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Dear members of the Basel Committee,

We would like to thank you for soliciting some feedback about the latest discussion paper "The regulatory framework: balancing risk sensitivity, simplicity and comparability."

Our comments focus specifically on the methodology proposed by the Committee to compute the scores of systemic importance of globally systemically important financial institutions or G-SIFIs. The latest version of the BCBS methodology is presented in a paper entitled "Global systemically important banks: updated assessment methodology and the higher loss absorbency requirement" (hereafter, BCBS, 2013), which was disclosed in July 2013.

Overall, we find that the scoring methodology developed by the BCBS is both simple and intuitive. It aggregates information about five broad categories of systemic importance: size, cross-jurisdictional activity, interconnectedness, substitutability/financial institution infrastructure, and complexity.[1] In order not to favor any particular facet of systemic risk, the BCBS aims to give an equal weight to each input (see BCBS, 2013, page 5):

"The methodology gives an equal weight of 20% to each of the five categories of systemic importance".

[1] As shown in the Appendix, most categories are then divided into two or three sub-categories.

To meet this objective, the original data are transformed as follows (page 6):

"For each bank, the score for a particular indicator is calculated by dividing the individual bank amount (expressed in EUR) by the aggregate amount for the indicator summed across all banks in the sample. This amount is then multiplied by 10,000 to express the indicator score in terms of basis points.

For example, if a bank's size divided by the total size of all banks in the sample is 0.03 (ie the bank makes up 3% of the sample total) its score will be expressed as 300 basis points. Each category score for each bank is determined by taking a simple average of the indicator scores in that category. The overall score for each bank is then calculated by taking a simple average of its five category scores. The maximum total score, ie the score that a bank would have if it were the only bank in sample, is 10,000 basis points (ie 100%)."

We show in this letter that the relative importance of the five categories may not be equal and that the resulting systemic risk score will be mechanically dominated by the most volatile categories. As a result, the scores, the ranking of banks, and in turn, their extra capital buffer, will be driven by a subset of variables only, i.e., the most volatile ones, which seems inconsistent with the original intention of the BCBS to give equal weight to each input.

The documented bias is likely to have severe implications in practice. Indeed, the BCBS acknowledges that some variables have an abnormally high influence on the value of the systemic risk score. On page 6, the Committee states that:

"The Committee has analysed the application of the scoring methodology described above to three years of data supplied by banks. It has found that, relative to the other categories that make up the G-SIB framework, the substitutability category has a greater impact on the assessment of systemic importance than the Committee intended for banks that are dominant in the provision of payment, underwriting and asset custody services. Therefore, the Committee has decided to apply a cap to the substitutability category score."

The truncation of some inputs is a crude and had hoc way of reducing the influence of the most volatile variables. Instead, we suggest a slightly modified formula that prevents any category to

play a dominant role in the computation of the score. The adjustment we suggest is to scale it by its cross-sectional standard deviation prior to the calculation of the score. This simple modification guarantees that each input contributes equally to the systemic risk score.

We first show why the systemic risk scores can be biased. According to BCSB (2013), the systemic risk score for bank i, denoted S_i, is defined as a weighted sum of K inputs:

$$S_i = \sum_{j=1}^{K} w_j \times x_{ij} \qquad (1)$$

where w_j corresponds to the weight (common to all banks) of input j in the systemic risk score, and $x_{ij} = X_{ij} / \sum_{i=1}^{N} X_{ij} \times 100$ corresponds to the relative value (in percentage) of input j for bank i. Note that all x_{ij}, for $j = 1,\ldots,K$, have the same empirical mean.

Currently, the BCBS considers $K = 5$ inputs, namely the bank's size, cross-jurisdictional activity, interconnectedness, substitutability/financial institution infrastructure, and complexity. In order to give the same importance to each of these categories, the Committee considers an equally weighted index with $w_j = 1 / K$. This assumption is justified by the fact that all inputs have the same importance in the score: an increase of 10% of a given input can be offset by a decrease of 10% of another input.

However, this assumption becomes problematic when the cross-sectional variances of the inputs are different. In such a case, a 10% increase of a given input does not represent the same signal if the factor has a variance of 1 or a variance of 100. One implication of this situation is that the ranking issued from the systemic risk score will be mainly driven by the most volatile categories.

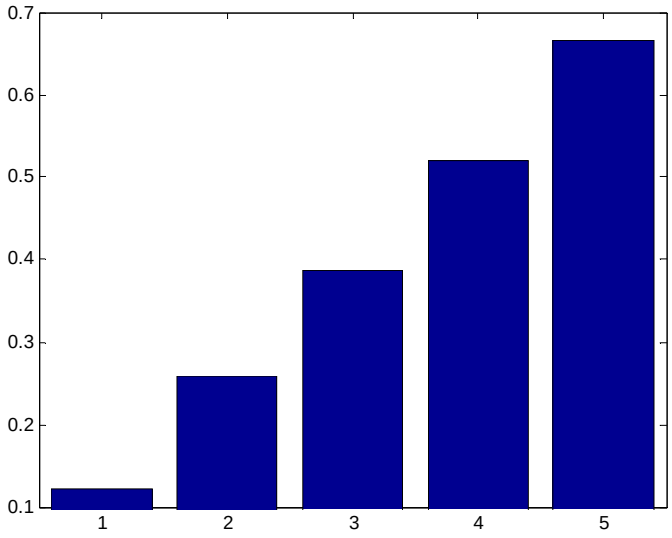
To illustrate this point, let us assume that the K inputs are independently distributed with a common mean but have different cross-sectional variances. For simplicity, we assume that the inputs are generated by:

$$X_{ij} = \beta + a_j u_i \qquad (2)$$

where $\beta > 0$, u_i is an *i.i.d.* uniform variable on [-1,1] and $a_j = 10 \times j$. Note that by definition, var(u_i)=1/3. In this simple example, the K inputs have a mean equal to β but *var*(X_K)>...> *var*(X_1) since *var*(X_j) = (100/3)× j^2. By simulation, we generate a series of realizations for X_{ij}, x_{ij}, and S_i, and then compare (1) the firms' ranking based on the equally weighted systemic risk score to (2) the firms' ranking based on each of the K inputs. In accordance with BCBS (2013), we use K=5 inputs and N=75 banks.

Figure 1 displays the average rank correlations (Spearman) measured between the ranking based on S_i and the input j. The average rank correlations are based on 1,000 simulations. We can verify that the correlation increases with the variance of the input: the higher the volatility of the input, the more similar are the rankings based on the score and the input.[2] The fact that the systemic risk scores are distorted by the most volatile inputs comes in violation of the Committee's intention to give all inputs equal weights. The high sensitivity of the scores with respect to volatility seems to be an unintended consequence of the current methodology.

Figure 1: Correlation between Score-based Rankings and Input-based Rankings



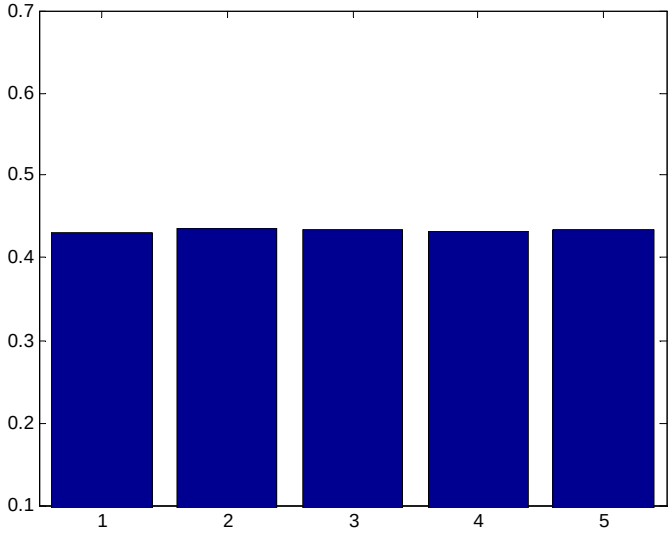
[2] We obtain similar results when we allow the K inputs to have different means (β_j).

We show below how to remove the above-mentioned bias. One simple correction consists in standardizing the variables that enter in the definition of the index by their volatility. In that case, the systemic risk score becomes:

$$\tilde{S}_i = \sum_{j=1}^{K} w_j \times \frac{x_{ij}}{\sigma_j} \qquad (3)$$

where $\sigma_j^2 = \mathrm{var}\left(x_{ij}\right)$ corresponds to the cross-sectional variance of input *j*. Note that the rest of the formula remains unchanged. In particular the weight of each input is still equal to $w_j = 1 / K$. Figure 2 displays the corresponding average rank correlations (obtained for 1,000 simulations) between the rankings based on the modified score $\tilde{S}_i$ and the initial inputs X_j. The suggested correction guarantees that each input contributes equally to the systemic risk score as desired by the BCBS.

Figure 2: Correlation between Modified Score-based Rankings and Input-based Rankings



We sincerely hope that you will find our comments useful and we remain at your disposal should you need more information about our comments.

Sincerely yours,

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Appendix: Indicators and weights used in the Systemic Risk Score (BCBS, 2013)

Indicator-based measurement approach

Category (and weighting)	Individual indicator	Indicator weighting
Cross-jurisdictional activity (20%)	Cross-jurisdictional claims	10%
	Cross-jurisdictional liabilities	10%
Size (20%)	Total exposures as defined for use in the Basel III leverage ratio	20%
Interconnectedness (20%)	Intra-financial system assets	6.67%
	Intra-financial system liabilities	6.67%
	Securities outstanding	6.67%
Substitutability/financial institution infrastructure (20%)	Assets under custody	6.67%
	Payments activity	6.67%
	Underwritten transactions in debt and equity markets	6.67%
Complexity (20%)	Notional amount of over-the-counter (OTC) derivatives	6.67%
	Level 3 assets	6.67%
	Trading and available-for-sale securities	6.67%

Source: Basel Committee on Banking Supervision (2013)