worsens. This result is robust to including macroeconomic determinants, and is consistent across all specification of our test. The macroeconomic determinants overall does not show any significant relation to the government guarantees. Introducing time lag effect, though, our results show that the overall economic situation is significantly related to the guarantee.

Overall, while being careful in drawing too strong conclusions from our results because of varying results and extreme values possibly introducing bias into the estimations, we conclude that the European debt crisis seem to show that the status of large banks, whether too big to fail or to big to save, depends not only on the size of the bank itself, but on the overall strength of its sovereign.

The remainder of this paper is organized as follows: in the next section we review previous research on TBTF. In section 3 we describe the data, its sources and the econometric model. Section 4 presents the empirical findings and discuss their implications. Section 5 concludes this paper.

2 Review of previous literature

The notion of too big to fail, and its implications have been assessed through various perspectives. You can broadly classify the empirically conducted studies on TBTF into three categories; studies that approach the theory through event study methodology, studies examining mergers and acquisitions, and studies focused on a market distortion perspective. There are attempts to conceptualize TBTF by conducting single-bank to lender of last resort models, emphasizing the time-

inconsistency of bank closure policy (Mailath and Mester, 1994; Freixas, 1999, e.g.). However, the vast majority of the papers on the subject are of empirical character.

O'Hara and Shaw (1990) was one of the first who set out to investigate the implication of TBTF. They conducted an event study, investigating abnormal bank equity returns, after the Comptroller of the Currency in the United States implied comprehensive deposit insurance for eleven banks in USA. The study showed significant positive residual returns on the day of the announcement for the banks deemed TBTF, whereas smaller banks did not show any significant effects.

Mergers and acquisition-oriented studies have attempted to quantify and put a value on the premium implied by TBTF. The most commonly tested hypothesis is that banks pay higher premiums for acquisitions when they are perceived to lead to the acquirer gaining TBTF status. Brewer and Jagtiani (2013) estimate that in the US, between 1991 and 2004, financial institutions paid a premium of approximately $14 billion to become TBTF. They used asset holdings of $100 billion as the size-threshold for TBTF status. In a related manner, Kane (2000) examines what he calls *megamergers* during the period 1991-1998, and finds evidence of TBTF, concluding that institutions engage in megamergers to become too large and benefit from system-risk premiums. Moreover, Kane show that such mergers render stock value gains for acquirers around the announcement date.

Instead of looking at equity pricing Penas and Unal (2004) consider the returns to bond holders around US bank mergers in the period of 1991-1997. They find that adjusted returns on merging banks' bonds are positive across pre-merger and announcement months. They argue the positive returns are attributed to gaining TBTF status, albeit in addition to diversification and synergy gains. Consistent with the reasoning of Brewer and Jagtiani (2013), Penas and Unal argue a threshold in asset size for gaining the TBTF status. In common for these papers is the

central role of bank size for examining and explaining TBTF.

Size as a measurement of whether a bank is TBTF or not, is according to some research not an optimal measurement. Recent studies by Zhou (2010), Moore and Zhou (2012), and Barth and Schnabel (2013) suggest size in itself is not sufficient to determine a bank's TBTF status. Rather, they argue, a bank's systemic importance is what determines whether a bank is TBTF. Their approach is to measure systemic importance through methods of calculating the probability of the distress of a bank j given distress of banks i. Their approach is related to literature on contagion effects, common in the financial sector. For an outline, see e.g. Chen (1999), who shows that contagion effects may arise as a consequence of information revealed to deposit owners after bank failure and how that in turn could initiate bank runs because depositors fear their bank will experience financial trouble.

Völz and Wedow (2011) and Balasubramnian and Cyree (2011), among others, assess TBTF through a market distortion perspective. Völz and Wedow find evidence for correlation between financial institution's size relative GDP and CDS spreads. Controlling for risk and liquidity, with a panel data sample including 91 banks from 24 countries, a 1% increase in the size to GDP ratio is found to reduce CDS spread by about 2 basis points. Consistent with the argument that size affect financing costs, Balasubramnian and Cyree (2011) finds evidence that yield spreads reflect the bond market's perception about large banks being TBTF.

2.1 Literature on governments and TBTF

Brown and Dinc (2011) shares close origins with this paper, in the sense that their article account for a government's fiscal position when investigating bank failure. Brown and Dinc (2011) is, as far as our knowledge, the first paper to provide evidence that a country's ability to support its financial sector is reflected in its public deficit, which analogously affects its treatment of distressed banks. Their

approach is to consider government takeover or closure decisions of banks in 21 emerging market economies during the 1990s. By adopting a hazard standard model[2] they find evidence that a bank is more likely to be taken over by the government if its own capital ratio is low. However, the bank is less likely to be taken over, if the average capital ratio of other banks in the same country is low as well. This is taken to be evidence of *too many to fail*, as they state it, implying that the sovereign may be unable to save many struggling banks simultaneously.

A recent study from Demirgüç-Kunt and Huizinga (2012) examines a similar question, that government finances impact financial institutions. They examine the impact a country's fiscal position have on bank valuation and credit default swap-spreads. They investigate if banks are TBTF or rather too big to save (TBTS). They find evidence, which suggest that a country's public finances impose constraints on the generosity of the financial safety net, and analogously that these limits are reflected in bank valuation and CDS-spreads. Brown and Dinc (2011) and Demirgüç-Kunt and Huizinga (2012) both recognize the central role governments' financial situation has on the TBTF status of banks. Demirgüç-Kunt and Huizinga illuminate this through a market perspective-oriented study while Brown and Dinc are more oriented towards a government perspective.

2.2 Literature on credit ratings and TBTF

Rime (2005) set out to examine the potential effect of TBTF expectations on large banks issuer ratings from a market distortion perspective, looking at data from the years 1999 to 2003. They use two measurements of TBTF: the natural logarithm of total bank assets and total bank assets relative the total assets of the banking sector of its home country, accounting for the fact that a bank may be more important if it is big relative its home banking sector. In their model they

[2]For an outline of a hazard standard model, see Wooldridge (2002, pp. 685-694)

use credit rating institution issuer ratings, which considers all factors that decide the capacity of the bank to repay its debt, including potential external support, as the dependent variable. They test this against the individual bank ratings, which only include the intrinsic capacity of the bank to repay its debt. They find that both their size measures have a significant positive impact on bank issuer ratings. Moreover, this effect is larger for banks with low intrinsic financial strength.

A study made by Schich and Lindh (2012) is closely related to this paper. They set out to investigate the difference between implicit government guarantees to banks across countries, and whether these implicit guarantees change over time. The authors employ credit ratings from Moody's and Fitch to create a variable,*uplift*, that measure the implicit government guarantees. They measure the state of the governments by using government credit ratings and conclude, by using data of 123 large European banks, that there are significant differences in implicit government guarantees for financial institutions in countries with different government ratings. Further, they conclude that banks which benefit from these implicit guarantees benefit from significantly lower funding cost, thus creating distortion on the bank market.

Bijlsma and Mocking (2013) perform a study in a similar fashion. However, they examine the relation between a bank's funding costs and credit ratings. They do this by collecting bank individual bond data on a daily basis and test how debt-servicing costs change with the presence of external support. They use a similar variable to Schich and Lindh (2012), but instead use a relative measure of the uplift. They conclude that large banks experience higher rating uplifts, and that banks with higher uplift do have funding advantages. They also find a TBTS effect, consistent with e.g. Demirgüç-Kunt and Huizinga (2012) and Barth and Schnabel (2013), by showing that funding advantages diminishes for banks with total assets above $1000 billion.

3 Data and methodology

3.1 Panel data

The dataset consists of a panel of 37 banks from 17 countries within the European Union from the years 2004 to 2012. Table 1 lists all banks and countries in the dataset. All banks represent the largest banks - in terms of total assets - in their respective country for which data was available.

The time period was decided upon by considerations of the economic climate and also constrained by data availability. Earlier research on related topics have often started around the year 2007, to include effects of the global financial crisis and the uncertainty that followed (Bijlsma and Mocking, 2013; Demirgüç-Kunt and Huizinga, 2012, e.g.). Our dataset stretches further back in time, to also include a pre-crisis period.

3.1.1 Too big to fail

As described in section two, a number of methods have been employed to examine TBTF. One method is to use event study methodology to test whether outcomes of an event differ between larger and smaller banks (O'Hara and Shaw, 1990, e.g.). Another method is to measure the effect on market variables such as CDS spreads and/or market to book value, controlling for size (Demirgüç-Kunt and Huizinga, 2012; Barth and Schnabel, 2013). A third method makes use of credit rating agencies' ratings on firms to examine TBTF (Rime, 2005; Schich and Lindh, 2012; Bijlsma and Mocking, 2013). The latter of these methods allow us to create a variable that can act as a measurement of government guarantees (Schich and Lindh, 2012).

A credit rating is an assessment of the likelihood that a debt issuer will be able to meet their debt obligations (Stern and Feldman, 2004). The rating agencies

assign firms ratings in numeric of alphabetical scales, where the highest ratings indicate a very low probability of the issuer not meeting its debt obligations. The major rating agencies are the American firms Fitch, Moody's and Standard & Poor's (Stern and Feldman, 2004). Each of these rating agencies publishes a set of ratings assessing a banks' ability to meet various debt obligations. In addition to such ratings, Fitch and Moody's release a *stand-alone credit rating* (Schich and Lindh, 2012). This rating only takes into account a banks' intrinsic capacity to meet its debt obligations (Rime, 2005). We use Moody's credit ratings because of their availability. Moody's stand-alone rating is called *Bank Financial Strength Rating* (BFSR). It measures the likelihood that a bank will *"require assistance from third parties such as its owners, its industry group, or official institutions."* (Moody's, 2012, p. 29)

To measure the assessment which includes external support we gather long-term credit ratings (LTCR) for all banks in the sample. The LTCR measures a banks ability to meet its domestic or foreign currency deposit obligations. A separate rating is released for both domestic and foreign currency. We gather Moody's Bank financial strength rating and the long-term deposit rating on foreign currency. The ratings on foreign currency spans over a longer time period on Moody's website than does the domestic ratings, and allow us to gather ratings for the entire sample.

The BFSR and LTCR are measured in different scales, where BFSR range from A down to E with additional signs (+ and -) below A and above E, and LTCR range from Aaa down to C, with numeric and alphabetical combinations further specifying the rating (see Table 2 for the exact scales). We use the mapping table from Moody's (2012), and reproduced in Table 2, to convert the BFSR and the LTCR into numerical values. The LTCR is simply converted its corresponding numerical value, while we calculate averages for BFSR values that corresponds to more than one LTCR. We convert the LTCR to the 1-20 scale of the LTCR rating

according to Table 2. Since there is no BFSR corresponding to Ca (Moody's, 2012) this value is not included when calculating the average rating corresponding to rating E. The lowest LCTR, C, is excluded altogether since banks still operating does not receive such rating as it indicates a company in default.

The BFSR is subtracted from the LTCR to create a variable that measures the uplift generated by external support (Schich and Lindh, 2012; Bijlsma and Mocking, 2013). To account for the fact that the absolute value of this uplift is restricted by the BFSR value we create a value for the relative uplift (Bijlsma and Mocking, 2013). The relative uplift relates the absolute uplift to the highest uplift possible (see Table 9 for details of calculations of all variables). The relative uplift is our dependent variable, and measures the implicit government guarantees (Schich and Lindh, 2012).

The method of using credit ratings as proxy for TBTF is not unproblematic. First of all, the LTCR does not only account for external support from the government, but also external support from a possible parent company. This would mean we overestimate the government support, which would make any inference dubious. Secondly, the rating is the result of Moody's subjective assessment of the size of the external support a bank is afforded (Bijlsma and Mocking, 2013). A subjective measurement is certainly subject to questions about its empirical worth, but ratings from the major credit rating institutions are extensively used and in both the private and public sector, suggesting their output is viewed as credible (Stern and Feldman, 2004). We attempt to minimize the effect of the former problem by selecting only the largest domestic banks from each country, to attempt to isolate the government support and guarantees.

3.1.2 Country variables

We first consider a country's ability to finance a bailout through three variables: the government debt in relation to its gross domestic product, the yield on long-term government bonds, and the government's reserves. These variables are *"essential for the question whether a country has enough resources or whether it can raise enough money for bailing out its banking sector"* (Barth and Schnabel, 2013, p. 14).

The government's debt ratio is the year-end value of the central government's gross debt divided by the year-end GDP. For 2012, the year-end value of the government debt ratio is, as of writing, yet to be published and therefore the ratio at the end of the third quarter of 2012 is used. A higher debt ratio indicates more difficulties to raise funds (Barth and Schnabel, 2013), and is consequently expected to have a negative relation with the dependent variable. That is, for banks in countries with higher debt levels we expect a decrease in the implicit guarantee offered by its sovereign.

The yield on government bond is the yearly rate of the Maastricht criterion[3] long-term bonds. A higher yield indicates more difficulty raising funds, and should therefore have a negative relation with our independent variable.

The government reserves are the foreign official reserves in relation to GDP at the year-end and include financial assets such as foreign currency, securities and derivatives that the government holds. It also includes gold reserves as well as other claims on foreign governments. The variable is intended to measure the funds at the government's disposal. Larger reserves should indicate a greater likelihood

[3]"The Maastricht Treaty EMU convergence criterion series relates to interest rates for long-term government bonds denominated in national currencies. Selection guidelines require data to be based on central government bond yields on the secondary market, gross of tax, with a residual maturity of around 10 years." (Eurostat, 2011)

that the government can rescue a distressed bank. Consequently, we expect a positive relation between the uplift and government reserves.

In addition to testing the financial ability of governments to rescue large banks, we also include a set of macroeconomic determinants to control for the overall state of the economy and for specific economic phenomena.

The growth rate of the stock market index indicates the financial conditions of the largest firms in the country (Bonfim, 2009). It also gives indications for the markets belief in the future state of the economy. A higher growth rate signals a healthier economy with a positive outlook for the future, and hence, we expect a positive relation to the dependent variable.

The unemployment rate is the European Commission *Macroeconomic Imbalance Procedure* (MIP) three-year moving average unemployment rate. Unemployment rate is an indicator that has many possible implications. A high unemployment rate is a costly burden for the government, both in terms of decreased tax revenue and costs for social benefits linked with unemployment. It can also be seen as a measurement of the level of demand in the economy; as higher unemployment rate might signal decreased production (Castro, 2013). Thus, we expect a negative relation between unemployment and the guarantees a government affords its banks.

The change in exchange rate is also MIP-criterion 3 year moving average. The rates are the yearly percentage change relative to 35 other industrial countries, based on HICP/CPI deflators. Exchange rates can control for the external competitiveness of the country's industries; increasing exchange rates indicate that the local currency is appreciating towards its trading partners, meaning the country's production is relatively more expensive (Castro, 2013). We therefore expect a negative relation to the dependent variable.

Real GDP growth rate is added to control for the overall business cycle in the

country (Castro, 2013). In growing economies the support should be higher than in economies with slow growth, meaning we expect a positive relation with TBTF guarantees.

GDP per capita is expressed in Euro for all countries to remove exchange rate differences. It is included to measure the country's overall economic development (Demirgüç-Kunt and Huizinga, 2012). We expect that richer countries can afford their banks a higher degree of protection, and consequently we expect a positive relation with the dependent variable.

We also include the rate of inflation in the country. High inflation could indicate monetary difficulties in the country (Demirgüç-Kunt and Detragiache, 2005). The effect of high inflation is that the real income level in the country decreases (Castro, 2013). High inflation can be seen as a sign of a troubled economy and thus we should expect a negative relation. An alternative view is that the reduction in the real value of money makes debt servicing easier (Castro, 2013). This would see banks being more likely to be able to meet their debt obligations, which could be reflected in a bank's uplift and should therefore show a positive relation with the uplift variable. The expected direction of the coefficient on this variable, then, is uncertain.

Lastly, we have collected Moody's government ratings for each country. The government rating uses the same scale as the LTCR, and the conversion to numerical values follows those in the second column in Table 2. The variable is used in the robustness tests in an attempt to validate the model specification.

In addition to these country variables we use the natural logarithm of bank assets to control for the size of banks (Rime, 2005). Consistent with the TBTF hypothesis, size should be positively related to the uplift.

All independent variables are listed in Table 3 with a short description and the expected relation to the dependent variable. Table 4 shows descriptive statistics

for the government variables.

3.1.3 Data sources

Credit ratings are collected from Moody's webpage manually. We collect each bank's rating at the year-end to correspond with the time of our explanatory variables. The government ratings were also collected manually from Moody's.

All national accounts and macroeconomic data are collected from Eurostat. Bank accounts data were collected from Datastream. All data were gathered through March and April of 2013.

3.2 Methodology

When confronted with panel data it is likely that residuals are correlated across observations, and standard OLS estimators can be biased. The bias enters as an unobserved effect, and introduces an omitted variable bias to the model. The correlation can occur both in the time series and in the cross-section. We consider the model:

$$y_{i,t} = \alpha + \beta' X'_{i,t} + \mu_i + \upsilon_t + \varepsilon_{i,t} \tag{1}$$

Where $y_{i,t}$ is the relative uplift of bank i at time t, β is a K x 1 vector of coefficients and X is a K x 1 vector of explanatory variables. The term μ_i is the time consistent unobserved effects, υ_t is the firm consistent unobserved effects, and $\varepsilon_{i,t}$ is the error term. The term μ_i represents the bank fixed effects that are correlated over time, while υ_t represents any time fixed effects that are correlated across firms. A fixed effects transformation allows us to eliminate the unobserved bank effects μ_i (Wooldridge, 2002). This absorbs bank fixed effects that are constant over time. It does not, however, account for the time fixed effects (Petersen, 2009). To absorb the time effect we include period dummies pd1, pd2 and pd3 that represent the

years 2004-2006, 2007-2009 and 2010-2012 respectively. This leaves us with the two-way fixed effect estimation equation:

$$\hat{y}_{i,t} = \hat{\alpha} + \hat{\beta}' X'_{i,t} + \hat{\gamma}' PD + \hat{\varepsilon} \tag{2}$$

Further, we use clustered standard errors, which should provide unbiased standard errors as long as the time effect is indeed fixed (Petersen, 2009). Clustered standard errors are also robust to heteroskedasticity (Petersen, 2009). We follow (Barth and Schnabel, 2013) and cluster standard errors at the country level to account for correlation between banks within each country.

We run four specifications of equation (2). The specifications and the results are presented in Table 7 and in more detail in Section 4.2.1. We discuss their implications in section 4.2.2.

Further, we perform two checks of robustness. First, we run one of the specifications again, but replace the variables intended to measure the government's ability to fund bank bailouts with Moody's ratings of a government's creditworthiness (Bijlsma and Mocking, 2013). This variable acts as an alternative indicator of a government's ability to raise funds. We examine whether earlier results are robust to changes in the specification, and consequently expect similar results as the original specification. Second, we replace the most extreme values of the sample by winsorizing at the 95% level. This means that we set the maximum and minimum values in the sample equal to the 2,5% percentile in each tail, trimming the sample from extreme values. In this test we examine whether the results are robust to controlling for a potential long-tailed sample distribution (Tukey, 1962).

4 Empirical analysis

We begin the empirical analysis by presenting and analyzing descriptive statistics. We then test the model outlined in section 3. Testing the robustness of our results concludes this section.

4.1 Descriptive statistics

Panel A in Table 5 reports summary statistics of the size of the relative uplift for the three three-year periods and for the entire sample, together with statistics for Moody's BFSR and LTCR ratings. The mean uplift is about 30,3% for the entire sample period. More interesting, though, is the drastic changes that has occurred between the three-year periods of the sample. The development of the uplift over the sample period is shown in Figure 1. It shows a remarkable development. In the first period the uplift was stable for the entire period with an average of 6,95%. The effect of the financial crisis in the second period is unmistakable with the uplift rocketing to 49,4% between the years 2006 and 2007, and remaining relatively stable at this level until 2009. Since 2009 the uplift has steadily decreased, and in the third period it averages 33,8%. Examining Moody's actual ratings in panel B of Table 5 can offer some insight into this development. Focusing on the second period we notice both a decrease in the average stand-alone rating compared to the previous period, but also higher long-term ratings. At first glance, it seems surprising that in the midst of a global financial crisis, where the lower stand-alone rating indicate a realization that banks were not as stable as previously thought, Moody's rate their long-term creditability higher. However, this is in line with the notion of TBTF as a government guarantee to its banks. As the banks were facing extraordinary difficulties, expectations of government intervention were put into practice in this period with numerous bailouts throughout Europe, and with the

European Commission approving commitments of an incredible €3,5 trillion to the crumbling financial sector (European Commission, 2009), implicit guarantees during this time became very explicit. With such support, the risk of a large bank defaulting on its debt obligations was actually deemed lower than during the years of stability and growth between 2004 and 2006.

The decrease in the third period could be seen as an indication that the European debt crisis has indeed affected government's ability to support financially strained banks. Expectations of government support certainly seem to be decreasing. While it could be an effect of the economic climate in European countries declining in the period, a more reasonable explanation is that many of the explicit emergency guarantees were withdrawn, which would account for the decrease (Schich and Lindh, 2012). However, the reason for withdrawing the guarantees is unclear: is it in response to a more stable financial system, or an effect of governments' deteriorating finances?

It could also be viewed as the level of support beginning to return to pre-crisis levels. However, market participants - having seen that when circumstances call for it - will expect governments to reinstate these extensive guarantees (Schich and Lindh, 2012), and a full return to the levels of 2004-2006 seem unlikely. The interpretation of what has happened since 2010 is difficult. To get further insight into how the government affects TBTF we take a closer look at the third period the European debt crisis and in particular at Greece, Italy, Portugal, Spain and Ireland, labeled GIPSI by Castro (2013). Table 6 reveals the difference in uplift between the countries most severely hit by the European debt crisis and the rest of Europe. The relative uplift in the GIPSI countries is less than half of that in the rest of the sample, with a mean uplift of about 17,7% compared to 39,8%. This result further indicates that the health of an economy influences the support that can be afforded to banks. Countries in crisis seem less likely to provide extensive

guarantees than healthier economies. To get more insight into what affects the level of support banks receive from their sovereigns we perform a series of regressions on the relative uplift in the next subsection.

4.2 Model estimations

We start by estimating the model specified in Section 3. We then proceed to test how the determinants of a country's financial ability to rescue failing banks, identified by Barth and Schnabel (2013), affect the uplift. This is followed by including a set of macroeconomic variables that control for the overall state of the economy. In the last subsection we check the robustness of our results by first replacing determinants of fiscal ability for Moody's government ratings to test if specification of the model holds under different circumstances, and secondly by winsorizing all variables at the 95% level to control if the results are robust to outliers in the sample. We begin by describing the regression results in the subsection below and continue to assess their implications in the succeeding subsection.

4.2.1 Regression results

The results from regressions (1) to (4) are presented in Table 7. Each regression uses the relative uplift as the dependent variable and a set of independent variables as described in Section 3. An overview of the independent variables is found in Table 3. The estimation intends to test whether guarantees to TBTF banks are affected by the government's financial position and the economical state of its sovereign. Across regressions (1) to (4) the variable controlling for size the natural logarithm of total bank assets is negatively related to the uplift at levels of significance ranging from the 10% to 1% level. Regressions (1) to (4) show that a country's debt level and the yield on its government bonds are negatively related to the uplift variable at significant levels, while total government reserves

are not related at any level of significance. The former two is intended to capture a country's ability to raise funds, whereas the latter measures the funds already at its disposal (Barth and Schnabel, 2013). Regression (2) adds controls for the macroeconomic conditions identified by Demirgüç-Kunt and Detragiache (2005) as significantly correlated with banking crises. The results show that the rate of inflation is negatively related to the uplift, while the growth rate of real GDP is not significantly related at any level. Regression (2) was performed on 285 observations with an R^2 of 0.618.

In regression (3) we use a set of macroeconomic determinants from Castro (2013), and Demirgüç-Kunt and Huizinga (2012) instead. The results show that the growth rate of the stock market, the unemployment rate and GDP per capita is not significantly related to the dependent variable, while percentage change in the exchange rate and growth rate of real GDP is negatively and significantly related. This regression was performed on 238 observations, yielding R^2 of 0.683. In regression (4) we control for potential inertia in the macroeconomic determinants from regression (3) (Patro, Wald, and Wu, 2002; Castro, 2013, e.g.). All macroeconomic variables are lagged, except for the growth rate of the market, which is assumed to be more responsive to the economic climate. The results show that the growth rate of the stock market and GDP per capita is positively, and significantly related to the uplift (at the 10% and 5% levels respectively). The unemployment rate, the central bank interest rate and the growth rate of real GDP are negatively related to the banks' uplift. Regression (4) yielded an R^2 of 0.678 across the 271 observations.

4.2.2 Regression analysis

The results from regressions (1) to (4) reveal a negative relation between the uplift variable and bank size. Earlier research has found size to be positively related

to TBTF variables (Völz and Wedow, 2011; Bijlsma and Mocking, 2013, e.g.). This result, though, is in line with the hypothesis that banks can grow too big to save (Demirgüç-Kunt and Huizinga, 2012; Barth and Schnabel, 2013). Taking into consideration that our sample consist of the largest banks in their respective countries, this result shows that at some level of size the guarantees offered by the government decreases. When banks grow too large, it puts a constraint on the government's ability to rescue failing banks (Völz and Wedow, 2011). Further, a substantial part of the very largest banks' business activities and operations takes place across borders and therefore introduces a need for cross-country coordination (Völz and Wedow, 2011). Consequently, as banks become bigger and thus more diversified across countries, the link between bank and a specific government becomes more vague and introduces more difficulties regarding any guarantees. Essentially, a bailout for the absolute largest banks in Europe is too costly for their governments alone (Acharya and Yorulmazer, 2007). This is especially true for small countries with a local currency and with a large, internationally exposed banking sector (Buiter and Sibert, 2008).

In all regressions (1) to (4) we test whether a government's fiscal ability affects the uplift. The variables measure both the government's ability to raise funds, as well as the funds at its disposal (Barth and Schnabel, 2013). We include macroeconomic variables that control the macroeconomic environment in regressions (2) to (4). In all regressions the government debt level and the yield on long-term government bonds has coefficients that indicate that limited fiscal possibilities puts a constraint on the guarantees. As a government's debt level increases it will result in more difficulties, or reluctance, to take on more debt to rescue failing banks. The long-term government bond yields measures the cost of issuing debt for the government. The negative coefficient on both these variables are in line with the argument that a country's ability to raise funds has an impact on the guarantees

it is believed to be able to offer (Barth and Schnabel, 2013). The funds already at the government's disposal seem to have no effect on the uplift in our sample. Overall, across all regressions it seems the ability to raise funds, and the cost of raising funds affect the size of the implicit guarantees offered by the government.

We include variables that control for business cycle effects that represent a banks growth opportunities, and monetary policy effects by introducing the real GDP growth and inflation rate variables in regression (2). Demirgüç-Kunt and Detragiache (2005) argue that slow economic growth and loss of monetary control contributes to banking crises. This suggests that banks are negatively affected by higher rate of inflation. As described earlier, the expected direction of inflation was uncertain. Higher inflation could, as mentioned, be seen as signs of a loss of monetary control, which could be an indicator of economic difficulties. In which case there should be a negative relation to the relative rating uplift. It could also have the opposite effect, through enabling banks to repay their debt more easily (Castro, 2013). The negative and significant result suggests that the effect on banks' ability to repay their debt does not outweigh the negative effects of high inflation.

In regression (3) we have a different set of macroeconomic variables. We include the unemployment rate and the growth rate of the stock market, as well as the percentage change in the exchange rate. These variables test the effect of the level of production and demand, the strength of a country's industries, and for the strength of the export industries in a country, respectively. The results suggest that a country's relative competitiveness on the export market is related with its government's support to incumbent banks. The nature of this relation is debatable. One argument would be that struggling export industries also needs government support, and that this puts constraints on the level of support the government can offer to the financial sector. An alternative argument is that struggling export

industries are simply a good indicator of a country in distress. The growth rate of real GDP is significantly opposite to the hypothesized direction. As mentioned in Section 3, higher GDP growth should indicate that the economy is performing well and is in a positive stage of the business cycle, and hence our expectation was that higher GDP growth should be related positively to the probability that governments protect its banks.

We run the same regression as in (3) in regression (4), but with a one-year lag on four of the variables. When controlling for economic inertia the coefficients are more in line with their hypothesized directions. The positive coefficient on the economic development of a country, measured by GDP per capita, suggests that wealthier countries can offer more extensive guarantees to their banks. In this specification, the growth rate of the stock market is also significantly positive, while the unemployment rate, exchange rate and real GDP growth are negative. The overall interpretation of results from regression (4) is that, taking into account macroeconomic inertia, the macroeconomic conditions could very well affect the level of support received by banks. As in regression (3), the negative result on real GDP growth rate is somewhat surprising. A simple interpretation of this result is that in growing economies banks are less likely to be in need of government support. In growing economies banks have more growth opportunities (Demirgüç-Kunt and Huizinga, 2012), which seem to be reflected in the uplift. This result, coupled with the lack of significant results on some of the macroeconomic variables from earlier regressions, raises questions about making inference on which economic conditions really affect the uplift, and certainly how.

Our results show that as Europe was hit by sovereign debt crisis the level of government support, as measured by the relative rating uplift, decreased. We have also shown that for countries in crisis, the relative uplift is less than half the level of the rest of the countries in the sample. Both seem to point to a

conclusion that the state of an economy seems to affect the guarantees banks receive. In regression analysis we show our result on bank size is consistent with the TBTS hypothesis, stating that as banks grow very large their prospect being saved decrease (Demirgüç-Kunt and Huizinga, 2012).

The effect of the macroeconomic conditions is inconclusive, due to changing results in the estimations. The effect of a government's fund-raising abilities, though, seems to really affect a bank's uplift. The results from these variables are consistently significant in their hypothesized direction through all four regressions, and suggest that the government's fiscal situation does affect the guarantees that banks receive.

4.3 Robustness checks

In this section we present the results of regressions that test the robustness of the results from the previous subsection. We perform two separate tests, both presented in Table 8. To test the robustness of our specification, we replace the fiscal determinants *Debt to GDP*, *Gov. bond yield* and *Gov. reserves* with Moody's rating of a government creditworthiness and repeat regression (4). Regression (1) reveals that country's creditworthiness, as evaluated by Moody's, has a positive effect on a bank's uplift. That is, in stronger economies banks has a more extensive implicit protection from their government. This result is significant at the 1% level and is consistent with Bijlsma and Mocking (2013), and Schich and Lindh (2012). Bank size has a negative relation to government guarantees in this specification as well. Both these results are consistent with the main test. The result on the unemployment rate from regression (4) is no longer significant when changing the specification. The rest of the variables are still significant and have the same direction as in regression (4).

Overall, the results seem robust to replacing fiscal determinants with a proxy,

and are in line with our previous tests and reinforce the hypothesis that the state of the sovereign's economy affects the guarantees it can afford its banks.

To control for extreme values and outliers in the sample we perform a second robustness test, winsorizing all variables at the 95% level and repeating regression (4) from the main estimation. The results from this regression show that bank size and debt to GDP, both of which were significant in the main estimation, is not in this specification. In both cases extreme values seem to have introduced a positive bias in these estimators. Comparing these estimators' coefficients, bank size in the main specification (-0.107) with (-0.604) in regression (2), and debt level (-0.344) with (-0.215) show that the extreme values causes overestimated coefficients and significance levels. The result on bank size, it could be argued, could still be consistent with our interpretation from earlier: that the negative coefficient signals that the very largest banks could be TBTS. The loss of significance could be viewed as being in line with this reasoning, since the very largest banks are now "smaller" and the TBTS effect is partially removed from the sample. The loss of significance on the coefficient on the level of debt is more problematic. It has been consistently, and significantly, in line with its hypothesized direction across all earlier specifications. This result indicates that extreme values cause the previous estimations to overstate the importance of the debt level in explaining a government's ability to offer protection to its banks. The result could indicate that the effect of a country's indebtedness is only relevant at extreme levels, and any conclusions must be made with this in mind.

The yield on government bonds, unemployment rate, interest rate and real GDP growth are still negatively and significantly related to the uplift. Comparing their coefficients and standard errors with the earlier results give no indication that the previous specification consistently over- or understates the estimates.

5 Conclusion

This paper has examined how a government's financial abilities and the economical situation in a country affects the generosity of the guarantees it affords its banks. By using the relative rating uplift in Moody's credit ratings as a measure for these guarantees we have shown that there has been a dramatic development in the rating uplift over the sample period, with a sharp increase during the recent financial crisis, and a clear decrease since 2010 when the European debt crisis hit. Whether the decrease is simply the uplift returning to its pre-crisis level, or affected by the economic situation in Europe remains to be seen. An indication of the latter is the result that average uplift is more than twice as high in the healthier European economies than in the countries in crisis: Greece, Italy, Portugal, Spain and Ireland.

In four regressions we then test the relation between the relative rating uplift to a set of government variables and control for bank size. The results show that a bank's relative uplift is negatively related with its size, the government's debt level and the yield on government bond across all four specifications. These results suggest that a government's fiscal ability affects how generous guarantees it can afford its banks. They also suggest that larger banks are afforded less protection. We see this as a result of the sample, which consist only of the largest banks in their respective country. The negative effect of size could indicate that the largest banks are simply too large, and have become too big to save, a result and an interpretation consistent with Demirgüç-Kunt and Huizinga (2012).

The effect of size and debt level is not robust to trimming the sample from extreme values, indicating the significance could be overestimated by a potential bias from extreme values.

Introducing macroeconomic determinants we control for such effects as the business cycle, the level of production and demand, and for the relative com-

petitiveness of a country's industries. The regressions give mixed results for the macroeconomic variables. But when considering time lag effects unemployment rate, exchange rate and real GDP growth show a negative and significant relation to the relative uplift, while the growth rate of the stock market index and GDP per capita are positively related. These results suggest that, with inertia considered, a government's financial ability and the country's macroeconomic situation affect bank guarantees. But the mixed results from regressions that include macroeconomic variables, as well as questions regarding the length of the time lag (that is, is a one-year lag the correct length to capture potential inertia) leads us to conclude that further investigation is needed to draw conclusions on which, and how, macroeconomic determinants affect bank protection.

Overall, we believe our results show that bank protection is affected by the bank's home country, and that a government's ability, and possibility, to raise funds affect the protection it affords its banks. The ability to, and cost of, taking on new debt to rescue financial institutions in distress seem key to the level of support a bank receives. Although, with the caveat that the debt level did not hold up in robustness checks.

A bank's status, whether too big to fail or too big to save, seem to not only be a result of the bank outgrowing its sovereign, but could also be a result of an economy becoming too small in relation to its banks. Given that earlier research has found funding advantages for banks perceived as too big to fail (Bijlsma and Mocking, 2013; Schich and Lindh, 2012), an implication of these results is that banks that have become too big to save are not optimally sized, and that the optimal size depends on the home government's finances. Very large banks, and banks in struggling economies could have a funding disadvantage. Governments not being able to provide sufficient protection to banks, whether because of too large banks or too weak public finances, could also have implications for governments, and the

society as a whole. As Völz and Wedow (2011) argues, when banks become too large the private sector risk having to bear a larger part of the cost if these banks become distressed. It should be in the interest of banks, governments and the rest of society that banks are cautious about growing too large.

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6 Appendix A

Table 1

List of all countries and banks in the sample

Country	Number of banks	Name of bank
Austria	2	Erste Bank AG
		Raiffeisen Bank Int. AG
Belgium	2	Belfius Bank SA/NV (formerly Dexia)
		KBC Group NV
Cyprus	2	Bank of Cyprus Group
		Cyprus Popular Bank PCL
Czech Republic	1	Komercni Banka
Denmark	1	Danske Bank A/S
France	4	Crédit Agricole SA
		BNP Paribas
		Natixis
		Société Générale
Germany	2	Commerzbank AG
		Deutsche Bank AG
Greece	3	Alpha Bank AE
		EFG Eurobank Ergasias SA
		National Bank of Greece SA
Hungary	1	OTP Bank Plc.
Ireland	1	Bank of Ireland
Italy	2	Banca Monte dei Paschi di Siena SpA
		UniCredit SpA
Netherlands	1	ING Bank NV
Poland	2	Bank Polska Kasa Opieki SA
		Powszechna Kasa Oszczednosci Bank Polski
Portugal	2	Banco Comercial Português SA
		Banco Espirito Santo SA
Spain	2	Banco Bilbao Vizcaya Argentaria SA
		Banco Santander SA
Sweden	4	Svenska Handelsbanken AB
		Skandinaviska Enskilda Banken AB
		Swedbank AB
		Nordea AB
UK	5	Barclays Bank Plc.
		HSBC Bank Plc.
		Lloyds TSB Bank Plc.
		Royal Bank of Scotland Plc.

Table 2

Moody's credit rating conversion

The table shows the method employed to convert Moody's ratings to numerical values, and converting them to the same scale. We follow Moody's conversion table (see Moody's, 2012). When the BFSR rating corresponds to more than one LTCR an average is calculated. Rating Ca has no corresponding BFSR in Moody's conversion scale, and is hence excluded when averaging the BFSR rating E.

Long-term credit rating	Numeric Value	Bank Financial Strength rating	Numeric Value
Aaa	20	A	20
Aa1	19	A-	19
Aa2	18	B+	18
Aa3	17	B	17
A1	16	B-	16
A2	15	C+	15
A3	14	C	14
Baa1	13	C-	12,5
Baa2	12		12,5
Baa3	11	D+	10,5
Ba1	10		10,5
Ba2	9	D	9
Ba3	8	D-	8
B1	7	E+	6
B2	6		6
B3	5		6
Caa1	4	E	3
Caa2	3		3
Caa3	2		3
Ca	1	-	-

Table 3

Descriptive statistics by groups of economies

This table presents all independent variables with a short description and their expected relation to the dependent variable.

Variable	Description	Source	Expected sign
Size	Natural logarithm of bank assets. Controls for size effects.	Rime (2005)	+
Debt to GDP	Government debt in relation to GDP. Measures a country's ability to raise money.	Barth and Schnabel (2013), Demirgüc-Kunt and Huzinga (2012), Castro (2013), etc.	-
Gov. bond yield	The Maastricht criterion yield on 10-year government bonds. Measures of a country's ability to raise money.	Barth and Schnabel (2013)	-
Gov. reserves	Government reserves in relation to GDP. Includes all financial assets, claims on other governments and gold. Intended to measure a government's present financial ability.	Barth and Schnabel (2013)	+
Market Growth	The growth rate of the stock market index. Controls for the financial status of the largest firms, and for the market's outlook on the future.	Bonfirm (2009), Castro (2013)	+
Unemployment	Three-year moving average unemployment rates. Controls for production levels and domestic demand.	Castro (2013)	-
Exchange rate	Percentage change in exchange rates to 35 industrialized countries. Controls for external competitiveness.	Castro (2013)	-
Real GDP growth	Annual growth rate of real GDP. Controls for business cycle movements.	Demirgüc-Kunt and Detragiache (2005), Demirgüc-Kunt and Huzinga (2012), Castro (2013)	+
GDP per capita	Included to control for the level of economic development.	Demirgüc-Kunt and Huzinga (2012)	+
Rate of inflation	Annual rate of inflation. Controls for effects from real money value changes. Predicted effect is uncertain.	Demirgüc-Kunt and Detragiache (2005), Castro (2013)	+/-
Gov. rating	Moody's government rating. Proxies for the overall fiscal and economical situation in a country-	Bijlsma and Mocking (2013)	+

Table 4

Summary statistics for all government variables

This table provides descriptive statistics for all government variables in the sample. The data stretches over the period 2004-2012. All data were collected from Eurostat.

Variable	Observations	Mean	St. Dev.	Min	Max
Debt to GDP	333	0.6743303	0.317154	0.21	1.812
Gov. bond yield	333	0.0453126	0.024846	0.014	0.225
Gov. reserves	333	0.0661833	0.0618956	0.0033858	0.421452
Market Growth	280	0.0213887	0.2149482	-0.4469078	0.6184597
Unemployment	333	0.081	0.0320338	0.035	0.223
Exchange rate	296	0.0138615	0.067447	-0.199	0.244
Real GDP growth	333	0.013042	0.0293865	-0.071	0.07
GDP per capita	329	26229.76	8820.227	5300	43700
Rate of inflation	333	0.0237477	0.0120702	-0.017	0.079
Gov. rating	333	17.77778	3.69286	0	20

Table 5

Summary statistics for the credit rating variables over the sample period

Panel A shows summary statistics for the relative uplift of all 37 banks in the sample, for three three-year periods and the sample total. Panel B shows summary statistics for Moody's credit ratings. All data in this table were collected manually from Moody's website and converted into numerical values in accordance with Table 2.

Panel A: Relative uplift

Variable		2004-2006	2007-2009	2010-2012	Total
Relative uplift	Observations	105	108	111	324
	Mean	0.0695489	0.4935473	0.3381717	0.3029099
	Min	-0.25	-0.2	-0.1666667	-0.25
	Max	0.6666667	1	0.8	1
	Std. Dev.	0.1484985	0.2088842	0.2303495	0.2643985

Panel B: Moody's credit ratings

Variable		2004-2006	2007-2009	2010-2012	Total
Stand alone rating	Observations	108	108	111	327
	Mean	16.15278	14.82407	11.47297	14.12538
	Min	10.5	9	3	3
	Max	20	18	16	20
	Std. Dev.	2.291245	2.037401	3.441616	3.316791
Long-term rating	Observations	108	108	111	327
	Mean	16.62963	17.22222	13.99099	15.92966
	Min	13	14	3	3
	Max	20	20	19	20
	Std. Dev.	1.683302	1.613803	4.095442	3.072429

Table 6

Descriptive statistics by groups of economies

Panel A shows summary statistics for the relative uplift of all 37 banks in the sample, grouped into countries in crisis: Greece, Italy, Portugal, Spain and Italy (GIPSI), and the rest of the sample, as well as the sample total. Panel B shows summary statistics for Moody's credit ratings. All data in this table were collected manually from Moody's website and converted into numerical values in accordance with Table 2.

Panel A: Relative uplift

Variable		GIPSI	Rest of sample	Total
Relative uplift	Observations	30	81	111
	Mean	0.1765217	0.3980421	0.3381717
	Min	-0.0666667	-0.1666667	-0.1666667
	Max	0.75	0.8	0.8
	Std. Dev.	0.2242408	0.2032301	0.2303495

Panel B: Moody's credit ratings

Variable		GIPSI	Rest of sample	Total
Stand alone rating	Observations	30	81	111
	Mean	9.083333	12.35802	11.47297
	Min	3	3	3
	Max	16	16	16
	Std. Dev.	4.398439	2.51773	3.441616
Long-term rating	Observations	30	81	111
	Mean	10.46667	15.2963	13.99099
	Min	3	4	3
	Max	19	19	19
	Std. Dev.	5.008499	2.75429	4.095442

Table 7
Fiscal and economical determinants

The table provides regression results with the relative uplift as the dependent variable. The sample in regression (1) to (4) consists of 17 countries and 37 banks for the period 2004-2012. All country variables were collected from Eurostat. The independent variables and their expected relation to the dependent variable are described in Table 2. We report coefficients and robust standard errors clustered at country level (in parentheses) of fixed effects regressions with dummies for periods 2004-2006, 2007-2009 and 2010-2012 (omitted).

	Relative rating uplift			
Variable	(1)	(2)	(3)	(4)
Size	-0.115**	-0.0945*	-0.119***	-0.107*
	(0.0439)	(0.0485)	(0.0339)	(0.0508)
Debt to GDP	-0.349***	-0.371**	-0.496***	-0.344**
	(0.104)	(0.160)	(0.152)	(0.118)
Gov. bond yield	-1.389***	-1.461***	-2.253***	-1.249***
	(0.260)	(0.234)	(0.671)	(0.310)
Gov. reserves	-0.438	-0.619	-1.185	-1.170
	(0.813)	(0.906)	(0.692)	(0.709)
Rate of inflation		-2.843**		
		(1.147)		
Market growth			0.138	0.131*
			(0.0857)	(0.0738)
Unemployment			1.033	
			(0.617)	
Exchange rate			-0.697**	
			(0.309)	
Real GDP growth		0.134	-1.718*	
		(0.640)	(0.974)	
GDP per capita			1.46e-05	
			(1.13e-05)	
Unemployment $_{(t-1)}$				-1.489*
				(0.784)
Exchange rate $_{(t-1)}$				-0.757**
				(0.308)
Real GDP growth $_{(t-1)}$				-1.658**
				(0.636)
GDP per capita $_{(t-1)}$				1.80e-05**
				(7.85e-06)
Period 1	-0.418***	-0.432***	-0.446***	-0.335***
	(0.0624)	(0.0640)	(0.0691)	(0.0760)
Period 2	0.0708**	0.0580	0.0387	0.128***
	(0.0316)	(0.0493)	(0.0441)	(0.0365)
Constant	2.240***	2.082***	2.074***	1.831**
	(0.533)	(0.617)	(0.573)	(0.750)
Observations	318	285	238	271
Number of bank2	37	37	35	35
Adjusted R-squared	0.607	0.618	0.683	0.678

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8

Robustness tests

The table provides regression results for the robustness test performed. In regression (1) perform the same regression as in (4) in Table 7, but we replace the fiscal variables *Debt to GDP, Gov. bond yield and Gov. reserves* with Moody's government rating, as an alternative measure for the government's ability to raise funds. In regression (2) we perform the same regression as (4) in Table 7, but with all variables winsorized at the 5 % level (2,5% in each tail). We report coefficients and robust standard errors clustered at country level (in parentheses) of fixed effects regressions with dummies for periods 2004-2006, 2007-2009 and 2010-2012 (omitted).

	Relative rating uplift	
Variables	(1)	(2)
Government rating	0.0245***	
	(0.00596)	
Size	-0.142**	-0.0604
	(0.0526)	(0.0594)
Debt to GDP		-0.215
		(0.128)
Gov. bond yield		-2.536**
		(0.878)
Gov. reserves		-1.252
		(1.198)
Market growth	0.180***	0.160***
	(0.0573)	(0.0504)
Unemployment $_{(t-1)}$	-0.899	-1.886**
	(0.599)	(0.882)
Exchange rate $_{(t-1)}$	-0.700**	-0.826***
	(0.277)	(0.250)
Real GDP growth $_{(t-1)}$	-1.548**	-1.464**
	(0.529)	(0.581)
GDP per capita $_{(t-1)}$	2.50e-05***	1.91e-05**
	(5.77e-06)	(8.84e-06)
Period 1	-0.284***	-0.298***
	(0.0627)	(0.0752)
Period 2	0.169***	0.149***
	(0.0312)	(0.0348)
Constant	1.229	1.168
	(0.702)	(0.895)
Observations	271	271
Number of bank2	35	35
Adjusted R-squared	0.683	0.700

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9

Calculation of variables

The table provides the calculation of the variables that were constructed by us. All variables not in this list were gathered as is from their respective source.

$$Relative\ rating\ uplift = \frac{(LTCR - BFSR)}{(20 - BFSR)}$$

$$Size = \ln(Total\ bank\ assets)$$

$$Stock\ market\ index\ growth = \frac{\Delta Stock\ market\ index}{Stock\ market\ index_{t-1}}$$

Figure 1

The development of the relative uplift over the sample period

