Implicit subsidies in the

EU banking sector.

An intermediary report which is part of the forthcoming study
"Banking structural reforms: a Green perspective"

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What are implicit subsidies?

Implicit subsidies refer to the gains that banks implicitly obtain due to the expectation that governments will act as guarantor of last resort during a financial crisis. These implicit guarantees bring substantial gains to banks in the form of an implicit subsidy, as creditors on financial markets factor in these guarantees and therefore those that benefit from them can borrow at lower funding rates. They are called implicit - as opposed to explicit - because there is no contractual agreement specifying the amounts or conditions of government support. Currently, governments do not charge taxes or any contribution for these implicit subsidies.

Distortions created by implicit subsidies

Implicit subsidies create significant distortions to markets and are therefore an important policy concern. A first distortion is in the domain of financial stability. Implicit subsidies create incentives for financial institutions to take more risk whilst using a free guarantee. Secondly, in the aggregate this has an impact on the size of the financial sector as a whole because financial institutions use the implicit subsidy to grow larger than they would in its absence. A third distortion is the competitive advantage that receiving banks have over banks without implicit subsidies, which intervenes with the principle of the single market. A fourth issue relates to budgeting transparency as these guarantees are not recognised in fiscal budgets, which leads to problems of fiscal transparency and accountability. Fifth they create an ongoing transfer of resources from the real economy and its tax payers to the financial economy and banks. Sixth, these implicit subsidies interfere with the principle of market discipline as depositors, bondholders and shareholders have fewer incentives to monitor the risk profile of banks. Last but not least, they also weigh on public spending via a negative effect on the country rating which increases the total cost of public debt.

Methodological approaches for measuring implicit subsidies

Implicit subsidies are not directly observable from prices of financial instruments; neither do their contractual terms exist. Economists have therefore developed models to estimate implicit subsidies. These models can be classified into two families, the funding advantage models and the contingent claim models[1].

<u>Funding advantage models</u>

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[1] This section is largely based on Sowerbutts and Noss (2012). It should be mentioned that alternative approaches can be found in literature such as event studies, mergers and acquisitions and distortion of market prices. These approaches fall outside the scope of the current study. See Bijlsma & Mocking (2013) for an overview.

Funding advantage models estimate the implicit subsidy as the reduction a bank enjoys in its annual cost of funding due to the presence of the implicit government guarantee. The cost a bank faces in issuing its debt is compared with the higher cost that it would face in the absence of implicit government support. The subsidy across the entire banking system is obtained by adding up the individual banks' subsidies, which are calculated for each bank individually.

Rating agencies provide different kinds of ratings for banks. Stand-alone ratings focus on the intrinsic repayment capacity of the borrower, whereas the all-in ratings which are often better also factor in governmental or parental support. Moody's, Fitch and Standard & Poor's all provide both rating types[2]. The difference between stand-alone and all-in is often referred to as the rating uplift. The higher stand-alone funding cost is compared to lower all-in funding cost by comparing market prices (or yields) of bank or high-yield debt with the corresponding ratings. This difference in yield is then multiplied by the yield sensitive debt (sometimes called risk sensitive debt) of the financial institution in order to obtain the funding advantage. Methodologically, some issues of judgment arise in two areas. First in the way bank yields are determined in function of ratings. The table below summarises the choices made for a selection of the studies.

Study	Data Source	Time period used	Maturity of bonds	Treatment of missing values
Haldane (2010)	Sterling Corporates Financial Index	Not available	7-10 y	Not available
Schich (2012)	Bloomberg fair market value curve	March 2012	5 y bonds are used	Non linear interpolation
Ueda & di Mauro (2012)	Moody's average cumulative default rates	Averages over 1920 – 1999	NA	Not applicable
Sowerbutts & Noss (2012)	Bank of America Merrill Lynch Sterling Corporates Financials Index	2007-2010	7-10 y	Linear interpolation

Secondly, judgement comes into play in the way how rating sensitive liabilities are determined. In the box below we have summarised some of the approaches used in the literature.

Study	Approach to determine risk sensitive liabilities
Sowerbutts & Noss (2012)	Deposits from banks and financial institutions. Financial liabilities at fair value (debt securities, deposits). Debt securities in issue (commercial paper, covered bonds, other debt securities and subordinated debt).
Haldane (2010)	Retail deposits are excluded and unsecured wholesale borrowing is included.

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[2] Moody's also reports the adjusted stand-alone rating which factors in the effect of parental support

Schich (2012)	Outstanding bonds and loans issues in the market. Info from Bloomberg.
Bijlsma & Mocking (2013)	Long term debt. Info from Bankscope.

Advantages:

The biggest advantage of the funding advantage models is the empirically observable direct link between ratings and funding costs. They are also the most parsimonious and simple of approaches and the most often used technique to be found in literature.

Disadvantages:

Funding advantage models are not so good at forward looking than contingent claim models. Another disadvantage follows the criticism of rating agencies in the wake of the financial crisis, for example in their inherent subjectivity.

<u>Contingent Claim models</u>

Contingent claim models use option pricing theory to value government support to the banking system. In these models, banks have a claim, in aggregate, on the government which is contingent on their failure. The value of the claim is the probability weighted amount of the value of the assets of the bank below a certain threshold at a future moment in time. The threshold is usually determined by the combined equity of the banks. The claim can be valued with the same modelling techniques as those that are used to value options. More specifically the claim can be seen as a put option, i.e. the right to sell the value of the banks to the government in case the value of the banks falls below the threshold, with a strike price equal to the threshold. Within contingent claim models, one can identify two approaches to calibrate the future distribution of banks assets, the equity option pricing approach and the historical approach.

- Equity option-price approach

    The equity-option price approach derives the future distribution of assets from the prices of equity options. It is followed by Oxera (2011) and Sowerbutts and Noss (2011). A simple approach is to use the Black-Scholes model to value equity options. The disadvantage is that this model assumes a normal distribution of equity returns which can therefore underestimate the fat tails in equity price distributions. Sowerbutts and Noss (2011) propose to use the model of Kou (2002) which uses a Gaussian distribution that allows for upward and downward jumps. Another assumption that will impact results is about the timing of state intervention. In case only the end of a period is considered as the moment at which the option can be exercised then a European option can be used, an approach followed by Oxera (2011). A more realistic approach is to consider that the option can be exercised at any moment during the period in which case a look-back option is used, this is the approach of Sowerbutts and Noss (2011). Another important parameter that will impact the outcome is the choice of the discount rate.

    Advantages:

    An advantage of the equity option-price approach is its forward looking character. Therefore these models are often used as early warning indicators.

Disadvantage:

An important disadvantage of using equity-option prices is that they contain biases because investor's risk preferences change in time which will create biases in equity prices. Indeed, we know from behavioural economics that financial markets can swing between excessive optimism and panic. Another disadvantage is that they are very sensitive to underlying model assumptions.

- Historical approach

  The historical approach derives the future distribution of banks' assets from historical prices of bank equity. A modelling technique called Extreme Value Theory is applied which combines the strength of both empirical techniques (using a non parametric empirical density function for the bulk of the distribution) and statistical techniques (using a Generalised Pareto Distribution for the tail of the distribution).

  Advantages:

  An advantage compared to the equity option approach mentioned above is that no assumption is required about the future evolution of banks assets.

  Disadvantage:

  A disadvantage is that this approach is very sensitive to underlying model assumptions.

An evaluation of the approaches

We have evaluated the academic and institutional literature on implicit subsidies by allocating a score to each study according to two criteria, robustness & transparency on the one hand and scope for the purpose of this report on the other. Each criteria receives a score between zero and one, where one corresponds to the highest possible score and zero to the lowest possible score. Each criterion is weighted at fifty per cent each to obtain the final score (see last column in the table below). The purpose of this scoring is to obtain a weighting factor so we can aggregate the results of all the studies into a meaningful final result. It is important to note that these scores are a subjective and qualitative measure that entirely depends on the judgement of the author.

For the robustness and transparency criterion, we have allocated the highest score to the studies using the funding advantage ratings based approach. As mentioned above, the FARB approach is least prone to model assumptions and is compelling because of the empirically observable relationship between rating and funding cost. Only the study of Sveriges Riksbank (2011) receives a 0.8 because the calculations are less transparent than those presented in the other FARB studies[3]. In contrast, the studies based on contingent claims analysis all receive a score of 0.6 for robustness and transparency. As already mentioned above, they are more prone to model assumptions, more complex and therefore less transparent than the FARB approaches.

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[3] Probably because the results related to FARB are presented in an appendix and are not part of the body of the publication.

For the scope criterion, the studies by Schich (2012) and Bijlsma and Mocking (2013) receive the highest score of 1.00 as they focus on banks in the EU. All the studies that focus on the large UK banks such as Haldane (2010), Noss & Sowerbutts (2012) and Oxera (2011) receive an 0.4 for the scope criterion. Studies focussing on global sample such as receive a score of 0.6.

Study	Method	Robustness & Transparency 50%	Scope 50%	Score
Schich, OECD (2012)	FARB	1	1	1.00
Haldane, BoE (2010)	FARB- UK sample large banks	1	0.4	0.70
	FARB- UK sample small banks	1	0.1	0.55
	FARB- Global sample	1	0.6	0.80
Noss & Sowerbutts, BoE (2012)	FARB	1	0.4	0.70
	CC options based	0.6	0.4	0.50
	CC Historical PIT	0.6	0.4	0.50
	CC Historical TTC	0.6	0.4	0.50
Ueda & di Mauro, IMF (2012)	FARB	1	0.6	0.80
Oxera (2011)	CC options based	0.1	0.4	0.25
Sveriges Riksbank (2011)	FARB	0.8	0.2	0.50
Moody's Analytics (2011)	Market Based Approach	0.4	0.8	0.60
Bijlsma & Mocking (2013)	FARB	1	1	1.00

Overview of estimates from literature

In this section we provide an overview of the results coming from the literature on implicit subsidies.

Study	Estimate expressed in nominal amounts	Estimate in other terms	Methodology
Schich, OECD (2012)	30-43 Billion USD for Germany (17 banks) in 2012	e.g. 1% - 1.4% of GDP for Germany	Funding advantage ratings-based (FARB) approach[4].
	7.5-22.5 Billion USD for France (7 banks) in 2012	0.35% - 1% of GDP for France	Moody's and Fitch rating data.
	9-10 Billion USD for UK (14 banks)	0.4% - 0.41% of GDP for UK	Based on a dataset of 123 EU banks.
	2-2.5 Billions USD for Spain (10 banks)	0.1% - 0.2% of GDP for Spain	
	96 – 146 bn EUR for the EU (123 banks)	Between 2.18 and 3.14 notches in the period between 2007 and March 2012	
Haldane, BoE		Rating uplift is 3.37 notches for large banks	Funding advantage ratings-based (FARB) approach;

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[4] Note that in this study, the results are presented in graphs as opposed to tables and only per country, therefore the precise amounts are not directly available and need to be read from the small graphs which inevitably leads to small reading errors. The upper-bound includes the debt of the subsidiaries and the lower-bound only reflects the debt of the rated bank.

Study	Figures	Result	Notes
(2010)	<table>Year | 2007 | 2008 | 2009 | 2010 FARB (UK banks in £bn) | 11 | 59 | 107 | FARB (global banks in $bn) | 37 | 220 | 250 |</table>	Rating uplift is 1.48 notches for small banks	Moody's rating data. Based on a dataset of 16 banks in the UK sample and 28 banks in the global sample.
Noss & Sowerbutts, BoE (2012)	Figures are in Billions of £ Year | 2007 | 2008 | 2009 | 2010 FARB | 3 | 25 | 120 | 38 CC options based | | | | 122.5 CC Historical PIT | 40 | 330 | 145 | 25 CC Historical TTC | 20 | 20 | 20 | 20	FARB rating uplift: 1.9 notches in 2007 2.1 notches in 2008 3.8 notches in 2009 3.8 notches in 2010 or 54 bp in 2010 CC options based: 175bp in 2010 CC historical PIT: 36bp in 2010 CC historical TTC: 29bp in 2010	FARB | 4 UK banks and Moody's rating data CC options based | Look-back option discounted at 1.2% CC Historical PIT | Bank equity data year by year CC Historical TTC | Bank equity data between 1973 and 2010
Ueda & di Mauro, IMF (2012)		Uplift is 1.8 - 3.4 rating notches or 60 bp (2007) Uplift is 2.5- 4.2 rating notches or 80 bp (2009)	Funding advantage ratings based approach Fitch rating data A dataset of 895 international banks
Oxera (2011)	CC options based	8bp base case 16bp with perfectly correlated asymmetric shocks	Using a European option and a 5% discount rate. An annual asset volatility of 4% and systemic threshold of 1.5%.
Sveriges Riksbank (2011)	30 Billion SEK	86 bp (2002 – 2012) or 55% of bank profits	Funding advantage ratings approach The dataset contains the 4 biggest Swedish banks.
NOU Bedre rustet mot finanskriser (2011)		10%-40% of profit of DnB	Cited in Sveriges Riksbank (2011)
Moody's Analytics (2011)	293 Billion € (upper estimate) 176 Billion € (lower estimate)	105 bp (upper estimate) 63 bp (lower estimate)	Based on top 20 €pean banks.
Bijlsma &	Up to 150 Billion €	5-31 bp	Funding advantage ratings

Mocking (2013)				approach Moody's rating data. Dataset contains 151 EU banks.

A synthesis of estimates from literature

The results of the different academic and institutional papers are not reported in a uniform and comparable metric. Estimates of implicit subsidies have been reported in billions of euros, as a percentage of GDP per country, as a percentage of bank assets or simply expressed in rating notches (uplift). Also different time periods have been used across studies. In our attempt to aggregate and make a synthesis of these diverse results, we have chosen basis points-to-assets as the common denominator of all the above mentioned papers. In the table below we summarize all the basis points-to-assets ratios of all the papers reviewed and calculate a weighted average, whereby the weights correspond to the scores reported in the section 'an evaluation of approaches' above.

Study	Method	Implicit subsidy in basis points-to-assets					
		2007	**2008**	**2009**	**2010**	**2011**	**2012**
Schich, OECD (2012)	FARB	111[5]	120	157	156	109	110
Haldane, BoE (2010)	FARB- UK sample large banks		100	200			
	FARB- UK sample small banks		100	100			
Noss & Sowerbutts, BoE (2012)	FARB				54		
	CC options based				175		
	CC Historical PIT				36		
	CC Historical TTC				29		
Ueda & di Mauro, IMF (2012)	FARB	60		90			
Oxera (2011)	Base Case scenario				8		
Sveriges Riksbank (2011)	FARB	86	86	86	86	86	86
Moody's Analytics	Market Based Approach	105	105	105	105	105	
Bijlsma & Mocking (2013)	FARB		5	16	15	31	30
Weighted Average		91	82	106	79	79	73
Arithmetic Average		90	102	123	81	100	98
90th Percentile		109	113	174	160	108	105
10th Percentile		68	46	58	14	48	41

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[5] Basis points-to-assets are not reported as such in Schich (2012). We have calculated this based on the rating uplifts available and the methodology of Schich. See appendix A for more information.

The average over the period 2007-2012 of the weighted average calculated in the table above (underlined figures) equals to **89 basis points. This is our best estimate of the implicit subsidies in the EU, distilled out of the eight different academic and institutional papers on the subject.**

The variance of the results from the different studies is relatively high. The average of the 90th percentile is a 128 bp and the average of the 10th percentile is 46 bp, which gives us an indication of the fork around the best estimate.

Best estimate of implicit subsidies in the EU

To obtain an estimate of the implicit subsidies in the EU, we apply the ratio of average basis points-to-assets calculated in the previous section to total assets in the financial sector reported by the European Central Bank[6]. On a total of 35,471 Billion € of assets in the EU banking sector[7] large[8] domestic credit institutions account for 26,288 Billion €. In order to be prudent we have applied the basis points-to-assets ratio to the large credit institutions only. The rationale for this conservative choice is that most of the literature uses samples based on large financial institutions. In addition several studies show an important size effect, i.e. large financial institutions benefit significantly more from implicit subsidies than small or medium sized institutions.

Our best estimate of implicit subsidies amounts to **233.9 Billion €.** The 10th to 90th percentile fork around this best estimate ranges from 113 Billion € to 336.5 Billion €.

Year	Assets (in €) of large domestic credit institutions (ECB figures)	Average basis points-to-assets	Implicit Subsidy in € (Assets x Average basis points-to-assets)
2012	26,288,760,000,000	89	**233,969,964,000**

According to ECB figures the total profitability of banks in the EU equals to -29.4 Billion € in 2012 and -14 Billion € in 2011 which is only a small fraction of the implicit subsidies. Interestingly enough the large banks are more profitable with a profit of 16.2 € Billion in 2012 than medium-sized banks or small banks. **These figures clearly show that without the implicit subsidies the large banking institutions in the EU would be making substantial losses.**

	Profit in € (2012)	As pct. of assets
Total	-29,420,000,000	-0.08%
Large Banks	16,250,000,000	0.05%

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[6] See http://www.ecb.europa.eu/stats/money/consolidated/html/index.en.html

[7] the EU refers to all the member states of the EU (28 in 2013).

[8] Banks with total assets greater than 0.5% of the total consolidated assets of EU banks are defined as large domestic banks.

Medium Sized Banks	-46,800,000,000	-0.13%
Small Banks	1,130,000,000	0.00%
Foreign Banks	5,340,000,000	0.02%

In the table below we show implicit subsidies over the period 2007-2012. We can see that both the order of magnitude of implicit subsidies as well as the proportion of implicit subsidies to profits persists over the years.

Year	Assets (in €) of large domestic credit institutions (ECB figures)	Average basis points-to-assets	Implicit Subsidy in € (Assets x Average basis points-to-assets)	Profits in € of large domestic credit institutions
2012	26,288,760,000,000	89	**233,969,964,000**	16,250,000,000
2011	26,780,480,000,000	100	**267,804,800,000**	36,630,000,000
2010	25,742,740,000,000	81	**208,837,978,250**	84,280,000,000
2009	26,026,000,000,000	123	**320,119,800,000**	11,300,000,000
2008	29,323,000,000,000	102	**299,681,060,000**	-67,000,000,000
2007	23,047,878,000,000	90	**232,596,185,400**	123,536,563,200

In 2012, this implicit subsidy amounts to 1.8% of GDP in market prices of the EU-28, which according to Eurostat equals to 12,967,742,100,000 €[9].

As we have shown that this implicit subsidy is a recurring yearly transfer of value from tax payers to financial institutions, its value can therefore be approximated by that of a perpetual bond by discounting the future (perpetual) cash flows[10]. Take for example a market interest rate of 4%.

$$Net\ present\ value\ of\ implicit\ subsidies = \frac{Best\ estimate\ of\ implicit\ subsidies}{4\%}$$

We estimate the **total net present value of implicit subsidies at 5,849 Billion € or 45% of 2012 GDP.**

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[9] See http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&plugin=1&language=en&pcode=tec00001

[10] See e.g Bijlsma and Mocking (2013) who also use a perpetual bond to value implicit subsidies.

	In € Billion	As % of 2012 GDP
NPV Implicit Subsidy	5,849.25	45%

It is important to make the distinction between the recurring value of the yearly subsidy and the net present value, especially because it allows for comparing the net present value with the total additional levies and capital buffers (see below).

Implicit subsidies and total state aid 2008-2012

The DG Competition of the European Commission has published a State Aid Scoreboard 2013[11] with figures of all state aid to banks in the period between 2008 and 2012. The tables below provide an overview of the different aid instruments that we have separated into non-cash aid instruments such as guarantees and cash aid instruments that cover other recapitalisation, asset relief and other liquidity measures.

Non-Cash Aid Instrument (2008-2012)	In € Billion	As % of 2012 GDP	Used	As % of 2012 GDP	Revenues / Fees	As % of GDP
Guarantees	492.2	3.82%	2.0	0.0%	32.9	0.30%

Cash Aid Instrument (2008-2012)	In € Billion	As % of 2012 GDP	Revenues / Fees	As % of GDP
Other liquidity measures	42.2	0.33%	92.1	0.70%
Recapitalization measures	413.2	3.20%		
Asset relief measures	178.7	1.39%		
Total	634.1	4.92%	92.1	0.70%

These figures on state aid provide the order of magnitude at which the state has been and still is exposed to the financial sector. The European Commission states that they cannot be read in terms of definite cost[12]. However, the total cash out minus cash in of this period does provide a meaningful

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[11] See http://ec.europa.eu/competition/state_aid/scoreboard/financial_economic_crisis_aid_en.html

[12] The European Commission mentions: "The figures for all the aid instruments do not represent definitive statistics on the amounts of State aid granted to financial sector. In other words, they do not provide information on the definite cost that the public finances bear as a result of the support provided to financial institutions. For example, in respect to guarantees on liabilities, governments will only bear a cost in case that they are called upon. In the same way, part of recapitalisation provided to the financial institutions has been already repaid but this is not included in State Aid Scoreboard." See http://ec.europa.eu/competition/state_aid/scoreboard/conceptual_remarks_crisis_aid_en.html

figure that is comparable with best estimates of implicit subsidies. In the table below we provide the summary of cash out minus cash in and implicit subsidies over the period 2008-2012.

The total cash equivalent transfer from tax payers to the financial sector amounts to 1,839.5 Billion € or 14.2% of 2012 GDP over a five year period.

	In € Billion	As % of 2012 GDP
Implicit subsidy 2008-2012[13]	1,330.41	10.3%
Total cash aid instrument (2008-2012)	634.1	4.92%
Total revenues and fees on aid instruments (including guarantees)	-125	-1%
Total cash equivalent value 2008-2012	1,839.5	14.19%

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[13] This is the sum of the best estimates over 2008-2012 reported in the table on page 10

Policy implications of implicit subsidies

Policies aiming at improving the stability of the financial sector and more specifically those addressing the problem of systemic risk, should in principle also address the problem of implicit subsidies. Therefore we have scrutinized recent policies and current policy proposals in this area in more detail.

These new policies can be divided into two areas, those that impose levies on financial institutions (be it levies on banks to fund the deposit guarantee scheme or levies for the new resolution fund) and those that impose extra capital buffers on financial institutions such as the global systemic institution buffer.

Let us first analyse the levies. The trilogues between Council, EP and EC in the context of Bank Recovery and Resolution Directive (BRRD) reveal that the total levy will most likely be in the range of 1.3%-3% of covered deposits (built up over 10-15 years). Given that covered deposits amount to 16% of the liabilities of banks in the EU on a total of 40 Trillion €, the total combined levy would thus fall in the range of 83.2 to 192 Billion €.

Now let us take a closer look at the capital buffers. The mandatory surcharge in CRD/CRRIV will become effective as of January 2016 and amounts to 1 - 3.5% of core equity to risk weighted assets for G-SIFI's[14]. In 2011, RWA's amount to 37.3% of total banking assets[15], and total assets of G-SIFI's in the EU in 2011 amount to 17,877 Billion €[16]. Based on these figures, we estimate the capital surcharge to be in the range of 67 Billion € (1%) to 233 Billion € (3.5%).

When we add up the levies and capital charges, we find that **combined policies to address systemic risk in the EU fall in the range of 149.8 Billion € to 425.4 Billion € of additional funds and capital. This is substantially lower than the net present value of implicit subsidies of 5,849 Billion €.**

This raises fundamental questions about the effectiveness of the combined CRR/CRDIV and BRRD policies to really address the distortions created by implicit subsidies. This report has compared the orders of magnitude of implicit subsidies with the capital charges and levies on financial institutions and concludes that current policy proposals will only have a marginal effect and will not fundamentally eliminate the distortions created by these implicit subsidies.

In the forthcoming study "Banking structural reform; a Green perspective", the effectiveness of additional structural reform policies will be evaluated in order to address the distortions created by implicit subsidies and the problem of systemic risk.

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[14] The G-SII "surcharge" reflects the cost of being systemically important and is aimed at reducing the moral hazard of implicit support and bail-out by taxpayer money. See Capital Requirements - CRD IV/CRR – Frequently Asked Questions. European Commission Memo - July 2013.

[15] See p. 16 in the CEPS report. Screening of the European Banking Sector Post Crisis, May 2011.

[16] See Table A3.2 in the appendix of High-level Expert Group on reforming the structure of the EU banking sector, Chaired by Erkki Liikanen – 2nd October 2012. We have added up the total assets of the G-SIFI's based on the data in this table.

Appendix A

The graph below is from Schich, S. and Lindh, S. (2012), "Implicit Guarantees for Bank Debt: Where Do We Stand?" *OECD Financial Market Trends Vol. 2012/1*

Figure A.3. Mapping of credit rating uplifts to estimated yield spread reductions

Estimates in basis points based on observed yield spreads, March 2012
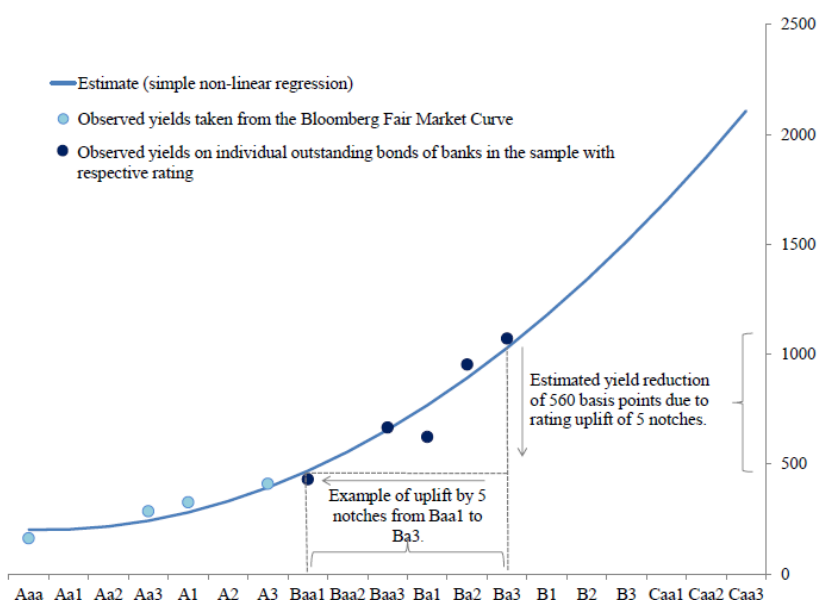
Notes: Value of reduction in yield spread in basis points, implied by a move up the rating ladder due to the credit rating uplift (i.e. the difference between the "all-in rating" and "stand-alone credit rating"). German government 5 year bonds are used as benchmark.

Sources: OECD Secretariat estimates based on data from Bloomberg and Moody's.

The table below represents the graph above from Schich (2012) in a more readable manner.

Figure A3 p. 18		BP	linear interpolation	1n	2n	3n	4n	5n
A	aaa	250	250	25	50	75	100	150
A-	aa1		275	25	50	75	125	175
B+	aa2		300	25	50	100	150	200
B	aa3		325	25	75	125	175	300
B-	a1	350	350	50	100	150	275	400
C+	a2		400	50	100	225	350	433
C	a3		450	50	175	300	383	466
C-	baa1	500	500	125	250	333	416	500
C-	baa2		625	125	208	291	375	542
D+	baa3	750	750	83	166	250	417	583
D+	ba1		833	83	167	334	500	667
D	ba2		916	84	251	417	584	751
D-	ba3	1000	1000	167	333	500	667	833
E+	b1		1167	167	333	500	667	833
E+	b2		1333	167	333	500	667	
E+	b3	1500	1500	167	333	500		
E	caa1		1667	167	333			
E	caa2		1833	167				
E	caa3	2000	2000					

Schich report an rating uplifts from 2007 to 2012. In order to calculate the funding advantage based on the table above, we have assumed an average rating of Aa3 and that 40% of the balance sheet liabilities as risk sensitive.

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