Rating and Financing Subsidies for Global Systemically Important Banks

Abstract:

The international financial crisis of 2007-2011 showed that when it comes to the crunch, governments bail out their banks. The implicit insurance against insolvency results in better ratings and lower funding costs for banks. But what is the value of the bailout expectation for banks as perceived by market participants? This paper provides an empirical way for the identification and valuation of implicit governmental rating and financing subsidies for banks by analysing the support imbedded in banks' credit ratings. The results show remarkable rating and funding subsidies: A small group of so-called global systemically important banks receives debt funding cost advantages of more than 590 basis points. European banks have a funding cost advantage of 134 basis points (or 3.3 rating notches), whereas listed banks receive 67 basis points (or 1.7 notches) of support.

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1 Introduction

The institutional function of banks and non-bank financial institutions in 'capitalist'-oriented states has been debated since the 1950s[1]. From the viewpoint of regulators, the worldwide financial and economic crisis between 2007 and 2011 showed once again that the development of national economies depends on the well-being of particular, systemically important financial institutions[2]. Being aware of that fact, market participants tested the resilience of the banking sector, and were proven right: During the crisis, regulators had been intervening in the financial market with the aim of averting the insolvency of *global systemically important banks* (*G-SIB*s) by accepting high government re-indebtedness.[3] However, as shown in the course of the crisis, 'smaller' banks received financial aid too.

If financial institutions (and, among them, mainly credit institutions) are overtly or covertly categorised as being systemically important, they gain an implicit insurance against insolvency[4]. This so-called "*Too Big To Fail policy*"[5] (*TBTF policy*) is justified by politicians and regulators on the basis of the argument that the economic costs of a market exit of a systemically important bank are higher than the costs of a bailout by the government, and that the stability of the financial system is a public good anyway.

That banks receive implicit rating and financing subsidies from their governments is not, therefore, in question. The most important force behind these subsidies is market participants' perception of government support. But how can the value of government support be estimated? This paper provides a clear and traceable way for the (1) identification and (2) valuation of governmental support for banks by analysing the support embedded in their credit ratings. Besides the overall (LT issuer) rating, the rating agency Fitch provides a *viability rating* measuring the institute's intrinsic creditworthiness, and a *support rating* measuring the probability of parental / governmental support. This enables the separation of the government sup-

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1 Cf. with further references Moosa (2010), p. 11; Schönfelder (2012), p. 12; Bitz (2009), p. 349-353.

2 Cf. for statements on level of the G20: G20 (2008), p. 1 and 3 as well as G20 (2009), p. 3.

3 For a comparative overview of (the compatibility of) European and US interventions since the financial crisis, cf. Goldstein/Veron (2012).

4 Cf. representatively Stern/Feldman (2004), p. 17f and Moss (2009), p. 1f.

5 The term 'Too Big to Fail' (TBTF) is misleading or may be wrongly understood, but has established itself in the scientific discussion. It was first used by print media in the context of the governmental bailout of the bank Continental Illinois in 1984 (cf. representatively Gelman, [1984], quoted from Stern/Feldman (2004), p. 14).

port element in banks' LT issuer ratings, and the estimation of the value of the subsidy in terms of lower financing cost. Prior research on the topic of implicit government subsidies for banks – although with differing approaches – has been done by SOUSSA (2000), MORGAN/STIROH (2005), RIME (2005) and SCHICH/LINDH (2012). To this author's knowledge, only UEDA/WEDER DI MAURO (2013) use a comparable approach to valuate rating and financing subsidies for banks.

The results of the present paper indicate that a small number of global systemically important banks receive funding cost advantages of more than 590 basis points. Furthermore, in the other tested samples, banks implicitly receive rating and funding subsidies that are neither inconsiderable nor negligible: European banks have a funding cost advantage of 3.3 notches (or 134 basis points), whereas listed banks 'only' receive 1.7 notches (or 67 basis points) of support.

The remainder of this paper is structured as follows. In *Section 2*, the type of rating used for analysis is defined, followed by a descriptive presentation of the banking (sub-)samples. *Section 3* starts with a brief presentation of the empirical regression methodology and subsequently depicts the results. A novel connection from rating spreads to financing subsidies (based on market data) is presented. *Section 4* concludes with remarks on policy implications.

2 Data Description

The ratings for financial institutions that are most widely known and most communicated are the long term issuer credit ratings (*LT issuer ratings*) that "opine on an entity's relative vulnerability to default on financial obligations"[6]. Additionally for financial institutions, Fitch Ratings[7] (Fitch) provides a (1) *Viability Rating* and a (2) *Support Rating* which are defined as follows:

(1) "Viability ratings ... represent Fitch's view as to the intrinsic creditworthiness of an issuer. … The [viability rating] excludes any extraordinary support that may be derived from outside of the entity as well as excluding potential benefits to a bank's financial

[6] Fitch Ratings (2013), p. 9.

[7] Fitch, the third-largest rating agency after S&P's and Moody's has approx. 350,000 outstanding ratings (see. SEC [2012], p. 6).

position from other extraordinary measures, including a distressed restructuring of liabilities."[8]

(2) "Support Ratings are Fitch Ratings' assessment of a potential supporter's propensity to support a bank and of its ability to support it. ... Support Ratings do not assess the intrinsic credit quality of a bank. Rather they communicate the agency's judgment on whether the bank would receive support should this become necessary."[9]

1,184 LT issuer ratings were obtained from Fitch's online ratings database on May 11th, 2013. Leaving out those institutions without both a support rating and a viability rating, the *full sample* amounts to 696. Almost 38 per cent of the banks are located in Europe[10] (see Figure 1). There is data for 187 banks on the Asian continent, and the North American banks (U.S., Canada) amount to 133.

Figure 1: Regional Distribution of Sample

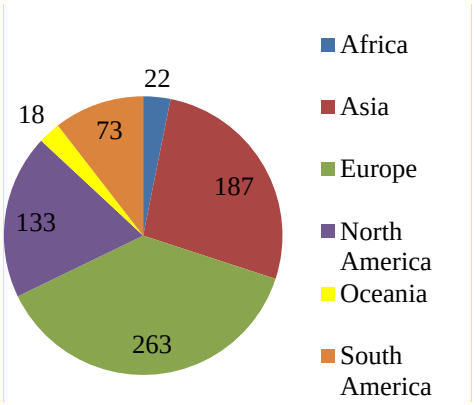
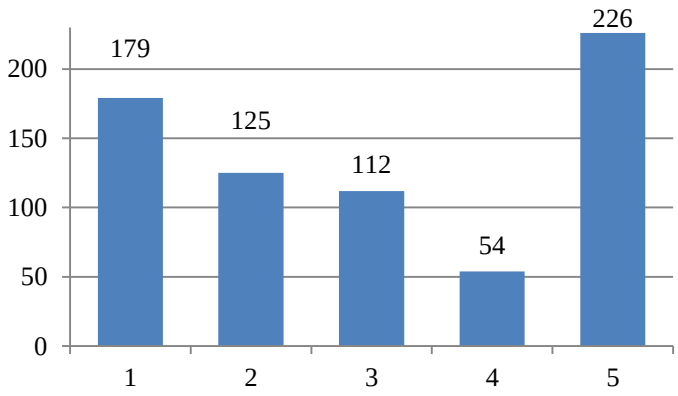


Figure 2: Distribution of Support Ratings



Fitch's rating scales between different products are matched and numerically transformed: Fitch uses the AAA rating scale for LT issuer ratings. For numerical reasons, numeric values from 1 to 20 are assigned, with 20 denoting the highest rating (AAA) and 1 denoting D (default). It is the same with sovereign ratings, which are used as another input variable in the

[8] Ibid, p. 25.

[9] Fitch Ratings (2013), p. 23.

[10] 27 sovereign states and dependent territories.

following empirical analysis. Viability ratings use a similar 20-notch rating scale[11] in assigning numeric values from 1 to 20, with 1 denoting the lowest rating[12], indicating "an issuer that, in Fitch's opinion, has failed, and that either has defaulted or would have defaulted had it not received extraordinary support or benefited from other extraordinary measures"[13].[14] Fitch's Support Rating runs from 1 to 5, with 1 indicating "an extremely high probability of external support"[15] and 5 indicating hardly any possibility of external support. Inverse values are used in the following calculations (see Appendix Table 1).

Unsurprisingly, LT issuer ratings of the *full sample* are – on average – higher (~1.5 notches) than viability ratings, since they consider both the individual strength (viability rating) and the probability of a governmental bailout (support rating), as shown in Figure 3 and Table 1. The histogram in Figure 2 shows the distribution of the support rating. There are a high number of financial institutions (226) with a rating of "5", receiving an extremely low level of support – or none at all. But there are also 179 institutions with ratings of "1", at which "the potential provider of support is very highly rated in its own right and has a very high propensity to support the bank in question"[16].

[11] A similar scale, but using small letters, i.e. "aaa", and "f" for a default instead of "D".

[12] For an overview of the assignments, see Appendix Table 1.

[13] Fitch Ratings (2013), p. 26.

[14] Note that the modifiers "+" or "–" may be appended to a rating to denote relative status within major rating categories. Such suffixes are not added to the "AAA" category, nor to categories below "B" (see Fitch [2013], p. 10).

[15] Fitch Ratings (2013), p. 23.

[16] Ibid.

Figure 3: Distribution of LT Issuer Ratings and Viability Ratings

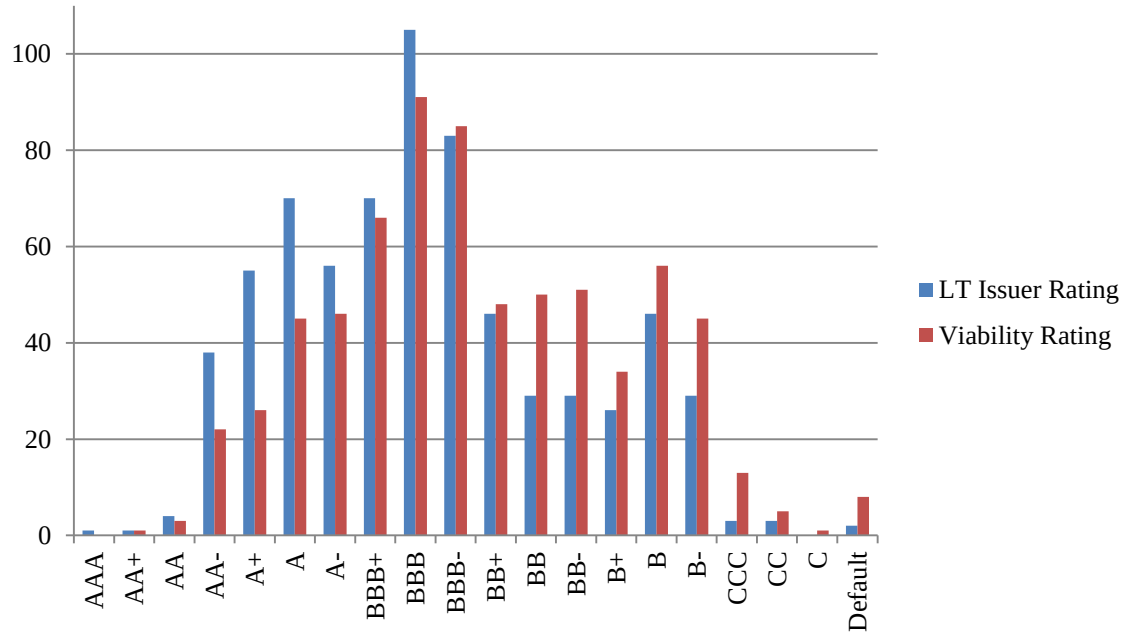


Table 1 below shows descriptive statistics on the distribution of the LT issuer rating, the viability rating, and the support rating in the *full sample* as well as eight subsamples, namely:

(1) G-SIB: On Nov 1st, 2012, the Financial Stability Board published an "Update of group of global [sic] systemically important banks (G-SIBs)"[17]. The updated list of that international standard-setter (closely connected to the BIS) contains 28 global systemically important banks (G-SIB)[18]. During the last financial crisis, those institutions sent "shocks through the financial system which, in turn, harmed the real economy"[19]. Since these institutions are deemed too big to fail (TBTF) – by both the regulator and market participants – they may receive extraordinarily high government subsidies. A comparatively high mean support rating of 4.76 (where 5 is the maximum) supports this assumption (see Table 1).

(2) Listing: All banks in the sample that are listed on a stock exchange are in that subsample. It can be assumed that those banks have a higher portion of private shareholders than the remaining banks.

[17] Financial Stability Board (2012).

[18] For the list of G-SIB Banks, see Appendix Table 2.

[19] Financial Stability Board (2013), p. 2.

(3) OECD: This sample contains all banks from the current 34 member countries[20] of the Organisation for Economic Co-operation and Development (OECD), and shall represent banks from developed and democratic economies.

To account for regional differences, the following regional sub-samples are applied:

(4) Europe: This sample contains data of 263 banks from 27 sovereign states and dependent territories in Europe.

(5) North America: This sample merges data of 133 US and Canadian banks. The sovereign ratings of both countries are identical.[21]

(6) Asia: This sample of 187 banks covers the Asian continent (excl. Oceania).

(7) Germany: A small 'Germany sample' is selected for comparison purposes.

Table 1: Summary Statistics for Ratings

		LT Issuer Rating		Viability Rating		Support Rating		Sovereign Rating	
	Count	μ	σ	μ	σ	μ	σ	μ	σ
Full Sample	696	11.69	3.46	10.46	3.61	2.96	1.61	15.03	4.43
(1) G-SIB	28	15.41	1.21	14.59	1.78	4.76	0.79	18.52	2.54
(2) Listing	185	12.99	2.89	12.22	3.32	3.03	1.70	16.93	3.86
(3) OECD	328	12.92	2.92	11.81	3.44	3.00	1.75	17.52	3.65
(4) Europe	263	11.42	3.83	9.72	4.09	3.13	1.56	14.58	4.53
(5) North America	133	12.74	2.91	12.46	2.81	2.08	1.75	20.00	-
(6) Asia	187	11.89	3.16	10.32	3.07	3.50	1.39	13.96	3.09
(7) Germany	23	14.65	3.46	11.39	3.62	4.70	1.61	20.00	-

[20] The respective countries are marked with an * in Appendix Table 2. For the official list, see OECD (2013).

[21] Therefore, the standard deviation is equal to 0.

3 Estimation of Government Support

3.1 Methodology

A regression analysis is applied to estimate the value of government support on the LT issuer rating for bank *i*. Governmental funding subsidies are later derived from this effect. The dependent variable is the long term issuer rating (*LT_issuer*) of bank *i*. This overall rating of bank *i* shall be explained by the bank's viability rating (*Viability*), its support rating (*Support*), and the sovereign rating (*Sovereign*) of the country where the respective entity's headquarters are located. This leads to the following regression analysis:

$$LT\_issuer_i = f\left(\alpha_{0_i} + \alpha_1 \cdot Viability_i + \alpha_2 \cdot Support_i + \alpha_3 \cdot Sovereign_i + \varepsilon_i\right)$$

Since all variables only take discrete values on an ordinal scale (1 to 20, or 1 to 5) an *ordered probit regression* is applied in STATA.[22]

3.2 Results

Table 2 shows the results of the regression analysis for the full 696-bank sample and the eight subsamples. All coefficients α_1- α_3 are significant on a 99 % confidence level. Column 1 (*full sample*) indicates that a one-notch increase of the support rating ($Support$) is expected to effect a one-notch increase of LT issuer rating (*LT_issuer*) by odds of 0.7694 (= α_2) or with a probability of 43.48 % $\left(= \frac{0.7694}{1+0.7694}\right)$, while the other variables in the model are held constant. The regression coefficients α_1 and α_3 for the *full sample* have lower values and, thus, a one-notch increase of the viability or sovereign rating is less likely to increase the LT issuer rating for one notch (0.4107 odds, e.g. 29.11 %, or 0.1684 odds, e.g. 14.41 %, respectively).

The subsamples bring even more interesting results. The high support rating coefficient for Global Systemically Important Banks (G-SIB) – 9.0920 – asserts that the probability of an improvement of the LT issuer rating caused by a one-notch increase of the support rating is 90.02 % $\left(= \frac{9.020}{1+9.020}\right)$! The North America sample leads to interesting results, too: A viability rating improvement has a higher impact on issuer ratings of Canadian and US banks (51.44 %) than the support rating (32.42 %).

[22] For more information on the use and advantages of the ordered probit regression, see Boes/Winkelmann (2006).

LR chi² is the Likelihood Ratio Chi-Square test (with 3 degrees of freedom) that at least one of the coefficients α_1- α_3 is not equal to zero. *Prob>LR chi²* is the probability of obtaining the Likelihood Ratio Chi-Square test statistic (*LR chi²*) if the predictors *Viability*, *Support* and *Sovereign* have, in actuality, no impact on the independent variable *LT_issuer*.[23] *Pseudo R²* is a coefficient of determination of MCFADDEN (1973). *Pseudo R²* is not an equivalent of R² of the linear regression, and should be interpreted with great caution.[24]

[23] See UCLA (2013).

[24] McFadden (1977), p. 307: "Values tend to be considerably lower than those of the R² index and should not be judged by the Standards for a 'good fit' in ordinary regression analysis. For example, values of 0.2 to 0.4 … represent an excellent fit".

Table 2: Results Ordered Probit Regression

	Full Sample	G-SIB	Listing	OECD	Europe	North America	Asia	Germany
Viability Rating (α_1)	0.4107[a)]	0.4490	0.5558	0.3935	0.3443	1.0593	0.3434	0.4968
Support Rating (α_2)	**0.7694**	**9.0920**	**0.5821**	**0.6203**	**0.8536**	**0.4799**	**1.1127**	**2.4081**
Country Rating (α_3)	0.1687	0.5053	0.1158	0.1308	0.2112	-	0.2840	-
cut 1	1.834	54.170	2.635	2.354	2.202	4.601	4.113	13.609
cut 2	2.594	59.042	3.532	2.733	2.841	5.973	4.515	14.863
cut 3	2.920	61.831	5.152	4.150	3.024	7.294	5.328	16.841
cut 4	4.192	63.037	5.606	4.577	4.431	8.078	6.679	17.504
cut 5	5.336	-	6.530	4.805	5.571	9.500	7.349	20.660
cut 6	5.943	-	6.777	5.350	6.083	10.317	8.128	-
cut 7	6.548	-	7.819	5.901	6.678	10.570	8.787	-
cut 8	7.046	-	8.949	6.466	7.310	12.348	9.758	-
cut 9	7.741	-	10.038	7.423	7.958	14.264	10.941	-
cut 10	8.691	-	10.920	8.502	8.737	14.997	12.010	-
cut 11	9.724	-	11.665	9.135	9.542	16.132	12.960	-
cut 12	10.567	-	12.858	9.856	10.754	17.436	14.037	-
cut 13	11.338	-	13.944	10.919	11.394	18.664	14.808	-
cut 14	12.366	-	16.482	11.878	12.820	21.810	15.787	-
cut 15	13.393	-	-	13.273	14.007	-	-	-
cut 16	15.060	-	-	13.924	15.023	-	-	-
cut 17	15.709	-	-	14.423	15.526	-	-	-
cut 18	16.026	-	-	-	15.882	-	-	-
No. of Obs.	696	29	186	368	263	133	187	23
LR chi² (3 df)	1401	37	349	593	571	*311	380	*30
Prob>LR chi²	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R²	0.3942	0.4404	0.4085	0.3382	0.4147	0.5195	0.4154	0.4257

Cut 1 - Cut 18 are the values of the estimated cut points on *LT_issuer* when *Viability*, *Support* and *Sovereign* are evaluated at zero. For the *full sample*, the following statements can be made: Because Cut 1 is 1.834 and Cut 18 is 16.026, stepping up one notch in the LT issuer rating requires about 0.8348 $\left(= \frac{16.026-1.834}{17}\right)$ of an additional score increase, potentially drawing from *Viability*, *Support* and / or *Sovereign*. Thus if *Support* was the only independent variable that changed, a one-notch support rating increase would increase *LT_issuer* in the *full sample* on average by 0.9216 $\left(= \frac{\alpha_2}{0.8348} = \frac{0.7649}{0.8348}\right)$; see Table 3.[25]

However, 0.9616 is an average value. The effect of a one-notch government support rating increase differs widely depending on the initial rating level: Moving from cut 5 to cut 6 (from B to B+) requires a step of 0.607 $(= 5{,}943 - 5.336)$ to increase the LT issuer rating in the amount of one notch, whereas the move from cut 15 to cut 16 (from A+ to AA-) requires a step of 1.667 $(= 15.060 - 13.393)$. This would mean that the rating subsidy is more valuable at lower rating levels. Therefore we can calculate analogously that a one-notch support rating increase for a B-rated bank is expected to increase the rating in the amount of 1.26 notches $\left(= \frac{0.7649}{0.607}\right)$. The expected effect of a one-notch support increase for an A+-rated bank is 0.46 notches $\left(= \frac{0.7649}{1.667}\right)$.

Table 3: Average Notch Impact of a One-Notch Government Support Increase on the LT Issuer Rating

Full Sample	G-SIB	Listing	OECD	Europe	North America	Asia	Germany
0.9216	3.0761	0.5465	0.8223	1.0608	0.3625	1.2391	1.0246

Table 3 shows that the highest government subsidies in ratings can be expected for G-SIBs, Asia and Europe. Again, the North American governments are expected to give the least support. Listed banks also receive little support, perhaps because the majority of them are in private (non-government) ownership.

Additionally, the listed banks sample is used to find out if 'big' listed banks (measured in market capitalisation) are more likely to receive a high support rating. An OLS regression analysis with the support rating as the dependent variable and the market capitalisation

[25] This interpretation was first suggested by Ueda/Weder di Mauro (2013), p. 3834.

(*MCap*) in Billions of Euro as an explanatory variable in a linear model leads to results that are less clear (see Figure 4):

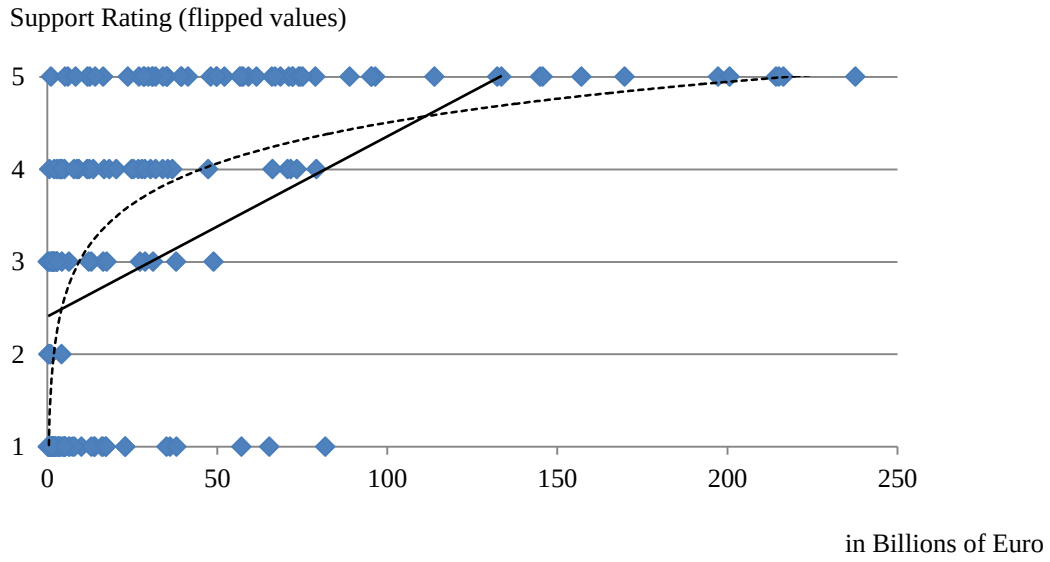
$Support = 0.0194\ MCap + 2.4269$ (with $R^2 = 0.2921$).

The simple logarithmic model may better explain the empirical findings, and may be understandable. However, it lacks theoretical foundation:

$Support = 0.636 \ln(MCap) + 1.5764$ ($R^2 = 0.4286$).

The numerical and graphical results show that there are only slight correlations between the market capitalisation of a bank and its rating.

Figure 4: Market Capitalisation and Support Ratings for Listed Banks Sample[26]



By combining the average support rating for each sample (Table 1) and the average effect of a one-notch government support rating increase on the LT issuer rating in the corresponding sample (Table 3), an estimation for the overall notch impact of government support on the LT issuer rating can be made (Table 4).

[26] Source: Own figure and calculations with rating data from Fitch and MCap data from www.google.com/finance.

Table 4: Overall Notch Impact of Government Support on the LT Issuer Rating

Full Sample	G-SIB	Listing	OECD	Europe	North America	Asia	Germany
2.7280	14.6422	1.6559	2.4669	3.3203	0.7540	4.3369	4.8156

It means that, on average (for example, due to the expected governmental support), Asian banks receive a 4.34 notches higher LT issuer rating (e.g. BB+ instead of B) than they would get without government support. The G-SIB sample receives the highest support with ~15 notches (!) but Germany (~5) also receives a comparably high LT issuer rating subsidy, too.

A higher LT issuer rating due to governmental support has a direct influence on a bank's funding costs. But what is the impact of ratings on financing costs? Although a rating is a relative statement on the credibility of a debtor and does not include an explicit default probability, rating agencies do publish empirical cumulative default rates for different rating categories that could be used for bond price (and financing cost) estimation. SOUSSA (2000) proposes a theoretical method for the computation of structural annualised interest rate differentials derived from the expected present value of a bond.[27] However, the data necessary for the model is also only available in theory.[28]

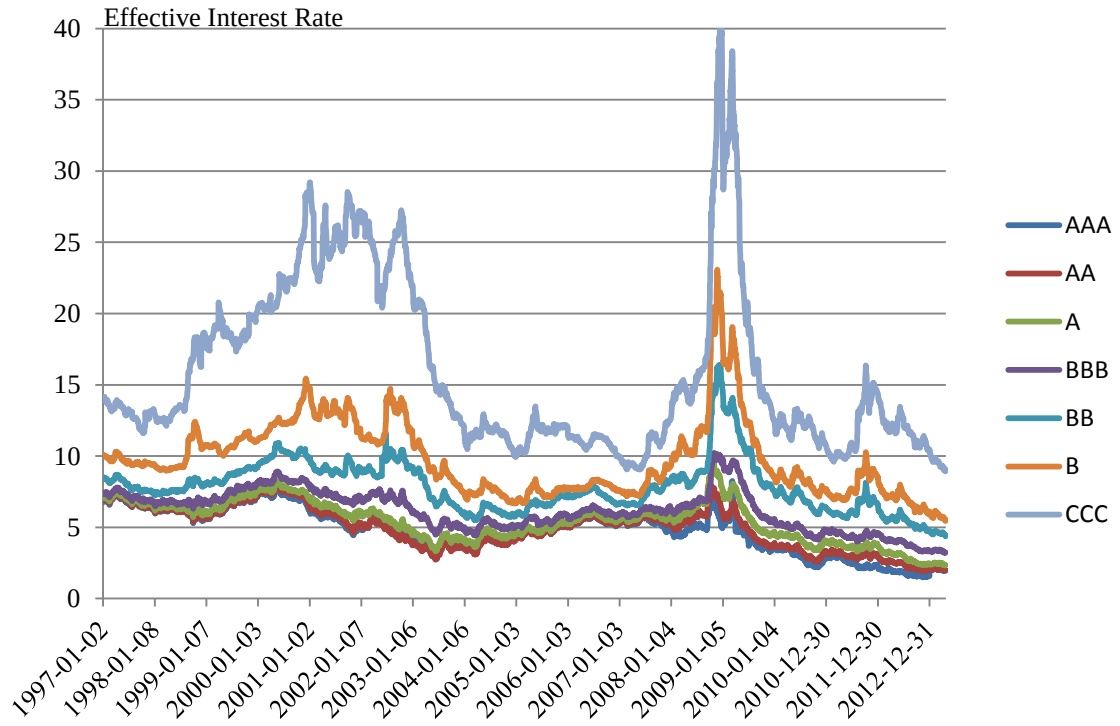
Therefore, the present paper uses market prices from bond indexes of various rating classes to derive interest rate differentials for different rating classes. Market prices are 'ideal indicators' for the informational content of an event, since they are the result of human expectations, knowledge, and actions – concentrated in one measure.[29] The effective yields for different rating categories of US corporates provided by Merrill Lynch (Figure 5) will be used for further assessment.

[27] In a similar paper, Ueda/Weder di Mauro (2013) also refer to Soussa (2000).

[28] The model requires, for example, knowledge of the risk-free return and the recovery rate of bonds.

[29] Von Hayek and von Mises worked out, in particular, that *"The sum of information reflected or precipitated in the prices is wholly the product of competition, or at least of the openness of the market … Competition operates as a discovery procedure not only by giving anyone who has the opportunity to exploit special circumstances the possibility to do so profitably, but also by conveying to the other parties the information that there is some such opportunity. It is by this conveying of information in coded form that the competitive efforts of the market game secure the utilization of widely dispersed knowledge"*, (Hayek [1976], p. 117).

Figure 5: Ratings and Corresponding Effective Interest Rates in % over Time (US Corporate Ratings Effective Yield for Debt)[30]



As Figure 5 shows, effective interest rates for debt (or funding costs) not only depend on the rating category, but differ greatly over time. For that reason, the mean yield spread for debt between different rating categories is computed for 16 years from 01.01.1997 to 31.12.2012, and is divided by the number of included notches.

Table 5: Mean Yield Spread for Debt Between Ratings (1997-2012)

	AAA-AA	AA-A	A-BBB	BBB-BB	BB-B	B-CCC
Notches	2	3	3	3	3	2
Spread Per Notch in Basis Points	7.11	16.76	24.77	55.93	63.22	306.35

For defining the mean spread (in effective interest rates for debt) of one notch for our sample, we should not take the overall average (since spreads differ greatly between high and low rating categories), but consider the ratings distribution of the data sample: The mean long term issuer rating of the *full sample* is BBB (~12 in the applied numerical scale) and the

[30] Source: Own figure with data from Bank of America, *Merrill Lynch US Corporate Ratings Effective Yield*, m.research.stlouisfed.org (accessed May 1st, 2013).

standard deviation is approx. three notches, forming an interval from A to BB (for both, see Table 1). The mean spread per notch in basis points between A and BB is 40.35 (= $\frac{24.77+55.93}{2}$) [31]. This number can be used to transform the overall effect of government support on the LT issuer rating (see Table 4) into the market-based effective yield spread (see Table 6).

Table 6: Overall Effect of Government Support on Effective Interest Rates (in Basis Points)

Full Sample	G-SIB	Listing	OECD	Europe	North America	Asia	Germany
110.07	590.81	66.82	99.54	133.97	30.424	174.99	194.31

The results show, for example, that, on average, G-SIBs receive a governmental subsidy of 590 basis points[32] (= 40.35 x 14.6422) and that Asian banks receive a financing subsidy of 175 basis points (= 40.35 x 4.3369). Although the levels of the subsidy in the subsamples may be quite remarkable, they remain comprehensible (e.g. the lowest subsidy observed is for North America, and listed banks receive less subsidy than unlisted ones). In periods of economic recession (see Figure 5, e.g. H2/2007 to H1/2011), i.e. when it really matters, mean spreads for debt yields of different rating classes are far higher than in 'normal times'. Governmental support is then far higher than the level reflected by the mean values.

4 Conclusion

This paper provides a clear and traceable method for the identification and valuation of governmental support for banks. The results indicate that some banks are systemically important. In all tested samples, banks implicitly receive rating and funding subsidies that are neither inconsiderable nor negligible. Market failure would justify regulatory interventions like subsidies. However, there are no comparable lines of argument for those subsidies in the given case. In contrast, governments should make every effort to diminish their support, since it leads to a distortion of the competition on markets and to adverse effects like *moral hazards*.

[31] Due to their complexity, calculations are simplified. The distribution coefficients of each sample could also be used.

[32] This result might be an overestimation, since SIB-banks have a higher mean LT issuer rating (15.41) than the *full sample* (11.69), and the mean yield spread for debt between higher ratings is lower (see Table 5 and footnote 31).

Under these conditions, yield-oriented decision makers of a systemically important financial intermediary are given the incentive to choose a riskier business strategy, since market disciplining (e.g. through an interest requirement adequate to the risk) is weakened.[33] Since this procedure hinders or even stops the selection function of the (financial) market, global systemically important banks, in particular, may increase in stature above the optimal (transaction cost-dependent) size of a firm, and therefore cause higher negative external effects. In the long run, this can lead to market failure (e.g. survival of inefficient actors, excess demand), the possibility of a high indebtedness of the public household and, in this way, to welfare losses. [34]

Recently, some countries introduced banking levies, such as Germany (2 - 6 basis points of the total liabilities and 0.03 basis points of the derivatives[35]) and the UK (8.8 basis points on global consolidated balance sheet liabilities)[36]. As the results of this paper show, these levies do not compensate for the governmental subsidies, which are significantly higher. Instead of trying to heal one distorting measure (a subsidy) with another distorting measure (a levy), sovereigns should concentrate on credibly convincing market participants that no bank can ever be *too big to fail*, e.g. through feasible restructuring / resolution laws and the enabling of a bail-in.

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[33] Cf. O'Hara/Shaw (1990), p. 1588f. Cf. on the existence of moral hazard and the effectiveness of market disciplining, Nier/Baumann (2006).

[34] Cf. Kellermann (2010), p. 18.

[35] Cf. Göbel/Henkel/Lantzius-Beninga (2012), p. 29-31.

[36] For an overview of EU national legislation and the new steps towards a higher tax contribution of the financial sector, see European Commission (2012).

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Appendix

Appendix Table 1: Rating Assignments from Fitch Ratings, Symbols to Numerical Numbers

Rating symbol	*LT_issuer Sovereign*
AAA	20
AA+	19
AA	18
AA-	17
A+	16
A	15
A-	14
BBB+	13
BBB	12
BBB-	11
BB+	10
BB	9
BB-	8
B+	7
B	6
B-	5
CCC	4
CC	3
C	2
RD	1

Rating symbol	*Viability*
aaa	20
aa+	19
aa	18
aa-	17
a+	16
a	15
a-	14
bbb+	13
bbb	12
bbb-	11
bb+	10
bb	9
bb-	8
b+	7
b	6
b-	5
ccc	4
cc	3
c	2
f	1

Rating symbol	*Support*
1	5
2	4
3	3
4	2
5	1

Appendix Table 2: Country List

Country	Freq.	Per cent	Country	Freq.	Per cent
Argentina	1	0.14	Luxembourg*	3	0.43
Australia*	11	1.58	Macedonia	1	0.14
Austria*	6	0.86	Malaysia	3	0.43
Azerbaijan	9	1.29	Malta	2	0.29
Bahrain	7	1.01	Mexico*	11	1.58
Belgium*	4	0.57	Mongolia	2	0.29
Bermuda	2	0.29	Morocco	1	0.14
Brazil	16	2.30	Netherlands*	7	1.01
Bulgaria	6	0.86	New Zealand*	7	1.01
Canada*	8	1.15	Nigeria	9	1.29
Chile*	3	0.43	Norway*	3	0.43
China	15	2.16	Panama	7	1.01
Colombia	6	0.86	Peru	6	0.86
Costa Rica	2	0.29	Philippines	8	1.15
Croatia	1	0.14	Poland*	8	1.15
Cyprus	2	0.29	Portugal*	7	1.01
Czech Rep.*	3	0.43	Romania	5	0.72
Denmark*	3	0.43	Russia	52	7.47
Dom. Rep.	3	0.43	Saudi Arabia	11	1.58
Ecuador	2	0.29	Serbia	1	0.14
Egypt	2	0.29	Singapore	3	0.43
El Salvador	2	0.29	Slovakia	2	0.29
Finland*	1	0.14	Slovenia*	6	0.86
France*	14	2.01	South Africa	8	1.15
Georgia	6	0.86	South Korea	7	1.01
Germany*	23	3.30	Spain*	21	3.02
Greece*	4	0.57	Sri Lanka	1	0.14
Guatemala	3	0.43	Sweden*	5	0.72
Hong Kong	8	1.15	Switzerland*	9	1.29
Hungary*	2	0.29	Taiwan	21	3.02
India	8	1.15	Thailand	10	1.44
Indonesia	8	1.15	Tunisia	1	0.14
Ireland*	2	0.29	Turkey*	19	2.73
Israel*	2	0.29	UAE	13	1.87
Italy*	18	2.59	Ukraine	13	1.87
Jamaica	1	0.14	United Kingd.*	24	3.45
Japan*	9	1.29	United States*	125	17.96
Kazakhstan	8	1.15	Uruguay	1	0.14
Kenya	1	0.14	Venezuela	7	1.01
Kuwait	8	1.15	Vietnam	4	0.57
Lebanon	2	0.29	Total	696	100

* OECD-Member

Appendix Table 3: Bank Lists

G-SIB	Germany
Banco Bilbao Vizcaya Argentaria (BBVA)	Aareal Bank AG
Banco Santander, S.A.	Bayerische Landesbank
Bank of America Corporation	Berlin-Hannoversche Hypothekenbank AG
Bank of China	BHF-Bank AG
Bank of New York Mellon (The)	Bremer Landesbank Kreditanstalt Oldenburg
Barclays Bank plc	Commerzbank AG
BGL BNP Paribas	Corealcredit Bank AG
Citigroup Inc.	Deutsche Bank AG
Credit Agricole	Deutsche Pfandbriefbank AG
Credit Suisse AG	Duesseldorfer Hypothekenbank AG
Deutsche Bank AG	Genossenschaftliche FinanzGruppe
Goldman Sachs Group, Inc. (The)	HSBC Trinkaus & Burkhardt AG
Groupe BPCE	HSH Nordbank AG
HSBC Bank plc	Landesbank Baden-Wuerttemberg
ING Bank NV	Landesbank Berlin AG
JPMorgan Chase & Co.	Landesbank Saar
Mitsubishi UFJ Trust and Banking Corporation	Norddeutsche Landesbank Girozentrale
Mizuho Bank, Ltd	ProCredit Holding AG & Co. KGaA
Morgan Stanley	S - Finanzgruppe Hessen-Thueringen
Nordea Bank AB	Sparkassen-Finanzgruppe (Sparkassen)
Societe Generale (SG)	UniCredit Bank AG
Standard Chartered Plc	Wuestenrot Bank AG Pfandbriefbank
State Street Corporation	Wuestenrot Bausparkasse AG
Sumitomo Mitsui Financial Group, Inc.	
The Royal Bank of Scotland Group plc	
UBS AG	
UniCredit S.p.A.	
Wells Fargo & Co.	