EUROPEAN COMMISSION

Brussels, 28.9.2011
SEC(2011) 1102 final

Vol. 15

COMMISSION STAFF WORKING PAPER

IMPACT ASSESSMENT

Accompanying the document

Proposal for a Council Directive

on a common system of financial transaction tax and amending Directive 2008/7/EC

{COM(2011) 594 final}
{SEC(2011) 1103 final}

ANNEX 14
EFFECTS ON MARKET STABILITY AND RISK

ESTIMATING BANKS' INDIVIDUAL CONTRIBUTIONS TO SYSTEMIC RISK: A SYMBOL-BASED APPROACH.

1. INTRODUCTION

The Commission is evaluating options regarding the introduction of a harmonized Financial Sector Taxation framework. Options under study include a Financial Activities Tax (FAT) and a Financial Transactions Tax (FTT). Details of these various options are studied so as to be in line with other regulatory proposals in the pipeline, aimed at strengthening the stability of the banking sector. In particular, the Commission has put forward new rules for banks' capital requirements, transposing into EU legislation the recent Basel 3 Accord, and is going to present a novel framework for crisis management. The latter, among other things, will introduce Resolution Funds (RF) whose function is that of limiting contagion effects across banks and thus of ensuring that bank failures can not take place in an uncontrolled fashion that would destabilise the financial system.

The aim of this work is to provide quantitative analysis supporting the Impact Assessment exercise on Financial Sector Taxation. In particular, the present contribution consists of an analysis, based on the model SYMBOL[1], estimating the probability and magnitude of systemic losses deriving from banks' defaults, explicitly taking into account the effects of Basel capital requirements, Deposit Guarantee Schemes (DGS) and bank Resolution Funds (RF).[2]

SYMBOL also provides results for the contribution of individual banks to the risk of the banking sector as a whole, both in the case where contagion effects are controlled fully by DGS/RF (and the associated crisis management tools) and in the case when these tools are not completely effective in managing the effects of banking defaults.

The analysis has been developed for 19 EU MS[3] using 2009 data for a sample of banks coming from *Bankscope* and augmented by further analysis by DG TAXUD, DG MARKT

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1 The SYMBOL model (**SY**stemic **M**odel of **B**anking **O**riginated **L**osses) has been jointly developed by the Joint Research Centre Financial Crisis Task Force, DG MARKT, and experts on banking regulation (see De Lisa et al., 2010).

2 In previous works, SYMBOL has been used to assess the impact of Basel III higher capital standards on the systemic losses and liquidity shortfalls deriving from banks' defaults. (see Marchesi *et* al., 2010).

3 These countries are Belgium, Bulgaria, Cyprus, Denmark, Finland, Germany, Greece, Ireland, Spain, France, Italy, Latvia, Luxembourg, Malta, Netherlands, Austria, Portugal, Sweden, and the United Kingdom.

and JRC, as well as integrations from Supervisory Authorities and/or Central Banks for some countries.[4] Moreover, some ECB data have been used to complete or correct the dataset.[5]

The remaining of this document develops as it follows. Section 2 introduces the SYMBOL model. Section 3 lists the main proposals on financial regulation incorporated in the SYMBOL analysis. Section 4 shows how SYMBOL has been used to obtain estimates of the banks' individual contributions to systemic expected losses. Section 5 contains some summary statistics of the results, examples for selected countries and information on how to read detailed results file.

Two Annexes are attached to this document. Annex A presents a summary table describing the samples used for SYMBOL simulation. Annex B gives mathematical details on the formulas applied to estimate banks individual expected yearly losses.

2. THE SYMBOL MODEL

SYMBOL starts by estimating individual bank credit losses which are generated via a Monte Carlo simulation according to the Basel FIRB function loss distribution. The average probability of default of the credit portfolio of each bank is estimated consistently with capital requirements, while other variables (LGD, correlation, etc.) are set at their default values.

Banks simulated losses are then compared with banks capital: whenever losses exceed capital, banks are considered to default.

The model proceeds by simulating contagion via the interbank market[6], in order to capture systemic linkages between banks besides the fact that their assets are correlated. In the absence of an effective intervention by resolution facilities[7], whenever a bank defaults it is assumed that 40% of the amounts of its interbank debits are passed as losses to creditor banks and distributed among them. Losses are distributed following a criterion of proportionality: the portion of loss absorbed by each 'infected' bank is proportional to its creditor exposure in the interbank market. Whenever with this additional loss the simulation shows that another bank's losses exceed its capital, that banks is also considered to default, and so on bank after bank until no new bank defaults.[8] Systemic losses are computed as the sum of the losses in

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4 Data from the Supervisory Authority and/or the Central Bank have been received from Bulgaria, Cyprus, Latvia, Ireland and United Kingdom.

5 Annex A contains aggregated data on relevant variables for the samples used.

6 Only domestic contagion is included in the version of SYMBOL used for the present report.

7 In the "best case" scenario, an RF operating in coordination with a liquidity facility is assumed to be able to neutralize contagion by absorbing a share of excess losses proportional to the size of a banks' interbank liabilities, while resolution and liquidity facilities are able to completely eliminate additional losses due to liquidation costs, fire sale effects and market congestion.

8 It is worth noting that contagion effects are sensitive to the two assumptions made: the 40% percentage of interbank debits that are passed as losses to creditor banks in case of failure, and the criterion of proportionality used to distribute these losses across banks, which is dependent on the fact that a bank-to-bank interbank lending matrix is not yet available to the Commission (although preliminary sensitivity analysis on this aspect points to the fact that the shape of the matrix should be less important than total size of interbank market). A loss of 40% on the interbank exposure is coherent with the upper

excess of capital over the entire bank sample. Distributions for the population of all banks in each MS are then obtained by rescaling the distributions proportionally according to the ratio of total assets in the sample and in the total banking sector in the MS.

3. FINANCIAL REGULATORY PROPOSALS INCORPORATED IN THE SYMBOL ANALYSIS

The Commission is currently presenting three distinct proposals on financial regulation:

1) A Capital Requirements Directive proposal (CRD IV), aimed at adopting the new rules proposed in the Basel 3 accord, including new definitions of capital for regulatory purposes, a new set of capital requirements for tier1 and total capital as a proportion of Risk Weighted Assets (RWA) and the introduction of a capital conservation buffer of 2.5% of RWA;
2) A Directive proposal aimed at strengthening Deposit Guarantee Schemes substantially enlarging their coverage (100,000 EUR) and, as a consequence, their funding;
3) A Directive proposal for an EU crisis management and banks resolution framework, including the creation of Resolution Funds in all MS.

The main features of these three proposals have been incorporated in the SYMBOL analysis, in order to come up with figures based on the most possible comprehensive view of all changes which are expected to impact the banking sector in the near future.

To take into account the effects of the new Basel 3 rules on capital requirements, distributions of losses are generated under the hypothesis that banks hold a capital equal at least to 8% or 10.5% of their risk weighted assets (i.e. excluding or including the presence of a mandatory capital conservation buffer).[9]

As far as Deposit Guarantee Schemes and Resolution Funds are concerned, instead, we base our working hypotheses on most recent version of these two proposals. In particular, the considered amount of funds available to DGS+RF purposes is the maximum between 1.5% of a country covered deposits and 0.3% of the amount of liabilities. Amounts of funds to be collected by the considered MS are reported in last column of Table A.1.[10]

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bound of economic research on this issue. See James (1991), Mistrulli (2007), Upper and Worms (2004).

9 Regarding Basel III, SYMBOL takes account at the moment of the consequences due to changes in the definition of capital and of Risk Weighted Assets in the trading book, securitization and counterparty risk, as well as the introduction of the capital conservation buffer. The leverage ratio and the new measures on liquidity can be possibly factored into the methodology used on the basis of how they modify contagion between banks via the interbank market.The analysis does for the moment also not include the effect of the stricter Tier1 constraints imposed by Basel III.

10 Figures in the last column of table A.1 refers to the sample of banks considered. As rules on the determination of the total amounts of funds available to DGS and RF in each MS are still under negotiation in the Council and the European Parliament, any rule adopted in the present study for simulation purposes can not reflect the final form of the rule as it will eventually be implemented. It was therefore chosen to calibrate funds available to DGS/RF on the basis of SYMBOL. In particular, preliminary SYMBOL results allows concluding that a calibration as the one considered would be effective and efficient, as it would ensure public finances to be hit in less than 0.05% of the cases.

4. METHODOLOGY

Estimates of the distribution of systemic losses deriving from banks defaults obtained using SYMBOL are presented under several "regulatory settings" and "contagion situations". Combinations of "settings" and "situations" identify the following "scenarios", representing joint assumptions on the regulatory set-up and the development of a financial crisis.

SYMBOL currently allows for two pairs of regulatory settings and two contagion situations:

1) Regulatory Settings

   The first regulatory setting regards the level of regulatory capital expressed as the minimum ratio of Capital to Risk Weighted Assets.

   The second regulatory setting regards the possibility of a "no bail-in" or a "bail-in" framework when DGS/RF absorbs losses. In the first case DGS/RF funds cover all non-equity creditors by absorbing losses of defaulted banks until funds are available; in the second case DGS/RF cover only insured depositors and inter-bank depositors (to avoid contagion), i.e. part of the losses would be absorbed by bondholders and depositors not eligible for insurance coverage.

2) Contagion Situations represent possible polar extremes of the effectiveness of interventions during the crisis:

   In the "best" situation, funds and facilities are assumed to be able to work in such a way that no additional losses due to liquidity or "fire sale" effects are generated, so that only economic losses due to defaults in bank's portfolios need to be covered, i.e. contagion effects are not considered.

   In the "worst" situation funds and facilities intervene, but they are not able to avoid liquidity and "fire sale" additional losses and to completely stop contagion.

In the current analysis the settings and situations explored are as follows:

A) Regulatory Capital Requirement Settings:

   Two different capital requirement settings are considered in order to evaluate the effects of the introduction or not of a mandatory "capital conservation buffer" for banks in Basel 3. In other words we distinguish between the situation where banks must hold a minimum capital equal to 8% of their Risk Weighted Assets (RWA) and the situation where a minimum capital conservation buffer of 2.5% is also put on top, so to reach at least a capital equal to 10.5% of RWA.

B) Bail-in / No bail-in Settings:

A single setting is considered in the current analysis, where private funds or state interventions are considered to cover all losses generated in the system.

C) Contagion Situations:

Two situations are considered: one where intervention is perfectly effective in blocking contagion, and one where interventions are only able to reimburse losses but are not able to prevent contagion.

The combination of these hypothesis yields four possible "scenarios", represented in Table 1.

Table 1: Scenario definition

Scenario	Capital Setting		*Bail-In* Setting		Situations	
	No Conservation Buffer, i.e. capital ≥ 8% RWA	**Conservation Buffer, i.e. capital ≥ 10.5% RWA**	**No Bail-In**	**Bail-In**	**Contagion**	**No Contagion**
1	X		X		X	
2	X		X			X
3		X	X		X	
4		X	X			X

Scenario 1 represents the worst (most risky) scenario: banks hold at least a capital of 8% of RWA, DGS/RF are ineffective in blocking contagion, and they cover all losses (no bail-in).

Scenario 2: while the minimum capital stays at 8% of RWA, DGS/RF are effective in blocking contagion (no contagion) and their interventions cover all losses (no bail-in)

Scenario 3: banks hold at least a capital of equal to 10.5% of RWA, DGS/RF are ineffective in blocking contagion, and they intervene to cover all losses (no bail-in).

Scenario 4 is the best (least risky) scenario where banks hold a minimum capital of 10.5% of their RWA, DGS/RF are effective in blocking contagion (no contagion), and they intervene to cover all losses (no bail-in).

For each of the scenarios, SYMBOL simulates excess losses for each individual bank in the sample. The sum of all of these losses is then used to generate the distribution of losses in each scenario.

SYMBOL is further used to estimate the contribution of each bank to systemic losses. The individual bank's contribution is defined as the expected average yearly loss of this bank (over the whole set of SYMBOL simulations).[11] A percentage contribution of each bank to the systemic risk is then obtained as the ratio of its individual contribution on the sum of individual contributions of all banks in each country.

The contribution of each bank to systemic loss is further divided in two parts: the contribution generated by each bank in all cases where the total loss is lower than RF/DGS available funds, and the contribution generated by each bank when the total losses exceed this amount.

5. SYMBOL RESULTS

The following results are based on a total number of SYMBOL simulations so to obtain for each country 100,000 runs where at least one bank defaults. This high number of run is needed in order to guarantee that in the right tail of the distribution a sufficient number of points is sampled. The results for the different versions of a FAT are presented in section 5.3. The discussion of the FTT - which cannot be explicitly modelled in SYMBOL – can be found in section 5.4.

[11] Our methodology is such that expected yearly losses are directly proportional to total losses. See Annex B below for mathematical details of the methodology used, which is a variation of the one proposed by Praschnik and Principato (2001). Contributions are calculated by excluding the more extreme events above the 99.999th quantile, in order to exclude the influence of events in the leftmost tail which could be suffering excess variance due to undersampling.

5.1. Distribution of excess losses

Tables 3-6 show some selected percentiles of the distribution of systemic losses under the various scenarios for all considered MS. Distributions presented in these tables refer to the bank populations and are therefore comparable across MS.

The tables report the cumulative distribution function of systemic excess losses. For instance for Scenario 1 in Belgium we can read that systemic excess losses are below 69,445 m€ in 99.9% of the cases.

It is clear that losses decrease moving from Scenario 1 to Scenario 2, and from Scenario 3 to Scenario 4, depending on the fact that contagion between banks is considered (Scenario 1 and 3) or not (Scenario 2 and 4). Moreover losses decrease when moving from a minimum capital ratio of 8% (Scenario 1 and 2) to a minimum capital ratio of 10.5% (Scenario 3 and 4).

5.2. Results for individual contributions to systemic losses

Tables 7-18 show some selected percentiles of the distribution of individual contributions to systemic losses. Tables 7-10 illustrate individual contributions for the **whole** set of cases (i.e. without considering cases where losses exceed or are below the amount of funds available to DGS/RF). Tables 11-14 illustrate individual contributions for cases where losses are **below** the amount of funds available to DGS/RF. Tables 15-18 finally illustrate individual contributions for cases where losses are **above** the amount of funds available to DGS/RF.

Figures should be read as in the following example. For Scenario 1 in Belgium the yearly expected loss is lower than 0.9134% for 75% of the banks in the sample. Average yearly individual contributions are usually much higher than the median, suggesting that there are few banks contributing most to the systemic risk.

This fact is also confirmed if we compute the Gini coefficient for the distributions of the individual contributions (whole, above and below) in each scenario and for all countries. The Gini coefficient measures the inequality of a distribution, so a value of 0 expresses total equality and a value of 1 maximal inequality.[12] Results are shown in Table 19 and plotted in the graphs of Figure 1 for comparison purposes.

By looking at these results it is possible to notice how the distributions of individual contributions to systemic risk tend to be rather concentrated. Concentration tends to increase when moving from the "below" to the "whole" and from the "whole" to be "above" individual contributions.

This is a not surprising results as bigger banks (less numerous) tend to relatively contribute more to higher systemic losses, while smaller banks (more numerous) tend to relatively contribute lower systemic losses.

[12] In our example a value of 0 would say that all banks contribute equally to the systemic losses while a value of 1 would say that there is a single bank responsible for the entire amount of systemic losses.

5.3. The FAT

Table 2 provides the coefficient of correlations between various types of FAT and various scenarios of systemic risk. Several messages stand out. First, when contagion is not avoided and DGS / Resolution Fund are not yet funded all versions of FAT perform in about the same way [contagion whole 8% scenario].

Suppose now that DGS / Resolution Fund are funded but that the legal framework for bank resolution is still unable to block contagion. Once again, all versions of FAT perform in about the same way [contagion above 8% scenario].Finally, consider that DGS / Resolution Fund are funded and that contagion can be avoided [no contagion above 8% scenario] In this case; FAT1 is more aligned to risk and provides the best incentive. This is not completely surprising as capital requirement require more equity when banks take more risks. If more risky activities produce high profits, part of them might be needed to remunerate the higher capital required.

It shall be stressed that FAT3 rests on the hypothesis that high returns are due to higher risks. While this could be true, other factors may trigger higher returns such as a lack of competition or more efficient production methods (e.g. superior knowledge of markets, a more productive workforce, mean management structures). In this latter case, the tax could be a tax on talent rather than a tax on high risk. In practice, Adrian and Brunnermeier (2010) find that the contribution of an individual institution to systemic risk is correlated with leverage, the relative size and maturity mismatch. As indicated in Table 2, FAT1 is the option that is best correlated with size, as measured by total assets.

Table 2. Correlation between individual contributions to FAT and Systemic Risk

	FAT1	**FAT2**	**FAT3**
Contagion - Whole - 8%	0.49	0.46	0.44
Contagion - Below - 8%	0.25	0.11	0.08
Contagion - Above - 8%	0.48	0.45	0.44
No Contagion - Whole - 8%	0.51	0.33	0.27
No Contagion - Below - 8%	0.43	0.28	0.22
No Contagion - Above - 8%	0.49	0.31	0.25
total assets	0.71	0.54	0.44

Note: taking FAT revenues adjusted for relocation and elasticities effects provide very similar results.

5.4. The FTT

The same exercise cannot be done for the FTT as there is no bank-level data on contribution to FTT. The aspects of dealing with risk and behavioural effects of the FTT related to the possibility of the FTT to curb speculation, noise trading and technical trade, and to decrease

markets' volatility. An extensive review of the economic literature in Hemmelgarn and Nicodème (2010) concludes that the effects of the FTT on volatility is largely inconclusive and depends on market structure. Several studies show that a FTT could even aggravate volatility (because of a reduction in the number of transactions), creating more room for speculators.

The simulations with a dynamic stochastic general equilibrium model presented in section 6.4.1 and Annex 15 show that a FTT impact on volatility would be very marginal while costs in terms of GDP will be relatively high. On the other hand, the FTT would serve as a tool to deal with the challenge of short-sighted profit-seeking behaviour. Also, it could help to reduce the rents of the financial sector generated by activities such as high-frequency automated trading.

Table 3: Estimated distributions of systemic excess losses in Scenario 1- Million Euro (Capital ≥ 8% RWA, No Bail-In, Contagion)

	90	95	96	97	98	99	99.5	99.9	99.95	99.99	99.995	99.999
BE	-	-	-	-	-	-	-	69,445	75,203	88,009	94,148	110,907
BG	-	-	-	-	-	-	-	56	144	451	830	1,817
DK	-	-	-	-	-	1	57	12,190	18,116	59,049	66,486	85,445
DE	-	11	25	54	128	436	1,255	321,017	388,965	464,719	494,974	575,736
GR	-	-	-	-	-	-	158	3,499	5,720	14,362	19,065	29,247
ES	-	-	-	-	2	146	1,348	14,860	30,581	79,267	105,814	164,196
FR	-	-	-	24	181	1,585	5,955	39,357	92,949	223,088	261,608	346,929
IE	-	-	-	-	-	-	787	68,848	77,334	91,954	97,964	113,956
IT	-	16	34	76	186	592	1,438	6,889	11,013	30,447	41,798	74,748
CY	-	-	-	-	-	-	-	19,573	21,463	23,632	24,464	26,382
LV	-	-	-	-	-	-	2	110	201	847	1,371	2,597
LU	-	-	-	-	-	-	-	50,776	60,553	74,228	77,739	85,326
MT	-	-	-	-	-	-	-	52	182	800	1,101	2,904
NL	-	-	-	-	-	-	5	24,275	129,948	157,113	168,784	198,370
AT	-	-	-	3	19	99	414	8,767	14,296	36,686	44,584	60,661
PT	-	-	-	-	-	-	67	6,924	12,988	23,435	27,773	37,992

FI	-	-	-	-	-	-	-	380	24,983	31,519	34,826	43,503
SE	-	-	-	-	-	-	-	69	9,780	58,346	65,067	79,655
UK	-	-	-	-	0	46	323	185,759	292,365	353,069	382,369	449,315

Table 4: Estimated distributions of systemic excess losses in Scenario 2 - Million Euro (Capital ≥ 8% RWA, No Bail-In, No Contagion)

	90	95	96	97	98	99	99.5	99.9	99.95	99.99	99.995	99.999
BE	-	-	-	-	-	-	-	3,626	6,813	15,926	20,747	34,157
BG	-	-	-	-	-	-	-	38	79	225	309	545
DK	-	-	-	-	-	1	49	1,698	3,464	10,191	14,051	26,281
DE	-	11	24	53	125	405	1,074	5,716	10,620	34,282	49,025	98,660
GR	-	-	-	-	-	-	106	1,897	3,217	6,995	8,948	14,842
ES	-	-	-	-	2	117	902	7,424	11,999	28,101	37,829	60,990
FR	-	-	-	23	166	1,182	4,251	19,393	30,235	63,643	83,061	132,007
IE	-	-	-	-	-	-	337	4,291	6,764	13,939	17,927	28,407
IT	-	16	34	74	180	560	1,340	5,854	9,313	22,234	31,288	51,638
CY	-	-	-	-	-	-	-	111	339	1,284	1,797	3,142
LV	-	-	-	-	-	-	1	60	107	253	327	556
LU	-	-	-	-	-	-	-	618	1,505	4,505	6,040	9,796
MT	-	-	-	-	-	-	-	16	118	455	636	1,129
NL	-	-	-	-	-	-	5	2,304	7,237	25,386	34,589	58,693
AT	-	-	-	3	18	86	279	2,134	3,603	7,639	9,533	15,123

PT	-	-	-	-	-	-	51	2,684	4,642	9,858	12,512	19,359
FI	-	-	-	-	-	-	-	144	1,809	8,125	11,336	19,874
SE	-	-	-	-	-	-	-	66	1,965	9,983	14,103	25,154
UK	-	-	-	-	0	43	269	8,136	18,270	53,579	72,394	128,850

Table 5: Estimated distributions of systemic excess losses in Scenario 3- Million Euro (Capital ≥ 10.5% RWA, No Bail-In , Contagion)

	90	95	96	97	98	99	99.5	99.9	99.95	99.99	99.995	99.999
BE	-	-	-	-	-	-	-	15,509	63,852	79,753	86,050	102,517
BG	-	-	-	-	-	-	-	55	143	449	808	1,813
DK	-	-	-	-	-	-	17	1,525	12,677	53,523	61,735	80,107
DE	-	6	16	38	95	318	917	12,370	370,337	455,300	484,531	565,109
GR	-	-	-	-	-	-	-	1,382	2,940	8,065	11,175	20,790
ES	-	-	-	-	0	65	471	10,507	24,720	65,275	85,791	141,078
FR	-	-	-	1	45	330	1,373	14,891	28,204	95,974	157,523	260,554
IE	-	-	-	-	-	-	-	8,699	46,159	77,618	84,660	101,801
IT	-	-	2	11	40	204	636	4,056	7,281	22,128	33,045	56,190
CY	-	-	-	-	-	-	-	19,359	21,371	23,585	24,427	26,320
LV	-	-	-	-	-	-	-	52	128	597	968	2,279
LU	-	-	-	-	-	-	-	757	52,376	71,921	75,799	83,630
MT	-	-	-	-	-	-	-	5	147	760	1,051	2,827
NL	-	-	-	-	-	-	-	9,773	72,722	151,571	163,275	192,763
AT	-	-	-	-	9	60	211	2,322	4,555	17,751	31,780	53,248

PT	-	-	-	-	-	-	-	2,143	5,351	14,086	18,440	28,193
FI	-	-	-	-	-	-	-	4	1,058	29,373	32,648	41,363
SE	-	-	-	-	-	-	-	45	8,710	53,712	62,356	77,536
UK	-	-	-	-	-	9	96	38,574	166,950	306,174	337,066	401,732

Table 6: Estimated distributions of systemic excess losses in Scenario 4 - Million Euro (Capital ≥ 10.5% RWA, No Bail-In, No Contagion)

	90	95	96	97	98	99	99.5	99.9	99.95	99.99	99.995	99.999
BE	-	-	-	-	-	-	-	1,001	4,076	12,938	17,701	30,398
BG	-	-	-	-	-	-	-	37	78	223	306	543
DK	-	-	-	-	-	-	16	981	2,470	9,083	12,975	24,947
DE	-	6	16	38	93	301	809	4,885	9,623	33,852	47,704	100,895
GR	-	-	-	-	-	-	-	767	1,776	5,184	7,069	11,801
ES	-	-	-	-	0	56	383	5,057	9,368	25,575	34,404	57,558
FR	-	-	-	1	44	307	1,148	10,230	18,085	45,269	60,498	99,316
IE	-	-	-	-	-	-	-	2,016	4,120	10,610	14,284	24,026
IT	-	-	2	11	40	196	597	3,514	6,251	17,605	25,427	43,833
CY	-	-	-	-	-	-	-	107	330	1,274	1,794	3,116
LV	-	-	-	-	-	-	-	30	66	199	272	496
LU	-	-	-	-	-	-	-	308	751	3,006	4,453	8,105
MT	-	-	-	-	-	-	-	3	88	432	610	1,112
NL	-	-	-	-	-	-	-	1,642	5,586	22,034	30,741	54,775
AT	-	-	-	-	9	55	172	1,288	2,383	5,954	7,825	13,101

PT	-	-	-	-	-	-	-	638	2,133	6,912	9,297	15,739
FI	-	-	-	-	-	-	-	3	433	5,988	9,166	17,731
SE	-	-	-	-	-	-	-	44	893	8,735	12,617	23,363
UK	-	-	-	-	-	8	89	2,330	7,835	37,386	54,891	105,561

Table 7: Distributions of individual banks' percentage contributions – whole – Scenario 1 (Capital ≥ 8% RWA, No Bail-In, Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0022%	0.0043%	0.0281%	0.9134%	17.1142%	26.1647%	37.9596%	4.3478%
BG	0.0877%	0.3010%	1.6317%	4.7369%	9.1465%	16.7407%	26.8025%	4.1667%
DK	0.0002%	0.0012%	0.0049%	0.0273%	0.1820%	3.0450%	26.6287%	1.0101%
DE	0.0002%	0.0008%	0.0026%	0.0080%	0.0257%	0.0576%	0.5994%	0.0675%
GR	0.1415%	0.3639%	0.8895%	7.1380%	17.3577%	23.1515%	35.9771%	6.2500%
ES	0.0018%	0.0046%	0.0314%	0.1644%	1.1811%	2.9237%	10.8990%	0.6993%
FR	0.0025%	0.0068%	0.0282%	0.0764%	0.5760%	2.3732%	9.5176%	0.5128%
IE	0.0014%	0.0157%	0.3075%	3.5338%	8.1870%	17.6855%	37.8607%	4.1667%
IT	0.0015%	0.0071%	0.0256%	0.0922%	0.3491%	0.6314%	3.9744%	0.2114%
CY	0.0077%	0.2077%	0.6766%	8.5586%	12.2505%	23.4636%	40.7975%	6.6667%
LV	0.2258%	0.8302%	2.7152%	7.7833%	8.3205%	8.7403%	23.8506%	4.7619%
LU	0.0334%	0.1538%	0.5123%	1.3600%	3.8738%	5.8616%	20.3512%	1.7857%
MT	0.0382%	0.3323%	1.0173%	10.7441%	34.3410%	41.6739%	47.5401%	10.0000%
NL	0.0174%	0.0478%	0.0872%	0.2099%	23.0060%	33.6746%	37.4938%	4.7619%
AT	0.0114%	0.0250%	0.0533%	0.1371%	0.6454%	2.5922%	6.2619%	0.5780%
PT	0.0706%	0.1978%	0.8752%	2.5135%	29.0670%	36.5734%	39.5154%	7.1429%
FI	0.0015%	0.0095%	0.2253%	1.7176%	22.1164%	56.9913%	84.8912%	11.1111%
SE	0.0009%	0.0020%	0.0047%	0.0179%	0.0407%	0.5504%	33.2243%	1.5152%
UK	0.0010%	0.0028%	0.0167%	0.0850%	1.1244%	1.6885%	31.6956%	1.1765%

Table 8: Distributions of individual banks' percentage contributions – whole – Scenario 2 (Capital ≥ 8% RWA, No Bail-In, No Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0078%	0.0208%	0.0427%	0.1656%	23.1840%	32.6450%	35.8473%	4.3478%
BG	0.1309%	0.5011%	2.7339%	4.6498%	10.4491%	16.0674%	18.7685%	4.1667%

DK	0.0004%	0.0026%	0.0178%	0.0766%	0.5481%	6.2852%	31.0633%	2.0000%
DE	0.0009%	0.0032%	0.0107%	0.0308%	0.0714%	0.1350%	0.9875%	0.0675%
GR	0.2203%	0.4663%	1.5785%	7.0135%	20.0000%	22.9969%	28.4450%	6.2500%
ES	0.0009%	0.0038%	0.0347%	0.1716%	0.6734%	4.3234%	12.8648%	0.6993%
FR	0.0045%	0.0092%	0.0490%	0.1158%	0.4310%	2.9426%	11.1523%	0.5128%
IE	0.0007%	0.0110%	0.0627%	3.7445%	17.6680%	20.7172%	22.4775%	4.1667%
IT	0.0016%	0.0080%	0.0286%	0.1028%	0.3851%	0.6830%	3.0177%	0.2114%
CY	0.2294%	0.6473%	1.5616%	6.6511%	20.9144%	28.9569%	33.9570%	6.6667%
LV	0.0036%	0.5580%	1.1622%	4.5207%	9.9036%	18.7625%	33.0925%	4.7619%
LU	0.0238%	0.0505%	0.1845%	0.6787%	2.3391%	3.9141%	81.6590%	3.5088%
MT	0.0291%	0.0473%	0.3704%	3.5151%	43.1600%	47.0231%	50.1135%	10.0000%
NL	0.0955%	0.1387%	0.2119%	0.9933%	18.7878%	19.3270%	44.6077%	4.7619%
AT	0.0288%	0.0618%	0.1096%	0.2598%	0.8464%	1.6975%	8.9955%	0.5780%
PT	0.0718%	0.1697%	0.6795%	3.8920%	29.5305%	31.9445%	32.9386%	7.1429%
FI	0.0099%	0.0412%	0.2377%	1.1698%	21.7191%	58.0918%	87.1899%	11.1111%
SE	0.0040%	0.0069%	0.0159%	0.0404%	0.1094%	0.2022%	36.6290%	1.5152%
UK	0.0027%	0.0083%	0.0285%	0.1546%	1.1078%	5.7536%	18.6160%	1.1765%

Table 9: Distributions of individual banks' percentage contributions – whole – Scenario 3 (Capital ≥ 10.5% RWA, No Bail-In, Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0046%	0.0096%	0.0410%	0.9420%	13.6335%	29.1879%	38.7886%	4.3478%
BG	0.0886%	0.3058%	1.5705%	4.7789%	8.8080%	16.8323%	27.0385%	4.1667%
DK	0.0003%	0.0017%	0.0069%	0.0338%	0.2243%	2.4940%	35.7049%	1.0101%
DE	0.0002%	0.0008%	0.0026%	0.0078%	0.0257%	0.0573%	0.5911%	0.0675%
GR	0.2547%	0.5217%	0.8674%	8.4102%	20.6547%	27.0478%	27.0903%	6.2500%
ES	0.0020%	0.0055%	0.0393%	0.2127%	1.2631%	3.2610%	11.6907%	0.6993%
FR	0.0056%	0.0130%	0.0612%	0.1589%	0.5735%	2.0863%	10.6079%	0.5128%
IE	0.0027%	0.0208%	0.3548%	3.7614%	8.0188%	19.0723%	36.4371%	4.1667%
IT	0.0024%	0.0087%	0.0224%	0.0821%	0.3687%	0.6857%	4.3992%	0.2114%
CY	0.0078%	0.1963%	0.5930%	8.5792%	12.3248%	23.5748%	40.9062%	6.6667%
LV	0.2455%	0.9949%	3.3307%	6.8224%	12.4977%	12.8572%	15.7057%	4.7619%
LU	0.0450%	0.1626%	0.5560%	1.4681%	3.9372%	6.2815%	19.0453%	1.7857%
MT	0.0466%	0.3711%	1.1522%	12.2141%	38.0873%	39.8161%	41.1991%	10.0000%
NL	0.0208%	0.0517%	0.0873%	0.2065%	19.4624%	35.1472%	39.3204%	4.7619%
AT	0.0205%	0.0426%	0.0959%	0.2171%	1.0754%	3.0780%	10.2694%	0.5780%
PT	0.0835%	0.1188%	0.8867%	2.7932%	27.9849%	35.2887%	39.0414%	7.1429%
FI	0.0027%	0.0176%	0.3807%	1.7054%	22.4382%	56.7157%	84.1377%	11.1111%
SE	0.0012%	0.0024%	0.0058%	0.0216%	0.0474%	0.5707%	33.3885%	1.5152%
UK	0.0010%	0.0042%	0.0197%	0.0834%	1.3876%	2.1093%	30.0370%	1.1765%

Table 10: Distributions of individual banks' percentage contributions – whole – Scenario 4 (Capital ≥ 10.5% RWA, No Bail-In, No Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0142%	0.0376%	0.0770%	0.2976%	21.9626%	28.8249%	38.4729%	4.3478%
BG	0.1334%	0.4796%	2.6567%	4.7079%	10.6112%	15.4658%	18.8470%	4.1667%

DK	0.0006%	0.0037%	0.0247%	0.0956%	0.6532%	5.4959%	20.6808%	1.0101%
DE	0.0010%	0.0036%	0.0120%	0.0329%	0.0768%	0.1352%	0.6885%	0.0675%
GR	0.3738%	0.6992%	1.2947%	9.4604%	17.5372%	21.8318%	27.3389%	6.2500%
ES	0.0014%	0.0056%	0.0487%	0.2526%	1.0110%	3.6859%	12.8974%	0.6993%
FR	0.0081%	0.0177%	0.0950%	0.2153%	0.5080%	2.5727%	8.5546%	0.5128%
IE	0.0011%	0.0228%	0.1321%	5.0397%	16.7615%	17.2005%	23.5855%	4.1667%
IT	0.0027%	0.0098%	0.0256%	0.0888%	0.3776%	0.7431%	3.5207%	0.2114%
CY	0.2487%	0.6067%	1.0305%	6.7877%	20.9855%	29.2661%	35.2996%	6.6667%
LV	0.0055%	0.7219%	1.6959%	6.5930%	14.8804%	15.7135%	20.7510%	4.7619%
LU	0.0407%	0.0862%	0.3135%	1.1400%	3.4968%	4.8710%	25.7367%	1.7857%
MT	0.0362%	0.0570%	0.4383%	4.1275%	43.3420%	46.3264%	48.7140%	10.0000%
NL	0.1176%	0.1720%	0.2577%	1.0045%	22.9457%	23.7061%	37.1041%	4.7619%
AT	0.0324%	0.0755%	0.1487%	0.3395%	0.9014%	2.3034%	10.6295%	0.5780%
PT	0.0898%	0.1854%	0.6429%	5.4522%	27.9206%	30.7674%	32.6901%	7.1429%
FI	0.0170%	0.0722%	0.4035%	2.0173%	22.9504%	56.7170%	83.7303%	11.1111%
SE	0.0051%	0.0088%	0.0204%	0.0519%	0.1412%	0.2612%	36.9101%	1.5152%
UK	0.0030%	0.0099%	0.0360%	0.2270%	1.6814%	4.4904%	19.5571%	1.1765%

Table 11: Distributions of individual banks' percentage contributions – below – Scenario 1 (Capital ≥ 8% RWA, No Bail-In, Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0500%	0.6944%	1.9526%	7.0065%	11.1666%	14.8967%	18.1460%	4.3478%
BG	0.1257%	0.4972%	2.8542%	4.9823%	10.1894%	13.9204%	20.3940%	4.1667%
DK	0.0008%	0.0054%	0.0351%	0.1610%	1.1725%	3.9017%	21.5494%	1.0101%
DE	0.0009%	0.0036%	0.0126%	0.0367%	0.0883%	0.1580%	1.0371%	0.0675%
GR	0.4080%	0.8874%	3.0304%	9.8364%	15.9143%	19.3363%	22.2263%	6.2500%
ES	0.0013%	0.0054%	0.0434%	0.3497%	0.9770%	4.6611%	12.4304%	0.6993%
FR	0.0049%	0.0106%	0.0546%	0.1349%	0.5488%	3.6944%	7.6902%	0.5128%
IE	0.0000%	0.0088%	0.0902%	4.8263%	18.1755%	20.0997%	20.2689%	4.1667%
IT	0.0016%	0.0086%	0.0318%	0.1077%	0.3972%	0.7584%	3.5832%	0.2114%
CY	0.0000%	0.0000%	0.6520%	8.3994%	22.9105%	28.8259%	32.9143%	6.6667%
LV	0.0000%	0.6777%	1.9519%	5.6490%	8.1576%	22.8133%	24.1175%	4.7619%
LU	0.0229%	0.1282%	0.5276%	1.3640%	4.5993%	7.9418%	16.9371%	1.7857%
MT	0.0383%	0.1499%	0.2886%	6.4203%	24.6879%	46.8324%	64.5479%	10.0000%
NL	0.0000%	0.8558%	1.5079%	3.6586%	9.1961%	16.3678%	37.2062%	4.7619%
AT	0.0382%	0.0821%	0.1510%	0.3662%	1.5952%	2.7490%	6.7230%	0.5780%
PT	0.0153%	1.0787%	2.5574%	7.1967%	23.6501%	25.1234%	25.3186%	7.1429%
FI	0.1212%	0.2109%	1.4756%	10.2906%	25.2072%	45.4432%	61.6320%	11.1111%
SE	0.1083%	0.2772%	0.6648%	1.7538%	3.9407%	5.5128%	9.3669%	1.5152%
UK	0.0012%	0.0263%	0.1133%	0.4458%	1.7519%	3.9454%	18.3630%	1.1765%

Table 12: Distributions of individual banks' percentage contributions – below – Scenario 2 (Capital ≥ 8% RWA, No Bail-In, No Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0342%	0.0927%	0.1872%	0.7309%	16.7226%	33.0464%	37.7922%	4.3478%
BG	0.1497%	0.5912%	3.1411%	5.0624%	10.7537%	15.5967%	16.9262%	4.1667%

DK	0.0008%	0.0052%	0.0381%	0.1528%	1.2147%	9.8273%	23.5538%	2.0000%
DE	0.0009%	0.0035%	0.0120%	0.0343%	0.0797%	0.1520%	1.1205%	0.0675%
GR	0.4374%	0.9271%	3.2891%	9.2740%	17.4012%	19.1305%	19.8559%	6.2500%
ES	0.0013%	0.0054%	0.0483%	0.2434%	0.9441%	5.2025%	12.6388%	0.6993%
FR	0.0058%	0.0126%	0.0645%	0.1485%	0.5753%	3.7778%	8.7251%	0.5128%
IE	0.0004%	0.0197%	0.1253%	7.5119%	14.9949%	15.1656%	15.7374%	4.1667%
IT	0.0018%	0.0092%	0.0335%	0.1146%	0.4155%	0.8057%	2.7999%	0.2114%
CY	0.4368%	1.1990%	3.1584%	11.2555%	17.3248%	18.3855%	20.2143%	6.6667%
LV	0.0063%	1.0533%	2.1449%	4.6691%	16.5334%	17.9649%	22.1794%	4.7619%
LU	0.0462%	0.0915%	0.3689%	1.2526%	3.3899%	7.5775%	68.5972%	3.5088%
MT	0.0930%	0.1902%	1.5330%	7.4777%	26.2422%	43.4285%	57.1775%	10.0000%
NL	0.3413%	0.4918%	0.7545%	3.5986%	19.8124%	20.8555%	22.2238%	4.7619%
AT	0.0417%	0.0905%	0.1580%	0.3677%	1.2419%	2.3550%	6.0227%	0.5780%
PT	0.3061%	0.7257%	2.8978%	14.1144%	19.4343%	20.2880%	21.5149%	7.1429%
FI	0.0965%	0.3997%	2.3415%	6.9243%	30.5981%	46.1596%	58.6088%	11.1111%
SE	0.0264%	0.0484%	0.1104%	0.2828%	0.7804%	1.4406%	31.1609%	1.5152%
UK	0.0049%	0.0177%	0.0645%	0.3460%	2.5346%	9.7633%	15.1320%	1.1765%

Table 13: Distributions of individual banks' percentage contributions – below – Scenario 3 (Capital ≥ 10.5% RWA, No Bail-In, Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0552%	0.7211%	1.9176%	6.9041%	11.2506%	15.1657%	18.1472%	4.3478%
BG	0.1281%	0.5051%	2.7501%	5.0547%	10.1415%	13.3322%	20.4863%	4.1667%
DK	0.0012%	0.0079%	0.0502%	0.2349%	1.1822%	5.3300%	17.9043%	1.0101%
DE	0.0012%	0.0045%	0.0155%	0.0431%	0.0992%	0.1745%	0.6837%	0.0675%
GR	0.6840%	1.3216%	2.4195%	12.8920%	16.4081%	17.0744%	17.5459%	6.2500%
ES	0.0021%	0.0090%	0.0693%	0.5357%	1.7546%	4.3971%	8.6366%	0.6993%
FR	0.0095%	0.0217%	0.1105%	0.2721%	0.6167%	3.0263%	6.9423%	0.5128%
IE	0.0000%	0.0229%	0.2209%	5.6806%	14.9391%	17.4807%	17.9009%	4.1667%
IT	0.0031%	0.0115%	0.0293%	0.1051%	0.4372%	0.8283%	4.7561%	0.2114%
CY	0.0000%	0.0000%	0.8997%	8.2409%	14.8677%	24.3596%	41.9002%	6.6667%
LV	0.0000%	1.2346%	3.1006%	7.2371%	11.0047%	13.5662%	14.5907%	4.7619%
LU	0.0226%	0.1291%	0.5569%	1.3411%	4.4667%	8.5567%	17.0568%	1.7857%
MT	0.0572%	0.2156%	0.4449%	8.4288%	29.8138%	44.1036%	55.5355%	10.0000%
NL	0.0000%	0.8885%	1.4287%	3.8481%	7.2559%	17.0093%	38.7579%	4.7619%
AT	0.0320%	0.0801%	0.1613%	0.3913%	1.5604%	3.3502%	5.6286%	0.5780%
PT	0.0417%	0.6874%	1.4760%	8.2660%	22.2463%	26.4136%	30.0514%	7.1429%
FI	0.1233%	0.2093%	1.4849%	10.2139%	25.0556%	45.4790%	61.8176%	11.1111%
SE	0.1114%	0.2774%	0.6588%	1.8348%	3.9308%	5.4931%	9.3030%	1.5152%
UK	0.0011%	0.0277%	0.1197%	0.4490%	2.1103%	6.8544%	16.3834%	1.1765%

Table 14: Distributions of individual banks' percentage contributions – below – Scenario 4 (Capital ≥ 10.5% RWA, No Bail-In, No Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0746%	0.1933%	0.3971%	1.5645%	21.5170%	26.5793%	32.2916%	4.3478%
BG	0.1531%	0.5683%	3.0376%	5.1493%	10.8547%	15.7103%	16.5536%	4.1667%

DK	0.0013%	0.0080%	0.0562%	0.2248%	1.5222%	8.4901%	13.8853%	1.0101%
DE	0.0011%	0.0041%	0.0141%	0.0384%	0.0882%	0.1572%	0.7826%	0.0675%
GR	0.7645%	1.4364%	2.6978%	13.1138%	13.7808%	14.5635%	15.7385%	6.2500%
ES	0.0021%	0.0087%	0.0757%	0.3878%	1.5195%	5.3578%	8.8839%	0.6993%
FR	0.0109%	0.0229%	0.1272%	0.2893%	0.6809%	3.2436%	6.8008%	0.5128%
IE	0.0011%	0.0476%	0.2993%	10.4917%	12.0406%	14.0974%	15.8043%	4.1667%
IT	0.0033%	0.0120%	0.0311%	0.1088%	0.4357%	0.8660%	4.1128%	0.2114%
CY	0.4852%	1.2278%	2.1099%	11.6133%	18.1775%	19.6476%	21.6274%	6.6667%
LV	0.0100%	1.4562%	2.4497%	8.1016%	11.0760%	12.1185%	12.7322%	4.7619%
LU	0.0647%	0.1306%	0.5091%	1.7337%	4.1579%	6.0628%	18.5164%	1.7857%
MT	0.1270%	0.2534%	1.9623%	9.4286%	30.5166%	40.3470%	48.2113%	10.0000%
NL	0.3758%	0.5449%	0.8236%	3.0795%	15.7495%	22.9539%	24.4704%	4.7619%
AT	0.0431%	0.0986%	0.2029%	0.4486%	1.1827%	2.7780%	6.3390%	0.5780%
PT	0.3676%	0.7610%	2.6266%	14.9285%	18.4133%	19.1398%	20.0689%	7.1429%
FI	0.1431%	0.6146%	3.4837%	10.1536%	35.6567%	39.5336%	42.6352%	11.1111%
SE	0.0336%	0.0609%	0.1393%	0.3561%	0.9838%	1.8125%	30.0749%	1.5152%
UK	0.0063%	0.0216%	0.0790%	0.4950%	3.6832%	8.8667%	12.0785%	1.1765%

Table 15: Distributions of individual banks' percentage contributions – above– Scenario 1 - (Capital ≥ 8% RWA, No Bail-In, Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0011%	0.0018%	0.0180%	0.9056%	17.1268%	26.1882%	37.9938%	4.3478%
BG	0.0491%	0.1217%	0.4360%	3.2527%	7.0954%	27.5938%	35.3327%	4.1667%
DK	0.0001%	0.0004%	0.0028%	0.0176%	0.0952%	1.7208%	28.4990%	1.0101%
DE	0.0001%	0.0004%	0.0015%	0.0061%	0.0229%	0.0537%	0.6115%	0.0675%
GR	0.0624%	0.1908%	0.2891%	4.7283%	17.9277%	26.6728%	43.7104%	6.2500%
ES	0.0015%	0.0035%	0.0208%	0.0769%	1.0781%	3.3384%	12.9602%	0.6993%
FR	0.0015%	0.0044%	0.0153%	0.0481%	0.4765%	1.7195%	9.7020%	0.5128%
IE	0.0010%	0.0149%	0.2506%	3.5274%	8.2412%	18.1093%	38.7684%	4.1667%
IT	0.0010%	0.0039%	0.0117%	0.0444%	0.2169%	0.3664%	4.7795%	0.2114%
CY	0.0043%	0.1797%	0.6440%	8.5693%	12.2658%	23.4931%	40.8488%	6.6667%
LV	0.1186%	0.8652%	2.5244%	6.0575%	9.8138%	10.2346%	24.7355%	4.7619%
LU	0.0274%	0.1338%	0.4899%	1.3599%	3.8662%	5.9003%	20.4430%	1.7857%
MT	0.0264%	0.2114%	0.8921%	12.0968%	35.6354%	40.9822%	45.2597%	10.0000%
NL	0.0091%	0.0206%	0.0626%	0.1931%	23.2300%	34.0025%	37.8589%	4.7619%
AT	0.0049%	0.0111%	0.0252%	0.0730%	0.4488%	2.3576%	6.2599%	0.5780%
PT	0.0158%	0.0798%	0.6773%	2.1575%	30.0244%	38.2053%	41.2786%	7.1429%
FI	0.0005%	0.0015%	0.1437%	1.7219%	21.9494%	57.1599%	85.3283%	11.1111%
SE	0.0002%	0.0005%	0.0012%	0.0041%	0.0202%	0.5430%	33.3515%	1.5152%
UK	0.0006%	0.0016%	0.0106%	0.0691%	1.0399%	1.6549%	31.9988%	1.1765%

Table 16: Distributions of individual banks' percentage contributions – above– Scenario 2 - (Capital ≥ 8% RWA, No Bail-In, No Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0023%	0.0050%	0.0111%	0.0416%	21.4225%	34.8838%	36.8245%	4.3478%
BG	0.0518%	0.1280%	0.9401%	2.8203%	13.7442%	22.7438%	30.0104%	4.1667%

DK	0.0002%	0.0008%	0.0038%	0.0153%	0.1081%	2.5118%	37.3744%	2.0000%
DE	0.0003%	0.0012%	0.0040%	0.0111%	0.0252%	0.0488%	0.2606%	0.0675%
GR	0.0588%	0.1132%	0.3054%	4.1836%	24.1743%	29.8259%	36.3478%	6.2500%
ES	0.0004%	0.0014%	0.0124%	0.0660%	0.2802%	2.0308%	18.1704%	0.6993%
FR	0.0021%	0.0039%	0.0227%	0.0541%	0.1841%	1.4909%	15.4365%	0.5128%
IE	0.0006%	0.0057%	0.0295%	1.5782%	19.1163%	24.0815%	26.9161%	4.1667%
IT	0.0011%	0.0047%	0.0139%	0.0491%	0.1842%	0.3668%	2.9448%	0.2114%
CY	0.0423%	0.0957%	0.2287%	3.3673%	22.9011%	39.4325%	49.0457%	6.6667%
LV	0.0017%	0.1385%	0.2704%	2.4548%	11.3724%	20.4006%	41.3220%	4.7619%
LU	0.0055%	0.0171%	0.0471%	0.1659%	1.0780%	2.2706%	92.3193%	3.5088%
MT	0.0074%	0.0188%	0.0943%	2.9475%	47.1783%	47.8769%	48.4357%	10.0000%
NL	0.0118%	0.0188%	0.0284%	0.1587%	18.0885%	18.2315%	52.8076%	4.7619%
AT	0.0100%	0.0202%	0.0421%	0.0885%	0.2769%	0.8590%	13.7734%	0.5780%
PT	0.0125%	0.0292%	0.1162%	1.3076%	31.8970%	35.1085%	36.3662%	7.1429%
FI	0.0018%	0.0073%	0.0390%	0.6261%	20.8803%	59.2190%	89.8900%	11.1111%
SE	0.0006%	0.0009%	0.0020%	0.0050%	0.0131%	0.0213%	37.4308%	1.5152%
UK	0.0005%	0.0016%	0.0051%	0.0277%	0.1619%	3.0956%	21.2252%	1.1765%

Table 17: Distributions of individual banks' percentage contributions – above– Scenario 3 (Capital ≥ 10.5% RWA, No Bail-In, Contagion)

	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0018%	0.0029%	0.0247%	0.9218%	13.6582%	29.2563%	38.8794%	4.3478%
BG	0.0490%	0.1231%	0.4352%	3.2564%	7.0590%	27.7505%	35.5091%	4.1667%
DK	0.0001%	0.0004%	0.0030%	0.0183%	0.1048%	1.2574%	38.6095%	1.0101%
DE	0.0001%	0.0004%	0.0015%	0.0058%	0.0219%	0.0530%	0.6027%	0.0675%
GR	0.0791%	0.1505%	0.2405%	5.0246%	23.5852%	33.8856%	35.5169%	6.2500%
ES	0.0015%	0.0034%	0.0214%	0.0795%	0.9059%	3.4840%	14.4479%	0.6993%
FR	0.0021%	0.0058%	0.0232%	0.0650%	0.4616%	1.3899%	12.2713%	0.5128%
IE	0.0020%	0.0163%	0.2390%	3.2924%	8.2831%	19.8526%	37.9297%	4.1667%
IT	0.0010%	0.0033%	0.0081%	0.0303%	0.1370%	0.3392%	3.4989%	0.2114%
CY	0.0043%	0.1705%	0.5796%	8.5873%	12.3365%	23.5971%	40.9450%	6.6667%
LV	0.0751%	0.9415%	2.7567%	6.8435%	15.2856%	15.7253%	16.7882%	4.7619%
LU	0.0370%	0.1633%	0.5565%	1.4561%	3.9146%	6.3714%	19.2121%	1.7857%
MT	0.0302%	0.2303%	0.9645%	13.5500%	39.0615%	39.3113%	39.5112%	10.0000%
NL	0.0098%	0.0187%	0.0627%	0.1843%	19.7024%	35.5807%	39.8053%	4.7619%
AT	0.0089%	0.0184%	0.0444%	0.1178%	0.6107%	2.5591%	13.4873%	0.5780%
PT	0.0133%	0.0419%	0.5711%	2.1107%	29.5120%	37.6823%	41.6895%	7.1429%
FI	0.0007%	0.0019%	0.2257%	1.7132%	22.1135%	57.0411%	84.9831%	11.1111%
SE	0.0002%	0.0005%	0.0013%	0.0046%	0.0213%	0.5597%	33.5551%	1.5152%
UK	0.0006%	0.0018%	0.0115%	0.0685%	1.2093%	2.1322%	30.6616%	1.1765%

Table 18: Distributions of individual banks' percentage contributions – above– Scenario 4 (Capital ≥ 10.5% RWA, No Bail-In, No Contagion)

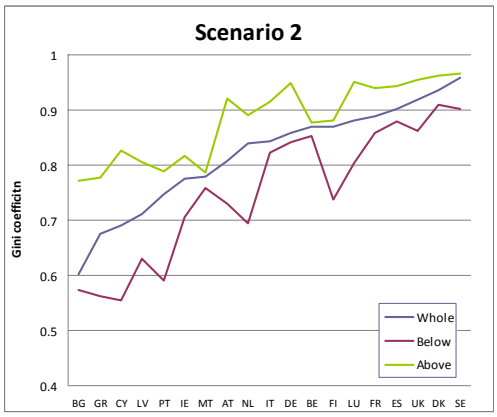
	Selected percentiles							
	10	**25**	**50**	**75**	**90**	**95**	**99**	**average**
BE	0.0032%	0.0069%	0.0145%	0.0482%	20.8550%	29.1715%	40.8218%	4.3478%
BG	0.0500%	0.1366%	0.9415%	2.7764%	13.3302%	22.8366%	30.2751%	4.1667%

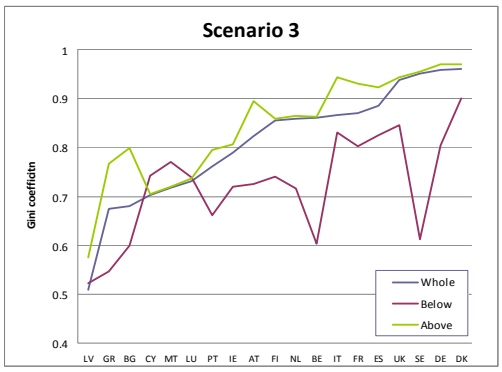
DK	0.0002%	0.0008%	0.0042%	0.0148%	0.0886%	1.6226%	25.1277%	1.0101%
DE	0.0003%	0.0012%	0.0036%	0.0101%	0.0240%	0.0428%	0.2661%	0.0675%
GR	0.0647%	0.1198%	0.2152%	5.5339%	21.4015%	29.3842%	38.5020%	6.2500%
ES	0.0004%	0.0015%	0.0131%	0.0695%	0.3016%	1.3628%	20.5355%	0.6993%
FR	0.0024%	0.0052%	0.0305%	0.0655%	0.1820%	1.1511%	12.9775%	0.5128%
IE	0.0008%	0.0099%	0.0396%	1.8999%	18.6573%	20.4367%	29.2582%	4.1667%
IT	0.0011%	0.0038%	0.0094%	0.0360%	0.1357%	0.3331%	2.9495%	0.2114%
CY	0.0436%	0.0710%	0.2306%	3.3326%	22.3644%	39.0958%	49.8394%	6.6667%
LV	0.0018%	0.1259%	0.3071%	4.0332%	18.0090%	20.6281%	28.1577%	4.7619%
LU	0.0088%	0.0230%	0.0730%	0.2885%	1.5448%	4.2534%	36.1708%	1.7857%
MT	0.0081%	0.0208%	0.1045%	3.4015%	42.3235%	48.1144%	52.7471%	10.0000%
NL	0.0146%	0.0217%	0.0329%	0.1802%	22.9425%	23.2517%	45.6179%	4.7619%
AT	0.0119%	0.0241%	0.0478%	0.1089%	0.3643%	1.2339%	17.1599%	0.5780%
PT	0.0113%	0.0228%	0.0836%	1.6906%	31.2654%	34.8406%	36.8164%	7.1429%
FI	0.0025%	0.0093%	0.0484%	1.0795%	21.4859%	58.6975%	88.4668%	11.1111%
SE	0.0006%	0.0009%	0.0022%	0.0058%	0.0145%	0.0246%	37.9525%	1.5152%
UK	0.0004%	0.0015%	0.0052%	0.0285%	0.1989%	2.1618%	23.7258%	1.1765%

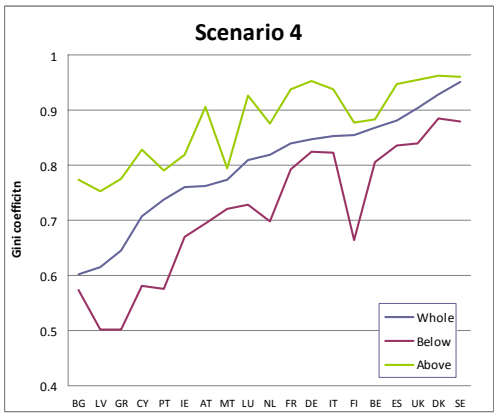
Table 19: Gini coefficients for the distributions of banks' individual percentage contribution in each scenario and for each country.

5.4.1.	*5.4.2.*	*Scenario 1*		*5.4.3.*	*Scenario 2*		*5.4.4.*	*Scenario 3*		*5.4.5.*	*Scenario 4*	
	Whole	**Below**	**Above**	**Whole**	**Below**	**Above**	**Whole**	**Below**	**Above**	**Whole**	**Below**	**Above**
BE	0.858	0.604	0.859	0.869	0.852	0.877	0.860	0.604	0.862	0.868	0.805	0.883
BG	0.679	0.601	0.796	0.601	0.574	0.772	0.681	0.600	0.798	0.601	0.574	0.773
DK	0.964	0.921	0.971	0.936	0.910	0.962	0.960	0.901	0.969	0.929	0.885	0.963
DE	0.958	0.832	0.968	0.859	0.842	0.949	0.958	0.804	0.969	0.848	0.825	0.953
GR	0.716	0.574	0.779	0.675	0.563	0.777	0.675	0.546	0.766	0.646	0.502	0.775
ES	0.893	0.874	0.917	0.901	0.879	0.943	0.885	0.825	0.923	0.882	0.835	0.948
FR	0.911	0.868	0.934	0.888	0.859	0.940	0.871	0.803	0.930	0.839	0.792	0.937
IE	0.803	0.759	0.812	0.775	0.706	0.817	0.790	0.720	0.807	0.761	0.670	0.819
IT	0.856	0.830	0.921	0.844	0.823	0.915	0.866	0.830	0.943	0.853	0.823	0.938
CY	0.700	0.738	0.702	0.691	0.554	0.826	0.703	0.742	0.704	0.708	0.581	0.829
LV	0.558	0.627	0.595	0.711	0.630	0.805	0.510	0.523	0.574	0.615	0.502	0.752
LU	0.749	0.739	0.753	0.882	0.803	0.951	0.731	0.739	0.737	0.810	0.729	0.927
MT	0.740	0.804	0.739	0.780	0.759	0.786	0.718	0.771	0.719	0.773	0.721	0.795
NL	0.854	0.713	0.859	0.840	0.695	0.890	0.859	0.716	0.865	0.818	0.698	0.875
AT	0.886	0.728	0.926	0.807	0.730	0.920	0.824	0.725	0.895	0.763	0.695	0.906
PT	0.769	0.628	0.791	0.748	0.591	0.789	0.762	0.662	0.795	0.738	0.575	0.790
FI	0.858	0.740	0.861	0.869	0.738	0.881	0.855	0.740	0.859	0.855	0.665	0.877
SE	0.956	0.614	0.958	0.958	0.901	0.966	0.952	0.613	0.954	0.951	0.879	0.961
UK	0.942	0.865	0.946	0.918	0.863	0.955	0.938	0.846	0.944	0.904	0.840	0.955

***Figure 1**: Gini coefficient in the various scenarios.*







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ANNEX A: Description of the sample of banks for the SYMBOL simulations

***Table A.1**: Description of the samples used for the simulations, data as of end 2009[13].*

	Number G1 Banks	Number G2 Banks	Sample % Population[14]	Total Assets (m€)	Total Liabilities (m€)	Total Interbank Debt[15] (m€)	Total Interbank Credit[16] (m€)	Total Covered Deposits(+) (m€)	Total Capital Requirements (8% RWA) (m€)	Total Capital (m€)	DGS/RF funds[17] (+) (m€)
BE	3	20	82.26%	878.336	829.934	184.888	160.678	260.890	23.413	48.401	2.516
BG(*)	0	24	185.35%	67.247	57.919	12.754	12.754	27.526	4.379	9.328	437
DK	3	96	71.05%	756.678	708.878	143.362	92.279	118.179	23.749	47.800	2.168
DE	6	1476	64.19%	4.648.331	4.415.620	1.086.016	790.975	1.093.841	125.452	232.711	20.096
GR	3	13	71.42%	322.714	295.667	43.441	20.313	135.758	16.781	27.047	1.511
ES	8	135	73.95%	2.370.807	2.188.636	348.780	226.113	542.332	115.565	182.171	7.874
FR	17	178	102.59%	7.191.608	6.817.107	842.666	779.727	1.550.504	245.024	374.500	22.850
IE(*)	5	19	101.91%	1.221.181	1.155.789	276.738	148.729	147.145	44.121	65.392	3.488
IT	8	465	81.81%	2.827.051	2.556.174	188.375	195.958	476.963	97.416	270.876	7.816

[13] Year 2009 is the latest year available in *Bankscope* and, even more importantly, 2009 is the year on which the Basel and the CEBS committee have based their Quantitative Impact Study exercises for the foreseen change on banks' capital and RWA when moving from Basel II to Basel III.

[14] The sample of banks covered in each Member States represents the indicated percentage of total assets for any Member State as shown for 2009 in the 2010 ECB EU banking structures publication, computed as the amount of total assets for all banks minus total assets of branches from abroad. European Central Bank (2010), *EU banking structures*, http://www.ecb.int/pub/pdf/other/eubankingstructures201009en.pdf

[15] A correction factor for the volume of the interbank debt/credit has been applied to the following MS, to correct for the inclusion of some classes of debts certificates: GR (56.5%), FR (39.1%), IT (26.9%), LU (79.8%), and AT (48.4%). The correction factors employed have been estimated using the 2010 ECB *Banking Sector Stability*, Table 11a.

[16] Data on interbank credits was not available for BG and CY so equality of interbank debits and credits has been assumed.

[17] The amount of funds for DGS/RF purposes is rescaled on the size of the sample (column 3 in Table A.1).

	Number G1 Banks	Number G2 Banks	Sample % Population[14]	Total Assets (m€)	Total Liabilities (m€)	Total Interbank Debt[15] (m€)	Total Interbank Credit[16] (m€)	Total Covered Deposits(+) (m€)	Total Capital Requirements (8% RWA) (m€)	Total Capital (m€)	DGS/RF funds[17] (+) (m€)
CY (*)	0	15	80.80%	107.446	100.436	53.067	53.067	22.661	4.883	7.011	537
LV(*)	0	21	72.65%	19.088	17.037	5.943	2.609	3.995	1.127	2.050	58
LU	1	55	68.35%	465.539	441.916	169.984	161.827	103.441	11.485	23.622	1.321
MT	0	10	43.83%	18.076	16.225	5.222	2.689	6.893	760	1.851	58
NL	4	17	78.02%	1.680.455	1.600.687	319.699	398.659	314.059	46.903	79.768	5.091
AT	1	172	29.88%	306.457	282.380	50.382	39.692	71.381	14.656	24.077	860
PT	3	11	66.49%	323.762	297.421	43.561	34.505	82.952	17.704	26.342	1.121
FI	1	8	78.36%	290.500	275.621	54.361	79.820	48.998	7.968	14.879	1.024
SE	3	63	52.37%	455.355	422.301	97.604	122.872	75.383	16.356	33.054	1.314
UK	7	78	73.97%	4.278.074	4.074.946	743.978	691.049	464.241	110.757	203.129	12.313

Notes: (*) Source is Central Bank or Supervisory Authority; (+) Estimated

ANNEX B: Calculation of individual banks' expected yearly losses

Let K be the total number of model simulations (including the ones without default), H the number of banks in the system and $L(i,j)$ the (excess) loss of the i-th bank in the simulation run j-th.

The systemic loss in the simulation run j-th is the sum of individual banks' excess losses:[18]

$$L_{Syst}(j) = \sum_{i=1}^{H} L(i, j) .$$

The contribution of bank i to systemic losses is defined as the expected yearly loss for this bank and is estimated as its average loss over the **whole** set of simulations, as it follows:

$$c(i) = \frac{\sum_{j=1}^{K} L(i, j)}{K}$$

The percentage contribution of each individual bank to the systemic risk is thus:

$$pc(i) = \frac{c(i)}{\sum_{h=1}^{H} c(h)} .$$

It is also possible to focus the attention on the tail of the loss distribution and determine the contribution of each bank in causing losses higher than a certain threshold T (i.e. the contribution of a bank in determining systemic losses **above** the threshold T):

$$c(i)\big|_{>T} = \frac{\sum_{j=1}^{K} \left[L(i, j) \big| L_{Syst}(j) > T \right]}{K}$$

$$pc(i)\big|_{>T} = \frac{c(i)\big|_{>T}}{\sum_{h=1}^{H} c(h)\big|_{>T}}$$

The contribution of a bank **below** the threshold T is obtained considering the difference between average yearly contributions on the whole set of simulations and on the runs with losses above the threshold:

$$c(i)\big|_{\leq T} = c(i) - c(i)\big|_{>T}$$

$$pc(i)\big|_{\leq T} = \frac{c(i)\big|_{\leq T}}{\sum_{h=1}^{H} c(h)\big|_{\leq T}} .$$

[18] Excess losses of non-defaulted banks are zero.