EUROPEAN
COMMISSION

Strasbourg, XXX
SWD(2014) 327/2

PART 2/3

COMMISSION STAFF WORKING DOCUMENT

ESTIMATES OF THE APPLICATION OF THE PROPOSED METHODOLOGY FOR THE CALCULATION OF CONTRIBUTIONS TO RESOLUTION FINANCING ARRANGEMENTS

Accompanying the document

Commission Delegated Regulation

supplementing Directive 2014/59/EU of the European Parliament and the Council of 15 May 2014 with regard to ex ante contributions to resolution financing arrangements

{C(2014) 7674}

Annex

Contents

EXECUTIVE SUMMARY

After describing the methodology that the Commission services are currently considering for the calculation of contributions, this document presents a full set of results based on available data. Data have been provided by Member States in reply to a request of the Commission services. **The data collection exercise** conducted in the context of the Commission Expert Group on Banking, Payments and Insurance **resulted in significant improvements** in terms of coverage, accompanied by the possibility to rely on data provided by the competent authorities, instead of by commercial providers, **for all but 3 Member States**.

Based on the analyses presented in this document, it is possible to conclude that under the proposed system small banks will not pay for big banks:

- **Banks representing the top 85% of total assets in the Euro area will pay at least 90% of total contributions**. In fact, the introduction of additional risk indicators would likely increase this share.

- **More than 50% of banks will be under the small bank regime, benefitting from an average reduction of 70% in the Euro area**. The introduction of lump sums for small banks does not create significant cliff effects in the Euro area, nor in non-participating Member States in general.

- **The reduction for small banks will be compensated for by every other bank, but with an additional burden of only 0.72%** of their contributions **in the Euro area**.

When examining the distribution of the contributory burden by size group, it can be seen that **larger banks tend to consistently get an upwards risk adjustment**, while **smaller banks tend to get a downwards risk adjustment**. The magnitudes of the relative risk adjustment tend to be distributed in a more concentrated fashion among larger banks, while they display a wider variation among smaller banks.

Furthermore, this document addresses some of the uncertainties that characterize the calculation of contributions. **It is estimated that there is significant variation** across Member States, and it is expected that there will be significant variation within Member States, **around the average prevalence of intragroup liabilities**. This would give rise to differential impacts of their exclusion from the BRRD base. The average prevalence of intragroup liabilities in the Euro area is tentatively estimated to be relatively limited (median of 5.88% or 8.9% of the BRRD base, depending on the methodology used, in 13 Euro area Member States). However, due to severe data limitations these estimates should be interpreted with great caution.

Finally, it is estimated that **the proposed treatment of derivatives would not alter the basic properties of the distribution: banks representing the largest 85% of total assets would still pay around 90% of total contributions** (and above 90% when taking the additional risk factors into account).

1) METHODOLOGY

This Section describes the methodology applied to produce the estimates reported in this document. The methodology reflects as closely as possible the options currently considered by the Commission services. In the notation that follows, n indexes institutions, i indexes indicators within pillars and j indexes pillars.

a) CALCULATION OF THE RAW INDICATORS

The list of individual risk indicators and the associated weights and signs applied is reported in Table 1 below.

Table 1: Balance sheet ratios and de-facto weights currently used in the current JRC analysis

Pillar / Indicator	**Effective weight**	**Assigned sign**
Pillar: Risk exposure	**62.5%**	
Indicator: RWA over Total Assets	*33.33%*	+
Indicator: Leverage ratio (Common equity over Total Assets)	*33.33%*	-
Indicator: Capital ratio (Total regulatory capital over RWA)	*33.33%*	-
Pillar: Stability and variety of the sources of funding and unencumbered highly liquid assets	**25%**	
Indicator: Loan to Deposits (Customer loans over Customer deposits)	*100%*	+
Pillar: Importance of an institution to the stability of the financial system or economy	**12.5%**	
Indicator: Share of interbank loans and deposits to the system (Interbank loans + interbank deposits)/sum(Interbank loans + interbank deposits) at EU level	*100%*	+

The following differences should be noted with respect to the options currently considered by the Commission services:

- The capital ratio is calculated with total regulatory capital instead of Common Equity Tier 1.
- The following indicators are not included: bail-in-able liabilities, liquidity coverage ratio and net stable funding ratio (the last two are replaced by customer loans / customer deposits).
- The additional risk factors of trading activities, off-balance sheet exposures, derivatives, complexity and resolvability are not included as they are to be specified by resolution authorities.

- The additional risk factors of IPS membership and extraordinary public financial support are not included due to the lack of data.

As a result, the weight of each of the available indicators is proportionally increased in order for their sum to be 100%.

b) DISCRETIZATION OF THE INDICATORS

For each raw indicator, x_{ij}, the number of bins, k_{ij}, is calculated as the nearest integer to:

$$1 + \log_2(N) + \log_2\left(1 + \frac{|g_{ij}|}{\sigma_{g_{ij}}}\right),$$

where:

N is the number of institutions in the sample;

$$g_{ij} = \frac{\frac{1}{N}\sum_{n=1}^{N}(x_{ijn} - \bar{x})^3}{\left[\frac{1}{N-1}\sum_{n=1}^{N}(x_{ijn} - \bar{x})^2\right]^{3/2}};$$

$$\bar{x} = \frac{\sum_{n=1}^{N} x_{ijn}}{N};$$

$$\sigma_g = \sqrt{\frac{6(N-2)}{(N+1)(N+3)}}.$$

For each indicator, the same number of institutions is assigned to each bin. In case the number of institutions cannot be exactly divided by the number of bins, each of the first r buckets from the left, where r is the remainder of the division of the number of institutions by the number of buckets, is assigned one additional institution.

For each indicator, all the institutions contained in a given bucket are assigned the value of the order of the bucket, counting from the left to the right, so that the value of the discretized indicator is defined as $I_{ijn} = 1,\ldots, k_{ij}$.

c) RESCALING OF THE INDICATORS

Each indicator, I_{ij}, is rescaled over the range 1-1000 by applying the following formula:

$$RI_{ijn} = (1000 - 1) * \frac{I_{ijn} - \min_n I_{ijn}}{\max_n I_{ijn} - \min_n I_{ijn}} + 1,$$

so that all indicators are in a common range of values and can be aggregated in a single composite indicator without having to worry about different ranges and scales or measurement units.

d) Inclusion of the Assigned Sign

The following transformation is applied to each rescaled indicator, RI_{ijm}, in order to include its sign:

$$TRI_{ijm} = \begin{cases} RI_{ijm} & if\ sign = "-" \\ 1001 - RI_{ijm} & if\ sign = "+" \end{cases}$$

e) Calculation of the Composite Indicator

The indicators i within each pillar j are aggregated through a weighted arithmetic average by applying the following formula:

$$PI_{jm} = \sum_{i=1}^{N_j} w_{ij} * TRI_{ijm} = w_{1j} * TRI_{1jm} + \cdots + w_{Nj} * TRI_{Njm},$$

where:

w_{ij} is the weight of indicator i in pillar j as reported in Table 1. The sum of the weight over i must equal to 1.;

N_j is the number of indicators within pillar j.

In order to compute the composite indicator, the pillars j are aggregated through a weighted geometric average by applying the following formula:

$$CI_m = \prod_j PI_{jm}^{W_j} = PI_{1m}^{W_1} * \ldots * PI_{Jm}^{W_J},$$

where:

W_j is the weight of pillar j as reported in Table 1. The sum of the weight over j must equal to 1;

J is the number of pillars.

The following transformation is applied in order for the final composite indicator to be defined as taking higher values for institutions with higher risk profiles:

$$FCI_m = 1000 - CI_m.$$

f) Calculation of the Annual Contributions

The final composite indicator, FCI_m, is rescaled over the desired range by applying the following formula:

$$\tilde{R}_m = (1.5 - 0.8) * \frac{FCI_m - \min_m FCI_m}{\max_m FCI_m - \min_m FCI_m} + 0.8.$$

The annual contribution of each institution n is computed as:

$$c_n = Target * \frac{\frac{B_n}{\sum_{p=1}^{N} B_p} \cdot \tilde{R}_n}{\sum_{p=1}^{N} \left(\frac{B_p}{\sum_{q=1}^{N} B_q} \cdot \tilde{R}_p \right)}$$

where:

p, q index institutions;

$Target$ is the annual target level minus the sum of the contributions of small banks. For the purpose of the yearly estimates presented in this working document, participating Member States are defined as Euro area Member States and they are always included in the calculations as if under the Single Resolution Fund; banks in non-participating Member States, on the contrary, contribute to national resolution funds. The annual target for each resolution financing arrangement is calculated as (1%*covered deposits)/8. This is a simplifying assumption (resolution financing arrangements have to reach their target level over 10 years under the BRRD), but helps comparability across participating and non-participating Member States (the Single Resolution Fund has to reach its target level over 8 years).

$\frac{B_n}{\sum_p B_p}$ is the flat component of institution n and B is the BRRD base, i.e. liabilities excluding own funds minus covered deposits. It should be noted that the BRRD base includes intragroup liabilities, due to the lack of data. Section O describes an attempt at estimating intragroup liabilities by Member State. Furthermore, liabilities are defined according to the applicable accounting standards.

g) THE MULTIPLICATIVE MODEL EXPLAINED

The denominator in the formula to compute the contributions, $\sum_{p=1}^{N} \left(\frac{B_p}{\sum_{q=1}^{N} B_q} \cdot \tilde{R}_p \right)$, is necessary in order to ensure that $\sum_{i=1}^{N} C_i = Target$. This is because the distribution of the BRRD base across risk profiles is unknown *ex ante*: as a result, the target would be met without applying the denominator to the calculation only if, *ex post*, the distribution of the BRRD base across risk profiles was such to yield an average $\tilde{R}_n$, weighted by BRRD base, exactly equal to 1.

The range of variation of $\tilde{R}_n$ is set between 0.8 and 1.5. This implies that, before applying the denominator term, the riskiest bank would see its flat contribution increase by 50%, while the least risky bank would see its flat contribution decrease by 20%.

However, given that the flat contribution is defined as $Target * \frac{B_n}{\sum_{p=1}^{N} B_p}$, the effective risk adjustment applied to the flat contribution is not $\tilde{R}_n$ but

$$\frac{\tilde{R}_n}{\sum_{p=1}^{N} \left(\frac{B_p}{\sum_{q=1}^{N} B_q} \cdot \tilde{R}_p \right)}.$$

When applying this formula to the final database, the final range of variation of the effective risk adjustment factor is distributed as follows:

Table 2: effective risk adjustment factors based on available data

min	**0.6045**
25th percentile	0.8254
Average	0.8944
Median	0.8927
75th percentile	0.9591
Max	**1.1334**

Source: JRC estimates

This result is completely empirically driven, i.e. as mentioned above depends on the distribution of the BRRD base across risk profiles. When calculating contributions based on actual data, the range will be different. However, if the range of variation of $\tilde{R}_n$ is set between 0.8 and 1.5, the ratio of the maximum effective risk adjustment to the minimum effective risk adjustment will always be equal to the ratio between 1.5 and 0.8, i.e. 1.875, irrespective of the actual data to which the model is applied. In other words, the policy choice fixing the range of the risk adjustment can only predetermine the ratio between, but not the absolute value of, the maximum penalty and the maximum discount[1].

2) DATABASE

a) DATA COLLECTION

Preliminary analyses of contributions to resolution financing arrangements have been conducted by the Commission services on the basis of commercial, publicly available data (the Bankscope database). The limitations of this database were carefully assessed and communicated to the Commission Expert Group on Banking, Payments and Insurance as the Commission services began consulting it on the delegated act in May 2014. In particular, the coverage of total assets was widely varying across Member States, ranging from 11% (Cyprus) to 89% (France), with median value 58%.

The differential representativeness and quality of samples across Member States would have been particularly problematic in the context of the Banking Union. Under the SRMR, a common target is allocated to banks in all participating Member States, so that inconsistent estimates for banks in one participating Member State affect the contributions of all others.

[1] As a final remark, it should be noted that, given this property, the exact extremes of the range actually become unimportant, as only their ratio determines the final ratio between the maximum and minimum adjustments. In other words, imposing a range of [0.8, 1.5] or of [1, 1.875] or of [0.6, 1.125] would always result in a ratio of 1.875 between the maximum discount and the maximum penalty and in the same range of effective risk adjustments.

In an effort to inform the preparation of the delegated act on the basis of the best available information, the Commission services requested Member States' representatives in the Commission Expert Group on Banking, Payments and Insurance to provide the necessary data. A draft data request was issued on 15 May 2014. A final data request was issued on 4 June 2014, with a deadline of 18 June 2014. The latest data included in the final database was received on 27 August 2014. The Commission services provided individual feedback to each Member State regarding the submitted data, and, where margins of improvement existed, worked with the Member States in order to ensure that the submitted data could be used in the final database. This allowed increasing the number of Member States for which the submitted data could be used from 10 to 25.

It was decided to use the data provided by the Member State when all requested data were provided and there was no need for additional imputations. Covered deposits are an exception to this rule. This is due to the fact that covered deposits are currently not reported to the competent authorities in many Member States. Among the countries that provided a comprehensive database, some did not provide any data on covered deposits (Belgium, Cyprus, Denmark, Germany, Greece, Ireland, Malta, Poland and the UK) or provided them only for a small portion of banks (Sweden). In these cases, the Commission services estimated covered deposits starting from customer deposits as provided by the Member State[2] and applying the coverage ratio estimated on the basis of data provided by Deposit Guarantee Schemes[3]. Potential differences between the definitions of deposits employed to estimate the coverage ratio and those used to report data to the competent authorities may persist when the data provided by Member States is used.

For 3 Member States data was compiled from a commercial, publicly available database (Bankscope), since the submitted data suffered from the following limitations:

- Hungary and Latvia: the data provided did not include “loans and advances to banks”.
- Netherlands: the data provided contained different consolidation levels (i.e. unconsolidated for some banks, consolidated for the others), so it could not be included in the final database (which is composed of solo data only).

For these 3 Member States, the estimated coverage ratio was also applied to compute covered deposits as described above.

b) THE FINAL DATABASE

All the analyses presented in this working document are based on the final database. The final database has the following characteristics:

- Data is at the individual, not consolidated, bank level.
- Data is as of 31 December 2012, except for Cyprus, Greece and Slovenia (31 December 2013).

[2] For the UK and Malta, covered deposits were estimated from customer deposits by applying the coverage ratio computed using the 2013 data provided by the Member State.

[3] For data and methodology of the estimate see G. Cannas, J. Cariboni, L. Kazemi Veisari, A. Pagano: *Updated estimates of EU eligible and covered deposits*, JRC Technical Report JRC87531, 2014

- Data only includes credit institutions.

- The representativeness of the sample varies across Member States, even if the full population of credit institutions was requested by the Commission services.

Table 4 reports the count of institutions and the total assets as published by the ECB[4] and the EBA[5], and as contained in the data submitted by the Member State and in the final database. No sensible assumption can be made on the distribution of banks that cannot be observed. Therefore, no adjustments were made for the sample-to-population ratio.

It is quite common for data provided directly by Member States to have missing values or values that do not pass basic consistency checks, such as total assets smaller than own funds, or total assets smaller than own funds and deposits. As a result, some observations have to be removed from the database. This removal only affects 9% of the total assets overall. However, it is not evenly distributed across Member States. For example, in one case as many as 65% of the observations have to be dropped, corresponding to 24% of total assets. In other cases, there are also figures significantly higher than the average. This may be corrected for by virtue of making sufficient assumptions.

Overall, the Commission services consider the quality of the final database to be significantly improved with respect to publicly available data, both in terms of reliability (figures are provided directly by competent authorities) and in terms of coverage, increasing from around 3,200 to around 4,600 banks and from around 74% to around 83% of total assets.

[4] http://www.ecb.europa.eu/stats/money/mfi/general/html/archive.en.html

[5] http://www.eba.europa.eu/supervisory-convergence/supervisory-disclosure/aggregate-statistical-data

Table 3: Number of banks in the final database by Member State

Country	Final Data Source used	Number of banks 2012				
		ECB	EBA	Data from MS	Final Database	% removed
AUSTRIA	MS data	751	809	703	668	5%
BELGIUM	MS data	103	104	49	45	8%
BULGARIA	MS data	31	31	26	24	8%
CYPRUS	MS data	137	135	13	10	23%
CZECH REPUBLIC	MS data	56	43	23	23	0%
GERMANY	MS data	1869	1737	1799	1740	3%
DENMARK[6]	MS data	161	106	95	70	26%
ESTONIA	MS data	16	16	8	6	25%
SPAIN	MS data	314	302	104	62	40%
FINLAND	MS data	313	313	289	266	8%
FRANCE	MS data	639	381	550	195	65%
GREECE	MS data	52	n.a.	25	10	60%
CROATIA	MS data	n.a.	n.a.	27	21	22%
HUNGARY	Bankscope	189	172	172	12	
IRELAND	MS data	472	38	36	31	14%
ITALY	MS data	714	706	627	595	5%
LITHUANIA	MS data	94	18	8	7	13%
LUXEMBOURG	MS data	141	141	111	105	5%
LATVIA	Bankscope	29	29	17	15	
MALTA	MS data	28	28	23	19	17%
NETHERLANDS	Bankscope	266	122	88	24	
POLAND	MS data	695	642	616	245	60%
PORTUGAL	MS data	152	186	145	123	15%
ROMANIA	MS data	39	n.a.	31	25	19%
SWEDEN	MS data	176	113	142	64	55%
SLOVENIA	MS data	23	21	20	17	15%
SLOVAKIA	MS data	28	31	29	12	59%
UNITED KINGDOM	MS data	373	200	193	177	8%
TOTAL		**7,861**	**6,424**	**5,969**	**4,611**	**23%**

Source: JRC estimates

[6] It should be noted that data for Denmark does not include the 7 reported mortgage banks institutions, as they are subject to specific discussions in the context of their treatment under Article 45(3) of the BRRD.

Table 4: Total assets in the final database by Member State

Country	Final Data Source used	Total Assets 2012 b€				
		ECB	EBA	Data from MS	Final Database	% removed
AUSTRIA	MS data	974	982	903	879	3%
BELGIUM	MS data	1085	1099	996	936	6%
BULGARIA	MS data	45	42	40	39	1%
CYPRUS	MS data	128	111	59	55	8%
CZECH REPUBLIC	MS data	192	184	167	167	0%
GERMANY	MS data	8219	8593	8364	8267	1%
DENMARK[7]	MS data	1158	1042	571	567	1%
ESTONIA	MS data	20	19	13	13	5%
SPAIN	MS data	3574	3145	2785	2409	13%
FINLAND	MS data	597	619	582	487	16%
FRANCE	MS data	7712	7128	8555	6466	24%
GREECE	MS data	441	n.a.	330	317	4%
CROATIA	MS data	58.063	n.a.	8	7	8%
HUNGARY	Bankscope	107	102		39	
IRELAND	MS data	1124	951	1014	979	3%
ITALY	MS data	4211	3803	3199	3163	1%
LITHUANIA	MS data	24	23	18	17	6%
LUXEMBOURG	MS data	868	735	656	635	3%
LATVIA	Bankscope	28	28		23	
MALTA	MS data	53	53	52	28	47%
NETHERLANDS	Bankscope	2490	2688		1766	
POLAND	MS data	354	336	302	290	4%
PORTUGAL	MS data	556	508	466	443	5%
ROMANIA	MS data	91	n.a.	74	66	11%
SWEDEN	MS data	1211	1756	1230	836	32%
SLOVENIA	MS data	51	45	39	37	7%
SLOVAKIA	MS data	60	56	58	51	12%
UNITED KINGDOM	MS data	9553	8678	8679	8365	4%
TOTAL					37,344	9%

Source: JRC estimates

[7] It should be noted that data for Denmark does not include the 7 reported mortgage banks institutions, as they are subject to specific discussions in the context of their treatment under Article 45(3) of the BRRD.