AGGREGATING REGULATORY CAPITAL REQUIREMENTS ACROSS JURISDICTIONS:
THEORETICAL AND PRACTICAL CONSIDERATIONS

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Aggregating Regulatory Capital Requirements across Jurisdictions:

Theoretical and Practical Considerations

Especially since the financial crisis of 2007–08, regulators in the U.S. and around the world have recognized that the solvency of insurance groups as well as that of their individual legal entities needs to be examined. Efforts toward global regulatory convergence were launched by the International Association of Insurance Supervisors (IAIS), initiated by the Financial Stability Board (FSB). These efforts include the negotiation of a group solvency capital standard for all Internationally Active Insurance Groups (IAIGs): Insurance Capital Standard 2.0 (ICS 2.0). The approach the IAIS has taken with the International Capital Standard has been largely resisted by regulatory and industry stakeholders in the United States (and some other countries) based on the nature of its current regulatory structures. The IAIS has agreed to consider an alternative approach based on comparability with ICS 2.0—referred to as the aggregation method (AM).

The AM was born of practical necessity. In the United States, the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) requires the Federal Reserve Board (FRB) to regulate holding companies, which include banks and insurance companies. In 2016, an FRB paper proposed a building block approach (BBA) to regulate the capital of these mixed entities. As banks and insurance companies do not "share any common capital assessment methodology," the FRB proposed relying on the existing methodologies for each sector and to aggregate capital requirements across regulatory frameworks with the use of a "translating mechanism" called a "scalar."[1]

This paper is offered to help clarify the objectives, both conceptual and practical, of a scalar methodology. It assembles an inventory of possible methodologies. It derives a set of criteria for the evaluation of methodologies from existing discussions of possible methodologies and from standard statistical principles. It evaluates each of the methodologies according to the specified criteria.

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1 Board of Governors of the Federal Reserve System, "Comparing Capital Requirements in Different Regulatory Frameworks," 2019, page iii.

Scalars are designed to allow regulators in a jurisdiction to have access to a metric of the capital adequacy of an insurance group—or more generally, of a financial services group—based on the capital adequacy metrics of its individual components, including those entities regulated in other jurisdictions. While scalars might be developed for all kinds of entities, the focus of this paper is on scalars for entities regulated by jurisdictions that specify a measure of capital adequacy based on the ratio of some measure of available capital to some measure of the risk inherent in their operations. This measure of inherent risk (which is also referred to as "required capital" in this paper) might vary: for insurance, it might express the capital required to account for asset, interest rate, underwriting and/or other risks; for banking, it might express a risk-weighted measure of assets.

The ideal form of scalars is one where an entity in one jurisdiction hypothetically calculates its available and required capital as if it operated in the originating jurisdiction while adjusting (or controlling for) other factors that might affect the safety of the group's ongoing operations. Of course, this conceptual "ideal" may be impractical requiring, as it would, each entity with ownership in a different jurisdiction to maintain two sets of books: one with accounting principles and solvency measures calculated according to local requirements and a second one aligning with the principles and practices of the jurisdiction of its ownership. This ideal might also require adjusting for all other relevant factors, and doing so in a manner that recognizes the possibility that different accounting practices and/or different levels of safety inherent in calculations of required capital might already reflect awareness by jurisdictional regulators of some or all of these other factors.

As this analysis examines possible scalar methodologies, four independent general criteria for assessment are introduced: validity, reliability, ease of implementation, and stability of parameters. Translating these criteria to explicitly apply to scalars and elaborating on specific factors that might be assessed under each of these four general criteria make the report's assessments more comparable and more useful.

Four families of methodology for estimating scalars are assessed: No Scalars, Capital Ratios, Equivalence of Two Points, and Probability of Negative Outcomes. One of these families—Equivalence of Two Points—turns out to be a generalization of two other families. Each of the three distinct families include multiple variants. Two variants from each of two families are specifically assessed and the variants of the third family are assessed as a group. The evaluation of these methodologies by the criteria just suggested presents issues to consider, sometimes applying to all branches of a family and sometime applying to one branch but not others.

The assessments presented here suggest not only that any scalar methodology will be imperfect; they also suggest that the extent to which the results produced will vary from the "ideal" is itself variable, depending on the circumstances (e.g., how much of a company's business is accounted for by entities in other jurisdictions). As a result, a final determination on preferred scalar methodologies likely will vary due to circumstances.

To summarize roughly the assessments of the five methodologies which are assessed in detail, it is useful to conceptualize two dimensions based on our four criteria of assessment: 1) validity; and 2) simplicity. Validity includes both conceptual validity as discussed in the paper and the lack of validity that follows from a lack of reliability. Simplicity includes both conceptual simplicity (discussed as part of validity) as well as ease of implementation. The best scalar methods would be very simple and highly valid. Unfortunately, none of the methods assessed here fit that description. Indeed, there is an ordinally inverse relationship between validity and simplicity, as can be seen in Figure A.

Figure A: Validity and Simplicity of Scalar Methodologies
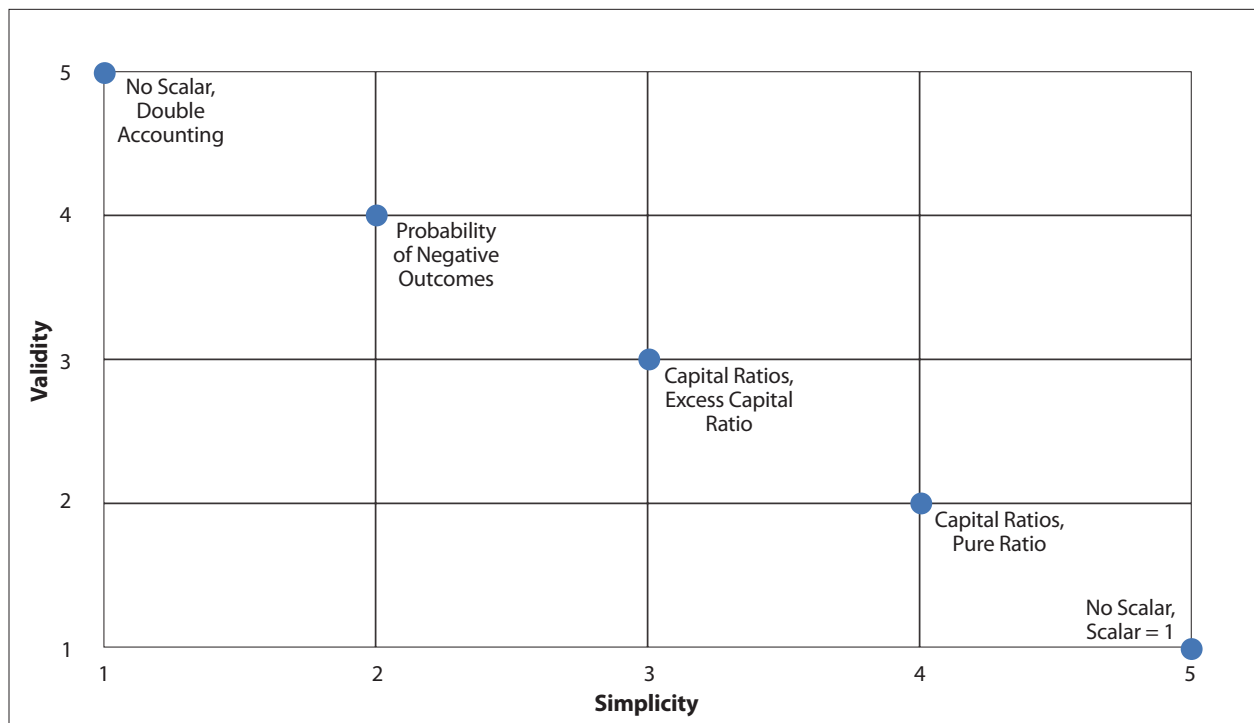
Four issues arise to a greater or lesser extent for all of the methodologies assessed, and it seems prudent to highlight them before concluding. Those issues are:

1. *The application of these methodologies to entities in different industries:*
   Jurisdictions differ by geography and/or by industry. The regulatory regime in a given geographic unit defines a jurisdiction. Most of the comments in this paper apply to scalars for entities in different jurisdictions, whether the basis for the difference is geography, industry, or both. However, it is true for all methodologies (with the exception of one of the No Scalar methods) that when the entities are in different industries, a second scalar element is required.

2. *The dependence of the anchors for these methodologies on regulatory actions and company responses (the "problem of endogeneity"):*
   For all methods discussed in this paper (with the exception of one of the two No Scalar approaches), the anchors of these methods (e.g., the Capital Adequacy ratio, or the Probability of Default), are the result, in part, of companies acting under regulatory requirements. As illustrated in this paper, scalars may adjust for the differences in those requirements. However, anchors also reflect the actions of regulators within the various regulatory systems, and the responses of companies to those actions. The anchors then are products both of the different requirements (for which scalars aim to adjust) and the responses of regulators and companies to those anchors.

3. *The dependence of stability and validity of results on jurisdictional regime stability:*
   For all methods discussed here, and likely for any other methods that might be contemplated, the validity of the results, and their stability over time, depends on regime stability.

4. *The value of sensitivity testing in selecting a most desirable method:*
   In discussing the role of sensitivity testing throughout this paper, two different dimensions of sensitivity have been implied: 1) sensitivity of results to changes of parameters within a model; and 2) sensitivity of results to differences in methods of calculating scalars.

This paper provides a discussion of these issues in more detail as well as possible responses. As with scalars themselves, there are no perfect solutions.

While the Academy offers the considerations presented in this paper to be taken into account by regulators as they consider adoption of scalars as part of the group capital regulation process, the Academy does not make any specific recommendations in favor of or against any particular methodology. However, three conclusions do seem to follow from the analysis presented here:

1. Methodologies based on observable data are preferable to methodologies based on assumption, other things being equal. Only the approaches discussed under the Probability of Negative Outcomes are defined by reference to the analysis of observable data, and thus deserve heightened attention in any regulatory environment. However, as discussed, with the advantage of reliance on data come several challenges—many of them directly related to the reliance on available data. As such, regulators should consider whether adoption of this methodology, the Probability of Negative Outcomes, is advisable especially after careful consideration.

2. Almost all methodologies will be prone to increased imperfection if regulatory regimes change in a manner affecting capital adequacy standards after scalars have been estimated. While there might be attempts to develop methods by which to calculate adjustments to scalars based on the changes observed, the optimal way to adjust scalars for regime change and other changes in relevant conditions is to recalculate the scalars periodically. Hence, it may be advisable for a periodic recalculation to be made as an intrinsic element of any methodology adopted.

3. All of the methodologies discussed here are and will be imperfect. While factors that might be addressed to reduce some of those imperfections have been identified, it is impossible to find perfect solutions given the criteria of validity, reliability, ease of implementation, and stability of parameters and results. The question facing regulators then involves balancing degrees of validity (i.e., how imperfect the measures are, given what they would be if ideally conceptualized and measured) against degrees of reliability, ease, and stability. The only reliable way in which to regard those degrees, and to provide meaningful information with which to select a methodology based on some optimization of the criteria, is through the application of sensitivity testing as described. Hence, it may be advisable that the information required to examine the impact of each selected methodology under varying parameters, and to compare the impact of differing methodologies, be collected by regulators in order to allow them, at least initially, to rely on sensitivity testing to determine the best scalars in a particular jurisdiction.

The complete version of this research report will be released in the coming days; you will be able to access the report at actuary.org/scalars.

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