June 10, 2022

Board of Governors of the
Federal Reserve System
20th and C St NW
Washington DC 20551

Dear Chair, Vice Chair, and Governors:

The Economic Growth, Regulatory Relief, and Consumer Protection Act established an Insurance Policy Advisory Committee (IPAC) to advise the Board on international capital standards and other insurance matters. As part of fulfilling its mandate, the IPAC submits for the Board's information its report covering certain aspects of the Insurance Capital Standard (ICS), titled "Potential Impact of the International Association of Insurance Supervisors' Insurance Capital Standard on the Life Insurance Industry, Policyholders and Markets in the United States."

The objective of the report is to assess potential implications of the ICS to the U.S. insurance industry, markets, and policyholders, with a specific focus on long-duration life insurance and retirement products. The report is the culmination of a study by IPAC members that included data from six insurers and quantitative analysis of changes in a hypothetical model Balance Sheet to determine whether and how levels of excess capital change in response to various economic scenarios.

With respect to the ICS, the IPAC understands the objectives of the International Association of Insurance Supervisors (IAIS) to establish a common language for supervisors to discuss solvency of Internationally Active Insurance Groups (IAIGs) and to enhance global convergence among the group capital standards that are in place. However, based on IPAC's data and analysis as described in the report, the IPAC has concluded that the ICS, in its present form, does not appropriately reflect the product and risk-mitigation features of long-duration life insurance and retirement products sold in the U.S. and, perhaps just as important, it does not reflect how investment choices available in U.S. capital markets support such long-duration products.

As currently constructed, the ICS would not be appropriate as a capital rule for U.S. based internationally active insurance groups. The ICS's market-adjusted valuation seeks to respond to structural changes in markets, such as a sustained low interest-rate environment. However, the ICS is overly sensitive to short-term market conditions, such as temporary movements in credit spreads and does not reflect several asset classes held by insurers in connection with long-duration life insurance and retirement contracts. The ICS as currently constructed produces excessive conservatism and volatility into its required capital and excess capital indicators. As the report describes in detail, this could lead to inappropriate solvency signals and incentivize insurers to change product offerings and investments to minimize these effects, potentially creating a misalignment with actual underlying risks.

Looking ahead, the IPAC suggests certain revisions to the ICS construct identified in this report be reflected in the final version of ICS, and that these changes be considered in the determination of comparability in the forthcoming Aggregation Method comparability assessment. With the objective of keeping this report as data and model backed as possible, the project scope was limited to key areas of concerns and the list of proposed revisions is not intended to be comprehensive.

For more information, please refer to the report which features an executive summary, an introduction to IPAC and its ICS-related project, a description of the analytical model used by IPAC to support the analysis, key findings, and IPAC's assessment of key impacts.

Please direct any inquiries to IPAC at IPAC@frb.gov.

Sincerely,

Insurance Policy Advisory Committee

Potential Impact of the International Association of Insurance Supervisors' Insurance Capital Standard on the Life Insurance Industry, Policyholders and Markets in the United States

Insurance Policy Advisory Committee
of the Federal Reserve Board of Governors

Report to the Board of Governors of the Federal Reserve

June 10, 2022

Insurance Policy Advisory Committee of the Federal Reserve Board of Governors
Email to: IPAC@frb.gov; Electronic copy available at https://www.milliman.com/IPAC

EXECUTIVE SUMMARY

The Insurance Policy Advisory Committee (IPAC) of the Federal Reserve Board (Board) was established by a 2018 act of Congress to provide information, advice, and recommendations to the Board on international insurance capital standards and other insurance policy issues. In May 2020, the IPAC voted to create an Insurance Capital Standard (ICS) Working Group and charged it with conducting an analysis to model specific impacts of the adoption of the International Association of Insurance Supervisors' (IAIS) ICS on US insurers, policyholders, and markets. The objective of this report is to assess the likely impact of the ICS with a particular focus on long-duration life insurance and retirement products. To accomplish this objective, the IPAC ICS Working Group built a stylized insurer model incorporating key elements of the ICS which includes anonymized data voluntarily provided by several large US life insurers. This model allowed for the analysis of the ICS impact on the stylized insurer under various economic scenarios and points in time.

The IPAC understands the goal of the IAIS in developing the ICS to enhance the ability of global insurance supervisors to assess the solvency of Internationally Active Insurance Groups (IAIGs) and to promote convergence among group capital standards already in place in other jurisdictions. However, the IPAC has concluded that the ICS in its current form does not adequately reflect important features of US long-duration life insurance and retirement products. As importantly, the ICS does not appropriately reflect the depth of US capital markets and the robust options available to US insurers to support long-duration liabilities.

The paper concludes that the ICS as currently constructed is not appropriate for use with US-based IAIGs as a prescribed capital requirement (PCR). The ICS's market-adjusted valuation methodology seeks to respond to structural changes in markets, such as a sustained low interest-rate environment. However, the ICS is overly sensitive to short-term market conditions, such as temporary movements in credit spreads, and does not reflect several asset classes held by insurers in connection with long-duration life and retirement contracts. The ICS, as currently constructed, produces excessive conservatism and volatility in its required capital and excess capital indicators. As the report describes in detail, this could lead to inappropriate solvency signals and incentivize insurers to change product offerings and investments to minimize these effects, potentially creating a misalignment with actual underlying risks.

The ICS is intended to ensure comparability and consistency across jurisdictions. Results from implementation of a global standard must be comparable to facilitate assessments of solvency that are agnostic as to where an insurance group is headquartered. The current iteration of the ICS falls short in this regard as it fails to reflect markets, existing products, and product features in all jurisdictions; and it inconsistently measures assets and liabilities in a way that can lead to inappropriate solvency signaling particularly during times of stress. Further, the ICS is a new, complex and untested calculation which would require significant investment in new systems, controls, testing and validation not currently in place in the US, both on the part of insurance

groups to submit the necessary data, as well as for regulators in the US to assess that data and the ICS result.

The IPAC suggests that the revisions to the ICS construct identified in this report be reflected in the final version of the ICS and that these changes be considered in the determination of comparability to the ICS in the forthcoming Aggregation Method comparability assessment.

Table of Contents

INTRODUCTION

This report is the culmination of analysis by the Insurance Policy Advisory Committee (IPAC). The information and recommendations contained in this report are provided to the Federal Reserve Board to assist in the assessment of the global Insurance Capital Standard (ICS) being developed by the International Association of Insurance Supervisors (IAIS).

Introduction to the IPAC

In 2018, the US Congress established the IPAC through Section 211(b) of the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA). More broadly, Section 211 of EGRRCPA addresses accountability of federal officials with respect to their consideration of international insurance capital standards for potential adoption, and thus applicability, in the US. Section 211 mandates increased transparency at standard-setting regulatory or supervisory forums and collaboration by federal officials with state insurance regulators through the National Association of Insurance Commissioners (NAIC). Congress established the IPAC to focus specifically on international insurance capital standards as well as on other insurance policy issues.

Congress mandated that the IPAC be comprised of not more than twenty-one members with diverse expertise in various aspects of insurance. EGRRCPA mentions the breadth of experience among those involved with the US insurance industry ranging, for example, from property and casualty experts to those with expertise on issues facing underserved insurance communities and consumers. Since 2019, the Board has annually solicited the public for experts interested in serving as IPAC members. A list of all inaugural and current IPAC members is included in Appendix A.

The IPAC exists to provide information, advice, and recommendations to the Board. The IPAC uses various forums. One example is regularly scheduled meetings.[1] Another is IPAC working groups, which utilize members' expert knowledge to research and produce focused and timely reports on relevant specific topics within the IPAC mandate.

Introduction to the IPAC ICS Project

At its Annual General Meeting in November 2019, the IAIS agreed to adopt the ICS Version 2.0 for a five-year monitoring period.[2] The monitoring period is a period of design stability during

[1] The Board publishes IPAC Records of Meeting on its public website: https://www.federalreserve.gov/aboutthefed/ipac.htm.

[2] The November 2019 agreement is the outcome of a series of complex negotiations among IAIS members. As part of the November 2019 agreement, the IAIS also agreed to assess by the end of the monitoring period whether a so-called "Aggregation Method" provides comparable, i.e., substantially the same, outcomes to the ICS. IAIS,

which the IAIS is assessing the ICS design and calibration, as well as collecting feedback about the ICS from group-wide insurance supervisors, insurers participating in the monitoring exercise, and other stakeholders.

In the November 2019 agreement, the IAIS also committed to perform an assessment of the economic impact of adopting the ICS. The IAIS has not announced the scope of this assessment or whether the assessment will be performed at a global, regional, or jurisdictional level. While the IAIS assessment could provide useful input on the appropriateness of the ICS for use as a harmonized, global group capital standard, IPAC members do not expect that the planned exercise would be sufficiently granular to adequately assess the potential impact and implications of the ICS on US insurers, policyholders, and insurance markets. In addition, the assessment is expected to start late in the monitoring period, and the IPAC is concerned that insufficient time would remain prior to the planned 2024 adoption of the final standard to address any necessary changes to the ICS design.

In response to these concerns, the IPAC created the ICS Working Group in May 2020 to perform its own US-focused research and analysis on the impact of the ICS, to inform and advise the Board, and to publish the results. The ICS Working Group, comprised of IPAC members, is sponsored by, and delivers periodic updates to, the IPAC. The IPAC provides the ICS Working Group with input on key project deliverables, including review and approval of this report prior to its public release. Board staff support the activities of the IPAC, including through project management and facilitation of the ICS Working Group. A list of ICS Working Group members is included in Appendix A.

The IPAC and its members are responsible for the content of this published report, and the views expressed herein are those of the IPAC and its members. These views are their own and do not necessarily reflect those of the Board, its staff, or the employing companies and institutions of IPAC members. The Board will consider the report – as well as other information – as it develops its policy positions with respect to the ongoing ICS negotiations at the IAIS.

The IPAC's intent in publishing this report is to provide the Board with advice in relation to its participation in the ongoing development of the ICS at the IAIS. This would also encompass the aim to influence the design and the use of the ICS and, by extension, further important changes to the ICS or the adoption of an alternative group capital approach in markets where the ICS is shown to have a detrimental impact.

The IPAC's efforts also serve to provide another means for data-based analysis to inform decisions on the ICS, given that the monitoring period data submitted to the IAIS by participating insurance groups has not been accessible to IAIS members for two years. This was a result of Covid-19 travel restrictions and data sharing agreements which require that the ICS-collected

"Statement from IAIS Secretary General Jonathan Dixon on the ICS Monitoring Period," Press Release (February 21, 2020), https://www.iaisweb.org/uploads/2022/01/200221-Media-Release-Statement-by-IAIS-SG-Jonathan-Dixon-on-ICS-monitoring-period.pdf.

data only be accessible by authorized IAIS working group members working on-site at the Bank for International Settlements in Basel, Switzerland.

I. REPORT OUTLINE

The objective for this report is to assess the potential impact of the IAIS ICS on the US insurance industry, policyholders, and markets, with a focus on long-duration life insurance and retirement products. More specifically, the key components of the ICS to be evaluated include:

1. Its market-adjusted valuation (MAV) basis,
2. Specified criteria for qualifying capital resources, and
3. The "standard method" (as contrasted with the use of internal models) for calculation of the ICS capital requirement.

These three components of the ICS are referred to as the "reference method" or "reference ICS" in IAIS public documents as well as herein. These terms are also used in the context of the five-year monitoring period to define the single method for which the IAIS has agreed to monitor performance over that period. The term does not denote that this method, as currently designed and calibrated, is a benchmark or will ultimately become the final version of the ICS.

The ICS also includes an alternative valuation method referred to as GAAP with Adjustments (GAAP Plus) and other methods for calculating ICS capital requirements (Other Methods). Such Other Methods under consideration by the IAIS during the monitoring period are internal models, dynamic hedging, and the Supervisor-Owned and Controlled Credit Assessment (SOCCA) processes. A decision on whether SOCCA processes will be part of the ICS standard method as a national discretion or included in Other Methods will be made by the IAIS by the end of the monitoring period. A decision will also be made by the end of the monitoring period whether GAAP Plus or any of the Other Methods will be included as part of the ICS that is slated for adoption in late 2024.

The US members of the IAIS, along with members of other interested jurisdictions, are developing an alternative approach to the ICS referred to as the Aggregation Method (AM). The IAIS will assess by the end of the monitoring period whether the AM provides comparable outcomes to the ICS such that it may be considered as an alternative implementation of the ICS. The AM is not directly evaluated in this report; however, the findings and conclusions contained herein may have relevance in terms of the IAIS' assessment of the comparability of the AM.

GAAP Plus, Other Methods and the AM are not included in the scope of this analysis. Rather, this report focuses on the impact that a hypothetical adoption of the reference ICS as a Prescribed Capital Requirement (PCR) for Internationally Active Insurance Groups (IAIGs) could have on the ongoing viability of long-duration life insurance and retirement products in the US.[3] In determining the focus of this report, the IPAC considered the experience of insurance groups

[3] A PCR is defined in Insurance Core Principle 17 as "a solvency control level above which the supervisor does not intervene on capital adequacy grounds." *IAIS Insurance Core Principles and ComFrame* (November 2019), 234.

represented on the IPAC ICS Working Group that participated in ICS field testing and responses by stakeholders to ICS-related public consultations.[4] This prior public feedback emphasized concerns that the resulting ICS ratios based on the reference method were not aligned with existing capital measures or internal analyses and did not reflect key features of insurance products and insurance supervision in the US. Rather, the ICS as currently specified is more heavily based on features of products and insurance supervision in jurisdictions outside of the US. In addition, due to the ICS construction, the ICS ratio can misrepresent the financial strength of insurance groups, and particularly for those US groups that offer long-duration life insurance and retirement products, which are featured much more prominently in the US than in some other jurisdictions. The public consultation feedback also suggested that the design of the MAV valuation approach for insurance liabilities, and in particular the discounting method it applies to projected future cash flows, is the source of much of this distortion in the ICS ratio measure.[5] This distortion is often compounded by the resulting capital requirements for market risks, including interest rate risk and non-default spread risk.

However, it has also been noted that the margin over current estimate[6] and the calculation of certain life insurance risks also contribute to a distortion of the ICS ratio.[7] Discussion of these non-primary sources of distortion have been set aside by the IPAC ICS Working Group in this analysis.

This report incorporates the results and findings from a quantitative model of a hypothetical, or 'stylized' insurer, developed from data voluntarily provided by large US life insurers. The IPAC ICS Working Group members, with support from Board staff, technical staff from the life insurance groups represented in the IPAC ICS Working Group, and from data volunteer firms, developed this model specifically to isolate certain components of the reference ICS that may account for the apparent distortion of the ICS output that was observed by US participants in ICS field-testing as well as other stakeholders.

The members of the IPAC ICS Working Group who designed the stylized insurer model and who have also contributed to this report have extensive knowledge and experience working with capital models generally, and the ICS specifically. The life insurers and industry groups they represent have contributed to the work of the IAIS on the ICS as field-testing and monitoring period volunteers, as stakeholders, or as advocates for the US insurance industry since the work

[4] IAIS, *Comments to ICS Version 2.0 Consultation Document (public)*, Section 5.1 – MAV Approach (May 2019), https://www.iaisweb.org/uploads/2022/01/191120-Resolution-of-comments-ICS-Version-2.0-consultation1.pdf.

[5] A further discussion on the Market-Adjusted Valuation (MAV) approach is included in Section II and Appendix B of this report.

[6] "Margin over current estimate (MOCE) is a margin added to the current estimate of insurance obligations in order to achieve a market-adjusted value of insurance liabilities. The MOCE is intended to cover the inherent uncertainty in the cash flows related to insurance obligations. As such, MOCE considers all uncertainties attached to these obligations." IAIS, *2020 ICS Data Collection Technical Specifications* (June 2021), 43.

[7] IAIS, "ICS Stakeholder Meeting," presented at the Basel Stakeholder Event on ICS (February 1, 2019), https://www.iaisweb.org/uploads/2022/01/190201-ICS-Stakeholder-Meeting-IAIS-Presentation.pdf, slide 5.

on the ICS began in 2014. A list of the IPAC ICS Working Group participants, technical team members and Board project support staff is included in Appendix A of this report.

The model developed by the IPAC ICS Working Group evaluates a stylized insurer which, in this context, is represented by a simplified balance sheet which includes only long-duration life insurance and retirement products and related investments that are common in the US. The investment portfolio is based on the actual holdings of six large US life insurance groups that volunteered data for this analysis.[8] Insurance liability amounts are based on actual projected cash flow data provided by the same groups for those products. A more in-depth discussion of the design of the model, assumptions and results is provided in Section III of this report.

This report is structured as follows: Section II provides background information on the ICS, including some historical context and an overview of its technical design. Section II also includes a discussion of the European experience with the development and implementation of Europe's Solvency II (SII) insurance supervisory and capital regime, which features a market value-based capital standard that has many similarities to the ICS. The section concludes with a review of the most relevant design elements of the ICS and how this design has evolved over the course of the field-testing phase. Section III provides the results of the model of a stylized life insurance group developed by the IPAC ICS Working Group to analyze the performance of the ICS through comparison to benchmarks and under different economic scenarios. Section IV contemplates the model results and other observations of ICS design to explore possible impacts to insurance groups and the broader economy. Section IV also provides a supervisory perspective. This is followed by Section V, which presents the report's conclusions.

II. BACKGROUND

2.1 About the IAIS

The IAIS is a voluntary, member-driven non-profit organization of insurance supervisors. With over 200 members representing 97 percent of worldwide premium volume, the IAIS is the international standard-setting body responsible for developing and supporting the implementation of principles, standards, and guidance for the supervision of the insurance sector.[9] The IAIS's mission is "to promote effective and globally consistent supervision of the

[8] The names of the companies are withheld to ensure data confidentiality. Small adjustments were also applied in aggregating the data to preserve confidentiality. Data providers were sourced from companies both within and outside the IPAC membership.

[9] IAIS, *IAIS Annual Report 2019*, 5, https://www.iaisweb.org/uploads/2022/01/201201-2019-Annual-Report.pdf.

insurance industry in order to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and to contribute to global financial stability."[10]

The US members of the IAIS are the Board, the Federal Insurance Office of the US Department of the Treasury (FIO), the NAIC, and the insurance regulatory agencies of the 50 US states, the District of Columbia and the five US territories, which collectively comprise the NAIC's membership.[11]

There are several committees and underlying working groups at the IAIS with ICS-related involvement: the Insurance Capital Standard and Comparability Task Force (ICSTF) and the Policy Development Committee (PDC), both of which report directly to the Executive Committee; and the Capital, Solvency and Field-Testing Working Group (CSFWG), which reports to the PDC.[12] The Board, FIO and the NAIC/states are each represented on these committees with ICS-related involvement.

2.2 About the ICS

The IAIS commenced the development of the Common Framework for the Supervision of Internationally Active Insurance Groups (ComFrame) on July 1, 2010[13] as one of its key post-financial-crisis initiatives. The IAIS noted at the time the "increasingly larger [*sic*] relevance of insurance groups including those that are internationally active" and the need for an IAIS response given that "no internationally coherent framework [was then] available."[14] The IAIS's interest in developing ComFrame was bolstered by action of the Financial Stability Board (FSB), which called upon the IAIS in 2012 to develop a comprehensive supervisory framework including a quantitative "insurance capital standard" (ICS) applicable to IAIGs [Internationally Active Insurance Groups]…"[15]

2.3 ICS Development to Date

The initial ICS data-gathering and field-testing exercise began in March 2014, focusing on gathering and analyzing data necessary to shape the development of the ICS and, in particular,

[10] IAIS, *Annual Report 2019*,5, https://www.iaisweb.org/uploads/2022/01/201201-2019-Annual-Report.pdf.

[11] IAISweb.org, accessed March 15, 2022, https://www.iaisweb.org/about-the-iais/iais-members/ .

[12] IAISweb.org, *Organisational Structure*, https://www.iaisweb.org/about-the-iais/organisational-structure/.

[13] IAIS, *Annual Report 2009-2010,* 17, https://www.iaisweb.org/uploads/2022/01/2009-2010_Annual_report.pdf.pdf.

[14] IAIS, *Annual Report 2009-2010,* 17.

[15] Federal Insurance Office (FIO), *Annual Report on the Insurance Industry 2014* (September 2014), 7, https://home.treasury.gov/system/files/311/2014_Annual_Report.pdf .

on potential valuation methodologies.[16] Over the ensuing years, the IAIS's work on ComFrame and the ICS continued and expanded. Several insurance groups (primarily IAIGs, but including a few non-IAIGs) from various jurisdictions, including the US, agreed to participate on a volunteer basis in field testing, whereby data would be submitted as part of an iterative annual process to evaluate whether the design, construct and calibration of the various components of the ICS at various stages of development met the intended objectives of the IAIS for each annual testing exercise.

In 2019, an important milestone was achieved when, at its annual meeting, the IAIS approved ICS Version 2.0 for use during the monitoring period.[17] Beginning in 2020, the five-year ICS monitoring period began, during which further design changes are minimized to maintain greater design stability and to better evaluate and monitor the ICS's performance. During this period, the ICS is not intended to be used by supervisors to assess the capital adequacy of IAIGs or to prompt supervisory action, nor are IAIGs expected to manage their business to the ICS. At the end of the monitoring period, potential improvements will be considered based on the reporting and analysis of data. The IAIS Strategic Plan calls for the resulting final ICS to be considered for adoption by the IAIS membership at the end of 2024.[18] The IAIS expects the adopted version to be considered for implementation by member jurisdictions beginning in 2025.

2.4 Reference ICS

The three components of the reference ICS are (1) a market-adjusted valuation (MAV); (2) criteria for qualifying capital resources; and (3) the standard method for determining the ICS capital requirement.[19]

The starting point of MAV is the audited consolidated GAAP balance sheet at the level of the insurance holding company of an insurance group, or the financial holding company in the case of a financial conglomerate. The ICS balance sheet is derived from the consolidated GAAP balance sheet by considering the line-item balances of insurance and insurance-related entities separately from those of non-insurance entities. The MAV specifications are applied to the balances of the insurance and insurance-related entities that are included in the consolidated balance sheet, resulting in some adjustments to the consolidated GAAP balances as further

[16] FIO, *Annual Report on the Insurance Industry 2014*, 7.

[17] https://www.iaisweb.org/uploads/2022/01/200221-Media-Release-Statement-by-IAIS-SG-Jonathan-Dixon-on-ICS-monitoring-period.pdf.

[18] IAIS, *Strategic Plan 2020-2024* (June 2019), https://www.iaisweb.org/uploads/2022/01/190613-2020-2024-Strategic-Plan.pdf .

[19] IAIS, *Risk-based Global Insurance Capital Standard Version 2.0 Public Consultation Document* (July 2018), 9.

discussed below.[20] The balances of non-insurance entities are not adjusted and remain as reported in the consolidated GAAP balance sheet.

Qualifying capital resources are determined at the consolidated GAAP balance sheet level and comprise qualifying financial instruments, retained earnings, as well as certain other capital elements. Capital resources are subject to adjustments, exclusions and deductions as outlined in the ICS Technical Specifications and as further discussed below.

The ICS capital requirement for insurance and insurance-related business is based on the potential for adverse changes in qualifying capital resources resulting from unexpected changes, events, or other manifestations of the specified risks. Capital requirements for non-insurance entities are based on a jurisdictional sectoral requirement or an equity risk charge. Further details on the standard method for calculating the ICS capital requirement can be found in the ICS Public Level 1 Document[21] and the additional discussion below.

The ICS ratio is calculated as:

ICS ratio = Qualifying capital resources / ICS capital requirement

Market-Adjusted Valuation (MAV)

The valuation of assets and liabilities is an integral component of the ICS, as the interactions between assets and liabilities are reflected in both qualifying capital resources and the ICS capital requirement, as market conditions and other circumstances change, reflecting the manifestation of various risks. In a market-adjusted balance sheet, assets are measured at fair value, and insurance liabilities are measured at a hypothetical market value ("adjusted market value"), based on a probability-weighted average of expected future cash flows discounted using IAIS-prescribed yield curves. The result is referred to as a "current estimate" to which a "margin over the current estimate" (MOCE) is then added.[22]

Discounting

To calculate a current estimate under MAV, expected future cash flows from insurance liabilities are discounted using a method that utilizes specified yield curves. IAIS-specified yield curves are provided for each major currency based on a risk-free yield curve plus a specified adjustment. The adjustment represents a spread over the risk-free rate that is included with a stated purpose

[20] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

[21] IAIS, *Public Level 1 Document: ICS Version 2.0 for the monitoring period* (November 2019).

[22] The current estimate calculation may recognize management actions when such actions are objective, realistic and verifiable. The MOCE is a margin added to the current estimate of insurance obligations intended to achieve a market-adjusted value of insurance liabilities. The MOCE is intended to cover the inherent uncertainty in the cash flows related to insurance obligations.

to attempt to mitigate potential excessive volatility in the capital measure.[23] The adjustment varies by the nature and stability of the liability cash flows and is reflected by applying what is termed the "Three-Bucket Approach," i.e., as the stability of the liability cash flows decreases, the block of business is assigned to the next lower bucket with a lower spread over the risk-free rate.

Further discussion of the Three-Bucket Approach is provided in the context of the model analysis in Section III, and information on the curve construction is summarized in Appendix B. A detailed description of the Three-Bucket Approach can be found in the ICS Technical Specifications.[24]

Criteria for Qualifying Capital Resources

The ICS establishes specific criteria to determine those capital resources (financial instruments such as common and preferred stock and debt, and other elements including retained earnings and accumulated other comprehensive income) that qualify as capital in the ICS for determination of the ICS ratio. These criteria are used to assess the nature, quality and suitability of these instruments and other elements as capital, focusing on their loss-absorbing capacity, subordination, availability to absorb losses, permanence, and the absence of both encumbrances and mandatory servicing costs.

The ICS identifies two tiers of capital and applies somewhat different criteria and limits to each. Tier 1 capital resources comprise financial instruments and other capital elements that absorb losses on a going-concern basis and in the event of an insolvency. Tier 2 capital resources comprise financial instruments and other capital elements that absorb losses only in the event of an insolvency or are otherwise considered weaker forms of capital. Qualifying Tier 1 capital resources are included without any limit. Qualifying Tier 2 capital resources are subject to certain imposed limits.[25] Qualifying Tier 1, and subject to applicable limitations, qualifying Tier 2 capital resources, are combined to comprise the numerator of the ICS ratio.

ICS Standard Method

A standard method for the calculation of the ICS risk charges is part of the overall reference ICS and aims to provide a single framework for a formulaic calculation of the capital requirement used in the determination of the ICS ratio. The standard method under the reference ICS is distinct from the use of group-specific internal models based on the unique attributes of each

[23] IAIS, *Risk-based Global Insurance Capital Standard Version 2.0 Public Consultation Document* (July 2018), 34.

[24] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020). The design of the data model developed by the IPAC is aligned with the 2020 ICS Technical Specifications. An IPAC review of subsequent ICS Technical Specifications noted only minor changes which were not deemed to have a material on impact the results of the model.

[25] A full description of qualifying capital resources and applicable deductions and limits can be found in the IAIS *2020 ICS Data Collection Technical Specifications* (June 2020).

IAIG's business model, products and risk profile, a potential "Other Method" that is also being considered during the monitoring period). The standard method is calibrated based on a target criterion of 99.5% value at risk over a one-year time horizon.[26] The standard method determines ICS risk charges for specific risks using a factor-based approach, a stress approach, or a model-based approach, depending on the nature of the underlying risk and available data and to provide comparability in calibration across groups. For example, credit risk charges in the ICS rely on factors which have been determined based on historical default and loss given default experience. The capital charge for interest rate risk is represented by the estimated loss generated by IAIS-developed stress scenarios.

A prescribed correlation matrix is used to aggregate all risk charges, recognizing diversification impacts between risks.

2.5 European Union (EU) Experience with Solvency II

In designing the ICS, IAIS members in the EU, which had already adopted Solvency II (SII), promoted its use as the recommended model for the ICS as a potential group capital standard. Absent other existing potential models in other jurisdictions, key features of SII inevitably found their way into the ICS. Therefore, in its design, the reference ICS is fundamentally similar to SII, being a risk-based group capital standard that uses a market-adjusted valuation framework. Specifically, the core design features of the MAV valuation approach under the reference ICS closely replicate those of SII:

- The ICS MAV balance sheet components directly compare to corresponding SII balance sheet components, e.g., the objective of MOCE under the MAV approach is comparable to that of the Risk Margin in SII.
- The liability discount rate calculated under the Three-Bucket Approach in MAV results in similar adjustments to the base discount rate curves as those provided under SII (e.g., Top bucket under MAV compares to the Matching Adjustment (MA) under SII; and the Middle bucket under MAV compares to the Volatility Adjustment (VA) under SII. Similarly, the General bucket under MAV compares to the default used in SII when the MA and VA do not apply).[27]

[26] Value at risk or VaR, measures the amount of potential loss over a given time period. VaR is a model-based approach and is generally developed from a combination of historical data and expert judgment. American Academy of Actuaries, Presentation to the National Association of Insurance Commissioners ComFrame Development and Analysis (G) Working Group, *99.5 Percent Value at Risk Measure over a One-Year Time Horizon* (August 15, 2015), https://www.actuary.org/sites/default/files/files/Solvency_NAIC_CDAWG_Presentation_99.5_VaR_081515.pdf.

[27] The MAV Three-Bucket Approach is discussed in later sections of this report and more fully described in Appendix B.

For these reasons, European regulators are broadly supportive of the ICS, viewing it as compatible with Solvency II. EU support was further reinforced in a February 2020 statement by Gabriel Bernardino, then Chairman of the European Insurance and Occupational Pensions Authority (EIOPA):

> *We will continue to work with our international peers from all continents in order to ensure that the final ICS standard is based on a market-adjusted valuation, that capital requirements are sufficiently robust and risk-sensitive, and that internal models are allowed to be used under sound and prudent criteria. Our vision is that in those circumstances European legislators should be comfortable to endorse the ICS and make any necessary adjustments to Solvency II to ensure that European IAIGs are required to use only one capital framework that meets international standards.*[28]

While there currently are calibration differences between the ICS and SII, given EIOPA's stated objective of having one capital framework, it is expected that EU members involved with the ICS will strive to amend the ICS to narrow those differences, including any differences that arise as a result of EIOPA's 2020 review (now reflected in the EU's September 2021 comprehensive review package) of SII rules. At the same time, other (non-EU) IAIS member jurisdictions also seek to avoid multiple capital frameworks and will be striving to narrow differences between the ICS and what is now in place, or may be implemented, as a group capital measure in their respective jurisdictions. While the precise contours of the ICS as it will be implemented are not yet known, given the influence that the EU's SII has had on the design of the ICS to date, it is useful to consider the experience of long-term guarantee business under SII as a potential indicator of how the ICS, and more specifically the reference ICS, may affect long-duration life and annuity business in various jurisdictions, particularly in the US.

SII was implemented in the EU in 2016 and has been subject to a series of interim reviews since implementation. More recently, the review of long-term guarantee measures in EIOPA's 2020 review of SII has generated a substantial amount of discussion on issues such as non-economic volatility and procyclicality, and the market impact on long-term guarantee products, issues which also are a primary focus of this report. The EU's experience with SII is relevant to and informs discussions of those issues, and thus is discussed below.

[28] Bernardino, Gabriel, EIOPA Chairman, "Winning the race towards a global Insurance Capital Standard'" Press Release (February 20, 2020), https://www.eiopa.europa.eu/content/winning-race-towards-global-insurance-capital-standard_en.

Non-economic Volatility and Procyclicality

Non-economic volatility/procyclicality has been a consistent and recurring issue raised in the context of discussions on SII. The Matching Adjustment (MA)[29] and Volatility Adjustment (VA)[30], which have been included in SII to address volatility concerns, have not been well received by many SII stakeholders. As a result, potential revisions to long-term guarantee measures, including both the MA and VA, were a key focus of EIOPA's 2020 review.[31]

Given the clear parallels in the design of the reference ICS and SII noted above, the non-economic volatility/procyclicality seen in the SII capital regime would also be expected in the reference ICS.

Market Impact of SII

For large portfolios, asset liability management (ALM) strategies focus on investing in a diversified range of assets rather than explicit cash-flow matching. Investing in a diversified asset mix is particularly important for long-term business given that the traditional fixed-income asset market is neither deep nor liquid beyond 30 years. This diversified asset mix thus includes investments in illiquid, real-return assets such as utilities, infrastructure, and real estate, which can provide stable returns over the long-term. However, even though investing in a diversified asset mix is a fundamentally prudent ALM strategy, the return on assets recognized in the SII liability discount rate is not sufficient to adequately compensate insurers on a risk-weighted return basis. [32]

For example, UK insurers have traditionally sold large volumes of long-term guarantee products, including annuities, which have been backed by investments in a diversified range of assets. However, since non-traditional assets in a diversified portfolio are not appropriately reflected in the MA and the VA, the SII experience in the UK has therefore been to limit investment in

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[29] Matching Adjustment – upward adjustment to risk free rates used for discounting liability cash flows, where the adjustment is based on the spreads earned on actual assets held to back liabilities.

[30] Volatility Adjustment – fixed spread adjustment applied as a parallel shift to risk free rates up to the last liquid point used for discounting liability cash flows. The fixed spread adjustment is calculated annually by EIOPA and is based on spread and risk-correction components in respect of an assumed representative portfolio of assets backing liabilities consisting of government and corporate bonds.

[31] EIOPA, *Opinion on the 2020 Review of Solvency II* (December 17, 2020), https://www.eiopa.europa.eu/sites/default/files/solvency_ii/eiopa-bos-20-749-opinion-2020-review-solvency-ii.pdf.

[32] The VA is based on an assumed portfolio consisting solely of government and corporate bonds, i.e., it does not include real-return assets. The MA cash flow matching requirements require a predictable cash flow pattern that would usually preclude illiquid, real-return assets. While for some asset classes, cash flows have been restructured to meet the MA eligibility requirements, e.g., securitization of equity backed mortgages, these transactions generally have limited risk management or economic benefit.

illiquid, real-return assets.[33] In turn, this has contributed, together with the low interest rate environment, to the decline in the attractiveness to insurers of continuing to offer long-term savings and investment products that would otherwise have been supported by these assets, and to a corresponding decline of their availability to consumers in the marketplace. Similar trends have been noted in other European countries with a shift away from long-term guarantee products to other products, such as unit-linked policies, where market risks are passed on to the consumer.

Similar to the experience in Europe with SII, if IAIGs that write such long-term guarantee business in the US become subject to the reference ICS as a PCR, they may also experience such impacts on long-term business. This may be a policy aim for the EU, but it would be less appropriate for the US, where the balance between public and private retirement funding is decidedly different, and there may be more need for long-term guarantee products. EU countries spend a significantly higher proportion of their GDP on public pensions than the US. The OECD reports that the US spends 7% of GDP while many EU countries spend significantly higher percentages; for example, Germany spends 10%, France 14% and Italy, with the highest percentage, is at almost 16%.[34]

2.6 Experience with the ICS

Development of ComFrame has been a strategic initiative of the IAIS since 2010, with the data collection and field testing of the ICS (as the quantitative capital component within ComFrame) ongoing since 2014. The ICS development process involved proposing and testing numerous aspects of the design, construction and calibration of the ICS. Along the way, many of those aspects were not uniformly supported by IAIS members, by volunteer groups in field testing, or by other stakeholders.

In the earlier years of ICS field testing, differing views among IAIS members were generally accommodated by expanding the scope of field testing to incorporate additional options for data collection and analysis, leaving any decision as to which option to ultimately select as a matter to be resolved later. As time went by, the need to narrow the ICS specifications and field testing to fewer options and to meet the project timeline, led to increased negotiations.

[33] House of Commons Treasury Committee, *The Solvency II Directive and its impact on the UK Insurance Industry, Third Report of Session 2017-19* (October 27, 2017), https://publications.parliament.uk/pa/cm201719/cmselect/cmtreasy/324/324.pdf.

[34] https://data.oecd.org/socialexp/pension-spending.htm#indicator-chart accessed on May 24, 2022.

EU members entered the ICS development process with a delicately negotiated group capital rule (part of SII) already approved by the European Parliament.[35, 36] As a result, those members developed a strong desire to use SII as the basis for implementation of the ICS within the EU.[37] Thus, it would be expected that they would seek to align the ICS design as closely as possible to SII. As noted in the previous section, the reference ICS now closely resembles SII in many respects. Since SII was developed and calibrated for the EU and to address its specific products, laws and markets, to the extent the reference ICS mirrors SII, the ICS would also reflect these EU-specific conditions – but not necessarily those of other jurisdictions, such as the US.

SII negotiations among EU member states also resulted in specific design concessions and accommodations for local EU business models and products, such as the MA and VA. Many of these elements made their way into the reference ICS in a similar shape or form; while they may be appropriate for the EU, they do not necessarily reflect the nuances of other jurisdictions' supervisory approaches, laws or business practices. Some IAIS members, primarily from the US and Canada, continue to argue that certain of these elements distort the solvency positions of their supervised companies and the degree of riskiness of certain products offered locally.[38]

These concerns regarding the reference ICS led the IPAC to analyze the impact of the ICS on US companies, products and markets, to advise the Board as to its results and findings, and to publish this report. The IPAC may undertake additional studies and publish subsequent reports to inform the Board, as well as the ongoing debate and negotiations at the IAIS on the ICS.

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[35] By the start of ICS design in 2014, "in the EU, the European Parliament, the Council of the European Union and the European Commission (EC), technically supported by the European Insurance and Occupational Pensions Authority (EIOPA), [were] modernizing the EU's insurance regulatory and supervisory regime through the Solvency II Directive (Directive 2009/138/EC), in place since 2009. This so-called Framework Directive was the culmination of work begun in the 1990s to update existing solvency standards in the EU. EIOPA, *Request for the EU-US Dialogue Project for Public Comment on the Technical Committee Reports - Comparing Certain Aspects of the Insurance Supervisory and Regulatory Regimes in the European Union and the United States* (September 2012), 1, https://register.eiopa.europa.eu/Publications/Reports/EU_US_Dialogue_Project_Report_for_Consultation.pdf.

[36] While Solvency II was not finally implemented in the EU until 2016, the Directive was in place since 2009, albeit with further work ongoing with respect to technical rules and guidelines.

[37] EIOPA, *Annual Report 2018* (June 2019), 51, https://www.eiopa.europa.eu/sites/default/files/publications/reports/eiopa_2018_annual_report.pdf.

[38] Federal Reserve Board of Governors Vice Chair for Supervision, Randal Quarles, in a speech to the NAIC International Insurance Forum in May 2021 noted, "Team USA has argued that as currently constructed, the ICS would not be appropriate as a capital rule for U.S. internationally active insurance groups." (Randal K. Quarles, Speech at the National Association of Insurance Commissioners International Insurance Forum (May 25, 2021), https://www.federalreserve.gov/newsevents/speech/files/quarles20210526a.pdf). The Office of the Superintendent of Financial Institutions in Canada issued public a statement in 2019 that the ICS is not fit for purpose in the Canadian market (Office of the Superintendent of Financial Institutions Canada, News Release (November 14, 2019), https://www.osfi-bsif.gc.ca/Eng/Docs/ics20191114-nr.pdf).

III. IPAC MODEL AND ANALYSIS

3.1 Background

The ICS is being designed as a group capital measure based on a market-adjusted valuation methodology and is intended for use as a PCR applicable to IAIGs. When appropriately constructed in a manner that reflects underlying economic risks associated with changes in the risk-free rate, and without undue recognition of temporary capital market movements, a market-based measure could provide some meaningful regulatory insights to supplement other supervisory tools.

However, to provide meaningful regulatory insights, a capital regime should not introduce excessive conservatism. Rather, a well-constructed capital regime should be based on an appropriate level of prudence and reflect underlying economics. Market-based regimes – such as the ICS – should not overreact to short-term volatility based on transient market conditions.

A regulatory capital regime cannot disconnect the features of insurance products that a society demands – such as long-term guarantees in products sold in the US – from the nature of fixed-income investments and spreads available in local capital markets that support such products and features. This issue has yet to be addressed in the design of the ICS; namely, that the ICS design includes aspects of discounting insurance liabilities and asset market valuation that are misaligned with each other and that do not reflect the markets, existing products and product features in all jurisdictions.

Further, these aspects of misalignment and the need to recognize local markets and societal needs are particularly important for the ICS given its mandate as a PCR. Misalignment between assumptions underlying the ICS and how insurers structure and support their liabilities could result in inappropriate signaling to regulators and markets, and potentially trigger inappropriate or even harmful regulatory interventions. The converse is also true, as this misalignment could send inappropriate signals to supervisors that no regulatory intervention actions are necessary when, in fact, they would be appropriate.

Investment assumptions underlying supervisory capital measures that are misaligned with the way insurers participate in local capital markets can unnecessarily increase the cost of insurance, adversely affecting insurers' ability to fulfil their roles as providers of protection and retirement products to customers and as long-term investors.

Further, although the ICS recognizes jurisdictional differences in risk-free rates over the observable period, it fails to recognize jurisdictional differences in the depth/liquidity of capital markets and availability of fixed-income investments and credit spreads. US insurers have utilized corporate spreads and capital markets to develop, price and support long duration guarantees for decades.

The stylized insurer analysis, described in the following section, was therefore designed to provide insights into these issues.

3.2 IPAC Stylized Insurer Model

Model Overview

The IPAC stylized insurer model analysis focused on assessing the extent to which key components of the ICS calculation introduce undue conservatism and non-economic volatility in respect of long-term business, as reflected in both ICS capital resources and capital requirements. Specifically, the analysis focused on the impact of applying the ICS MAV (market-adjusted valuation) discounting method to long-term business. The analysis looked at the impact of the MAV approach and the measurement of interest rate risk (IRR) and non-default spread risk (NDSR) under different base and economic scenarios.

Other elements of the ICS, including insurance risk, the treatment of income tax impacts, the role of senior debt and other capital instruments, and MOCE, are less directly affected by the discounting method and were excluded from the analysis.

By focusing on MAV, IRR and NDSR, the data and resource requirements for the IPAC analysis were considerably reduced relative to that which would be needed for the full ICS calculation.[39] A key benefit of focusing the IPAC model only on several key areas of the ICS was that it enabled multiple "what if"-type analyses of the ICS calculation that would not otherwise be practical using the full ICS calculation.

As a result, the IPAC analysis considered both the impact of the ICS on long-term business under different economic scenarios and a comparison to a Single-A discounting approach. A Single-A corporate bond curve was selected as a benchmark to compare to results of the ICS. The IPAC chose a Single-A curve as it aligns with the recently updated US GAAP accounting standard covering the valuation of long-duration insurance contracts, FASB Accounting Standards Update 2018-12, and serves as a broad proxy for the average credit quality of assets held by US insurers to back long-duration insurance liabilities.[40] The results of using the IPAC's proposed revisions to the Three-Bucket Approach were also analyzed. These proposed revisions align with recommendations (discussed in Sections 3.4 and 3.5) that would more appropriately reflect product design, ALM practices and investment strategies in the US.

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[39] A full ICS calculation typically requires multiple restatements of all balance sheet liabilities.

[40] FASB Accounting Standards Update 2018-12, Financial Services – Insurance (Topic 944) requires that insurance contracts under the scope of the standard (e.g., non-participating traditional, fixed term life insurance contracts) apply an upper medium grade (low credit risk) fixed-income instrument yield to estimate the liability for future policy benefits. This has been interpreted as a Single-A interest yield or corporate bond rate. PricewaterhouseCoopers, *Insurance Contracts Guide* (November 2021), Section 5.2.3, 5-6, https://viewpoint.pwc.com/dt/us/en/pwc/accounting_guides/insurance-contracts/assets/pwcinsuranceguide1121.pdf

Finally, it should be acknowledged that a stylized analysis is based on a simplified version of the ICS calculation. A key concern with any stylized analysis is how well the stylized model represents the most influential features of the actual calculation.

To address this concern, the IPAC stylized insurer model included the following:

- Asset and liability data were provided by data providers based on their actual long-term business portfolios. These portfolios include the following products which play a prominent role in US markets: term life insurance, non-participating whole life insurance, payout annuities, long-term disability income products, structured settlement annuities, universal life and participating whole life insurance.[41]
- ICS-based calculations were reproduced using the IAIS tools and assumptions provided by the IAIS to ICS field-testing volunteers. Notably these include:
    - The MAV Middle and General bucket discount rate curves, which were reproduced using the IAIS ICS yield curve generator for the IAIS 2020 ICS data collection exercise of the monitoring period.[42]
    - Criteria used to allocate business into the Top, Middle or General buckets under the Three-Bucket Approach in the IPAC model were those set out in the IAIS 2020 ICS Technical Specifications.[43]
    - IRR and NDSR calculations in the IPAC model were those set out in the IAIS 2020 ICS Technical Specifications.

In summary, the data, calculations, and assumptions used in the IPAC stylized insurer model ensured that results from the model provide a credible and realistic representation of the ICS as it relates to long-term business with respect to MAV, IRR and NDSR in the IPAC model economic scenarios.[44]

Model Design

Output from the IPAC model comprised the market value of assets (investments), the value of insurance liabilities (discounted based on MAV and the applied scenarios), and the ICS IRR and NDSR components (aggregated using the ICS risk correlation matrix). The ICS ratio was not calculated because the full ICS calculations were not reproduced in the IPAC model.

As described earlier, a stylized model is intended to provide a representation of how the more complex model (in this case, the ICS) behaves. Since the change in the ICS ratio is a function of

[41] Variable annuities and long-term care insurance were excluded due to their valuation model complexities.

[42] IAIS, *Public 2020 ICS Data Collection Yield Curves* (June 2020).

[43] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

[44] An IPAC ICS Model Specifications document will be made available shortly after the publication of this report and will be available to be downloaded from following web address: https://www.milliman.com/IPAC.

the change in qualifying capital resources versus the change in required capital, the output from the IPAC stylized insurer model provides relevant information on how the ICS will perform under these scenarios and modifications.

Inputs for the model, submitted by the data providers via a data collection template, included investment asset market values, insurance liability expected future cash flows, and other supporting data required by the MAV approach. The data submitted by the individual data providers was then subject to a very modest scaling adjustment to preserve confidentiality and then aggregated for use in the model.

Data was provided as of the "baseline" date of December 31, 2019, as well as under the ICS-specified shocks that were used to determine the IRR and NDSR charges. To further facilitate this analysis, data was also provided based on IPAC-defined economic scenarios detailed below. Liability cash flows were also submitted to support a calculation using a Single-A corporate bond discount curve, which was chosen as a broad proxy for the average credit quality of assets held by US life and annuity insurers backing long-term business and in alignment with FASB Accounting Standards Update 2018-12. Capital resources and capital requirements calculated using a Single-A discount curve are considered to provide a useful benchmark with which to measure the capital resources and capital requirements under the ICS.

The asset and liability data were segregated between products (and the assets backing them) for which cash flows are affected by market interest rate movements (e.g., participating products) and those for which cash flows are not sensitive to interest rates.

For each economic scenario (including the Single-A benchmark), cash flows were restated for interest rate sensitive products under each scenario. For non-interest sensitive products, cash flows were fixed using the 12.31.2019 baseline and were not restated under each scenario. Participating products were also adjusted to reflect realistic discretionary management actions under each scenario and under each ICS-defined risk shock. Policyholder dividend rates were dynamically adjusted for changes in the rates/spreads in each scenario. These adjustments followed the instructions in Section *5.2.1.4 Future discretionary benefits* of the ICS Data Collection Technical Specifications. In particular, the projection of future discretionary benefits was consistent with the economic scenarios on which the valuation was based and the insurer's contractual obligations to policyholders. The example provided in Section 5.2.1.4, on how the projected liability crediting rate for a participating product could change, is a simplified example of how the projection of future discretionary benefits was developed for the participating products.[45]

The model operates by applying the discount curves from the IAIS ICS yield-curve generator to the liability cash flows to obtain a liability balance under each IPAC-defined economic scenario

[45] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

and for each ICS risk shock. Asset market values under corresponding scenarios and shocks were precalculated based on the actual market conditions and related discounting curves that were defined under each scenario and submitted by data providers in their data collection template.

Economic Scenarios and Design Modification Analyses

The following economic scenarios and modifications to the ICS calculation were considered as part of the IPAC stylized insurer model analysis. For each of the economic scenarios described below, the IAIS ICS yield-curve generator was used to ensure that all discount curves used in the MAV, IRR and NDSR calculations matched the reference ICS methodology.[46] Section 3.3 below discusses the IPAC model results for each of these scenarios. Liability data as of December 31, 2019, was used for all economic scenarios.

A. 12.31.19 baseline: Market conditions as of December 31, 2019, under the ICS MAV discounting approach and under the Single-A discounting benchmark.
B. 3.31.20 scenario: Market conditions as of March 31, 2020. This period was selected as a recent example of spread widening and rates falling.
C. 6.30.20 scenario: Market conditions as of June 30, 2020. This period was selected as a recent example of a drop in credit spreads.
D. Interest Rate "spike up" scenario: Artificially derived shock of the risk-free rate curve using the high point over the last 5 years (Q2 2015 – Q2 2020) to calculate the increase in the risk-free rate curve above the 12.31.19 baseline risk-free rate curve.

Section 3.4 includes an analysis of detailed design elements of the ICS MAV discounting approach to provide insight into the key drivers of the ICS calculation that are relevant to long-term business and to highlight areas where the ICS could be improved. The following ICS MAV discounting elements were adjusted using the IPAC model to evaluate their potential impact using the 12.31.2019 baseline data and include only liabilities with fixed cash flows. Interest-rate-sensitive cash flows were excluded from this portion of the analysis to minimize the burden on data providers.[47]

A1. 12.31.2019 baseline - ICS fixed liability cash flows only
A2. Increased the spread over the long-term forward rate (LTFR) component of the risk-free rate curve from 20 basis points (bps) to 100 bps for Middle and General buckets[48]
A3. Reduced the grading period from the last observable term to the LTFR from 60 years to 40 years for the Middle and General buckets (with a 100 bps spread over LTFR)[49]

[46] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

[47] A description of the ICS discounting approach can be found in Appendix B and in the ICS Technical Specifications.

[48] The Top bucket spread over the LTFR was set equal to the Top bucket spread.

[49] The Top bucket spread is assumed for the entire yield curve so there was no grading or adjustment.

A4. Modified the Top and Middle bucket spread calculation to reflect inclusion of spread from certain ineligible assets (i.e., equity, real estate and alternative assets)
A5. Modified the spread in the Middle and General buckets by applying a 100% application ratio[50]
A6. Moved all General bucket liabilities into the Middle bucket[51]

3.3 Model Analysis

A summary of the model results is provided in Appendix C and is labeled to correspond to the descriptions provided in the section above (e.g., A1, A2, etc.). There are two portfolios. The first portfolio is identified as "all liability cash flows" and contains all the products for which data was collected. The second, identified as "fixed-liability cash-flows only," excludes participating whole life where liability cash flows are sensitive to interest rates.

The economic scenarios were run for both portfolios under the ICS MAV discounting method. To limit the number of cash-flow restatements required from data providers, only the 12.31.2019 baseline was run for both portfolios under the Single-A discounting benchmark. For the same reason, the specified ICS design element adjustments were only run using the "fixed-liability cash-flows only" portfolio.

The following sections consider the impact of these economic scenarios on ICS capital resources. The impact of these economic scenarios on ICS interest rate risk and ICS non-default spread risk are considered separately in later sections.

Capital Resources on December 31, 2019 Based on ICS MAV and Single-A (12.31.19 baseline balance sheet)

Under the 12.31.2019 baseline, the ICS method produced capital resources (assets less liabilities) which were lower in the aggregate than capital resources using the Single-A discounting benchmark.[52] As discussed below, the aggregate result is a function of offsetting levels of conservatism between liability buckets. ICS MAV and Single-A discount rates at year-end 2019 are shown below in Chart 1.

[50] See Appendix B for a description of the application ratio.

[51] As a simplifying assumption, the Middle bucket Total Observed Matching (TOM) ratio remained constant, so no Yield Curve Generator adjustments were required.

[52] Assuming a spread over long-term risk free rate of 20 bps.

Chart 1

The General and Middle bucket liability discount rates were noticeably lower than the Single-A liability discount rate for durations over 9 years. Since the impact of discounting is more significant for longer-duration liabilities, the conservatism of the General and Middle bucket discount rates at longer durations relative to Single-A had a significant impact on the ICS liabilities calculated for these buckets (see Table 1 below).

Table 1

12.31.2019 Baseline: December 31, 2019 market conditions (Fixed liability cash flows only)

	ICS MAV				Single-A			
$ in Millions	Top	Middle	General	Total	Top	Middle	General	Total
Assets	64,933	50,480	110,308	225,721	64,933	50,480	110,308	225,721
Liabilities	55,325	35,634	103,552	194,511	56,642	34,928	100,278	191,849
Capital Resources	9,607	14,846	6,756	31,209	8,290	15,552	10,030	33,872
Interest Rate Risk				10,023				8,187
NDSR				695				1,931
Diversification				(499)				(1,249)
Excess Capital				20,990				25,003

As discussed in Section 3.4, the use of application ratios in addition to the conservative spread over the LTFR assumption of 20 bps adds significant conservatism to the General and Middle bucket liability discount rates. For example, removing the application ratios increased the IPAC model ICS capital resources under the 12.31.2019 baseline by 8%. Similarly, using a spread over the LTFR of 100 bps (instead of 20 bps) increased capital resources by an additional 3%. This 100 bps spread was utilized to evaluate the impact of changes to the spread over the LTFR. While further analysis would be needed to determine a spread over the LTFR that would be appropriate for the US, the 100 bps is a reasonable proxy for a long-term spread assumption (and notably this assumption has also been used in prior versions of ICS field testing).

Observation 1: General and Middle bucket liability discount rates are meaningfully more conservative (lower) than the Single-A discount rates over most tenors resulting in ICS capital resources being significantly lower than those calculated using a Single-A methodology. Notably for long-duration liabilities, the impact of the application ratios and use of the conservative 20 bps spread over the LTFR is significantly punitive.

In contrast, the Top bucket discount curve was noticeably higher than the Single-A curve at nearly all durations. This reflects the fact that the yields on own assets used for the Top bucket are higher than Single-A; i.e., that Single-A is in fact a relatively conservative benchmark compared to the actual assets held by the data providers.

As shown in Table 1 above, since both the General and Middle bucket discount rates were lower than Single-A for longer durations, the resulting General and Middle bucket discounted liabilities were higher than their Single-A equivalents. Similarly, since the Top bucket liability discount rate was higher than the Single-A curve, Top bucket liabilities were lower than their Single-A equivalent.

In aggregate, however, the higher General and Middle bucket liabilities more than offset the lower Top bucket liabilities, resulting in higher ICS versus Single-A liabilities and consequently, lower ICS capital resources relative to capital resources under Single-A.

Observation 2: ICS results are dependent on the mix of business allocated to each bucket, with conservatism in the General and Middle buckets being offset by less conservatism in the Top Bucket. Capital resources in the General and Middle buckets were 33% and 5% lower, respectively, than using an equivalent Single-A discount curve. Capital resources in the Top bucket were 16% higher than the Single-A equivalent.

Observation 3: The results from applying the ICS liability bucket allocation criteria have an emphasis on explicit asset/liability cash-flow matching that is not aligned with US long-term business ALM practices. Consequently, the majority of US life insurance products is allocated to the General bucket which, as noted in Observation 2 above, results in an excessively conservative liability discount rate.

Observation 4: The Top bucket is noticeably higher than the Single-A curve at nearly all durations (except 25-34 years), but too few US life insurance products fall into that bucket.

Assessment 1: The misalignment in allocation of liabilities to the three buckets, compared to the actual ALM practices of US insurers, and the inherent offsetting level of conservatism between the liability buckets increases the likelihood of the ICS producing inappropriate signals to regulators and markets. This in turn brings into question the ability of the ICS to operate effectively as a PCR in the US. This issue is further discussed in Section IV.

The impact of the liability offsets between the three buckets when compared to a Single-A benchmark is particularly noticeable when examining the change in ICS capital resources from quarter-to-quarter, as discussed in the sections below.

As noted earlier, participating business was excluded from the ICS-versus-Single-A analysis to limit the number of liability cash-flow restatements from data providers. It should also be noted, however, that the inclusion of participating business would not be likely to materially affect the observations from this analysis because the impact of different discount rates on the participating business is generally assumed to be largely offset by management actions, e.g., changes in policy dividends. Consequently, the inclusion of participating business would likely have minimal impact on capital resources calculated using the ICS MAV discounting methodology versus those calculated using the Single-A benchmark.

The remainder of the model analyses discussed below includes all products with fixed or interest sensitive liability cash flows, including participating life insurance.

ICS Capital Resources Based on March 31, 2020 ICS MAV (3.31.2020 scenario)

Capital resources of the stylized insurer based on the ICS MAV in the 3.31.2020 scenario were marginally lower than those calculated using the ICS MAV in the 12.31.2019 baseline ($40.5 billion vs. $40.8 billion). Given the extreme nature of Covid-19's impact on the markets in Q1 2020, this is a somewhat surprising result. However, the reason for this becomes apparent in analyzing the changes in assets versus liabilities for each of the buckets (see Table 2 below).

Table 2

(A) 12.31.2019 Baseline: December 31, 2019 market conditions (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,933	50,480	222,030	337,443
Liabilities	55,325	35,634	205,723	296,682
Capital Resources	9,607	14,846	16,307	40,760

(B) 3.31.2020 Scenario: March 31, 2020 market conditions (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,885	49,470	218,672	333,027
Liabilities	52,552	35,638	204,291	292,481
Capital Resources	12,333	13,831	14,381	40,545

Change: 3.31.2020 Scenario - 12.31.2019 Baseline (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	(48)	(1,010)	(3,358)	(4,416)
Liabilities	(2,773)	5	(1,432)	(4,201)
Capital Resources	2,726	(1,015)	(1,926)	(215)

Similar to the observations noted in the section above regarding the 12.31.2019 baseline balance sheet, the small aggregate change in MAV capital resources based on the 3.31.2020 scenario as compared to the 12.31.2019 baseline is the net effect of offsetting impacts between the ICS liability buckets.

Observation 5: Despite a highly stressed market environment in Q1 2020, ICS capital resources were relatively unchanged over this period. This was a result of offsetting impacts between the ICS liability buckets, where a decrease in capital resources in the Middle and General buckets was almost entirely offset by an increase in capital resources in the Top bucket.

Starting with the General and Middle buckets, the decline in risk free rates in Q1 2020 was generally more than offset by the significant widening in credit spreads for assets in these buckets, notably at shorter durations. The market value of assets in the General and Middle buckets consequently decreased. The decrease in assets in these buckets, however, was not matched by the change in liabilities during the quarter since the impact of the decline in risk-free

rates was largely offset by the increase in the assumed ICS representative spreads net of the application ratio haircuts. Consequently, there was little change in the discount rate curves and the liabilities for these buckets remained largely unchanged during the quarter.

The propensity of the application ratio haircuts to introduce non-economic volatility between the measurement of asset and liabilities becomes even more pronounced when applied in a market environment where spreads are changing significantly, i.e., where large movements in spreads result in large changes in the haircuts affecting the valuation of liabilities (but not the assets).

In contrast to the decrease in capital resources observed for the General and Middle buckets, capital resources for the Top bucket increased in the 3.31.2020 scenario. This is a particularly surprising result given that, by design, Top bucket asset and liabilities are intended to be closely matched; as a result, one would expect to see the change in liabilities moving reasonably in sync with the change in assets. Instead, Top bucket liabilities decreased significantly more than the decrease in Top bucket assets, resulting in an increase in Top bucket capital resources.

Para. 142 of the 2020 ICS Technical Specifications states the following:

> *The adjustment for the Top Bucket is based on the average spread above the risk-free yield curve of the eligible assets, as listed in Table 4, identified by the IAIG to back the portfolio of liabilities meeting the Top Bucket criteria.* [53]

For the purposes of the IPAC model, the average spread over the risk-free rate was calculated based on a market value-weighted average of the spread on own assets included in the Top bucket, consistent with the approach used to calculate the spread over the risk-free rate prescribed for the Middle and General bucket liability discount rate curves. This average spread is subsequently added to the risk-free rate curve to determine the Top bucket liability discount curve.

It should be noted, however, that the ICS average spread over risk-free calculation is a simplification that implicitly assumes that the different spreads over risk-free by tenor can be represented by a single average spread across all tenors. While this might be a reasonable assumption for “normal” market environments, this was not the case for the stressed market environment that was observed in Q1 2020.

In Q1 2020, spreads at shorter tenors widened more significantly than those at longer durations.[54] Applying the ICS average spread specification results in the MAV liability discount rate curves based on the Three-Bucket Approach failing to adequately reflect the non-parallel

[53] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

[54] E.g., Single-A +182 bps for 10yr vs. +81 bps for 30r; BBB +244 bps for 10yr vs. +133 bps for 30yr.

increase in spreads. This creates a further disconnect between the actual yield earned on assets backing liabilities and the assumed yield in the liability discount rate.

This disconnect applies to all three buckets but is particularly noticeable in the Top bucket, where the significant increase in the Top bucket liability discount rate due to the higher average spread adjustment resulted in a decrease in the Top bucket liabilities that was not offset by the decrease in Top bucket assets (as should have been expected for a cash flow matched segment).

Observation 6: The change in Top bucket liabilities was not consistent with the change in the market value of Top bucket assets (as would have been expected, given that this bucket is expected to be highly cash-flow matched). Top bucket liabilities decreased more than the market value of Top bucket assets, resulting in a net increase in Top bucket capital resources.

This result is primarily due to the limitations of the ICS average-spread calculation specified in Para. 155 of the 2020 ICS Technical Specifications (and applied to the Top bucket as per Para. 142). Ultimately, the average-spread calculation is a simplification that is not sufficiently robust in a market environment where there is a significant non-parallel movement in spreads.

Assessment 2: The issues noted above with the General and Middle bucket "representative" spreads, application ratios, and the average spread over risk-free calculation are all sources of non-economic volatility. As demonstrated in Table 2 above, the quarter-over-quarter change in capital resources by bucket appears to have largely cancelled out on a combined basis for all buckets under the 3.31.2020 scenario. The resulting impact on ICS capital resources across the various buckets brings into question the ability of ICS to provide a meaningful solvency signal for US long-term business during a stressed market environment.

ICS Capital Resources Based on June 30, 2020 ICS MAV (6.30.2020 scenario)

Capital resources of the stylized insurer based on ICS MAV under the 6.30.2020 scenario were significantly lower than those calculated using the ICS MAV under the 3.31.2020 scenario ($34.8 billion vs. $40.5 billion). See Table 3 below.

Table 3

(B) 3.31.2020 Scenario: March 31, 2020 market conditions (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,885	49,470	218,672	333,027
Liabilities	52,552	35,638	204,291	292,481
Capital Resources	12,333	13,831	14,381	40,545

(C) 6.30.2020 Scenario: June 30, 2020 market conditions (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	69,208	52,655	234,760	356,623
Liabilities	59,190	39,335	223,309	321,834
Capital Resources	10,018	13,321	11,451	34,789

Change: 6.30.2020 Scenario - 3.31.2020 Scenario (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	4,323	3,186	16,088	23,596
Liabilities	6,638	3,697	19,018	29,352
Capital Resources	(2,315)	(511)	(2,930)	(5,756)

During Q1 2020, the impact of the decrease in risk-free rates was largely negated by the impact of the widening of credit spreads. During Q2 2020, however, risk-free rates were largely unchanged, but credits spreads narrowed.

During Q2 2020, therefore, yields reduced resulting in an increase in asset and liability values. However, similar to the 3.31.2020 scenario ICS results, the change in assets versus liabilities by bucket was impacted by the Three-Bucket discount rate methodology issues noted earlier, i.e., the issues associated with the non-parallel change in spreads and the use of application ratios.

As would be expected, under the 6.30.2020 scenario, liabilities increased more than assets in the General and Middle bucket as yields declined given the longer duration of liabilities compared to assets.

Similar to the results under the 3.31.2020 scenario, Top bucket assets and liabilities did not move in sync as one would expect, given that the Top bucket asset and liability cash-flows are

highly matched. Specifically, the non-parallel decrease in spreads observed in Q2 2020 resulted in a larger increase in Top bucket liabilities relative to the increase in Top bucket assets. Again here, this largely non-economic result is a function of the bucket average-spread approach.

Assessment 3: The impact of "representative" spreads, application ratios and the average spread over risk-free calculation, applied under a non-parallel, decreasing-spread scenario, continued to provide a source of non-economic volatility. In contrast to the results of the 3.31.2020 scenario, the results for the 6.30.2020 scenario were much more severe relative to the significant improvement in market conditions in Q2 2020. This further reinforces the concerns around the ICS being able to provide a meaningful solvency signal with respect to US long-term business, during periods when there are large movements in market inputs.

ICS Capital Resources Results Under an Interest Rate (IR) "Spike-up" Scenario

Capital resources of the stylized insurer based on ICS MAV calculated under the IR spike-up scenario were significantly higher than those calculated using the ICS MAV under the 12.31.2019 baseline ($46.7 billion vs. $40.8 billion). See Table 4 below.

Table 4

(A) 12.31.2019 Baseline: December 31, 2019 market conditions (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,933	50,480	222,030	337,443
Liabilities	55,325	35,634	205,723	296,682
Capital Resources	9,607	14,846	16,307	40,760

(D) IR Spike Up Scenario: Interest rate spike up market conditions (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	54,377	43,619	185,914	283,909
Liabilities	45,026	26,673	165,517	237,216
Capital Resources	9,351	16,946	20,396	46,693

Change: IR Spike Up Scenario - Baseline Scenario (all liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	(10,556)	(6,861)	(36,116)	(53,534)
Liabilities	(10,300)	(8,961)	(40,206)	(59,466)
Capital Resources	(256)	2,099	4,090	5,933

As would be expected, liabilities decreased more than assets in the General and Middle buckets given the longer duration of liabilities relative to assets. Since this scenario was a shock to risk-free rates only, the issues discussed with respect to the changes in spreads in the 3.31 and 6.30 2020 scenarios did not apply. For example, movements in Top bucket assets and liabilities stayed in sync and the overall change in capital resources for this scenario is more intuitive.

Interest Rate Risk (IRR) Model Results

Under the 12.31.2019 baseline, the IRR charge under ICS MAV was $3.0 billion (25%) higher than under the Single-A discounting benchmark. The ICS IRR charge subsequently decreased by $2.4 billion (16%) between the 12.31.2019 baseline and 3.31.2020 scenario, and then increased by $7.4 billion (60%) between 3.31 and 6.30 2020 scenarios. See Table 5 below.

Table 5

All liability cash flows

	12.31.2019 Baseline			
$ in Millions	IRR	NDSR	Diversification	Total
ICS MAV	14,762	582	(426)	14,918
Single-A	11,796	1,980	(1,336)	12,440
Difference	2,966	(1,398)	910	2,479

	ICS MAV			
$ in Millions	IRR	NDSR	Diversification	Total
3.31.2020 Scenario	12,358	3,404	(2,148)	13,614
6.30.2020 Scenario	19,728	5,222	(3,317)	21,633

	Change in ICS			
$ in Millions	IRR	NDSR	Diversification	Total
3.31.2020 - 12.31.2019	(2,405)	2,822	(910)	(493)
6.30.2020 - 3.31.2020	7,371	1,818	(1,169)	8,019

The higher ICS IRR charge relative to Single-A in the 12.31.2019 baseline was a result of the conservatism of the ICS liability discount rate curves (as discussed in the prior sections). While the ICS IRR charge is determined based on the highest impact from various interest rates (IR) shocks e.g., IR down, IR up, IR twist etc., in practice, for long-term business the ICS IRR charge is most affected by the IR down-shock.

Applying the IR down-shock to a starting curve that is already overly conservative results in artificially low rates (which under current market conditions are often negative) and, in the case of business with minimum interest rate guarantees, results in these guarantees being triggered which drives up the ICS IRR charge.

Therefore, not only does the artificially low MAV discount rate introduce excessive conservatism in the determination of capital resources, it also introduces excessive conservatism in the subsequent determination of the ICS IRR charge.

Finally, the excessive conservatism in the ICS IRR charge is further exacerbated by applying the prescribed shock to the LTFR which, by definition, should more reasonably be assumed to remain unchanged given the long-term nature of this assumption.

Observation 7: The excessive conservatism in the General and Middle bucket liability discount rates, noted in earlier sections, introduces additional conservatism in the measurement of the ICS IRR charge. Specifically, the IRR charge is measured assuming an

artificially low starting interest-rate environment that consequently overstates the impact of minimum interest-rate guarantees and negative interest rates.

As noted in the earlier section, *ICS capital resources based on March 31, 2020 ICS MAV,* the impact of the decline in risk free rates in Q1 2020 was generally more than offset by the significant widening in credit spreads, resulting in a higher 3.31.20 MAV liability discount rate curve as compared to 12.31.2019. The IRR down-shock at 3.31.2020 was similar to that at 12.31.2019 which, when applied to the higher 3.31.2020 MAV discount rate, resulted in a lower ICS IRR charge under the 3.31.2020 scenario relative to that calculated at 12.31.2019.

Between March 31, 2020 and June 30, 2020, risk-free rates remained at similarly low levels, but spreads contracted significantly from the high levels at March 31, 2020. As a result, the 6.30.2020 scenario MAV liability discount rate was significantly lower than that calculated under the 3.31.2020 scenario. The IRR down-shock under the 6.30.2020 scenario was largely unchanged from the 3.31.2020 scenario. When applied to the lower MAV discount rate under the 6.30.2020 scenario, the IRR down-shock resulted in a significant increase in the ICS IRR charge relative to the 3.31.2020 scenario.

Observation 8: There is significant interplay between the changes in the ICS MAV liability discount rates and the measurement of the ICS IRR charge. For example, the increase in the ICS MAV liability discount rate for the 3.31.2020 scenario resulted in a significant decrease in the ICS IRR charge. In contrast, the subsequent decrease in the ICS MAV liability discount rate in the 6.30.2020 scenario resulted in a significant increase in the ICS IRR charge.

Observation 9: The use of application ratios introduces significant non-economic volatility which not only impacts the measurement of capital resources but also the measurement of the ICS IRR charge (the IRR charge decreased by $0.9 billion (9.4%) relative to the baseline when the application ratio was adjusted to 100%; see Appendix C, scenario A5).

Assessment 4: The IPAC model demonstrates that the ICS IRR charge exhibits non-economic volatility that is highly sensitive to short-term changes in the economic environment. This ultimately reduces the effectiveness of the ICS as tool for regulatory oversight, particularly with respect to long-term business where such volatility can be more significant over a longer contract period.

Non-default Spread Risk (NDSR) Model Results

NDSR is calculated in the ICS as a bi-directional stress applied to both asset and liability spreads. The inclusion of an NDSR charge in the ICS is highly contentious among IAIS members and insurance groups participating in the development of the ICS and the monitoring period. Indeed, and as demonstrated in the IPAC model results discussed below, the NDSR charge significantly increases the risk of inappropriate signaling in the ICS.

The risk of inappropriate signaling arises for two reasons. First, the NDSR charge fails to recognize the temporary nature of changes in spreads. Second, as discussed in the earlier *Model Analysis* sections, the Three-Bucket Approach methodology introduces an artificial mismatch in how spreads are measured on the asset and liability sides of the balance sheet. This artificial mismatch is subsequently stressed and quantified in the NDSR charge.

To illustrate how this artificial mismatch occurs, for a well-matched asset/liability segment, changes in spreads should affect both the assets and liabilities in reasonably equal amounts; thus, the exposure to changes in non-default spreads for a well-matched segment would be relatively small. However, under the Three-Bucket Approach, haircuts in the form of application ratios and implicit conservatism with respect to "representative" assets, are applied to the spreads assumed in the liability discount rate. As a result, when the asset spreads and the (now-inconsistent) liability spreads are shocked, the change in the market value of assets no longer moves in sync with the change in the corresponding liabilities, resulting in an NDSR charge that can be significant.

In this example, the source of the non-default spread risk is the design of the ICS MAV Three-Bucket liability discounting methodology itself as opposed to the exposure to true economic changes in non-default spreads.

Assessment 5: The ICS NDSR charge is a source of non-economic volatility in the ICS calculation. Specifically, the artificial disconnect between the measurement of assets and liabilities due to the ICS MAV liability discounting methodology is exacerbated when quantified under a shocked-spread scenario and reflected in the ICS NDSR charge.

The IPAC model results confirm this assessment. Per Table 5 above, the increase in the ICS NDSR charge of $2.8 billion from the 12.31.2019 baseline to the 3.31.2020 scenario is consistent with the widening in spreads observed in Q1 2020. However, and even though credit spreads started to revert to normal levels in Q2, the ICS NDSR charge increased by an additional $1.8 billion under the 6.30.2020 scenario.

The reason for the increase under the 6.30.2020 scenario is that the combination of low risk-free rates and a narrowing of credit spreads resulted in a low 6.30.2020 scenario ICS MAV liability discount rate relative to the 3.31.2020 scenario ICS MAV discount rate. Similar to observations regarding the IRR charge in the preceding section, the application of the NDSR down-shock to the low ICS MAV valuation discount rate resulted in an arbitrarily low valuation discount rate. This in turn triggered minimum interest rate guarantees on parts of the business included in the IPAC model.

Observation 10: Consistent with the comments in the IRR section above, there is significant interplay between changes in the ICS MAV liability discount rates and the measurement of the ICS NDSR charge. For example, the decrease in the MAV liability discount rate under the

6.30.2020 scenario resulted in an increase in the ICS NDSR charge relative to the 3.31.2020 scenario, even though spreads had compressed between the two scenarios.

Assessment 6: The ICS NDSR risk charge is a construct of the ICS MAV liability discount rate methodology that does not appropriately reflect the temporary nature of changes in credit spreads. As evidenced by the IPAC model results, the NDSR charge can be highly prone to causing inappropriate signals in market environments where there are large temporary changes in spreads.

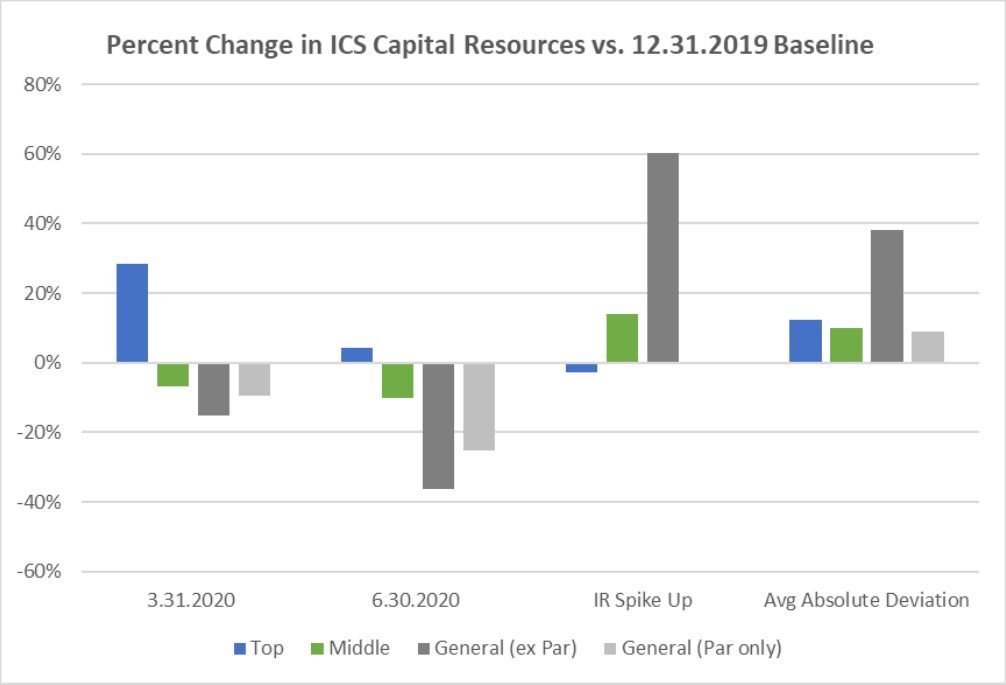
Interest Rate Sensitive Liability Cash Flow Products

Participating whole life insurance (Par-life) cash flows are sensitive to interest rate movements. The IPAC model, which includes these products, demonstrates that despite these products having a lower risk profile than non-participating products, they generally require more ICS capital, particularly for interest rate risk, as compared to the other products included in the model.

A key driver of this result is that the Par-life liabilities are allocated to the General bucket under the ICS Three-Bucket Approach, which would be a typical bucketing result given the Par-life product design. Given their pass-through nature, ALM for these products would not typically focus on explicit cash-flow matching. As a result, these products would not normally meet the Three-Bucket Top and Middle bucket criteria that relate to cash-flow matching, including limitations on future premiums. These are elaborated upon in the section below, *Potential Refinements to the Bucketing Criteria*. The excessively conservative discount rate in the General bucket combined with the generally longer-than-average Par-life liabilities result in an ICS IRR charge that is also overly conservative, given the lower risk profile of Par-life products.

A key flaw in the Three-Bucket bucketing criteria methodology is that it fails to recognize the lower risk profile of the Par-life business. Chart 2, below, highlights this issue.

Chart 2



As can be seen in Chart 2 with reference to the average absolute deviation, Par-life products exhibited similar levels of capital resource volatility, on average, as non-Par products that were assigned to the Top and Middle buckets. Par-life products also exhibited less volatility than non-Par business included in the General bucket. Despite this lower level of volatility, Par-life products are nonetheless allocated by the Three-Bucket bucketing criteria to the General bucket.

The lower level of volatility exhibited by Par-life products is attributed to the recognition of management actions that allow for adjustments to the dividend/crediting rate to generally align with the prescribed yield curve in each scenario. These adjustments in valuation projections for future discretionary benefits are appropriately provided for in Section 5.2.4 of the ICS Technical Specifications, as long as they are not contrary to the contractual obligations to policyholders and are consistent with the insurer's current business practices.

Observation 11: Despite the ICS appropriately providing for adjustments in valuation projections for future discretionary benefits, the discount rate that is then applied to Par-life products is overly conservative given the lower risk profile of those products. The criteria used to allocate products to the liability buckets that are used to determine the MAV liability discount rates fail to recognize the lower risk profile of Par-life business in terms of its ability to pass-through risk through management actions. As a result, Par-life business is allocated to the General bucket instead of the Middle and Top buckets, which are more appropriate for products with lower asset/liability mismatch risk.

Like the comments on the IRR charge above, Par-life products are also sensitive to ICS MAV discount curves when contract guarantees are close to being triggered. Of note, the excessive conservatism in the General bucket results in an artificially low discount rate that limits the extent of management actions that can be recognized in the IRR down-shock scenario, resulting in the triggering of contract guarantees and, consequently, overstatement of the ICS IRR charge.

Observation 12: The use of the conservative General bucket discount rate artificially limits the amount of pass-through of risk that can be assumed from management actions in the determination of the ICS IRR charge. Consequently, the ICS IRR charge with respect to Par-life products is overstated.

Assessment 7: The IPAC model analysis demonstrates that the treatment of Par-life in the determination of the MAV discount rate is misaligned with the actual risk profile of this business. This results in the measurement of the ICS IRR charge for Par-life to be overstated relative to its lower risk profile which, in turn, increases the risk of the ICS providing an inappropriate signal in a low interest rate environment.

3.4 Evaluation of the ICS MAV Liability Discounting Methodology Design

Ideally, the ICS valuation of liabilities should be linked to assets backing them to provide a true current estimate and avoid distorting the measurement of both capital resources and the capital requirement. A liability valuation that reflects expected credit spreads of supporting assets on a best-estimate basis would appropriately result in an IRR capital requirement reflecting ALM mismatch, while simultaneously ensuring that capital requirements with respect to other risks (e.g., life risks) are not distorted.

However, as discussed in Section 3.3 above, the ICS results are heavily dependent on the stratification of products into the three buckets, and on the degree of conservatism of the discount rates within each of the three buckets.

In effect, the stratification of products into buckets for valuation purposes effectively layers an additional set of “risk charges” on top of the capital requirement. This primarily relates to the products that fall in the General and Middle buckets and receive an adverse valuation relative to the Top bucket. Excessive layers of conservatism in the ICS MAV methodology flow through to the determination of other risk charges that are calculated using life liability balances and in many cases, may result in inappropriate signaling, non-economic volatility, and procyclicality.

Of note, the methodology used for this stratification is based on cash-flow matching criteria that are inconsistent with ALM practices generally used by US insurers in managing their long-term business. To support long-term business, US insurers typically invest in a diversified range of assets including both fixed-income and real-return assets, e.g., real estate, infrastructure, and public/private equity, with a focus on managing economic mismatch rather than purely on cash-

flow matching. In the US, as in many other jurisdictions, financial markets are not deep and liquid beyond 30 years, and yet a small portion of the liability cash-flows can extend beyond that time frame. The focus on economic matching allows an insurer to limit its economic risk, earn more spread on shorter assets while limiting the tenor of credit exposure, and reinvest over time to extend the asset cash flows.

Such ALM practices of US insurers also are consistent with Insurance Core Principle 16 – Enterprise Risk Management for Solvency Purposes, which states, "ALM does not imply that assets should be matched as closely as possible to liabilities, but rather that mismatches are effectively managed."[55] The over-emphasis on cash-flow matching in the Three-Bucket Approach should be addressed, both in the criteria used to assign products to the three buckets and in the determination of liability discount rates for each respective bucket.

Potential Refinements to the Bucketing Criteria

The Top and Middle bucket classification criteria for the ICS should be refined to better reflect the ALM and investment risk management strength inherent in many products, including participating whole life insurance, a common product in the US.

The following refinements can better reflect the characteristics of insurance liabilities and allow for more US life insurance and retirement products to appropriately qualify for inclusion in the Top and Middle buckets. This would better reflect the risk profile and ALM practices for such products, as compared to their current relegation to the General bucket.

Alignment of Criteria with Modern ALM practices

There are several criteria for the Top and Middle buckets that are not consistent with sound ALM practices for long-duration products. As noted earlier, exclusion of products from qualification for the Top bucket based on cash-flow matching is not necessary. It also conflicts with insurer ALM practices for long-duration products where liability cash flows extend out beyond the investable horizon. In such instances, firms often incorporate additional measures of risks to keep any potential exposure within their respective risk tolerances.

To qualify for the Top bucket, ICS Technical Specification paragraph 132.b requires that the portfolio of assets to cover the insurance liabilities be identified and, together with the corresponding liabilities, managed separately without being used to make payments relating to other business of the IAIG.[56] Additionally, in criterion 132.c, the expected cash flows of the

[55] IAIS*, Insurance Core Principles* (November 2018), ICP 16, 16.5.1.

[56] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

identified portfolio of assets would have to replicate the expected cash flows of the portfolio of insurance liabilities up to the last observable term (LOT) of the risk-free yield curve of the currency. These criteria are not consistent with actual sound ALM practices in the US for long-term guaranteed products. This requirement should be broadened to evaluate ALM strategies beyond strict cash-flow matching, e.g., to reflect a reasonable, but not perfect, degree of alignment between asset and liability sensitivities. To achieve a close match of asset and liability sensitivities, an insurer that has liability cash flows beyond the LOT would need excess asset cash flows in the periods before the LOT to provide for shortfalls in asset cash flows in subsequent periods. The ICS should recognize such an ALM strategy.

In addition, insurers will tend to own spread assets shorter than liabilities due to both availability and credit considerations. The risk-free curve will typically be longer than the availability of spread assets, so spread assets cannot fully cash match liabilities up to the risk-free LOT. Insurers can also manage credit risk more prudently by limiting the tenor of their credit exposure, by investing in shorter spread assets than liabilities and reinvesting over time.

Criteria that put limitations on future premium (132.d and 134.e, for Top and Middle buckets) should be revised or removed for products demonstrating substantial future premium risk mitigation. This is another example of the unnecessary linkage of cash-flow matching to the qualification for certain buckets and the calculation of ICS MAV liability discount rates.

Remove Overly Conservative Requirements Based on Risk-free Rates

The Middle bucket criterion of 134.d states that the asset market value must exceed the liability value discounted with the risk-free yield curve. However, a discounted liability calculation using the risk-free yield curve would not produce an appropriate market-adjusted valuation, as insurance liabilities are not supported by risk-free asset portfolios. Such a requirement is likely to preclude products with otherwise strong ALM profiles from qualifying for the Middle bucket. The IPAC model scenario results confirm that the risk-free rates and credit spreads were very volatile in 2020. As a consequence, criterion 134.d would have caused products to move in and out of the Middle bucket over that period, creating short-term volatility in the ICS ratio. Liabilities subject to this criterion should be calculated by applying the risk-free rate plus a representative or own-asset spread. Accordingly, criterion 134.d should be removed or revised.

Refinements in Liability Discounting Construction

The methodology for liability discounting should promote the alignment of valuations between assets and liabilities. However, as noted previously, the current ICS MAV framework inconsistently measures assets and liabilities, which can lead to inappropriate signaling to regulators and markets, particularly during times of stress. This is exacerbated in the US, which has more diverse and deeper financial markets, relative to some other jurisdictions. Lack of full

reflection of spreads in the liability discount rate for US business under the ICS MAV Three-Bucket Approach leads to relatively higher liability valuations than in other markets.

Application Ratio and Representative Portfolio

To reflect expected credit spreads of supporting assets, any haircut in spread recognition (application ratio less than 100%) should be removed. A haircut inherently results in misalignment of asset and liability valuations, causing excessive conservatism in the risk charges indexed to discounted liability cash flows. As noted in the model results in Appendix C, setting the application ratios to 100% resulted in a material (8%) increase in capital resources (scenario A5) versus the ICS 12.31.2019 baseline (scenario A1).

Also, for the ICS representative spreads used in the General bucket and the weighted average of multiple portfolios (WAMP) Middle bucket spread calculations, an insurer's own-asset portfolio or a more appropriately designed representative portfolio should be used. At the present time, these portfolios are not representative of US insurer holdings and have lower spreads, an inconsistency that results in excess conservatism in liabilities and impacts risk charges.

In addition, the current method assigns a spread of zero to all ineligible assets, which is inherently punitive and not backed by data. At a minimum, the proportion of assets deemed ineligible should be excluded from the weighted-average calculation to avoid diluting the spread average.

The types of assets defined as ineligible are investment income receivable, convertible notes, insurance-linked securities, equities, hedge funds, private equity, real estate, infrastructure equity and other investment asset types. These asset types are all appropriate investments when held as part of a well-diversified ALM strategy for long-term business. Holdings of asset classes with historical average returns above the risk-free rate and not dependent on trading should also be considered for eligibility by the supervisor, with risk charges based on the underlying economics.

Term Structure of Spreads and Granularity of Asset Classes

Refinements to the ICS are needed to properly recognize the manner in which spreads vary by tenor, currency and rating. Assets have varying spreads due to these and other attributes such as asset class. If liabilities are valued on inputs that are dissimilar to those of the corresponding assets that back them, their MAV-based movements over time will not align. Use of a flat spread by tenor under the Three-Bucket Approach, as opposed to a tenor-specific spread, results in misalignment of asset and liability valuations. In addition, as the average spread is typically lower than the long-term spreads, a penalty is effectively added on long-term products. The fact that spreads vary by tenor should be reflected in the construction of both the Top and Middle bucket spread adjustments.

Spreads can also vary significantly by asset type, so there should be recognition of spreads by granular asset type within a given rating (e.g., public versus private, structured credit, etc.).

Flat Average Spread Adjustments are too Simplistic

As noted in the *Model Analysis* section in Observation 6, changes in the market value of assets in the Top bucket do not move consistently with the changes in the corresponding liabilities. This is primarily the result of the ICS Three-Bucket average spread calculation (specified in Para. 155 of the 2020 ICS Technical Specifications and applied to the Top bucket as per Para. 142). The average spread calculation is a simplification that is not sufficiently robust in a market environment where there is a significant non-parallel movement in spreads.

There should be recognition within the ICS of tenor in spreads included in the calculation of liability discount rates appropriate to the asset type and rating.

Equity and Alternative Investments

Appropriate recognition of these types of assets when used to back long-term business should continue to be explored. At a minimum, equity and alternative investments should be removed from the Middle bucket WAMP calculation to avoid the dilutive effect of applying zero spreads for these asset types. The formula for the WAMP spread in the ICS Technical Specifications is:

$Wamp_{spread}$ = … +… +$W_{Non\text{-}eligible}$ x 0

This zero-spread assumption is inherently punitive, as well as unnecessary. It misrepresents the benefit of these assets when used as part of a sound diversified ALM strategy to back long-term business.

LTFR and Spread Add-on

Greater differentiation between LTFRs by currency is required, reflecting the nature of their markets, instead of using the same rate for most developed economies. The ICS LTFR spread assumption for USD (i.e., 20 bps) is not a reasonable representation of spreads beyond the LOT or expected future spreads.

There are not sufficient spread assets with cash flows beyond the LOT. In practice, insurers aim to align the sensitivities of their assets and liabilities and reinvest each year to extend the asset portfolio. This results in a continuous addition of spread-asset cash flows at the longest tenors. As a result, the logical basis for the spread add-on to LTFR is the spread for tenors at or near the LOT.

The ICS LTFR spread assumption should be revised to a level aligned with a stable and reasonable long-term expectation (e.g., 100-150 bps). It was previously noted that the spreads

in the Middle Bucket WAMP methodology are lower relative to a representative US insurer's long-term holdings. In the 2020 ICS Data Collection Exercise, and based on pre-pandemic December 2019 data, the spreads for USD assets for cash flows beyond 20 years were 1.44%, 1.59%, 1.66% and 2.55% for RC 1-4, respectively.[57] While these data points are based on a single moment in time during a favorable US market environment, they support that a 20bp LTFR spread assumption is significantly understated.

The convergence period from the LOT to the LTFR should be shortened from 60 to 40 years for the risk-free yield curve. This would lead to more stable liability valuations as observed interest rates move, since more liability cash flows would be discounted using the LTFR. It would also lower interest rate risk charges, reducing procyclical interest rate risk measures resulting from temporary market dislocations reducing valuation rates.

3.5 Implications of the ICS MAV Liability Discounting Methodology Design on Risk Charges

Risk charges under the ICS are based on shocks to asset and liability values, so any flaws in the ICS MAV liability discounting methodology extend to the measurement of all risk charges that incorporate life liability balances, though only interest rate risk and non-default spread risk are within the scope of this report.

Interest Rate Risk

The IRR charge calculation has the following components (ICS Technical Specifications Section 7.3.2):[58]

- It is based on a combination of five stresses applied to the entire risk-free yield curve for each currency: mean-reversion, level-up scenario, level-down scenario, a twist-up-to-down scenario and a twist-down-to-up scenario
- Stresses are applied to assets and liabilities that are sensitive to changes in risk-free rates, including the impact of lapses
- The stress approach is aligned with the three-segment approach used for construction of the MAV discounting curves, with stress scenarios defined for the first segment and the LTFR and the same extrapolation methodology applied as for the pre-stress yield curve[59]
- The LTFR is maintained for the mean reversion and twist scenarios and increased or decreased 10% for the up and the down scenarios (para. 438, 440).

[57] Per "2020_ICS_Data_Collection_Yield_Curves_generator_-_update-(20200619)" provided by the IAIS. The spreads were drawn from cell C36 of the "Middle Bucket WAMP spreads" tab after typing a 1 into the "of which 20Y+" columns of Row 36 for each for RC1-4, namely P36, W36, AD36 and AK36 separately.

[58] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

[59] See Appendix B for further description of the risk-free curve and its three-segment construction.

- Financial instruments issued by the IAIG that qualify as capital resources are excluded from the IRR calculation.

In general, inconsistent measurement of assets and liabilities in the ICS distorts the IRR charge. As noted in Observation 7, the excessive conservatism in the General and Middle bucket liability discount rates introduces additional conservatism in the measurement of the IRR charge. Application ratios also introduce significant non-economic volatility, impacting the IRR charge, as noted in Observation 9.

The variation in the LTFR in the up and down-shocks leads to an additional IRR charge, since there are very limited asset cash flows beyond the LOT to be measured. This construction makes the LTFR a mechanism to extend the curve but is not based on a true long-term estimate of the forward rate.

The use of flat spread adjustments in the development of ICS MAV liability discount curves results in the mismeasurement of IRR. As noted in Observation 6, the average spread calculation is not sufficiently robust in a market environment with significant non-parallel movements in spreads.

Flat spread adjustments make the slope of the 12.31.2019 baseline ICS MAV liability discount curve flatter than it should be based on the normal condition that spreads widen as tenor increases. As a result, earlier liability cash flows are systematically undervalued and later liability cash flows overvalued. This results in increased sensitivity of liabilities relative to assets, down-shocks being overstated and up shocks understated. Twist shocks are also impacted by the flat spread adjustment: the twist up-to-down is more twisted than it should be, resulting in a lower shock impact and twist down-to-up is less twisted, resulting in a higher shock impact.

As noted previously in Section 3.3 of the report, the down-rate scenarios dominate the IRR shocks. These are being overstated by both the LTFR adjustment in the shocks and the use of flat spread adjustments in the base rates. In addition, as noted in Observation 12, IRR charges are overstated for Par-life products because the conservative General bucket discount rate artificially limits the amount of passing through of risk that can be assumed from management actions.

Non-Default Spread Risk

The Non-Default Spread Risk (NDSR) charge has the following components:[60]

- It is based on the greater of an upward and downward stress to spreads applied to assets and liabilities, floored at zero.

[60] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020), Section 7.3.3.

- The shocks are absolute levels based on credit risk category (50, 75 and 100bp), with the down-shock limited to 50% of the absolute value of the spread over the risk-free yield curve.
- The shocks are applied to all liabilities except for financial instruments issued by the IAIG that qualify as capital resources.
- The shocks are applied to all assets eligible for inclusion in the Top and Middle bucket discount rates, with the exception of sovereign assets.
- The shocks are applied as a parallel shift to spreads by risk category, without reflecting any difference in spreads by tenor, which exist across asset classes and markets.

The NDSR calculation measures the relative change in asset and liability values based on the spread shocks, resulting in a pure measurement of the differences between asset spreads and spreads built into the Three-Bucket Approach for liability valuation. By definition, the calculation measures the flaws in the design of the Three-Bucket Approach. If the spreads in the liability discount rates were aligned with those of the assets, NDSR would be zero. NDSR does not assess economic risk and is not appropriate in a solvency regime for long-duration products that are not sensitive to temporary spread movements as demonstrated over decades of historical performance.

The use of application ratios directly increases the NDSR charge, since the liability discount rate includes lower spreads than assets, and the subsequent spread shocks are overvalued. In addition, lower discount rates result in higher shock values.

Similar to the IRR charge mechanism, the use of flat spread adjustments in the development of ICS MAV liability discount curves results in mismeasurement of the NDSR. Given that spreads normally widen as tenor increases, the slope of the 12.31.2019 baseline liability discount rate is flatter than it should be. As a result, earlier liability cash flows are systematically undervalued and later liability cash flows are overvalued. This results in increased sensitivity of liabilities relative to assets, with down-shocks being overstated and up-shocks understated.

IV. ASSESSMENT OF ICS IMPACTS

4.1 Insurance Group and Market Impact

The perceptions of investors, supervisors and other stakeholders of the level and quality of an insurance group’s capital and financial strength are directly linked to the group’s strategy and capital management. Capitalization influences an insurer’s product mix, pricing and competitive positioning. Assessing, understanding and managing capital volatility and the need for capital cushions are core components of capital management and ultimately drive an insurer’s actions.

As a part of running the business, and given the capital regimes in which they operate, insurance groups must make assumptions around insurance and financial risks, including regarding mortality, interest rates and investment returns.

A capital framework that provides appropriate signals will prompt prudent capital and risk management and effectively establish hurdles, or guardrails, against excessive levels of risk-taking. However, a capital framework that is overly conservative or reacts to temporary changes in the markets can be very problematic, making it difficult for insurers to develop and market products that provide long-term value and protection for consumers while also generating an acceptable return on capital.

The potential impact of regulatory capital requirements on an insurance group is illustrated in the following examples that leverage the results from the IPAC stylized insurer model.

Product Strategy

A high percentage of US long-duration life insurance and retirement products fall within the General bucket under the ICS MAV liability discounting methodology. This translates into lower levels of capital resources, higher capital requirements and, ultimately, a lower ICS ratio attributable to these products with a need for a higher capital cushion, all as compared to what the ICS result would be if those products were assigned to the Top or Middle buckets.

Table 6

12.31.2019 Baseline ($ in millions)

	Capital under ICS	Capital under Single A	Diff	% of ICS
Top	$ 9,607	$ 8,290	1,317	13.7%
Middle	14,846	15,552	(706)	-4.8%
General (no Par)	6,756	10,030	(3,274)	-48.5%
Total (no Par)	$ 31,209	$ 33,872	(2,663)	-8.5%
General (Par)	9,551	8,196	1,355	14.2%
Total (with Par)	$ 40,760	$ 42,068	(1,308)	-3.2%

As observed in the results of the IPAC stylized insurer model in Table 6 above, these General bucket impacts are tempered by offsetting impacts of the other buckets, to the extent the insurance group has business that can be assigned to those other buckets. However, if an insurer subject to the ICS primarily sold traditional life products such as universal life, whole life and term life which, under the current ICS MAV bucketing criteria, would likely fall into the General bucket, the impact to capital resources from conservatism in valuation under ICS MAV could be very significant.

The IPAC model has shown that ICS capital resources (excluding Par-life) are about one-third lower as compared to the valuation under the Single-A benchmark. The insurer would very likely have to raise prices, exit certain product lines, or otherwise manage to the higher ICS target capital level. Furthermore, the insurer would have to compete with other firms, not subject to the ICS, operating in the same markets, thereby contributing to a non-level playing field.

The conservatism of the General bucket also creates additional non-economic misalignment for Par-life products. Despite the presence of significant discretionary loss-mitigating features, Par-life products are relegated to the General bucket, in part due to the limitation on future premiums criteria in paragraphs 132.d and 134.e.[61] However, the presence or absence of future premiums is not particularly relevant in determining the relative risk of products (and, by extension, the criteria for bucket assignments). This includes products such as Par-life which have the benefit of both discretionary and non-discretionary benefits and are supported by recurring premium. Further, due to the conservatism of the General bucket, insurers would be led to include artificial cuts to discretionary benefits in the valuation of their Par-life liabilities under the ICS, which then leaves them with lower levels of discretionary benefits to absorb losses in the calculation of capital requirements. While this may not be apparent in the summarized modeled calculation, it has the impact of overstating overall risk when analyzing capital resources and capital requirements as part of the ICS ratio.

Asset Liability Management

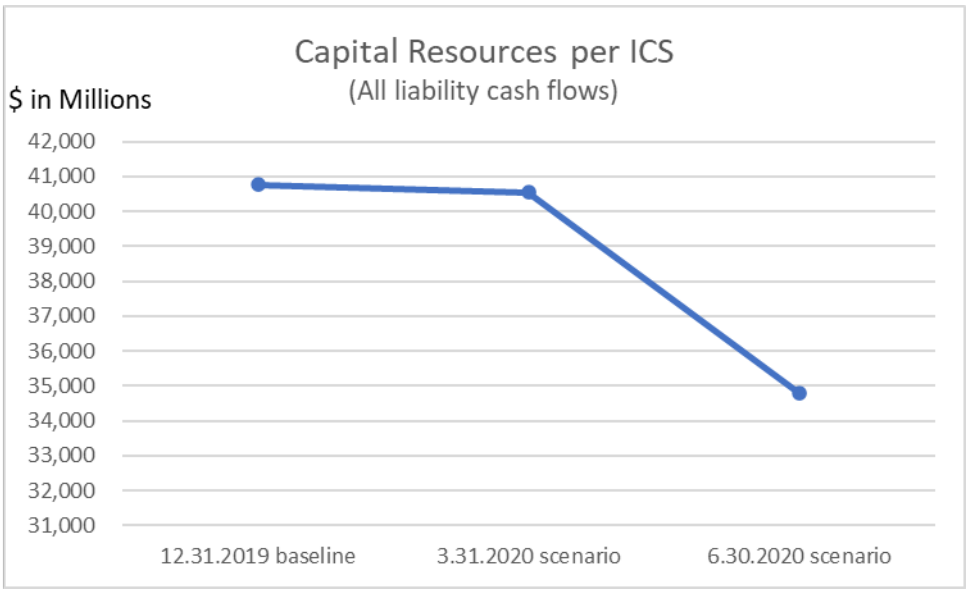
Changes in an applicable capital framework will generally lead to changes in ALM practices; i.e., ALM is not static. For example, a market-based framework like the ICS generally encourages hedging of economic risks, which should be an incentive for insurers to readjust their ALM positions on a timely basis. However, the current reference ICS construct does not recognize the full benefit of ALM hedging programs in the calculation of the capital ratio. For example, if an insurer had a dynamic hedging program that added duration as rates dropped, it would mitigate the underlying economic risk, but the insurer would not realize that benefit in its ICS ratio.

As interest rates started trending down from Q4 2019 through Q1 2020, the IPAC model (Chart 3 below) shows capital resources did not move much under the 3.31.2020 scenario, primarily because at Q1 2020 spreads also widened. Assume that Chart 3 reflects an insurer with capital targets and limits and which utilized appropriate risk-mitigation tools, including dynamic hedging, market-appropriate product pricing, and prudent capital planning to maintain capital resources above a hypothetical $38 billion internal limit. An appropriately structured market-based regime should provide risk signals and prompt more timely need for risk mitigation. Within the ICS construct, however, temporarily widened spreads dampened signals associated

[61] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

with falling rates. The negative impact was finally observed in model results when spreads normalized by Q2 2020 and rates stayed low.

Chart 3



Strategic Asset Allocation (SAA)

Insurers seek to optimize risk-adjusted returns. The assessment of risk-to-reward characteristics of assets backing insurance liabilities is a key component of strategic asset allocation. Regulatory capital regimes often impose rules around expected volatility and returns of asset classes. However, if such rules are misaligned with historical and expected trends, they could inappropriately influence asset allocation choices by an insurer.

A number of asset classes, including illiquid assets that provide important illiquidity premium, are used to support long-dated illiquid liabilities. These asset classes (e.g., infrastructure equity, real estate and private equity) typically provide a natural hedge against future inflation and an alternative to investing in long-term corporate bonds. Nonetheless, the ICS Three-Bucket Approach fails to recognize the differential yield that these assets have historically generated. The ICS framework, including spread haircuts and shocks, thus further distorts the ALM benefits of assets classes termed broadly as “Alternatives” as well as long-term equity investments in infrastructure. When paired with largely illiquid long-dated liabilities, incremental yield from such investments enables attractive product pricing for consumers and risk-adjusted returns for insurers. However, for an insurer subject to the ICS as currently designed, it may be difficult for long-term private equity, for example, to be utilized as a preferred asset class during the insurer’s asset-allocation process.

By artificially limiting inclusion of yields from certain asset classes in the ICS MAV liability discounting methodology and given the previously cited distortions caused by the IRR and NDSR

capital requirement calculations, imposing the ICS as a PCR could result in US IAIGs being incentivized to move away from investing in such alternative and infrastructure asset classes.

Life insurance companies also have a long history of direct investment in many types of income-generating real estate because of their usually long investment timeframe potential for capital appreciation, recurring income stream, and minimal credit risk. Debt backed by real assets (e.g., commercial and residential mortgages, and mortgage-backed securities) is eligible for inclusion in the determination of the spread adjustment under the Three-Bucket Approach, while equity (or outright) investment in such assets is not. Direct ownership of real estate can provide a better risk profile for insurers than debt backed by real estate, especially when it is not levered, yet produces a similar income stream from renting the properties.

If these asset categories are not included in the derivation of ICS MAV liability discount rates, the application of ICS could potentially disincentivize insurance groups from making such investments and, by extension, from being able to price long-term guarantee products with the benefit of such investments.

Capital Markets and Cost of Capital

Insurers routinely access capital markets for funding growth and to maintain adequate amounts of capital buffer. Capitalization influences insurers' ratings which, in turn, directly impacts the costs they will incur to raise and maintain capital (e.g., debt service costs).

In considering the results from the IPAC model generally, the financial strength of an insurer would be perceived very differently if looking at the overly conservative results of the ICS versus the Single-A benchmark. Further, under the ICS, excess capital dropped significantly under the IPAC model 6.30.2020 scenario (see Chart 3) as risk-free rates remained largely unchanged from Q1 2020 but spreads normalized. From a management perspective, insurers often have internal limits and external expectations around the need for capital cushions. However, the signals from ICS appear to be untimely and distorted to a degree that would preclude the ICS from being a useful tool to help confirm those expectations.

Signals to capital markets are critically important. The IPAC stylized insurer model demonstrates that the ICS valuation continues to depict conservatism and volatility that are not linked with the insurer's risks or its ability to meet obligations, nor does it reflect some of the sound economic risk mitigation approaches typically used by insurers. Undue conservatism and volatility can cause inappropriate signals and lead to unnecessary increases in cost of capital.

Due to the nature of their investments and business models, insurers can help mitigate liquidity issues in financial markets. Unlike banks, the vast majority of life insurers' liabilities are long-term and illiquid, as compared to the short-term deposit liabilities of a bank that may be withdrawn on demand. For life insurers, there is much smaller risk of a bank-like run or "contagion" effects caused by interrelated business activities. As a result, insurers are able to

hold the majority of their assets until maturity, thereby reducing the risk of a forced sale of assets in a stressed market. Within the ICS, undue deference to temporary spread movements, and the temporary impact such spread movements have on asset values, are likely to distort signals on capitalization and financial strength.

Competitive Landscape

The ICS is intended as a PCR for IAIGs, which would create an unlevel playing field. US IAIGs would face competitive challenges from non-IAIGs that operate in the same market, but which would not be subject to the ICS nor to its negative impacts as described earlier in this report.

US insurers have been moving away from sovereign and even corporate debt toward infrastructure, private debt and other assets that offer a higher illiquidity premium, and often much-needed longer durations, with a sufficient level of return to provide consumers with attractive minimum guaranteed insurance and annuity products. As noted earlier in the section, *Strategic Asset Allocation (SAA)*, the ICS disincentivizes insurers from investing in these kinds of investments and, as a result, IAIGs subject to the ICS would be less able to compete on equal footing with non-IAIGs that would not be subject to the ICS.

Impact on Long-Duration Insurance Products

As noted in previous sections of this report, long-term life insurance and retirement products sold in the US would be primarily assigned to the General bucket for purposes of ICS valuation and subjected to excessive conservatism that is not aligned with common and sound ALM and SAA practices in the US. The calculation of risk charges further exacerbates these issues. Insurance groups subject to the ICS would need more initial capital and capital cushion to support such products. Over the long term, such groups would then be economically pressured to reduce or stop selling such products, pass additional capital-associated costs on to consumers, or change the product design to make it make more capital efficient (with lower benefits or guarantees to consumers) under the prevailing capital regime.

If the ICS were to apply only to IAIGs, as is presently intended by the IAIS, non-IAIGs would have an economic advantage and could increase their market share relative to IAIGs. This would essentially create an arbitrary capital differentiator within the US based on whether a US-based group is selling enough insurance in non-US markets to meet the international business criteria to qualify as an IAIG.

Some jurisdictions have signaled that they are moving towards ICS-like regimes for all insurers of a certain size and complexity, regardless of whether they meet the criteria to be identified as IAIGs. If the US were to follow a similar approach, the ICS design issues identified in this report would impact all US insurers and translate into higher cost and/or reduced product availability market-wide, thus adversely impacting consumers to an even greater degree.

4.2 Regulatory Perspective

Whether a capital rule is appropriately designed and effective should be determined relative to its stated supervisory objectives. The main objectives of the ICS, as stated in the ICS Principles, are to protect policyholders and contribute to financial stability. Additionally, the ICS is tied to the IAIS mission, "to promote effective and globally consistent supervision of the insurance industry in order to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and to contribute to global financial stability."[62]

Achievement of these objectives requires that the design of a group regulatory capital framework accurately reflects capital resources available to absorb losses and measures the risks to which groups are exposed. This, in turn, requires that a group regulatory capital framework accurately measures the supervised groups' financial obligations, including the long-duration products that are the focus of this report, as well as the value of the long-term investments that support those obligations. The ICS must appropriately value these liabilities and investments, which can span many decades, and accurately measure risk exposures while minimizing any destabilizing non-economic volatility.

These valuation and risk measurements must also reflect the local realities of business conventions, legal and regulatory frameworks, capital markets and consumer behavior, as well as how governmental and public polices in the relevant jurisdiction have balanced public versus private sector funding and responsibility for retirement and security. These are not matters which are comparable across all jurisdictions, nor can they be addressed without a broad swath of public support for overarching legislative action to reverse public policy decisions that have been ingrained in the fabric of the nation for many decades. This makes the achievement of a single international insurance capital standard that is implemented in a consistent manner by all jurisdictions inherently challenging –particularly if that standard, the ICS in this instance, does not accommodate the types of products needed to address societal needs in specific jurisdictions.

Regulatory capital under the state-based insurance regulatory regime in the US currently consists of two components:

- Insurance operating entity-level prudential regulations: The NAIC Risk-Based Capital (RBC) framework alerts state regulators so they can intervene and with increasing levels of action if the minimum level of regulatory capital prescribed by law descends below successively lower thresholds. RBC is intended to provide regulators with more time to

[62] IAIS, *Public Level 1 Document: ICS Version 2.0 for the monitoring period* (November 2019).

act on undercapitalized companies, to prevent an insolvency or to minimize its costs and disruption to the insurance market.[63]

- Group capital monitoring system: The NAIC has developed the Group Capital Calculation (GCC), measuring capital at the group level, for use as a financial analysis tool to accompany other supervisory measures and tools, both at the legal entity and group level. As a financial analysis tool, the GCC lacks a "trigger" which, in and of itself, would require regulatory action at the group level. However, it will be used in tandem with RBC and other available inputs in developing a "group profile summary", which, taken together, is intended to lead to a timely and appropriate supervisory response.

In the remainder of this section, the ICS is evaluated for use as a PCR as well as for potential use as a monitoring tool. If adopted and implemented as a PCR in the US, the ICS would apply separately from, and in addition to, the US state-based requirements.[64] Thus, this section also considers the impact of the ICS as an overlay to entity-level RBC in the US and compares the ICS to the GCC as a monitoring tool.

The ICS as a US PCR

A capital standard that assesses a group's material risks against its capital resources can be a powerful tool in financial supervision. There are significant concerns with the ICS's effectiveness as a US PCR, since its embedded measures and criteria do not currently appear to be appropriately tailored to US business practices, products, and markets.

As noted in Section III, the IPAC stylized model results show that the measurement of capital resources under the reference ICS can be overly conservative primarily due to the design of the discounting method used for liability valuation. As currently designed, the ICS may not provide reliable signals to regulators. One prominent example was observed in the IPAC model for well-matched positions, with respect to the Top bucket liabilities (section 3.3 Observation 6).

In addition, as noted in section 3.3, the effect of overly conservative discounting can also result in exaggerated risk charges and risk charge movements period-over-period. The ICS could offer potential benefits in forward-looking estimates of value that integrate market information, but these estimates may also be inappropriately volatile. The inclusion of an NDSR charge in the ICS is a prominent source of inappropriate volatility. The design of the NDSR charge is arbitrary; it lacks a foundation in quantitative, data-based analysis, and it is unclear how the NDSR charge

[63] Largely based on CIPR (June 2020). https://content.naic.org/cipr_topics/topic_riskbased_capital.htm#:~:text=The%20NAIC%20RBC%20formula%20generates,control%20and%20mandatory%20control%20levels.

[64] The Federal Reserve, NAIC and FIO have each stated that the ICS in its current form is not suitable for use in the US as a PCR.

disaggregates the non-default element from the credit and liquidity components of the spread, which are not intended to be covered by this charge.

Given its intended use as a PCR, the more conservative results of the ICS (which can include non-economic elements) may motivate supervised groups to take risk mitigation actions to address supervisory constraints which run counter to sound economic objectives.

In addition, as a PCR, the ICS would obligate the group supervisor, whenever capital resources fall below the minimum requirement, to:

- Require management to establish and execute plans that would cause capital resources to return to levels in excess of minimum requirements, and under extreme circumstances, or
- Place the holding company into rehabilitation, an act that transfers full management authority of the business, including subsidiaries, to the regulator.

While there is a range of possible regulatory actions in the event that an insurer dropped below the minimum capital requirement in the ICS, the consequences for a regulated group and its policyholders can be adverse. Poor solvency ratios create the perception to policyholders, distributors, employees, owners, suppliers and other stakeholders of the group that the group's going-concern status is in doubt. Such doubts from important stakeholders can further exacerbate the group's difficulties. The desire to avoid such adverse impacts on a group is partly why state insurance regulators in the US, unlike banking regulators, appropriately place less emphasis on the "run" risk that justifies rapid intervention. As compared to banking regulators, insurance regulators set "mandatory control" solvency ratios closer to the level where the regulated entity's condition would be deemed hazardous. It is then left to the insurance regulator's discretion and due process, informed by trend tests and other measures and tools, to decide whether a rehabilitation order is necessary.

Given the high probability for providing inappropriate signals and significant negative ramifications of such inappropriate signals, the ICS, as currently designed, would not be appropriate as a PCR for US IAIGs.

The ICS Utility as a Monitoring Tool

A redesigned ICS has the potential to provide regulators with a globally comparable measure of group solvency that is consistently market-based and reflective of an expanded set of risk factors, complementing the existing US state-based capital regime. For example, insurance liability measurement in the ICS is viewed by proponents as more transparent and accurate than either US GAAP (which does not discount all liabilities with market rates) or US statutory accounting (which uses book value for most liabilities and fixed income investments). The ICS also captures some risks that are not currently reflected in state-based RBC in the US.

As noted, these benefits may be meaningful to regulators, particularly in environments where existing regulatory frameworks may be slower to respond, e.g., in low or declining interest rate environments or in periods when the increased risk of future credit losses is shown in higher credit spreads. That said, insurance liabilities are not subject to deep and liquid markets as are many investments, and the MAV-based liability valuations are dependent upon numerous assumptions of significant consequence, which may not hold true.

There are significant aspects of the ICS that need to be redesigned to address the current measurement distortions and exaggerated risk calibrations noted earlier in this report. The ICS, as currently constructed, does not reflect the risk profile of US life groups. If those flaws were rectified, the ICS could get closer to its objective of providing regulators with a comparable measure of solvency across local jurisdictions which would be more agnostic as to where a group is headquartered. It could also provide additional information about insurance group solvency to supplement that which currently exists under US state-based regulation. US state-based regulation relies on valuations that reflect an evolving mix of market- and book value-based standards. A redesigned ICS could offer regulators insight as a monitoring tool due to its market-based measure of capital resources and consideration of expanded risk factors in required capital.

Because this report focuses only on long-duration life insurance and retirement products in the US and specific related asset and liability valuations and risk charges, a redesign of the ICS should contemplate the possibility of further changes in addition to those recommended in this report.

In considering the potential additional value that might be derived from the ICS capital measure as a monitoring tool, it must be compared against existing tools or those that are in development under the US state-based regulatory framework.

In contrast to the consolidation approach utilized in the ICS, the GCC takes an aggregation approach to measure group capital resources and required capital. Under an aggregation approach, the underlying local jurisdictional results are summed, incorporating certain adjustments to address calibration and consistency, and to eliminate any double counting of capital, to determine a group capital ratio. Thus, the local regulations that contemplate the specific product designs, legal frameworks and market nuances, and regulatory triggers are incorporated into the capital and required capital measures. Every involved jurisdictional supervisor in a supervisory college should therefore be able to easily verify how the data from the group's entities domiciled in their jurisdiction are inputted and aggregated in arriving at the GCC.

The ICS is intended to ensure comparability and consistency across jurisdictions. Results from implementation of a global standard must be comparable to make assessments of solvency that are agnostic as to where an insurance group is headquartered. That said, there is a risk that too

much homogenization and an inability to reflect evolving local markets could result in a solvency measure that does not accurately measure an insurance group's solvency position. As noted earlier in this report, the ICS, with its singular calibration measure and EU-dominant influences, does not adequately reflect US-specific conventions, products, laws or differences between business lines.

In addition, unlike the GCC, the ICS is not directly tied into state-based regulation or supervisory processes. Statutory reporting and RBC are deeply embedded in US state insurance regulation and underlie virtually every aspect of that system. They are embedded in NAIC guidance that is used by the states for valuation, financial filings, examinations, financial analysis and Own Risk and Solvency Assessment (ORSA). RBC constitutes the fabric of US insurance regulation, including supervisory infrastructure elements such as the training of supervisors and data architecture. Further, unlike the GCC, the ICS treats capital as being fungible and does not identify where capital is needed and located within an insurance group.

By contrast to the GCC, implementing the ICS in the US as an incremental tool at the group level would introduce a one-off measure that has little or no relation to the abundance of existing measures and tools that are used in the state-based system in the US. It would introduce signals that vary from those other measures and tools, resulting in the need to assess conflicts in supervisory signals and heightening the risk of errant supervisory decisions.

In addition to failing to align with the US regulatory system and US life insurance and retirement products, implementation of the ICS would impose significant cost. The ICS is a new, complex, and untested calculation which would require significant investment in new systems, controls, testing and validation not currently in place today in the US, both on the part of insurance groups to submit the necessary data, as well as for regulators in the US to assess that data and the ICS results. Implementation, production and interpretation of ICS figures would certainly consume significant time and resources for regulators and companies alike.

In summary, if the ICS were redesigned to better reflect US (in addition to other jurisdictions') business practices, products and markets, it could better deliver insights to regulators reliant on local regulations to measure group financial health. However, adjustments to existing local regulations could more efficiently deliver these insights than implementation of a new framework such as the ICS.

V. CONCLUSION

With respect to the ICS, the IPAC understands the objectives of the IAIS to establish a common language for supervisors to discuss solvency of IAIGs and to enhance global convergence among the group capital standards that are in place. However, based on IPAC's data and analysis as described herein, the IPAC has concluded that the reference ICS, in its present form, does not appropriately reflect product and risk-mitigation features of long-duration life insurance and

retirement products sold in the US and, perhaps just as importantly, it does not reflect how investment choices available in US capital markets support such long-duration products. As currently constructed, the ICS would not be appropriate as a PCR for US-based internationally active insurance groups.

Three broad observations on the ICS inform this conclusion. First, although its market-adjusted valuation approach is more current with observed structural changes in markets, for example a "low for long" interest rate environment, the IPAC have found that it, among other things, fails to appropriately reflect several relevant asset classes presently held by US insurers writing long-duration contracts and is overly reactive to temporary variations in credit spreads. These shortcomings mean the ICS, in its present form, could introduce excessive conservatism and significant volatility into required capital and excess capital indicators, potentially leading to inappropriate solvency signals for regulators and markets.

Second, the treatment of Par-life in particular under the ICS discounting methodology, is also misaligned with the actual risk-mitigating profile of that line of business, causing the measurement of risk charges for Par-life to be overstated in a low interest rate environment.

Third, the ICS does not recognize clearly defined dynamic hedging programs or the use of long-term alternative assets in liability management, either for participating or non-participating products. This introduces regulatory conflict between the ICS and the US statutory rules to which many businesses conform. The IPAC views many of these conflicts in signals as potentially impairing prudent management of these businesses and even introducing inappropriate risk and supervisory signals.

The consequences of introduction of the ICS as a PCR in the US are two-fold. First, groups subject to the ICS would likely be motivated to amend their product offerings and investment strategies driven largely by the ICS, and in a manner not aligned with a long-term risk perspective. This could include scaling back participation in US long-dated insurance business due to diminishing returns on capital and a lack of price competitiveness relative to competitors not subject to the ICS.

Second, the inappropriate signals from the ICS could compel group supervisors in the US to intervene at times or to a degree that may be counter to otherwise-sound regulatory goals. For example, supervisory interventions during periods of liquidity-driven stresses to credit markets can exacerbate a company's difficulties in the marketplace and make recovery more arduous than would otherwise have been necessary.

The ICS design features that create these unwarranted adverse impacts include its (a) failure to recognize in discounting insurance liabilities the spreads on illiquid assets typically held by US insurers to back long-term business, (b) use of application ratios that reduce spread recognition in those liabilities, and (c) overly simplistic assumptions regarding longer-term average spreads.

This results in excessive conservatism and non-economic volatility across a variety of economic environments. The excess conservatism reduces capital resource levels and increases the non-economic volatility of the capital ratio which creates misalignment with sound long-term ALM, strategic asset allocation and capital management practices of US insurers which, in turn, are tailored to US products, markets, accounting and supervisory frameworks.

An appropriately designed ICS could add value as a monitoring tool by providing a more uniform assessment of capital as a measure of risk across international markets. It could also provide insights to supervisory colleges and lead to a more common understanding of group-wide risk across the jurisdictions in which an IAIG operates. However, to be "appropriately designed" for the business practices, products, markets and supervisory regime in the US, at a minimum, the proposed revisions described in this IPAC report will need to be satisfactorily addressed and incorporated.

Further, the IPAC also suggests that these proposed revisions be considered in the determination of comparability to the ICS in the forthcoming Aggregation Method comparability assessment. Specifically, the IPAC notes that regulatory supervision is best served when adopted standards are tailored to the applicable regulatory framework, which in the context of the Aggregation Method comparability assessment, requires that the Aggregation Method should be compared to a version of the ICS that reflects the revisions proposed in this report.

APPENDICES

APPENDIX A: Report Participants

IPAC ICS Workgroup Members and Former Members

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Inaugural Members	2021 Members	2022 Members
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Wayne Peacock	Wayne Peacock	Wayne Peacock
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Michael Lockerman*	Michael Lockerman*	Andrew Vedder*
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APPENDIX B: ICS MAV Liability Discounting

The ICS market-adjusted valuation approach prescribes a discount curve to be used in the valuation of insurance liabilities. The curve is applied to obtain the probability-weighted average of the present value of future cash flows referred to as the Current Estimate liability. Further details on ICS MAV discount curve construction can be found in the ICS Technical Specifications in section 5.2.5.[65]

Risk-free curve

A risk-free curve is constructed by the IAIS for each currency. It is divided into three segments. Segment 1 extends from 1 year to the last observed liquid point or LOT of the yield curve which, for example, is 30 years for USD. Segment 3 is the LTFR, the starting point of which, is based on the later of 30 years after the LOT or 60 years. Segment 2 extrapolates the yield between the LOT and the LTFR. Segment 1 is based on the government bonds or swap rates, whichever a jurisdiction's supervisor deems more appropriate, and may include a credit risk correction. The LTFR is the sum of an expected real interest rate, an inflation target, and a spread which is added to the LTFR to represent the expected spread that may be earned from reinvestments in the long-term. The level of the LTFR including the spread, as well as the adjustment added to the risk-free rate (below) have been subject to an intense debate, between jurisdictions that advocate prudence by keeping the adjustments, if any, as low as possible, and those who advocate for consistency, to the extent possible, between how assets and liabilities are valued, e.g., by using the yield earned from the asset portfolio to discount the insurance liabilities.

Three-Bucket Approach (spread adjustment over the risk-free curve)

The ICS MAV discount curves are determined by adding an adjustment to the risk-free curves for each currency, in order to reflect the long-term nature of insurance contracts, and to mitigate potential excessive volatility by avoiding reflecting changes in market conditions that do not affect solvency. The adjustment varies by the nature and stability of the liability cash flows, reflected by applying the Three-Bucket Approach. The adjustment is applied as a parallel shift to the risk-free curve up to the LOT.

The Top bucket, with the highest adjustment, is based on the specific group's asset structure and spreads and is applicable only for those liabilities which meet the restrictive set of criteria that create assurance that the IAIG will be able to hold assets to maturity, earning the spreads used to discount the liabilities. Examples of the criteria requirements include asset-liability matching and the stability of liability cash flows. The Top bucket adjustment is based on the average spread above the risk-free rate for specified "eligible" assets.

[65] IAIS, *Public 2020 ICS Data Collection Technical Specifications* (June 2020).

The Middle bucket strikes a balance between the Top and the General buckets. Liabilities are required to meet a set of criteria that are more relaxed than the Top bucket criteria. The Middle bucket mixes market- and group-specific inputs. The Middle bucket adjustment is based on market spreads and risk corrections for each credit quality rating category provided by the IAIS. Each spread by credit quality rating is weighted based on the group-specific eligible assets that back Middle bucket liabilities. This spread adjustment is multiplied by a specified "Application Ratio" of 90%. The Middle bucket spread adjustment is further restricted to only the period in which asset and liability cash flows are sufficiently matched. After that period, the adjustment is phased out.

The General bucket is used for insurance liabilities that do not meet the criteria of the other buckets. It is calculated using both spreads and a portfolio structure which are determined based on market-wide data and therefore may not reflect the assets of a specific IAIG or its asset-liability management practices. The General bucket adjustment is provided by the IAIS and is based on the ICS data provider's prior year submissions. The General bucket spread adjustment is multiplied by a specified "Application Ratio" of 80%.

APPENDIX C: Model Results

Model results for the full portfolio of products (fixed and interest sensitive liability cash flows)

A. 12.31.2019 Baseline (All liability cash flows)

	ICS MAV				Single-A			
$ in Millions	Top	Middle	General	Total	Top	Middle	General	Total
Assets	64,933	50,480	222,030	337,443	64,933	50,480	222,030	337,443
Liabilities	55,325	35,634	205,723	296,682	56,642	34,928	203,804	295,374
Capital Resources	9,607	14,846	16,307	40,760	8,290	15,552	18,226	42,068
Interest Rate Risk				14,762				11,796
NDSR				582				1,980
Diversification				(426)				(1,336)
Excess Capital				25,842				29,629

B. 3.31.2020 Scenario (All liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,885	49,470	218,672	333,027
Liabilities	52,552	35,638	204,291	292,481
Capital Resources	12,333	13,831	14,381	40,545
Interest Rate Risk				12,358
NDSR				3,404
Diversification				(2,148)
Excess Capital				26,932

C. 6.30.2020 Scenario (All liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	69,208	52,655	234,760	356,623
Liabilities	59,190	39,335	223,309	321,834
Capital Resources	10,018	13,321	11,451	34,789
Interest Rate Risk				19,728
NDSR				5,222
Diversification				(3,317)
Excess Capital				13,156

D. IR Spike Up Scenario (All liability cash flows)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	54,377	43,619	185,914	283,909
Liabilities	45,026	26,673	165,517	237,216
Capital Resources	9,351	16,946	20,396	46,693
Interest Rate Risk				6,197
NDSR				577
Diversification				(408)
Excess Capital				40,328

Model results based on fixed liability cash flows only

A1. 12.31.2019 Baseline: December 31, 2019 market conditions (Fixed liability cash flows only)

	ICS MAV				Single-A			
$ in Millions	Top	Middle	General	Total	Top	Middle	General	Total
Assets	64,933	50,480	110,308	225,721	64,933	50,480	110,308	225,721
Liabilities	55,325	35,634	103,552	194,511	56,642	34,928	100,278	191,849
Capital Resources	9,607	14,846	6,756	31,209	8,290	15,552	10,030	33,872
Interest Rate Risk				10,023				8,187
NDSR				695				1,931
Diversification				(499)				(1,249)
Excess Capital				20,990				25,003

A2. 12.31.2019 Baseline: Spread over the LTFR adjusted from 20 bps to 100 bps (Fixed liability cash flows only)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,933	50,480	110,308	225,721
Liabilities	55,328	35,301	103,034	193,663
Capital Resources	9,605	15,179	7,274	32,057
Interest Rate Risk				9,411
NDSR				587
Diversification				(424)
Excess Capital				22,483

A3. 12.31.2019 Baseline: Grading adjusted from 60 years to 40 years to 100 bps spread over LTFR (Fixed liability cash flows only)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,933	50,480	110,308	225,721
Liabilities	55,337	34,878	101,975	192,190
Capital Resources	9,596	15,602	8,333	33,531
Interest Rate Risk				10,023
NDSR				695
Diversification				(499)
Excess Capital				23,312

A4. 12.31.2019 Baseline: Included certain ineligible assets in Top and Middle bucket spread (Fixed liability cash flows only)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,933	50,480	110,308	225,721
Liabilities	55,298	35,177	103,552	194,026
Capital Resources	9,635	15,303	6,756	31,694
Interest Rate Risk				9,832
NDSR				916
Diversification				(648)
Excess Capital				21,594

Model results based on fixed liability cash flows only (continued)

A5. 12.31.2019 Baseline: 100% Application Ratio for all buckets (Fixed liability cash flows only)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,933	50,480	110,308	225,721
Liabilities	55,325	35,217	101,429	191,972
Capital Resources	9,607	15,263	8,879	33,749
Interest Rate Risk				9,080
NDSR				1,874
Diversification				(1,234)
Excess Capital				24,030

A6. 12.31.2019 Baseline: All general bucket products reflected in the middle bucket (Fixed liability cash flows only)

	ICS MAV			
$ in Millions	Top	Middle	General	Total
Assets	64,933	50,480	110,308	225,721
Liabilities	55,325	137,551	-	192,876
Capital Resources	9,607	(87,071)	110,308	32,844
Interest Rate Risk				9,573
NDSR				1,465
Diversification				(998)
Excess Capital				22,805

APPENDIX D: List of Acronyms

Acronym	Description
ALM	Asset-Liability Management
AM	Aggregation Method
CSFWG	Capital, Solvency and Field-Testing Working Group
EIOPA	European Insurance and Occupational Pensions Authority
EU	European Union
FIO	Federal Insurance Office
FSB	Financial Stability Board
GCC	Group Capital Calculation
IAIG	Internationally Active Insurance Group
IAIS	International Association of Insurance Supervisors
ICS	Insurance Capital Standard
ICSTF	Insurance Capital Standard and Comparability Task Force
IPAC	Insurance Policy Advisory Committee
IR	Interest Rate
IRR	Interest Rate Risk
LOT	Last Observable Term
LTFR	Long-Term Forward Rate
MA	Matching Adjustment
MAV	Market-Adjusted Valuation
MOCE	Margin Over the Current Estimate
NAIC	National Association of Insurance Commissioners
NDSR	Non-Default Spread Risk
PCR	Prescribed Capital Requirement
PDC	Policy Development Committee
RBC	Risk-Based Capital
SAA	Strategic Asset Allocation
SII	Solvency II
VA	Volatility Adjustment
WAMP	Weighted Average of Multiple Portfolios

REFERENCES

International Association of Insurance Supervisors (IAIS), *ICS Version 2.0 Public Consultation* (July 31, 2018), https://www.iaisweb.org/page/supervisory-material/insurance-capital-standard/file/76133/ics-version-20-public-consultation-document.

_____, *Insurance Core Principles and ComFrame* (November 2019), https://www.iaisweb.org/page/supervisory-material/insurance-core-principles-and-comframe/file/91154/iais-icps-and-comframe-adopted-in-november-2019.

_____, *Public Level 1 Document: ICS Version 2.0 for the monitoring period* (November 14, 2019), https://www.iaisweb.org/uploads/2022/01/191120-Level-1-Document-for-ICS-Version-2.0-for-the-monitoring-period1.pdf.

_____, *Public 2020 ICS Data Collection Technical Specifications* (June 2020), https://www.iaisweb.org/uploads/2022/01/200630-Public-2020-ICS-Data-Collection-Technical-Specifications.pdf.

_____, *Public 2020 ICS Data Collection Yield Curves* (June 2020), https://www.iaisweb.org/uploads/2022/01/200630-Public-2020-ICS-Data-Collection-Yield-Curves.xlsx.