



International Association of Insurance Supervisors

**Macprudential Policy and Surveillance
in Insurance**

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About the IAIS

The International Association of Insurance Supervisors (IAIS) is a voluntary membership organization of insurance supervisors and regulators from more than 200 jurisdictions in nearly 140 countries. The mission of the IAIS is 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.

Established in 1994, the IAIS is the international standard setting body responsible for developing principles, standards and other supporting material for the supervision of the insurance sector and assisting in their implementation. The IAIS also provides a forum for Members to share their experiences and understanding of insurance supervision and insurance markets. In addition to active participation of its Members, the IAIS benefits from input in select IAIS activities from Observers representing international institutions, professional associations and insurance and reinsurance companies, as well as consultants and other professionals.

The IAIS coordinates its work with other international financial policymakers and associations of supervisors or regulators, and assists in shaping financial systems globally. In particular, the IAIS is a member of the Financial Stability Board (FSB), founding member and co-parent of the Joint Forum, along with the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO), member of the Standards Advisory Council of the International Accounting Standards Board (IASB), and partner in the Access to Insurance Initiative (A2ii). In recognition of its collective expertise, the IAIS also is routinely called upon by the G20 leaders and other international standard setting bodies for input on insurance issues as well as on issues related to the regulation and supervision of the global financial sector.

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Glossary

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| BIS | Bank for International Settlements |
| D-SII | Domestically, Systemically Important Insurer |
| FSAP | Financial Sector Assessment Program |
| FSB | Financial Stability Board |
| G20 | Group of 20 Finance Ministers and Central Bank Governors representing 19 major economies and the European Union |
| G-SII | Globally, Systemically Important Insurer |
| IAIG | Internationally Active Insurance Group |
| ICPs | Insurance Core Principles |
| IMF | International Monetary Fund |
| MPS | Macroprudential Policy and Surveillance |
| MPSSC | Macroprudential Policy and Surveillance Subcommittee (previously Macroprudential Policy and Surveillance Working Group) |



Preface

In response to the recent financial crisis, the International Association of Insurance Supervisors (IAIS) in early 2011 created the Macroprudential Policy and Surveillance Working Group, now the Macroprudential Policy and Surveillance Subcommittee (MPSSC), reporting to the IAIS Financial Stability Committee (FSC). In October 2011, the IAIS adopted an updated version of its Insurance Core Principles (ICPs), which are the globally accepted requirements for the supervision of the insurance sector. The new set of ICPs include, for the first time, a principle (ICP 24) and supporting standards and guidance governing macroprudential surveillance (IAIS, 2011b).¹

One of the key mandates of the MPSSC is to develop a framework for implementing macroprudential policy and surveillance (MPS) in the insurance sector.² The focus is on enhancing the supervisory capacity to identify, assess and mitigate macro-financial vulnerabilities in areas of economic significance to the global insurance sector where the impact of disruptions to financial stability are deemed most severe and wide-spread.

This document sets forth the IAIS' approach to the identification of key indicators of macro-financial vulnerabilities and the development of a conceptual approach for organising and addressing such vulnerabilities within a macroprudential framework for the insurance sector, with a focus on cross-sectional surveillance. Given the outstanding finalisation of an assessment approach for global systematically important insurers (G-SIIs) (IAIS, 2012a and 2012d), this report does not investigate the systemic relevance of insurance companies. Rather, it aims at defining measures that can help reduce vulnerabilities and/or correct misalignments of insurers to macro-financial shocks and going concern risk originating from outside the sector.³

Going forward, the IAIS will further refine MPS by issuing guidance on the practical application of ICP 24. We also will develop a toolkit and data template of early warning risk measures to be leveraged for stress testing.

¹ In addition, the IAIS Executive Committee, in its Roadmap for 2012-13, endorsed two strategic pillars of the IAIS in calling for: (i) the promotion of macroprudential surveillance, and (ii) the assessment and mitigation of risk and vulnerabilities both arising within the global insurance sector and originating from other sectors

² Unless specified otherwise, "insurance" refers to the business of primary insurers and reinsurers, including captives, in line with the Insurance Core Principles (see in particular paragraph 1 of the Introduction to the ICPs).

³ While risks can arise within the global insurance sector, traditional insurance business models are generally considered to represent a lower level of systemic risk than banks, mainly because of the different character of their liabilities and the lower degree of interconnectedness to other financial institutions and capital markets (IAIS, 2011a and 2012b). For some preliminary analysis of the systemic risk in the insurance sector completed by industry, see The Geneva Association (2011a and 2011b).



1. Executive Summary

(1) **Growing supervisory concerns about continued systemic risk and rising macro-financial linkages between insurance activities and the financial sector at large call for a clear definition of macroprudential policy and surveillance (MPS) for the insurance sector.** The inherent system-wide, or systemic, risks that caused the recent financial crisis are still present and remain insufficiently addressed by current policy frameworks. In particular, the crisis has demonstrated the critical absence of effective mechanisms to: (i) monitor the growing complexity and opacity of the interconnectedness of financial institutions; and (ii) assess the extent of cross-border exposures causing potential spillover and contagion effects. The major challenges have been the assessment of macro-financial shocks affecting asset quality, funding, and asset-liability mismatching, especially in the context of systemically important institutions (FSB/IMF/BIS, 2009). Although traditional insurance activities may not have contributed to systemic risk during the crisis, the interlinkages between the insurance sector and other sectors may increase in the future through products, markets and financial conglomerates. This warrants enhancements to supervisory processes, combined with stronger risk management and flexible approaches to resolvability, in order to minimise adverse externalities.⁴ MPS for insurance should be addressed within the context of systemic risk in the financial system as a whole, such that it encompasses insurance activities and their role within the financial system, both within national boundaries and across borders, and without any undue compartmentalising of insurance firms relative to other financial institutions.

(2) **The primary objective of MPS is to limit or mitigate systemic risks with the goal of maintaining financial stability and minimising the incidence and impact of disruptions in the provision of key financial products and services that can have adverse consequences for the real economy and broader implications for economic growth.** Macroprudential surveillance is predicated on: (i) the assessment of system-wide vulnerabilities and the accurate identification of threats arising from the build-up and unwinding of financial imbalances; (ii) shared exposures to macro-financial shocks; and (iii) possible contagion or spillover effects from individual institutions and markets due to direct or indirect connectedness. The findings from surveillance efforts support macroprudential policy, which includes measures to counter increases in potential systemic risks using existing microprudential tools or instruments designed specifically to mitigate systemic risk.

(3) **In contrast to microprudential supervision, which is concerned with the viability of individual institutions, MPS takes a market-wide perspective (“portfolio risk”) with a view**

⁴ This framework adopts the delineation of traditional, non-traditional and non-insurance activities developed by the IAIS (2011a and 2012b). The potential for insurance groups or conglomerates to become systemically relevant arises primarily through their engagement in non-traditional and non-insurance businesses (NT-NI), whereas traditional insurance is less likely to create or amplify systemic risk. The classification does not imply that traditional insurance can never be a source of systemic risk, especially when combined with NT-NI activities within large insurance-based groups or financial conglomerates.



to maintaining financial stability.⁵ Its successful implementation depends on the quality of surveillance activities and analytical tools, strength of supervisory measures and institutions, and effectiveness of policy instruments (including the persuasiveness of recommendations).

(4) **The areas of general vulnerabilities of insurance firms can be combined with a conceptual approach to the specification of risk indicators that define impact of macro-financial shocks on the insurance sector.** The design and implementation of a structural model for MPS requires additional elements beyond the scope of microprudential supervision in support of a more holistic and comprehensive treatment of risks and their impact on financial stability. Such a treatment requires varied sources of information across institutions, markets, and products.

(5) **However, the development of MPS is generally complicated by difficulties arising from the identification of vulnerabilities and measurement of risks.** In particular, these difficulties relate to:

- i. The vulnerabilities that can give rise to systemic risks are invariably bound to change over time. This report focuses on the cross-sectional dimension of vulnerabilities;
- ii. The economic meaning of risk indicators, which depend on valuation methodologies built on assumptions whose validity may be undermined by the very stress events they are designed to measure; and
- iii. The interpretation of macro-financial shocks – and as a result the ability of MPS to provide early warnings – that involves a trade-off between accuracy and timeliness, which in turn is complicated by insufficient precedent.

(6) **The surveillance element of MPS is based on combining the conceptual approach to the specification of risk indicators with the identified vulnerabilities in the insurance sector.** The structural model for the organisation of surveillance and monitoring activities under MPS needs to be complemented by suitable policy and supervisory instruments. The development of these instruments defines the current work programme of the MPSSC.

⁵ The portfolio approach underscores that top-down MPS is concerned with the interaction between systematic and idiosyncratic risks. In contrast, bottom-up microprudential surveillance ignores the interlinkages between risk factors by focusing on individual risks where “the result for the overall portfolio arises purely as a consequence of aggregation.” (Borio, 2003)



2. Defining Macroprudential Policy and Surveillance (MPS)

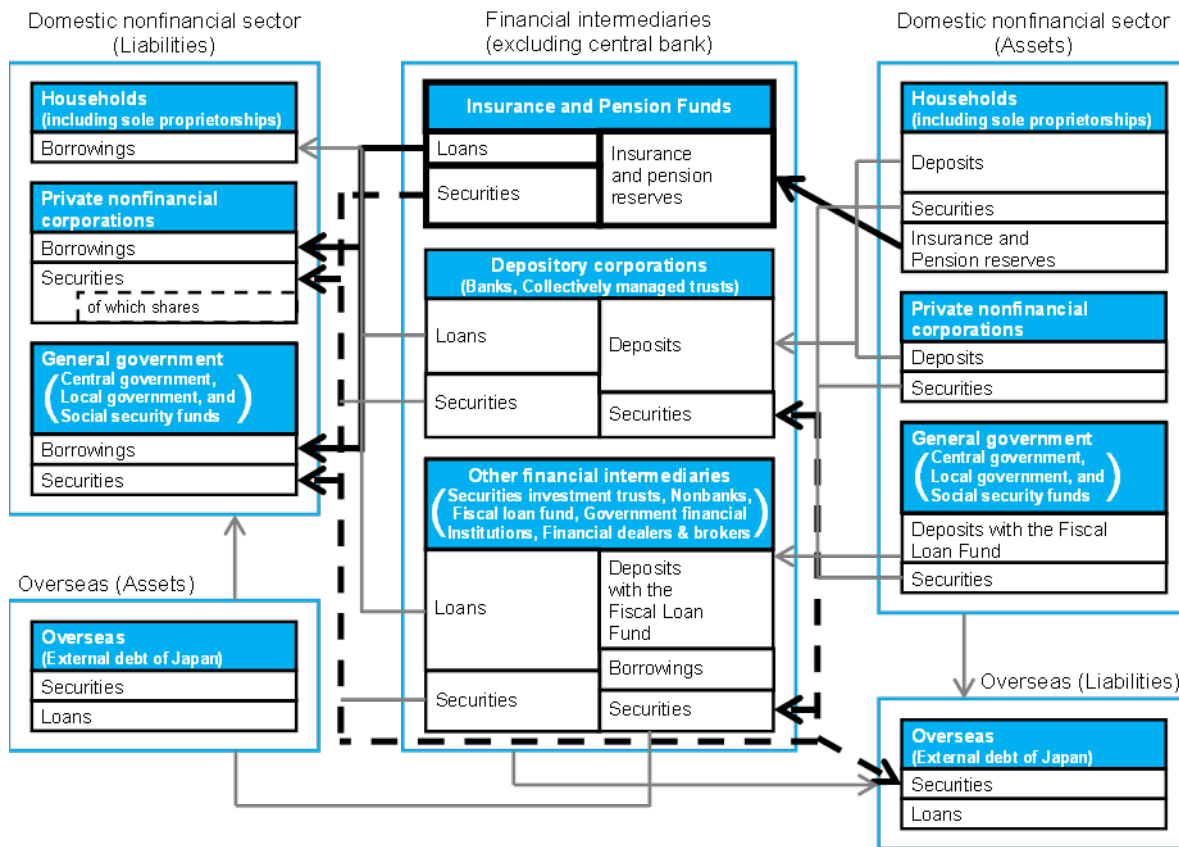
(7) **In the wake of the global financial crisis, there has been greater supervisory focus on the detection and mitigation of system-wide vulnerabilities that are insufficiently addressed within the scope of existing microprudential supervision.** The traditional approach to financial stability analysis concentrates on the identification of vulnerabilities prior to stress from individual failures, with a firm-specific focus. In contrast, the potential build-up of system-wide vulnerabilities warrants a comprehensive monitoring of on-going developments beyond institutional fragility, especially in areas of economic significance to financial sector participants (including insurers) and the real economy. Concerted effort geared towards the comprehensive assessment of systemic risk has resulted in different approaches in regulatory policies and supervisory practices that enhance the resilience of the financial sector while avoiding impairment to efficient activities that do not cause and/or amplify stress in any meaningful manner.

(8) **The primary objective of MPS is to limit or mitigate systemic risks with the goal of maintaining financial stability and minimising the incidence and impact of disruptions in the provision of key financial products and services that can have adverse consequences for the real economy (and broader implications for economic growth).**⁶ Systemic risk arises from individual or collective financial arrangements - both institutional and market-based - that could either lead directly to a system-wide distress in the financial sector or significantly amplify its consequences with adverse effects on the real economy. The propagation of such distress, which can be triggered by general or institution-specific shocks, happens via existing and/or new risk transmission channels within a particular sector or, more importantly, across different sectors of the financial system.⁷ Endogenous adverse feedback effects significantly amplify the initial shock(s), which perpetuates the deterioration in the financial sector and leads to significant output losses. Such contagion can occur within the sector (“within-sector contagion”), from one sector to another sector (“outbound contagion”), and from other sectors to a particular sector (“inbound contagion”) (see Figure 1 below). Ultimately, these disruptions due to shocks originating outside and within the financial system generate externalities that raise the aggregate risk profile of affected entities whose reactions impact economic activity. The scope of such risk transmission then results in the impairment of the flow of financial services and situations where the cost of obtaining the financial services rises sharply.

⁶ Such risk to financial stability arises from fault lines in the architecture of the financial system, for instance between banking and non-banking financial sector activities, and the collective impact of common shocks on a material number of firms, possibly amplified by market failures. An analysis through the prism of market failure is provided in De Nicolò and others (2012). Such market failures may arise from risk externalities across financial institutions as well as between financial institutions and the real economy. These externalities could be mitigated through the use of existing policy instruments, which would avoid non-trivial political challenges of macroprudential measures aimed at smoothing financial cycles.

⁷ See Brunnermeier and others (2011).

Fig. 1. Conceptualising spillover effects — the insurance sector in the flow of funds (Japan)



Source: Bank of Japan.

(9) **As an integral element in the design and implementation of MPS, systemic risk should guide the choice of measures and indicators of causes of material financial sector distress.** The proper identification, monitoring and mitigation of systemic risk requires a profoundly macroprudential view. Ideally, systemic risk measures should support, or be linked to, macroprudential policy objectives, by providing information on the build-up of system-wide vulnerabilities in both the time and cross-sectional dimensions with an acceptable level of accuracy and forecasting power for financial instability.

(10) **In contrast to microprudential supervision, which is concerned with the viability of individual institutions, MPS takes a market-wide perspective (“portfolio risk”) in averting negative externalities in support of financial stability.** It bridges the gap between the price stability mandate of monetary policy and the focus in microprudential supervision on the governance and financial soundness of individual firms. Thus, MPS represents a fundamental supervisory shift in averting threats to financial stability by preventing (or limiting) the build-up of vulnerabilities to systemic risk (including the management of credit and asset price cycles). It also increases system-wide resilience by mitigating interdependencies among individual entities,



products and activities so that both the financial system and each sector thereof can maintain its core functions during and after a distress event.

(11) **Looking at MPS in more detail, a key analytical distinction should be made between the “analytical” and “regulatory” elements.** However, more often than not, the boundaries between the surveillance, assessment and policy elements of MPS become blurred in practice. While the first two elements are focussed on the identification, assessment, and monitoring of risks (which defines “macroprudential surveillance and assessment”), the latter element is concerned with the design and implementation by national authorities of supervisory measures (which defines “macroprudential policy”) aimed at preventing and/or mitigating the identified risks and, in so doing, contributing to the soundness of the financial system.

(12) **Macroprudential *surveillance* is predicated on: (i) the assessment of system-wide vulnerabilities and the accurate identification of threats arising from the build-up and unwinding of financial imbalances; (ii) the assessment of system-wide vulnerabilities from shared exposures to macro-financial shocks; and (iii) possible contagion or spillover effects from individual institutions and markets due to direct or indirect connectedness.** It needs to be sufficiently forward-looking and administered reliably to justify effective remedial actions in a timely manner. Surveillance carried out by national supervisors not only involves monitoring the compliance of these institutions with safety and soundness standards, but also entails evaluating whether these standards are sufficient to protect the rest of the economy adequately from financial distress.

(13) **Macroprudential *policy* builds on insights gained from the monitoring of trends and developments in designing instruments that help reduce the cyclical impact of systemic risk and enhance system-wide resilience to macro-financial shocks within a sector and across the financial system.** The supervisory implications of such efforts go beyond the perimeter of firm-specific safety and soundness standards. They may require a broader evaluation of institutional, legal, and fiscal regimes, especially as to their capacity to protect the rest of the economy adequately from financial distress in a systemically important firm.

(14) **Macroprudential and microprudential approaches to policy and surveillance in insurance supervision are two sides of the same coin.** Whereas the primary motive of microprudential supervision is policyholder or consumer protection, it also indirectly endeavours to preserve financial stability. In this view, the interests of policyholders are protected best when insurers are financially sound and solvent, and a collection of solvent firms subject to individual distress is viewed as not posing a threat of financial instability. However, the financial crisis has demonstrated that the actions of individual firms may be optimal at the level of the firm but suboptimal from a macroprudential standpoint and, thus, individual firm solvency is not, on its own, adequate to protect against the risk of financial instability.



Illustration 1. Negative externalities – contagion effects in banking and implications for insurance

The most salient examples of negative market dynamics can be observed for liquidity risk in the banking sector. While the long-term funding profile of insurance companies is less susceptible to funding shocks (although such risks cannot be excluded, particularly in life insurance), the analysis of contagion effects is instructive to a general understanding of how the unwinding of financial imbalances can cause negative externalities, with possible implications for the insurance sector based on their asset exposures and/or relationships with banks.

Many sources of macro-financial shocks are triggered or at least propagated by system-wide vulnerabilities as an essential element of financial stability. For instance, the crisis revealed that negative externalities of liquidity risk management precipitated collective insolvency problems. Many business models of banks - but also a number of non-bank financial institutions (and specifically money market funds) - were vulnerable to sharp declines in financial asset prices, which increased counterparty risks, undermined solvency, and led to a collapse of private markets outside the scope of regulated financial intermediation.

These contagion effects are now well-acknowledged, i.e. that even solvent institutions may suffer from these, which may subsequently push them to illiquidity and insolvency; however the financial crisis has demonstrated that some of these effects also might have included insurance operations, at least in certain jurisdictions. For instance, the public sector support of several insurance groups in the Netherlands during the financial crisis illustrated that rising vulnerabilities in one area, such as banking, can affect overall investor confidence in other areas, such as insurance groups or conglomerates. Against a backdrop of severe stress and an overall loss in confidence in financial markets, the banking side of several firms had become vulnerable to the risk of large withdrawals of deposits, and both banks and life insurers sustained a sharp decrease in the value of investment portfolios, which in turn led to declining solvency ratios. At the same time, it became ever more difficult to delineate the cause and effect of the negative dynamics that afflicted both banking and insurance operations. In order to contain spillover effects to other financial institutions and the real economy, the Dutch government committed itself to provide capital support to each financial institution that faced difficulties because of the financial crisis, even if their fundamentals were healthy and viable. ING Group, Aegon Group and SNS Reaal used this facility for support in the amount of EUR 14 billion in total. These three financial institutions have in common that they all conduct both banking and insurance activities, but the relative size of these activities differs per institution. It should be underscored, however, that the Dutch experience appears to have been unique and perhaps limited to the Dutch version of bancassurance as no systemic spillovers within financial groups were observed in other jurisdictions with an active bancassurance sector (IAIS, 2011a).

(15) **The microprudential approach to surveillance and supervision needs to be complemented by MPS.** The classical microprudential approach to financial stability analysis concentrates analytical efforts on the identification of vulnerabilities prior to stress from individual failures, with a firm-specific focus. In contrast, the potential build-up of system-wide vulnerabilities warrants a comprehensive monitoring of developments beyond institutional fragility in areas where the impact of disruptions to financial stability is deemed most severe and wide-spread - and especially in areas of economic significance to both the financial sector participants (including insurers) and the real economy. Forward-looking MPS endeavours to identify those risks to individual insurers arising from interconnections with other parts of the financial system and the real economy. By properly identifying these interconnections as well as identifying the vulnerabilities and risks that may arise therefrom, MPS contributes to financial system stability (IMF, 2011b).



(16) Thus, for microprudential supervisors, the general scope of macroprudential analysis of a particular sector, as well as its interactions with the real economy, includes (compare also Table 1 below):

- i. *Comprehensively detecting and monitoring system-wide vulnerabilities and risks* based on established processes to collect and process prudential and market data; and
- ii. *Limiting the build-up of systemic risk* by identifying sources of macro-financial shocks as well as common exposures, risk concentrations, and interdependencies that are sources of spillover and contagion risks that may jeopardize the functioning of the financial system (or a particular sector).

Table 1. Differences between macro- and microprudential perspectives on financial stability

| | Macroprudential | Microprudential |
|---|---|---|
| Proximate objective | limit impact of system-wide distress (anticipate and prevent system-wide failure) | limit impact of individual distress on policyholders through an efficient run-off/effective resolution in case of failure |
| Characterisation of risk | "endogenous" (dependent on collective behaviour) | "exogenous" (independent of firm behaviour) |
| Consideration of interlinkages between firms and common exposures | essential ("firm-to-firm" and "firm-to-aggregate" linkages) | optional |
| Calibration of prudential controls | in terms of system-wide risk; top-down | in terms of individual risk; bottom-up |

Source: IAIS (2010a) after Borio (2003)

(17) For macroprudential *policymakers*, the analysis further includes:

- iii. *Assessing risks* to the stability of the financial system as a whole (and of a particular sector) in order to preserve financial stability as MPS interacts with other public policies; and
- iv. *Mitigating the impact of systemic risks* by establishing suitable defences capable of containing the severity and duration of adverse effects within the insurance sector and potential knock-on effects on other financial sector participants and the real economy.

In this manner, MPS builds upon and complements microprudential supervision.



3. The Role of Systemic Risk in MPS for Insurance

(18) **Insurance companies pursuing traditional business models are generally considered to represent a lower level of systemic risk than banks, mainly because of the different character of their liabilities and the lower degree of interconnectedness to other financial institutions and capital markets (CEA, 2010).** The IAIS has stated that “based on information analysed to date, for most lines of business there is little evidence of traditional insurance either generating or amplifying systemic risk within the financial system or in the real economy (IAIS, 2011a).”

(19) **However, the contemporary insurance landscape cannot be described solely on the basis of traditional business models.** It is also populated with large, complex insurance groups or insurance-based conglomerates, engaging in activities across many jurisdictions. These groups and conglomerates may include business models with non-traditional, non-insurance (NTNI) activities that make them more susceptible to financial market conditions (IAIS, 2011a). Examples may include life insurance products with non-traditional features and different types of financial guarantees that heighten a firm’s exposure to financial market risk, the underwriting of credit insurance, and reinsurance contracts with modified risk transfer that can materially affect the risk profile of contracts. Traditional, liability-driven investment and funding activities have become mixed with non-traditional activities, such as extensive securities lending and repurchasing agreements. Groups and conglomerates have also expanded in scale and scope to include non-insurance activities, such as asset management, proprietary trading, synthetic investment structures, and the underwriting of credit default swaps, which go beyond the traditional scope of insurance.⁸

(20) **In particular, it is important to recognise the changing scope of systemic risk in the insurance sector and the potential for systemically relevant activities conducted by insurance-based groups or conglomerates.** Once insurance groups engage in sufficiently material activities with no direct connection to the traditional business model (and insurable interest), the clear and consistent demarcation of systemically relevant insurance activities across different business lines in both investment and underwriting in the area of NTNI activities becomes conceptually challenging for the purpose of determining the macro-financial vulnerabilities. Moreover, ownership relations to banking (bancassurance) within a conglomerate structure might result in weakness within the banking sector and could adversely impact insurance activities via intra-group capital and liquidity arrangements. The IAIS has recognised that rising interdependencies between the sectors may increase in the future through products,

⁸ A distinction needs to be made more clearly when discussing the traditional insurance industry as insurers are commonly not subject to systemic risk from outside parties via their investments and risk mitigation practices as well as the risks which may be assumed in the future. It should be noted, however, that traditional insurers may be subject to systemic risk as a result of a multi-national ownership structure based on the difference in the quality, coordination, and focus of supervision.



markets and institutional interlinkages,⁹ which would “require enhancements to supervision and supervisory processes, combined with stronger risk management and enhanced approaches to resolvability to minimize adverse externalities (IAIS, 2010a).” Thus, from a regulatory perspective, the postulation that insurance entities will not be a source of future systemic risk may be too simplistic and can never be normative. It is based on historical observations and neglects the evolving nature of business models. Thus, the failure to identify, assess, monitor and mitigate critical trends runs the risk of missing systemic risk events in the future.

(21) **Many of these activities are likely to propagate via identified transmission channels and they tend to amplify rather than induce systemic risk.** Most systemic risk indicators for the banking sector seem to follow the rationale of “systemic risk contribution” based on the impact of institutional failure on the financial sector through well-identified risk transmission channels. However, the subtler nuances of NTNI activities increasing the interconnectedness of insurers via institutional arrangements and/or markets require more focus on “systemic risk participation,” with large macro-financial shocks to common exposures affecting the overall functioning of the sector (see Table 2 below). For instance, bancassurance can present a form of close interrelation between insurance and banking. While the combination of banking and insurance activities may generate, in principle, risk diversification benefits, market distress during the financial crisis created contagion effects within some conglomerates when funding risks in banking operations metastasised to greater reputational risk that affected all business activities, including insurance underwriting (see Illustration 1 above). Moreover, the scale of such contagion effects is compounded by the complexity of these interlinkages and the relevance of certain activities for financial stability in relation to certain risk types, such as operational risk.¹⁰ Transmission channels can result from either the failure of an insurance firm (resulting in either an impact on the provision of critical services or impacting on other financial institutions) or from the risks arising from the on-going activities of insurers where they act procyclically, or are subject to herd behaviour or amplify the credit cycle.

⁹ For example, insurance-linked securities, such as catastrophes bonds, typically create linkages with other financial market participants by way of transferring risks out of the insurance sector (von Dahlen and von Peter, 2012).

¹⁰ The most recent progress report of the FSB to the G20 Ministers and Governors on “Increasing the Intensity and Effectiveness of SIFI Supervision” (FSB, 2012a) also points to an increased focus on monitoring operational risk exposures impacting systemically relevant institutions, especially given the fact that capital regimes for operational risk are far less advanced compared to the regime for market risk and credit risk. The IAIS ICP for enterprise-wide risk management (ICP 16) provides guidance for supervision of operational risk management. The IAIS is expected to launch a peer review against ICP 16 in 2014. In addition, the draft ComFrame paper for the supervision of internationally active insurance groups (IAIGs), which is currently in its development phase to be followed by a field testing phase, builds on and complements the ICPs for IAIGs.



Table 2. General transmission channels of systemic risk

| | Contribution Approach ("Risk Agitation") | Participation Approach ("Risk Amplification") |
|-------------------|--|--|
| Concept | systemic resilience to individual failure | individual resilience and sectoral response to common shock |
| Description | contribution to systemic risk conditional on individual failure due to knock-on effect | expected loss from systemic event due to common exposure and risk concentration |
| Risk transmission | "institution-to-institution" | "institution- and sector-to-aggregate" |
| Policy objectives | avoid/mitigate contagion effect (by containing systemic impact upon failure) avoid moral hazard | maintain overall functioning of system and maximise survivorship of sound institutions |

Sources: Drehmann and Tarashev (2011), FSB (2010), Weistroffer (2011), and Jobst (2012a). Note: The policy objectives and indicators to measure systemic risk under both contribution and participation approaches are not exclusive to each concept.

4. Review of Existing Approaches and Adaptation to Insurance

(22) **This section provides a review of the growing literature on macro-financial analysis and systemic risk measurement as fundamental elements of the wider concept of MPS.** It accepts the premise of recent reports to G20 Finance Ministers and Central Bank Governors by the IMF, FSB and BIS on Macroprudential Policy Tools and Frameworks (2011a and 2011b), which states that “a consensus that having a system-wide analytical perspective is [now] a fundamental attribute of a well-specified macroprudential framework.”

(23) **While the high-level principles appear to be undisputed, the perhaps more mundane, yet challenging, task is to define the macroprudential framework and translate it into implementable tools and actionable policies.** Thus, this review endeavours to shed light on four interrelated issues. First, it takes a look at the models employed in macroprudential or financial stability analysis. Then, given that concerns related to the absence of financial stability are at the heart of any macroprudential undertaking, the second part reviews analytical advances in the detection of systemic risk and the creation of early warning indicators. The third section deals with the guidance given to policymakers – when they should intervene and when intervention should stop. The final section discusses selected literature dealing with the institutional set-up for the conduct of MPS. It incorporates a summary of the findings from a survey of insurance supervisors as presented by the IAIS (2010a) and a review of current work done at the IAIS Secretariat, in particular with respect to the Market Development Report (MDR), the Global Insurance Market Report (GIMAR) and its precursor, the Global Reinsurance Market Report (GRMR).

4.1. The conceptual framework of macroprudential policy and surveillance

(24) **The macroprudential orientation of regulatory policies and supervisory implementation is not new, but has always been among the classic toolkits of central banks in ensuring financial stability.** After two decades with repeated bouts of financial instability, Borio (2003) was arguably one of the first to develop a comprehensive framework for macroprudential policy and surveillance. Three years earlier, Andrew Crockett had staked out the same territory (BIS, 2000). But it was Borio who, together with a number of BIS colleagues who subsequently wrote extensively on this subject, gave the framework sharper contours. He delineated the new macroprudential perspective from the traditional microprudential approach by emphasizing the importance of “understanding the mutually reinforcing dynamic interactions between the financial and the real economy” for the assessment of systemic risk. And he underscored that it is not only important to understand how systemic risk builds up over time, but also how common exposures spread the crisis. Thus, the time and cross-sectional dimensions of systemic risk were introduced, two terms that continue to be relevant in the literature. Galati and Moessner (2011) provide a comprehensive review of the current literature on MPS.



(25) **Macroprudential analysis – the framework to identify, assess, and monitor systemic risk – requires a sound modelling of the shock transmission channels both within the financial system and between the financial system and the real economy.** In a comprehensive survey conducted under the auspices of the Basel Committee on Banking Supervision (BCBS) two main strands of modelling approaches to detect the impact of financial shocks on the real economy are compared, the dynamic stochastic general equilibrium (DSGE) model and a more traditional econometric macro stress testing approach (BCBS 2012). While the results show promising results regarding forecasting ability and robustness, they also reveal how much more work needs to be done in order to fix model deficiencies and close knowledge gaps.

4.2. Detecting systemic risk

(26) **While the theoretical underpinnings and the observable effectiveness of macroprudential analysis are still fraught with some uncertainty, considerable progress has been achieved on the indicator front.** This section first reviews the literature on aggregate (financial sector) indicators before turning to indicators of market conditions. In so doing, it will also progress from the early days of measuring systemic risk to approaches developed more recently.

(27) **Aggregate (financial sector) indicators were first designed in the late 1990s but have been proven insufficient for macroprudential analysis.** The prime example are the Financial Soundness Indicators (FSIs) developed by the International Monetary Fund (IMF). Today, they comprise 40 indicators collected in more than 60 countries, and the IMF is planning to extend the current FSI set to include indicators covering non-bank financial institutions, such as insurers. These indicators typically have a macro flavour, such as industry-wide balance sheet data or leverage ratios, and they are collected at low frequency intervals (monthly, quarterly or yearly). In an evaluation of various approaches, the IMF identified “certain limitations” associated with financial indicators based on balance sheet data (IMF, 2009). They were found to be “static and backward-looking,” and they failed “to anticipate changes in market conditions and spillovers” from other financial institutions. Further, in a comprehensive stock-taking exercise, the Committee on the Global Financial System (CGFS) identified as a major weakness that many early warning indicators designed to detect banking crises “tend to predict events that happen in the very near future, and moreover do not reflect an underlying model of how the real economy and the financial sector interact.” In the opinion of the CGFS, “they are therefore ill-suited to informing macroprudential policy decisions.” (CGFS, 2010) In contrast, the CGFS saw as more promising early warning indicators that rely on indicators based on credit quantities and asset markets, such as changes in credit and financial asset prices as bellwethers of a build-up of financial imbalances.¹¹

¹¹ In contrast, the CGFS attested that “these indicators perform relatively well in predicting – even out-of-sample – episodes of financial distress over somewhat longer horizons (one to four years), and reflect a

(28) **Aggregate indicators derived predominantly from individual balance sheet positions and income statements are by design static and backward-looking.** Moreover, systemic risk is not solely a function of an individual firm's failure. If the system is sound, the failure can and will be absorbed by other healthy institutions. However, if other institutions are already weak, a single failure can cause a cascade effect and potentially bring the whole system down. The fundamental question therefore concerns causality, namely whether firms are weak because of a system crisis, or the system is in crisis because firms are weak.¹²

(29) **Market-based indicators of systemic risk promise to overcome some of the deficiencies attributed to aggregate measures, despite well-known limitations.** These indicators are typically observed at higher frequencies, and they can examine either market stress or financial institution risk both individually and collectively. Most approaches thus far have focused on determining the contribution of financial institutions to systemic risk, including capturing spillover and contagion effects between institutions within and across different sectors and national boundaries via market prices. Specifically, these indicators tend to deliver near-coincident measures of systemic risk based on the joint changes on either the volatility of equity prices or credit risk as expressed through credit default swaps (CDS).¹³ These market prices are influenced by the investor perceptions of system-wide vulnerabilities from the potential of common exposures to certain asset classes, industry sectors, and markets establish relationships that can affect both the probability but also the magnitude of systemic risk if these exposures are significant enough to cause either material impairment of other financial institutions or disruptions to critical functions of the sector and/or the whole financial system.

view of financial instability that is based on endogenous cycles. According to this view, excessively strong growth in credit and financial asset prices reflect the build-up of financial imbalances that have the potential to unwind in a disruptive fashion with large negative macroeconomic consequences." This view was also supported in an IMF analysis reported in the September 2011 Global Financial Stability Report (IMF, 2011a). It found that "the yearly change in the credit-to-GDP measure is best among credit aggregates in signalling a crisis." But the IMF warned also that "a credit aggregate alone may not be a sufficiently good leading indicator, especially when considering a large sample of countries."

¹² Billio and others (2011) present five different systemic risk measures based on principal components and Granger causality networks. The universe of firms tested extends beyond banks to include also insurers, hedge funds and broker/dealers. Their results based on stock market returns suggest that the banking and insurance sectors may be even more important sources of connectedness than other parts of the financial system. Similarly, the IMF applied conditional correlation and cluster analysis to a sample of global banks and insurers and found that financial institutions displayed a relatively higher degree of co-movements during stress periods than in normal periods (IMF, 2009).

¹³ In addition to the well-known shortcomings arising from market illiquidity and over-reaction one has to acknowledge that CDS markets do not cover the whole insurance universe. In general, there are no CDS for unlisted companies, which could make reliance on CDS markets precarious.

(30) **Most approaches in this area have placed the emphasis squarely on modelling dependence in response to extreme changes in market conditions (without controlling for firm-to-firm relationships) if one or more firms were to experience material distress.**¹⁴ For instance, Acharya and others (2009, 2010, 2012a and 2012b) estimate potential losses as Marginal Expected Shortfall (MES) of individual banks in the event of a systemic crisis, which is defined as the situation when the aggregate equity capital of sample banks falls below some fraction of aggregate assets.¹⁵ Thus, the MES specifies historical expected losses, conditional on a firm having breached some high systemic risk threshold based on its historical equity returns. Adjusting MES by the degree of firm-specific leverage and capitalisation yields the Systemic Expected Shortfall (SES). This method, however, generates a purely empirical measure of linear and bivariate dependence rather than a closed-form solution. It does not consider interaction between subsets of banks and is limited to cases when the entire banking sector is undercapitalised. Brownlees and Engle (2011) apply the same definition for a systemic crisis and formulate a capital shortfall measure (“SRISK index”) that is similar to SES; however, they provide a close-form specification of extreme value dependence underpinning MES by modelling the correlations between the firm and market returns using the Dynamic Conditional Correlation (DCC)-GARCH (Engle, 2001 and 2002) model to estimate these quantities on a weekly basis using daily equity returns.¹⁶ Also Huang and others (2010) derive correlation of equity returns via DCC-GARCH as statistical support to motivate the specification of the dependence structure for default probabilities within a system of firms. Both CoVaR (Adrian and Brunnermeier, 2011) and CoRisk (Chan-Lau, 2010), follow the same logic of deriving a bivariate measure of dependence between a firm’s financial performance and an extreme deterioration of market conditions (or that of its peers). For instance, the CoVaR (CoRisk) for a certain firm is defined as the Value-at-Risk (VaR) (as a measure of extreme default risk) of the whole sector (firm) conditional on a particular institution being in distress. However, these approaches are not structural and rely on quantile regressions as a way of determining an empirical measure of linear sensitivity (i.e. conditional dependence) of individual default risk (rather than equity returns). It means that they also cannot identify the forces, business practices, or regulatory/market incentives that may be driving the observed changes in default probabilities/risk exposures. Furthermore, the CoVaR measure does not really address the issue of systemic risk as only the dependent variable can be considered in the tails (the explanatory variable has an average effect).

¹⁴ See also Markeloff and others (2012).

¹⁵ The expected shortfall (ES) is a general tail risk measure that is defined as the average value of the cumulative density function beyond a threshold percentile value, such as 95% Value-at-Risk (VaR).

¹⁶ Note that Brownlees and Engle (2011) do not use the weekly MES (with an assumed market shock of 2%) in calculating SRISK values, but rather a long-term MES, where the expectation value is for a six month period with cumulative market decline of at least 40%).

(31) **However, there are only a few multivariate models of systemic risk.** For instance, the Systemic CCA framework (Gray and Jobst, 2009, 2010 and 2011; Gray and others, 2010) generates a multivariate density estimation of joint expected losses based on the non-parametric dependence structure of sample firms for any level of statistical confidence. In addition, the measure of dependence is also linked to a semi-structural model of default risk since the input variables are individual expected losses of firms based on their implied put option values for a given debt level, market capitalisation, and equity price volatility.¹⁷ Similar to the empirical copula approach in the Systemic CCA, the Joint Probability of Distress (Segoviano and Goodhart, 2009) measure uses a multivariate entropy measure to determine joint default risk using the implied default probability in credit default swap (CDS) spreads.¹⁸ Thus, both approaches derive a so-called conditional tail expectation (CTE) beyond CoVaR, CoRisk and SES, which examine only the bivariate and marginal effect of extreme value dependence, by covering all available data that can be usefully integrated to assess systemic risk. While these approaches are promising, they have yet to prove operational usefulness as early warning measures.

(32) **There is also a growing literature on network analysis to model how interlinked asset holdings matter greatly in the generation and propagation of systemic risk (Allen and others 2010).** Haldane (2009 and 2012) developed the compelling argument that networks can produce non-linearity and unpredictability with the attendant extreme (or fat-tailed) events. One empirical example of the network literature is based on a Federal Reserve (Fed) data set, which allowed for the mapping of bilateral exposures of 22 global banks that accessed Fed emergency loans in the period 2008-10 (Battiston and others, 2012). The authors find that size is not a relevant factor to determine systemic importance. In fact, the correlation between the amount of debt (DebtRank) and size was less than 0.4 and decreasing toward the peak of the crisis.

¹⁷ The contingent claims approach (CCA) explicitly acknowledges the potential role of non-linearities in the measurement of default risk by determining the expected losses of a firm based on its implied put option value of equity. Systemic CCA extends CCA to measure systemic risk from the interlinkages between individual risk-adjusted balance sheets of financial institutions. Market data (equity and equity option prices) as well as capital structure information are used to generate a conditional, non-linear metric of system-wide default risk based on expected shortfall.

¹⁸ This approach treats the banking sector as a portfolio of banks with corresponding probability of default (PoD) in order to empirically construct a non-parametric multivariate density function (BSMD), which characterises both the individual and joint movement of PoD values of banks. Similarly, Jobst (2013) applies entropy correlation of implied volatilities from equity put options of financial institutions as an early warning indicator.

(33) The development of robust methodologies remains a work-in-progress, especially when it comes to the determination of the systemic relevance of insurers:¹⁹

- *Critical data gaps.* The work by Battiston and others (2012) is a case in point. It is based on bilateral credit exposures of banks domiciled in Europe and the United States and does not include insurance groups. In fact, under current reporting regimes it would be impossible to collect appropriate exposure data from insurers.
- *Lack of institution-specific understanding.* The insurance business model differs significantly from the business model of banks, and the insurance balance sheet behaves differently in the face of adverse market shocks. In contrast to banks, where sharp asset price declines may lead to immediate and substantial liquidity drains, insurers typically do not suffer collateral calls or liquidity outflows, and their major source of income (premium inflow) is not affected for example by market shocks.²⁰ This is another way of saying that, for reasons relating to the longer investment horizon, the characteristics of risk-based capital requirements and the inverted production cycle, insurers have a higher capacity to absorb adverse asset price shocks.²¹ Consequently, it appears questionable whether conclusions about interconnectedness and contagion emanating from insurers based on the volatility of asset prices would stand closer institutional inspection.²² Clearly, more work needs to be done to build contagion models that more adequately reflect the specifics of the insurance business model and the different reaction of the insurance balance sheet in the face of adverse shocks.
- *Effectiveness of market-based indicators.* Many systemic risk measures have short lead times, and there is often a high degree of noise in some signals. It is telling that out of 10 near-contemporaneous indicators tested by the IMF only a few survived simple explanatory tests (IMF, 2011a).

¹⁹ Borio and others (2012), for example, question the value of network analysis. In their view too much attention is paid to interlinkages and not enough on the common exposures of institutions.

²⁰ The issue of potential solvency concerns due to asset fire sales has been a focus of insurance supervision and corporate risk management for many years. While always a risk to specific institutions, instances of fire sales making insurers amplifiers of systemic shocks have not been documented in the literature.

²¹ This was borne out by the performance of the insurance sector during the 2008-09 period of the financial crisis. Only those insurance groups heavily engaged in NTNI businesses came under pressure similar to what was observed in the banking sector. The bulk of the insurance industry weathered the storm and, due to beneficial sectoral and financial market developments, was able to quickly restore its former financial strength.

²² A case in point is the statement that “the illiquidity of bank and insurance assets, coupled with the fact that banks and insurers are not designed to withstand rapid and large losses (unlike hedge funds), make these sectors a natural repository for systemic risk” (Billio and others, 2011), which does not account for insurers’ demonstrated ability to weather sustained declines in the prices of financial assets.



- *Some indicators are highly susceptible to market distortions.* Policy interactions themselves may impact the indicators (IMF, 2009). Again, more work is required to reduce noise, eliminate unreliable model input, and deal with the issue of contamination by policy actions.

4.3. Guiding policy makers

(34) The literature shows that policymakers and supervisors ultimately need an integrated presentation of the information assembled in individual indicators. The information should alert them to the build-up of systemic risk and the likelihood of crisis.

At a later stage in the cycle, policymakers will require information to determine the return to normal and the exit from crisis fighting mode. In this vein, the IMF proposed the creation of systemic risk dashboards (IMF, 2011a). These include several risk categories, selecting for each category a small number of low and high-frequency indicators with proven reliability. While the IMF template was designed with respect to the banking sector, it appears to be simple and robust enough to be easily adapted for the insurance sector. On the insurance side, the 2007 and 2008 IAIS Global Reinsurance Market Reports (GRMR) presented simple default risk models (including joint probabilities of default) derived from credit default swaps (IAIS, 2007 and 2008). As early as 2004, the IAIS Reinsurance Transparency Group (RTG) collected sector-specific CDS data (CDS sold and bought by reinsurers). The data are seen as early rudimentary indicators of systemic connectedness and were published yearly in the GRMRs.²³

(35) In recent years, macroprudential stress tests have also been increasingly used to analyse market dynamics under extreme (tail risk) scenarios and ascertain whether and when supervisory intervention would be required (EIOPA, 2011). While the importance of conducting stress tests does not appear to be disputed, their usefulness is often questioned, given the shortcomings of partial equilibrium exercises (which appear to be the standard approach) and prevalent model misspecifications.²⁴ An IAIS survey revealed that in recent years insurance supervisors have become increasingly reliant on a mixture of both top-down and bottom-up approaches to stress testing (IAIS, 2011c). The 2011 report discussed the issue of stress-testing in insurance and reinsurance supervision, looking at concepts, debates and current micro- and macro-level practices among insurance supervisors. Among the issues highlighted by the survey were challenges in collecting appropriate data and difficulties in capturing feedback effects between financial sectors and the real economy. The survey also found that stress tests were performed more often on the asset side of the insurer's balance sheet. However, in recent years, the liability side, where critical insurance-specific risks are located, was beginning to assume a more central focus.

²³ As of 2012, this data is now published in the Global Insurance Market Report (IAIS, 2012c).

²⁴ Borio and others (2012) state categorically that "stress tests failed spectacularly when they were needed most: none of them helped to detect the vulnerabilities in the financial system ahead of the recent financial crisis." They concede, however, that stress tests may have a role as crisis management and resolution tools.



4.4. The institutional set-up

(36) **Institutional set-up and governance are critical to the implementation of MPS in insurance and will determine the effectiveness of efforts aimed at mitigating systemic risk.** Questions to address with respect to the set-up relate to (i) mandate, powers, and instruments, (ii) information and resources, (iii) accountability and transparency, (iv) composition of the decision-making body, and (v) national and international policy coordination. A recent IMF staff discussion note presented key issues with respect to institutional models (Nier and others, 2011), while the September 2011 GFSR summarised three concrete examples which at that time were either already, or about to be, implemented (IMF, 2011a). In 2010, a survey conducted by the RTG that covered jurisdictions collectively representing approximately 85% of global premium income showed that IAIS Members were already in the process of either developing or enhancing their insurance-specific macroprudential surveillance (IAIS, 2010a; Ramella and von Dahlen, 2010). Although nearly all respondents (94%) said that they had no agreed working definition of macroprudential surveillance, the vast majority (97%) stated that they were conducting, or planning to conduct, an analysis of the insurance market within the next 12 months.²⁵

(37) **The institutional literature suggests that central banks should be in the lead of macroprudential policymaking.** For example, echoing Borio's argument that there would be "a premium on closer cooperation between supervisory authorities and the central bank" (Borio, 2003), IMF staff note that one of the first issues to address "involves a rethink of the appropriate institutional boundaries between central banks and financial regulatory agencies" and that "the central bank should play an important role in macroprudential policymaking." (Nier and others, 2011) These statements appear to give the lead to central banks while relegating supervisors to a merely supporting role.²⁶

(38) **Clear differences between insurance and banking demonstrate, however, that insurance supervisors must have a lead role at the macroprudential policy design table for insurance entities.** The preceding statements appear to give the lead to central banks while relegating supervisors to a merely supporting role. There should be little, if any, disagreement that cooperation and a robust dialogue between central banks and supervisors would be beneficial. In their role, central banks develop and have access to a wealth of information about broad economic and market factors. Economic and broad market considerations are very important aspects of macroprudential surveillance by financial

²⁵ At the same time, 78% of the respondents indicated that they were about to conduct an analysis of the impact of macroeconomic and other financial variables on the insurance market. Thus, it appears that insurance supervisors were ready to at least tackle the practical challenges of macroprudential surveillance.

²⁶ This aspect is closely related to the question of possible recovery and resolution framework for financial institutions other than banks in the context of the policy measures for G-SIIs. Recently the European Commission (2012) and the FSB (2012b) have published guidance notes for public consultation, which attribute significant importance to central banks within so-called Crisis Management Groups (CMGs).



supervisors overall, including insurance supervisors, and can substantively inform the development of macroprudential policies. However, while there is a substantive overlap in certain areas, an approach that places central banks in a lead role with insurance supervisors providing simple technical support has the potential to lead to inappropriate results. First, the central bank's macroprudential mandate is by default geared toward the banking sector, even in those places where central banks do not have primary responsibility for the supervision of banks. Insurance products are different from banking products and insurance supervision entails substantively different requirements to properly address those differences. It is not clear what technical competence a central bank may have for the development and application of an insurance-focused toolkit to a business model that is quite different from the banking model. Second, the distinction between micro and macroprudential surveillance and risks in the insurance context is often not easily distinguishable. Insurance supervisors have a stronger background in the macro issues that impact insurance entities and policyholders, and should consequently be closely involved in the development of macroprudential surveillance tools and policy making. Third, putting the central bank in the lead and demanding that it should have access to all relevant data and information could give central banks data collection rights that are above and beyond current confidentiality arrangements. For example, access to data and the preservation of confidentiality appear to have been addressed so far only in a small number of countries, and more universal solutions have yet to be developed. For these reasons, and in order to ensure effective and efficient use of resources and overcome an inaction bias with respect to potential macroprudential policy interventions, macroprudential policy activity requires close cooperation between central banks and insurance supervisors. To accomplish this will require an on-going and regular dialogue and a sharing of macroprudential ideas, which will be beneficial to both central banks and insurance supervisors, but which for insurance entities should be led by insurance supervisors.



5. Implementing MPS in Insurance Supervision

(39) **Against the background of a more comprehensive understanding of threats to financial stability and rising concern about tail events, MPS is becoming a salient feature of insurance supervision.** Indeed, MPS has been elevated to the level of IAIS principles and guidance in 2011. Specifically, the new ICP 24 on Macroprudential Surveillance and Insurance Supervision states:

“The supervisor identifies, monitors and analyses market and financial developments and other environmental factors that may impact insurers and insurance markets and uses this information in the supervision of individual insurers. Such tasks should, where appropriate, utilize information from, and insights gained by, other national authorities. [...] The supervisor has an established process to assess the potential systemic importance of insurers, including policies they underwrite and instruments they issue in traditional and non-traditional lines of business.”

(40) **In furtherance of these objectives, the MPSSC has been tasked with the design of an MPS framework, including the identification, measurement and monitoring of vulnerabilities and risks in the insurance sector and the broader financial system with the goal of mitigating systemic risk that might negatively affect not only the risk profile of insurers, but also the financial system and the real economy.** More specifically, this includes providing guidance on the development and conduct of macroprudential surveillance in a three-step process:

- i. *Determining key indicators of general macro-financial vulnerabilities* using stylised facts on the macro-financial sensitivities of different insurance models and recognising the need to distinguish traditional and non-traditional/non-insurance activities;
- ii. *Designing a conceptual approach* for defining risk transmission channels of stress affecting these vulnerabilities to inform early-warning and stress testing exercises aimed at identifying and addressing common exposures, risk concentrations, and interdependencies that are sources of spillover and contagion risks that may jeopardise the functioning of the system as a whole; and
- iii. *Developing a macroprudential framework* that integrates the key indicators of macro-financial vulnerabilities with the conceptual approach that can support an individual jurisdiction’s MPS development and microprudential supervision, including the implementation of ICP 24. This also includes the design and implementation of policy measures aimed at limiting the build-up of systemic risk and establishing suitable defences capable of containing the severity and duration of material distress affecting the insurance sector with adverse effects on the real economy.



(41) **However, the development of MPS in general, and for the insurance sector in particular, is still in its infancy.** There are conceptual challenges surrounding the identification and measurement of systemic risk and its sector-specific application affecting the calibration of effective supervisory measures. A macro-financial model could be informed by pre-defined indicators that facilitate the assessment of adverse financial and economic developments on identified vulnerabilities that could give rise to systemic risk considerations. An early warning capability may be based on quantitative indicators and models, supervisory data and assessments, inspection results and other qualitative information, including market intelligence. Necessarily, the precise formulation of a macroprudential model will depend upon the powers of individual jurisdictions and, in some cases, the powers and mandates of national authorities may need to be considered. The greater focus on macroprudential policy and surveillance also implies enhanced oversight for complex internationally active insurance groups (IAIGs) so that in the event of stress/crisis across national boundaries, improved regulatory decisions can be accomplished.

(42) **An IAIS survey of macroprudential surveillance practices at the national level revealed that even though most responding supervisory authorities do not have a formalised definition of macroprudential surveillance, most of them carry out macroprudential surveillance activities (IAIS, 2010a).**²⁷ The two most prevalent macroprudential surveillance activities comprise the monitoring of trends and development in insurance markets and the analysis of the system-wide impact of macroeconomic variables on the insurance market. In both instances, the focus tends to be on the analysis of domestic data, with international data analysis receiving comparatively less attention, partly due to data availability (and granularity). However, insurance-specific macroprudential surveillance activities at the global level are limited. Instead, the primary focus of attention has been so far on the role of banking, resulting in “critical knowledge gap[s] with respect to insurance-specific macroprudential surveillance of a global nature.”

(43) **In general terms, some difficulties have arisen with respect to the identification of vulnerabilities and the measurement of risks, which complicates the design and implementation of MPS in the insurance context:**

- i. *The vulnerabilities that can give rise to systemic risks are invariably bound to change over time.* The development of key indicators underpinning the macroprudential framework is premised on a comprehensive assessment of general conditions and trends in the insurance and the broader financial system, the interconnections between insurers and other financial institutions (with a focus on non-traditional and non-insurance activities in (re)insurance groups), and capital market conditions. However, the capricious

²⁷ The responses to the survey were from a wide range of Members representing both a wide geographic spread and a wide range of different jurisdictions. Responses were received from supervisors in jurisdictions which collectively represent approximately 85% of global premium income at the time of the survey.

nature of capital markets, the dynamics of business strategies, including but not limited to the constant evolution of underwriting practices and innovations in risk transfer, require a periodic re-assessment of the robustness of the framework and, in particular, the usefulness and predictive power of certain indicators for macroprudential surveillance.

- ii. *The economic meaning of risk indicators depends on valuation methodologies built on assumptions whose validity may be undermined by the very stress events they are designed to measure.* Systemic risks affecting financial stability generally arise from uncertainty, that is, rare and non-recurring events, rather than repeated realisations of predictable outcomes. This reality renders the exclusive application of (quantitative) measures and valuation models (which tend to rely on the convergence of asset prices to long-term expectations) problematic. While the conventional statistical apparatus applied to the identification of extraordinary cross-sectional patterns and variations of indicators over time might generate robust measures of stress relative to past events, it fails miserably to capture risk from sudden and unexpected realisations beyond historical precedent. Thus, qualitative information — together with greater judgement (especially as composite indicators require a more nuanced interpretation) — is also pivotal to the consistent determination of macro-financial shocks.
- iii. *The interpretation of macro-financial shocks – and as a result the ability of macroprudential surveillance to provide early warnings – involves a trade-off between accuracy and timeliness, which is complicated by insufficient precedent.* The combination of identified vulnerabilities and risk indicators informs policy measures designed to strengthen the resilience of firms and/or mitigate the impact of cyclical effects. However, the assessment of the impact from macro-financial shocks does not benefit from past experiences that can help calibrate the interpretation of signals and the manner in which early warnings are provided. Moreover, it needs to occur when it is far from certain whether risks will indeed materialise and, if so, whether the available information is sufficient to support effective policy without appropriateness and adequacy being observable over the near term. Conversely, any early warning gains greater accuracy as the realisation of the identified risk becomes more probable, which reduces the time of timely policy reaction.²⁸

(44) In addition, significant differences between banking and insurance limit the usefulness of existing (bank-focused) methods to identify systemic risk, and could complicate the execution of consistent MPS in the insurance sector. While established (general) approaches to MPS in the banking sector are instructive, they require careful assessment as to their adaptability for the design of an effective MPS framework for the insurance sector.

²⁸ Changes in accounting rules should also be taken into account when developing macro-financial risk indicators because the incentives for risk-taking could be affected (Ellul and others, 2013).

- i. *While the financial crisis has provided some momentum to the identification of vulnerabilities and risk drivers in the banking sector and support for the selection and consistent application of policy instruments, similar analysis for insurers has been far and few between.* For the banking sector, the literature points out that excessive credit growth increases the likelihood of a financial crisis and policy measures designed to reduce procyclicality of lending conditions in the system would need to be triggered one and three years in advance.²⁹ While the relevance of credit aggregates as indicators of macro-financial vulnerabilities and risks seems less compelling for the insurance sector, the predictive power of asset prices reconciles with the characteristics of economic shocks affecting the investment performance and capital cost of insurers. However, insurers are even more affected by underwriting risk setting from pricing and reserving decisions (see Figure 2 below), which could be compounded by demographic shocks as well as natural and human-made catastrophes (IAIS, 2010a and 2011a; von Peter and others, 2012). Understanding these insurance-specific shocks and enacting policies aimed at mitigating risks emerging from them require tailor-made tools that are yet to be developed.³⁰
- ii. *Moreover, the characterisation of MPS in insurance is contingent on a business model that is much different than the one commonly found in the banking sector.* Understanding the differences between business models and their structural implications for the financial sector are fundamental to a qualified assessment of how insurers might be affected by systemic risk or the manner in which systemic risk might propagate within the insurance sector, and, by extension, spill over into the real economy.
 - a. *The business model of insurers engenders macro-financial vulnerabilities, whose systemic risk implications are less influenced by the economic cycle.* While banks and insurance companies share some similarities (e.g. the efficient matching of assets and liabilities to satisfy payment claims arising from providing financial services), institutional failures in the insurance sector have arguably a different impact on the financial system and the real economy than those in the banking sector. In contrast to banking, underwriting risks are mostly idiosyncratic and generally independent of the economic cycle (see Illustration 2 below) – though investment-linked products and capital replenishment efforts can be adversely impacted by negative economic conditions in ways that apply also to banking activities. In addition, the pre-paid funding model, the longer duration of the claims

²⁹ For the banking sector, Borio and Drehmann (2008) and Ng (2011) show that abnormal credit growth has increased the likelihood of a financial crisis and demonstrate that measures designed to reduce procyclicality in the system could signal financial crisis between one and three years in advance.

³⁰ To date, the focus of the IAIS in regard to macro-financial linkages has been largely on the reinsurance sector, and on natural and human-made catastrophe shocks.



process and penalties for early surrenders of life insurance policies make insurers generally less susceptible to liquidity runs and spillover effects from interlinkages that can trigger a rapid deterioration of solvency and/or liquidity conditions. Thus, the presumption is that most systemic risk in insurance will likely build up slowly. Insurance-specific examples could be risks associated with climate change, liability schemes, and longevity. However, if not addressed and mitigated in time, these risks could potentially impact the insurance sector by affecting the viability of certain lines of business or, in the extreme case, threatening the sustainability of the entire sector. One could argue that these systemic impacts may be of greater significance to the real economy through the loss of access to insurance solutions than through the specific financial interlinkages more apparent in the broader financial system.

- b. *The differences in business models between banks and insurers also influence channels of risk transmission.* Banks and insurance companies exhibit different tendencies of propagating shocks within and across sectors, which influences the assessment of macro-financial shocks. Banks are prone to contribute to systemic risk from individual failures that propagate material financial distress via intra-and inter-sectoral linkages to other institutions and markets (based on established exposures via lending and investment) and threaten to cause disruptions to the functioning of the financial sector infrastructure (“contribution approach”). Leverage and maturity mismatches, which are core aspects of the term structure transformation of financial intermediation underpinning the banking model, can amplify the potential of material financial distress. For example, the sudden disposal of large asset positions of an institution in distress could significantly disrupt trading and/or cause significant losses for other firms with similar holdings. In contrast, insurers do not exhibit the same degree of interconnectedness, and their primary operational focus is on the absorption of idiosyncratic risk not related to the economic business cycle or financial market conditions. Thus, the traditional insurance business tends to be more affected by shocks that challenge the general resilience of the whole sector (e.g. exposure to environmental factors such as natural catastrophes or changes in longevity) (“participation approach”).



6. A Framework for Macroprudential Surveillance in Insurance

6.1. Identifying macro-financial vulnerabilities in the insurance sector

(45) **In this section, we identify general macro-financial vulnerabilities in the insurance sector.** The determination of macro-financial shocks affecting identified vulnerabilities requires a careful examination of the interactions between insurance activities and developments in the rest of the financial sector and the real economy. The insurance sector comprises a variety of unique business models and supervisory frameworks that differ significantly across jurisdictions. As a result, the relevance of macro-financial shocks and their impact on the assets, liabilities, and revenues of insurers are also bound to differ across business models and jurisdictions. Such potential vulnerabilities are wide ranging and specific measures to address them could include stress tests, loss scenarios and extreme but plausible asset price movements. It would, however, be impossible to map all vulnerabilities for all business models in all jurisdictions without running the risk of obscuring the most relevant macro-financial risk transmission channels affecting financial stability. Such an endeavour would invariably fail to be effective.

(46) **Instead, Table 3 summarises the vulnerabilities of stylised life insurance and non-life insurance business models and depicts how the assets, liabilities, and revenues of model insurers may be impacted by macro-financial shocks.** It is understood that these models may also include non-traditional and non-insurance businesses as discussed in the IAIS report *Insurance and Financial Stability* (IAIS, 2011a). Table 3 focuses on mapping the impact of macro-financial shocks and explaining the nature of respective outcomes for the life and non-life insurers in a normative fashion with respect to general characteristics of business models. In that sense, the examples presented in Table 3 by design do not cover the whole spectrum of possible shocks and their outcomes. In fact, specific macro-financial vulnerabilities have been selected to illustrate how differences in general business models (which might, in addition, also be influenced by different regulations and supervisory implementation) and variations in the financial soundness of individual insurance companies might mitigate or amplify these vulnerabilities.



Table 3. Macro-financial vulnerabilities of the insurance sector

| Economic Impact | Asset Side | Liabilities | Revenues |
|---|---|---|---|
| Non-life Insurance | | | |
| Vulnerabilities | Short-tailed business is highly sensitive to fluctuations of asset prices over short-duration investment horizons and early realisation of MtM valuation losses of fixed income securities; lower sensitivity of long-tailed products to asset price fluctuations but greater impact on future pricing. | Short-term risk horizon mitigates impact of interest rates on valuation and limits time horizon for capital replenishment. | Non-life insurance cycle may limit underwriting profitability and reduce income buffers (cyclical impacts are expected to be particularly severe in reinsurance); large declines in asset values (and own market valuation) may reduce underwriting capacity and adversely impact solvency. |
| Possible Scenarios/ Transmission Channel | Declining asset prices, possibly in tandem with deflationary monetary conditions, could cause large valuation losses, which might be amplified by concentration risk. | Inadequate loss reserves can occur due to structural breaks affecting model validity/robustness; coincidence of insurance and re-insurance cycle might limit possibilities of risk-sharing and reduce primary insurance capacity. | Investment income becomes insufficient to offset poor underwriting results. |
| Life Insurance | | | |
| Vulnerabilities | Life insurers are particularly sensitive to fluctuations of interest rates, which increase valuation (reinvestment) risk if interest rates increase (decrease); MtM valuation losses are realised late. | Interest rate movements and inflation expectations can compromise the validity of discount rates from actuarial models. | Lower interest rates may adversely impact life insurance products with options and guarantees and capital-intensive life insurance products and increase lapse and surrender rates of these products. |
| Possible Scenarios/ Transmission Channel | Large decreases in interest rates could lower investment yields over time. | Inadequate loss reserves can occur due to large increases in inflation. | Investment income (and/or time horizon for payments to policyholders/creditors) may be insufficient to offset limited capacity to redesign products and re-price underwriting risk. |

Source: IAIS (2013)

(47) **Most economic risks have an immediate effect on the investment performance of insurance companies.** Three specific shocks are discussed below in terms of how they would impact the insurance industry:

- i. *Asset price and interest rate risk.* Although income from underwriting activities is the dominant driver of earnings, life insurers in particular depend also on their investment performance, which can be impacted adversely by interest rate changes and asset price volatility, especially if some investments are very long term and/or are highly concentrated in particular asset classes. While the long-term nature of investments, the low revenue volatility of life insurers (together with predictable pay-out obligations), risk-based capital, and company enterprise risk management practices can mitigate the sensitivity to negative asset price shocks, the general valuation risk of fixed income investments goes hand in hand with interest rate risk. Higher interest rates can result in asset-liability mismatches as fixed-income investments not matched to the liabilities depreciate (and firms hold longer duration assets).³¹ Conversely, lower interest rates increase the

³¹ Note that current accounting principles can have a valuation asymmetry between assets and liabilities. Assets are largely recorded at market values, whereas in a number of jurisdictions technical provisions may not reflect market movements so that investment valuation losses from rising interest rates are not

reinvestment risk and have a negative impact on life insurance and annuity contracts, which commonly offer guaranteed, non-adjustable rates of interest in return for fixed premium income, thus causing low contract benefit liquidity.³² There can also be an effect from the differential impact of interest rate changes under various accounting regimes. The interest rate risk can be reduced by holding a commensurate amount of duration-matched fixed income investments. Similarly, the interest rate exposure is less pronounced over the near term in the case of many non-life insurers, which commonly hold shorter duration assets.

- ii. *Foreign exchange risk.* Both life and non-life insurers are exposed to fluctuations in exchange rates affecting the settlement of claims in foreign currency depending on the geographic diversity of operations. While insurers mitigate foreign exchange risk by matching the currency denomination of investment and claims, this might not always be possible, especially for short-tailed non-life businesses. However, the impact of this on systemic risk concerns is likely to be small.

Funding risk. The adverse movement of claims frequency and severity in response to an exceptional string of large natural catastrophes could drain the existing liquidity position and overwhelm the liquidity management capacity of non-life insurers.³³ The risk of timely access to capital market funding may also affect life insurers if structural changes in claims activity and exceptional surrender behaviour by policyholders upset the long-term nature of contracts and the actuarial assumptions of longevity underpinning the underwriting process.³⁴

(48) Moreover, there are insurance-specific risks that should be distinguished from the macro-financial shocks affecting other financial sectors or the real economy:

- i. *Underwriting risk.* Commercial considerations regarding the pricing and coverage of insurable interest is influenced by the rapid growth or decline in the volume of the underwriting portfolio. Moreover, the dependence on intermediaries, the possibility of rising reinsurance rates increasing substantially, and the effects of a high level of uncertainty in pricing in new or emerging markets (possibly complicated by insufficiently understood insurance risk) represent considerable challenges (see Figure 2 below).

offset by an equal (or even greater) impact on discounted reserves. Because traditional solvency instruments to some extent continue to be based on accounting figures this effect could lead to an artificial impact on the solvency margin. (IAIS, 2010a)

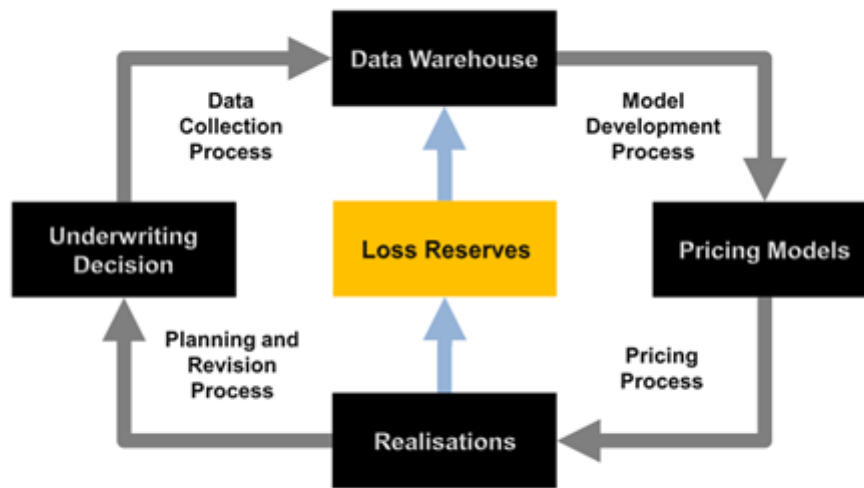
³² Life insurance companies are traditionally very large institutional investors in fixed income assets. Some of their business lines promising long-term returns above current interest rates to policyholders are challenged by the currently prevailing low-yield environment.

³³ Note, however, that the immediacy of such liquidity pressures is quite distinct from the demands placed on the treasury function of banks in wholesale funding markets, where margin calls have to be satisfied on an intra-day basis.

³⁴ A number of large non-life primary insurers and reinsurers have adopted risk transfer solutions to mitigate the impact of claims volatility on capital markets liquidity conditions by using *insurance-linked securities* (ILS) and so-called sidecar arrangements.

- ii. *Deterioration of technical provisions.* This includes the adequacy of the technical claims and other underwriting provisions, the uncertainty of the claims experience (in terms of the frequency and size of claims), the length of the claims development (including possible outcomes relating to any disputed claims, particularly where the outcome is subject to legal proceedings), the impact of inflation, the effects of increasing longevity on pension products, the guarantees and options in policy terms, the risks of early policy surrenders which can be linked to variations in interest rates, and other social, economic, legislative and technological changes.

Fig. 2. Insurance control cycle – pricing and reserving of insurance



Source: Jobst (2012b)

- iii. *Demographic risks.* Changes in mortality can have a significant temporary impact on the life insurance industry. While companies focusing on mortality risks would record a negative impact, companies focusing on longevity risks would benefit in the short term. While shocks do not change the underlying trend, they heavily affect mortality rates and short-term pay-outs. As mortality shocks would obviously lead to claims above normal levels, the settlement of these claims would increase liquidity requirements across the market. Typical risk-based capital requirements include holding capital for such a possibility. It is important to recognize that while higher capital charges increase the probability of asset fire sales to raise needed capital in the short run, it decreases the likelihood of policyholders surrendering their policies, which would have increased value for death protection to the survivors.
- iv. *Catastrophe risks.* This risk reflects the ability of insurers to withstand catastrophic events, increases in unexpected exposures, latent claims or aggregation of claims, or the possible exhaustion of reinsurance (or alternative risk transfer) arrangements, and the appropriateness of the underlying assumptions and calibrations underpinning catastrophe



models. Insurance companies use commercially available models to simulate and estimate the possible cost of claims arising from natural catastrophes and man-made disasters. These models are based on historic claims and are constantly updated. Nevertheless, there is a fundamental model risk. As there are very few models used by very many market players, there is also the danger that the model risks affect all relevant market players simultaneously. (IAIS, 2010a)

Illustration 2. General macro-financial implications for insurance³⁵

Although economic cycles impact investment income and the underwriting performance of insurance companies over time, it is commonplace to assume that such macro-financial linkages vary by different business lines as well as technical factors influencing the pricing and reserving of insurance products. In general, the most significant association of the insurance cycle with changes in economic growth can be found in forward-looking indicators of monetary conditions (interest rates and inflation) and asset valuations in capital markets (equity and debt prices).

Certain life insurance activities exhibit a high correlation with economic volatility, mainly because they rely on stable investment returns to match expected claims over the long run. The longer duration of investments can make life insurers more susceptible to secular changes in credit spreads, interest rates and asset prices than non-life insurers (unless they are reasonably hedged). For instance, lower interest rates not only heighten the re-investment risk for new funds generated from renewal premiums or bond maturities, but also increase the present value of future claims, which could give rise to asset-liability mismatches in spite of temporary asset valuation gains. More importantly, monetary easing policies (possibly in combination with higher asset impairments) during an economic slowdown lowers investment income and, thus, could jeopardise the returns of life insurance companies, particularly those offering guaranteed premium rates or returns in capital-intensive investment products (in combination with low policy surrender rates).³⁶

In the non-life insurance sector, underwriting performance broadly tracks economic growth, which affects the way in which environmental factors impact available capacity and future pricing as insurers adjust to changing demand and the cost of capital. Large catastrophe losses tend to be followed by premium hardening due to the temporary loss of insurance capacity (i.e. capital), whose cost of replenishment is accentuated if the non-life insurance cycle coincides with financial market stress when rising risk aversion of investors and depressed asset prices raise the cost of capital. Conversely, excess capacity (caused, for example, by favourable net reserve developments that push up risk-adjusted capital) limits pricing flexibility on renewals. Such price dynamics are also influenced by the extent to which renewal rates trail expected underwriting losses. Selective price increases become more likely if the long-term loss trend outpaces historical price increases at the margin.³⁷ In addition, higher rates of inflation during periods of economic recovery can adversely affect provisioning and reserve adequacy, especially if changes in claims activity negatively impact performance in real terms.³⁸ However, the impact of the economic business cycle on the scale and frequency of different underwriting risks associated with

³⁵ Based on Jobst (*forthcoming*).

³⁶ During the financial crisis, however, several mitigating factors allowed life insurers to mitigate investment risks. In most cases, the realisation of such adverse effects can be reduced by regulatory forbearance, product designs, and/or and personal tax regimes.

³⁷ While the growing popularity of insurance-linked securities (ILS), e.g. on natural catastrophes, increases the linkage of some insurance firms to capital markets, the outsourcing of insurance risk via these alternative risk transfer (ART) mechanisms has arguably muted the impact of the insurance cycle on some business lines and, by extension, has reduced the potential for economic conditions to exacerbate pricing pressures.

³⁸ Thus, an inflationary effect beyond expectations (which implies higher nominal insurance cover due to price appreciation) could cause insurers being under-reserved for future claims.

property, casualty and professional business lines is much smaller than the erratic occurrence of natural catastrophes and man-made disasters, whose system-wide impact may be exacerbated by firm-specific and/or cross-sectional concentration of exposures (Slijkerman and others, 2013).

Some non-traditional and more complex forms of life insurance lines are inherently more susceptible to financial market effects than simple mortality life insurance lines. Moreover, funding arrangements via capital markets might require the availability of liquidity that might exceed cash in-flows from premium income. For instance, in securities lending (in the context of liquidity swaps, which have gained popularity prior to supervisory intervention by the U.K. FSA in 2012), insurers shift their business model from being a provider of liquidity to the market by “transforming” policyholder funds into corporate investments. Such collateralised funding arrangements establish cash flow requirements that markedly differ from long-term cash flow projections associated with insurance liabilities. The cash flow models for liquidity swaps generally are derived from mark-to-market valuations and can give rise to margin calls if funding liquidity deteriorates.³⁹ Also, especially prior to the credit crisis, insurance-backed contracts, such as guaranteed investment contracts (GICs), implied some liquidity risk to the extent that policyholders could surrender their contracts at short notice with limited penalties, causing a cash flow scenario comparable to a bank run if contracts are surrendered on short notice.⁴⁰

6.2. Determining indicators of macro-financial vulnerabilities

(49) **The areas of general vulnerabilities of insurance firms can be combined with a conceptual framework for the specification of risk indicators of varying scope and frequency in order to develop an MPS framework.** Based on this conceptual framework, identified risk indicators can be matched to the aforementioned general vulnerabilities of different insurance business models to macro-financial shocks (see Table 3 above). The generation of system-wide risk indicators is supported by information derived from prudential data/statutory filings of company returns and market sources, which may overlap with more specific risk metrics developed for financial stability analysis (e.g. the IMF’s proposed Financial Soundness Indicators for the insurance sector) and the identification of global systemically important insurers (G-SIIs) (IAIS, 2012d). A Risk Dashboard comprising 43 mostly high-frequency indicators covering interlinkages, funding and liquidity, as well as macro, credit, and market risk was recently presented by the European System Risk Board (ESRB, 2012).⁴¹ And the 2012 Annual Report of the U.S. Financial Stability Oversight Board (FSOC) included a chapter on “Potential Emerging Threats” summarising key risks to financial market participants, including insurance companies (FSOC, 2012).⁴²

³⁹ See also the discussion of AIG’s securities lending prior to the financial crisis in IAIS (2011a).

⁴⁰ For instance, in August 1999, holders of GICs issued by General American Life Insurance Co. exercised put options that required the life insurer to rapidly repay principal and interest, causing its parent, General American Group, to go into administration.

⁴¹ While predominantly focused on risks arising from banking activities, the ESRB Dashboard includes also seven insurance indicators covering profitability, combined ratios, retention, as well as premium and solvency developments. What still needs to be determined is how these micro indicators interact with leverage and interconnectedness to assess the actual systemic implications.

⁴² One of the risks discussed was the direct and indirect exposure risk of US insurers to sovereign defaults in the euro area periphery.



(50) **Environmental, macroeconomic, and sectoral risk indicators inform a system-wide assessment based on broad determinants of macro-financial conditions and external events (see Table 4 below).** The scope for potential macro-financial shocks to affect system-wide behaviours can be analysed through: (i) financial ratio analysis (which groups ratios into categories based on various facets of a company’s financial soundness as defined by liquidity, profitability, capital, etc.); (ii) peer analysis (which permits comparison of firms of similar sizes); (iii) trend analysis (by which financial data and ratios are compared over time to highlight trends and allow an examination of comparative numbers for significant and unexpected changes); and (iv) stress testing (which allows an assessment of the firm-specific and system-wide sensitivity to changes in macro-financial conditions, such as interest rates/credit spreads, liquidity, and foreign exchange).⁴³

⁴³ It should be noted that macroprudential stress testing for insurance has not reached the level of developments attained in the stress testing of banks. (IAIS, 2010a) In the context of the Financial Stability Assessment Program (FSAP), which is conducted jointly by the World Bank and the IMF, insurance stress testing has played a secondary role thus far in terms of coverage and analysis of systemic risk. This might be explained not only by the fact that insurers are deemed less systemically relevant but also the unique conceptual challenges that emerge from the different balance-sheet structure of insurance firms impacting the design of top-down stress testing approaches (which are conducted without direct involvement of the firms themselves). While on the asset side, insurers appear more or less similar to banks, and so stress testing techniques developed for the banking industry can be adapted to be applied to insurance, on the liability side, different types of shocks and methods of analysis are needed (which also involve very granular information on exposures and risk models applied by firms).



Table 4. Conceptual framework for macroprudential risk indicators and impact on insurers (low frequency)

| General Scope Definition of Scope | | Examples of Risk Indicators | Insurance Impact |
|---|---|--|---|
| (Level 1) | (Level 2) | | |
| Low Frequency | | | |
| General assessment of economic, monetary, and capital market conditions | Environmental | Socio demographic changes (mortality, longevity), geological changes, disasters, court decisions | <i>Short term:</i> unexpected deterioration in underwriting profitability (e.g., due to catastrophes) may erode liquidity buffer and adversely impact solvency; <i>Long term:</i> failed adjustment to socio-demographic changes (mortality, longevity) may reduce risk-bearing capacity (capital and reserving); Litigation and changes in court practice may lead to step |
| | Macro-economic/monetary | Credit aggregates, general macro soundness indicators (inflation, real growth, unemployment) defining demand conditions, debt-driven capital flows, FX reserves; central bank policy rate decisions | Adverse economic conditions decrease demand for insurance |
| | Sectoral | Asset prices in real economy (e.g., housing/commercial real estate), system leverage (households, corporations) | Inflationary effect on expectation of future economic losses (which implies higher nominal insurance cover) without immediate underwriting adjustment may lead to insufficient pricing and/or inadequate provisioning as well as increased lapse rates; higher sector leverage (households/corporates) decreases demand for insurance; declines in real asset values may generate collateral calls on certain products and outstanding credit lines |
| System-wide (aggregate) assessment of insurance sector-specific conditions | Structural (statutory/prudential): comparative fundamental/peer/ trend analysis and stress testing | Capital structure composition and funding profile, duration gap, accumulation of investment exposures (e.g., commercial property investment, structured products) and/or concentration of underwriting risks; underwriting/investment income, pricing and reserving; capital ratios (equity/total assets, equity/loss reserves, equity/gross premiums written) | "Pro-cyclicality" of concentrated asset exposures and possibly higher reserve/financial leverage (e.g., positive (negative) duration gap increase vulnerability to higher (lower) interest rates) |
| | Interlinkages | Reinsurance (without retrocession) or particular counterparties (including alternative risk transfer (ART)); scope and scale of CDS protection sold | Exposure to counterparty risk and spillover effects; higher risks from funding arrangements |



Table 4 (cont.). Conceptual framework for macroprudential risk indicators and impact on insurers (high frequency)

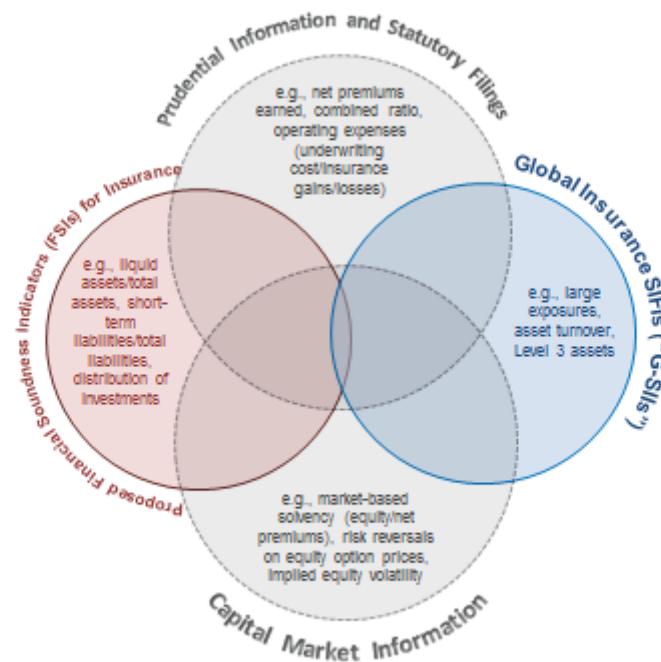
| General Scope Definition of Scope | | Examples of Risk Indicators | Insurance Impact |
|--|--|--|--|
| (Level 1) | (Level 2) | | |
| High Frequency | | | |
| General assessment of economic, monetary, and capital market conditions | Capital markets | Sovereign yield curve/asset swap rates, FX rate dynamics, FX swap basis; money market interest rates, secured/unsecured (interbank) market funding conditions (LIBOR-OIS spread, repo rates), margins/haircuts on repo collateral and securities lending | Changes in interest rates will reveal existing vulnerabilities from asset-liability mismatches, re-investment risk, and risks associated with financial guarantee products |
| | Sectoral | General asset prices directly affecting the sector (e.g., equity price indices, commodities), market price of risk, and indicators of risk reversals (e.g., based on equity option prices) | Lower (higher) risk aversion lowers (increases) cost of capital replenishment possibly causing non-life premium softening (hardening) due to capacity excess (shortage); lower demand for annuities; declines in financial asset values may generate collateral calls on certain products and outstanding credit lines |
| System-wide (aggregate) assessment of industry sector-specific conditions | Structural (markets-based): trend analysis of own performance | Liquidity of equity/bonds (bid-ask spread, transaction volumes(s)); equity price (level/volatility), earnings per share (EPS), price-to-book; debt spread (credit default swap (CDS), bond), market-implied credit rating, market leverage | Lower (higher) market valuation of financial assets (of own equity/bonds/CDS) increases (decreases) cost of capital and could negatively (positively) impact renewal rates |
| | Interlinkages | Correlation/dependence measure (for multiple firms) using market prices; joint solvency risk, e.g., joint CDS spread | (Greater) immediate impact/contagion from negative financial market movements |

Source: IAIS (2013)

(51) **The design and implementation of a structural model for MPS requires additional elements in support of a more holistic and comprehensive treatment.** Such a treatment requires varied sources of information across institutions, markets and products (see Figure 3 above). Successfully negotiating a balance between qualitative and quantitative information, however, depends on the capacity of supervisors to encourage greater symbiosis of quantitative and qualitative approaches. In particular, systemic risk analysis is conditional on the development of a suitable measurement system that can support effective macroprudential surveillance. In particular, this requires:

- i. *Extending the scope of coverage and closing data gaps on all insurance activities that are economically material in order to avoid “atomistic” behaviour.* For instance, risk exposures may be viewed as small for a single insurer, but may be large if all other firms have a similar exposure. Enhanced data coverage can induce better private risk management as well as better supervisory risk assessment.
- ii. *Considering quantities to supplement price indicators to define transmission channels that help specify risk sensitivities.* Given that the build-up of system-wide vulnerabilities tends to be gradual and occurs in areas outside intensive supervisory scrutiny, existing (high-frequency) market measures tend to be near-coincidental to crisis events. Systemic risk materialises when accumulated imbalances become unsustainable, triggering observable changes in solvency and liquidity conditions or remedial actions of affected firms. Therefore, more focus needs to be given to the quantum of risk and the extent to which it can trigger a significant negative amplification effect within the sector, with negative knock-on effects on the real economy. While the sources of risk can vary, the amplification of negative shocks tends to exhibit common patterns defined by direct and indirect linkages through contractual obligations and feedback effects on asset prices and liquidity, respectively.
- iii. *Evaluating the impact of risk drivers conditional on plausible scenarios defined by firm- and system-wide changes.* Any early warning and stress testing framework supporting macroprudential surveillance on systemic risk would not only include firm-specific variables (financial soundness indicators, or FSIs) and the characteristics of risk exposures, but also information on the relation between a firm’s strategic and operational decisions contingent on macroeconomic and capital market conditions. Each of these dimensions can change the transmission channel of systemic risk – either individually or jointly.

Fig. 3. Sources of risk indicators



Source: IAIS (2013)

6.3. Establishing macroprudential surveillance

(52) **The surveillance element of MPS is based on combining the conceptual framework for the specification of risk indicators (conditional on their varying risk transmission channels) with the identified vulnerabilities in the insurance sector in order to support the design and implementation of macroprudential surveillance.** In particular, this includes the operationalization of early warning systems and vulnerability exercises that:

- i. *Identify vulnerabilities and map out risk scenarios sufficiently in advance so that corrective policies can be implemented (“flag raising”).* In this regard, the focus is not on predicting the timing of stress, but on identifying the underlying vulnerabilities, i.e. the predisposition to shocks as well as transmission channels and knock-on effects within the insurance sector and its implications for the real economy; and
- ii. *Help prioritise policy and supervisory responses and the formulation of contingency plans based on probability and potential impact while recognising that vulnerabilities are still relevant even in benign times.*

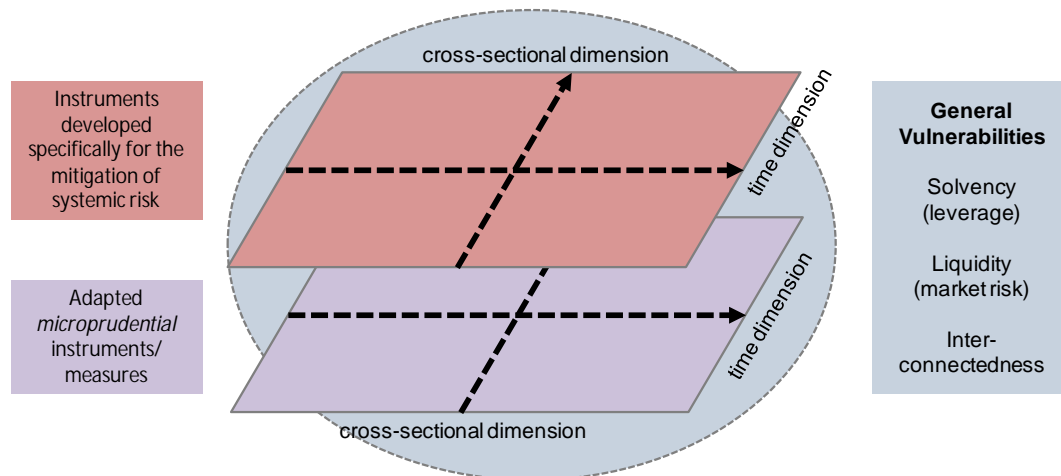


(53) **In this way, surveillance is not limited to monitoring trends and developments of prudential compliance and macro-financial risks.** It also informs the formulation of macro-prudential policy in assessing the resilience of the financial system and the insurance sector in order to develop a suitable approach aimed at mitigating the impact of systemic risks and reducing the cyclical impact of systemic risk as well as enhancing the system-wide resilience to macro-financial shocks. It does so by establishing suitable defences capable of containing the severity and duration of adverse effects within the insurance sector and potential knock-on effects on other financial sector participants and the real economy.

7. Macroprudential Policy Instruments in Insurance and Supervisory Coordination

(54) **The structural model for the organisation of surveillance and monitoring activities under MPS needs to be complemented by suitable policy and supervisory instruments.** Macroprudential policy does not seek to replace traditional regulation of insurers, but offers an additional perspective (in terms of system stability) beyond the institutional viability as primary goal. In fact, it can often be integrated within traditional regulatory (i.e. microprudential policy) instruments, and relies on supervisors for implementation and enforcement (BIS, 2011).⁴⁴ However, macroprudential policy adapts the use of these existing instruments to counter growing risks in the financial system. Thus, macroprudential policy comprises existing microprudential instruments (“first-layer instruments”) and instruments designed specifically to mitigate systemic risk (“second-layer instruments”). These first-layer and second-layer instruments have two dimensions (see Figure 4 below). Time-dimensional policy instruments are addressing financial effects from cyclical movement of interest rates and share prices, as well as economic cycles. Cross-sector-dimensional policy instruments are addressing vulnerabilities caused by interconnectedness and spillover effects.

Fig. 4. Conceptual diagram of macroprudential policy instruments



Source: IAIS (2013)

(55) **Many proposed policy instruments can be readily adapted from microprudential supervision but require an often difficult trade-off between (i) hard-wired (rules-based) automatic stabilisers and (ii) discretionary, principles-based responses.** Typical methods of adaption include: (i) enhancing the scope of supervisory measures, such as enhanced reporting, enhanced confidential and public disclosure, and banning certain activities; (ii) applying traditional administrative orders not only to one insurer but also to the whole insurance

⁴⁴ However, under certain circumstances microprudential and macroprudential measures can have conflicting objectives.



sector; and (iii) advancing regulations, such as limitations on double gearing, dividend pay-outs and large exposures, which can help mitigate system-wide risks from structural vulnerabilities.⁴⁵

(56) **However, the macroprudential policy also requires new instruments to mitigate systemic risk.** Although it relies primarily on prudential regulation and supervision, calibrated and used to limit systemic risk, additional measures and instruments are needed to directly address systemic risks, especially when it comes to operationalizing remedies to negative externalities (adverse side effects) arising from individually optimal behaviour of insurance companies.⁴⁶ These instruments may include time-varying measures to avert liability run-offs from troubled insurers, conserve and enhance capital and solvency margins, and target particular firm-specific vulnerabilities and risks that may have system-wide implications, particularly those arising from globally and domestic systemically important insurers (G-SIIs and D-SIIs, respectively).

62. **The macroprudential policies for insurance need to be part of an integrated framework that relies on the need for cooperation and effective coordination within the financial supervisory framework.** More broadly, macroprudential policy is no substitute for sound policies, including, in particular, macroeconomic policies. However, it might also result in recommendations and actions conflicting with objectives of financial supervision, market participants, or other stakeholders. Since macro-financial shocks are likely to impact all financial sectors,⁴⁷ the analysis of their impact and potential mitigation cannot be conducted in isolation.

⁴⁵ Of note are similar efforts in the banking sector. For example, the CGFS (2012) recently published a report on operationalising the selection and application of macroprudential policies, which provides guidance on the effectiveness and timing of banking-related instruments (which affect the treatment of capital, liquidity and assets). Their identification is facilitated by two alternative approaches that seek to link systemic risk analysis and instrument selection.

⁴⁶ It remains to be seen whether measures targeting systemic risk directly can be more effective than addressing this risk through prudential control at individual institutions.

⁴⁷ It should be noted that the insurance balance sheet may react differently to financial shocks than the bank balance sheet.



8. Conclusion

63. **Various issues and challenges exist related to the development and implementation of MPS in the insurance sector.** In many ways, MPS continues to be in its early stages, and most applications are limited to the banking sector. While banks are by default considered more prone to be sources and amplifiers of systemic risk, insurers pursuing a traditional business model generally are seen to generate lower degrees of systemic risk. The current financial crisis, however, has underscored that insurers are also recipients of systemic risk originating in other segments of the financial sector. A review of current business practices also shows that insurance groups or insurance-based conglomerates engaging in non-traditional and non-insurance businesses are more susceptible to financial market conditions and potentially more prone to be sources of systemic risk than insurers focusing on a traditional business model.

64. **Against this more comprehensive understanding of threats to financial stability both impacting on, and emerging from, the insurance sector, MPS is becoming a salient feature in the insurance sector.** Challenges, however, exist in identifying and measuring macro-financial vulnerabilities in the insurance sector. To address these challenges, the IAIS has developed a stylised analysis of key vulnerabilities impacting assets, liabilities, and revenues of life and non-life insurers, and a list of possible scenarios and transmission channels for the proliferation of vulnerabilities. The IAIS also proposes a conceptual approach to macroprudential risk indicators and an understanding of its impact on insurers.

65. **An effective MPS requires effective cooperation and coordination among all relevant authorities.** The fact that macroprudential surveillance and policy is often seen as prerogative of central banks puts a high premium on coordination and effective cooperation among the institutions charged with financial sector supervision within and across national boundaries. Effective macroprudential policy activities are likely to require a blend of instruments derived from conventional, sector-specific microprudential toolkits as well as traditional macroeconomic or monetary policy tools.

66. **The development of a macroprudential toolkit reflecting the specifics of the insurance sector defines the current work programme of the Macroprudential Policy and Surveillance Subcommittee (MPSCC).** The Subcommittee will also reflect on the outcome of a separate IAIS workstream dealing with the identification of global systemically important insurers (G-SIIs). Macroprudential surveillance is inherently concerned about the build-up of systemic risk in the insurance sector, and the presence of G-SIIs will have a significant bearing on the development of the macroprudential toolkit for supervisors.



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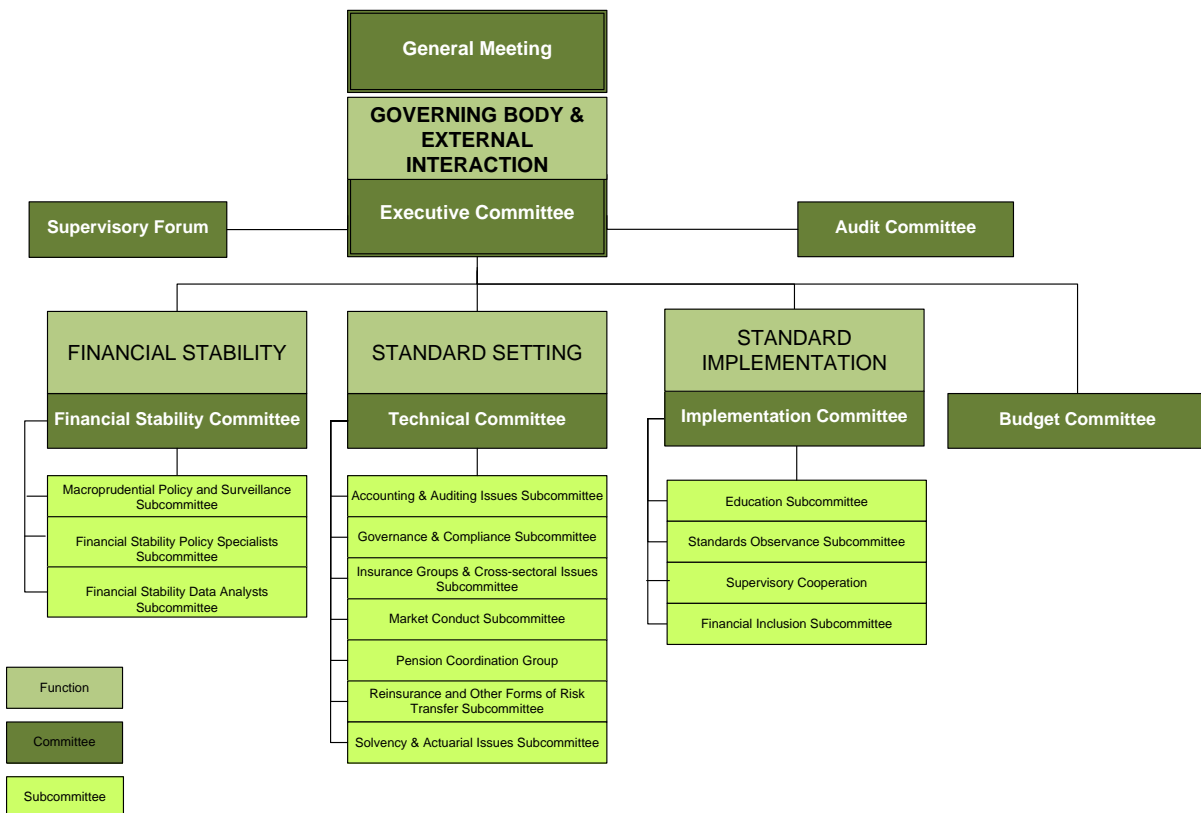
Appendix 1. Members of the Macropprudential Policy and Surveillance Subcommittee

| | |
|---|--|
| Ed Toy | Chair, USA (NAIC) |
| Christian Schmidt | Vice-Chair, Liechtenstein |
| Andreas (Andy) Jobst | Bermuda |
| Casper Christophersen Rafael Quevedo (alternate) | EIOPA |
| Guy Levy-Rueff (until August 2012) Anne-Sophie Borie-Tessier | France |
| Stanislav M. Georgiev (until April 2013) Meta Zähres | Germany (BaFin) Germany (BaFin) |
| M. Pulla Rao | India |
| Akie Oba Eiichiro Fukase | Japan (FSA) Japan (Bank of Japan) |
| Marc Radice | Switzerland |
| Dean Minot | United Kingdom (PRA) |
| Randall Dodd Larry Bruning | USA (Federal Insurance Office) USA (NAIC) |
| Dave Sandberg Dave Ingram (alternate) | International Actuarial Association |
| Daniel Hofmann (until January 2013) Sebastian von Dahlen | Economic Counsellor, IAIS Secretariat Economic Counsellor, IAIS Secretariat |



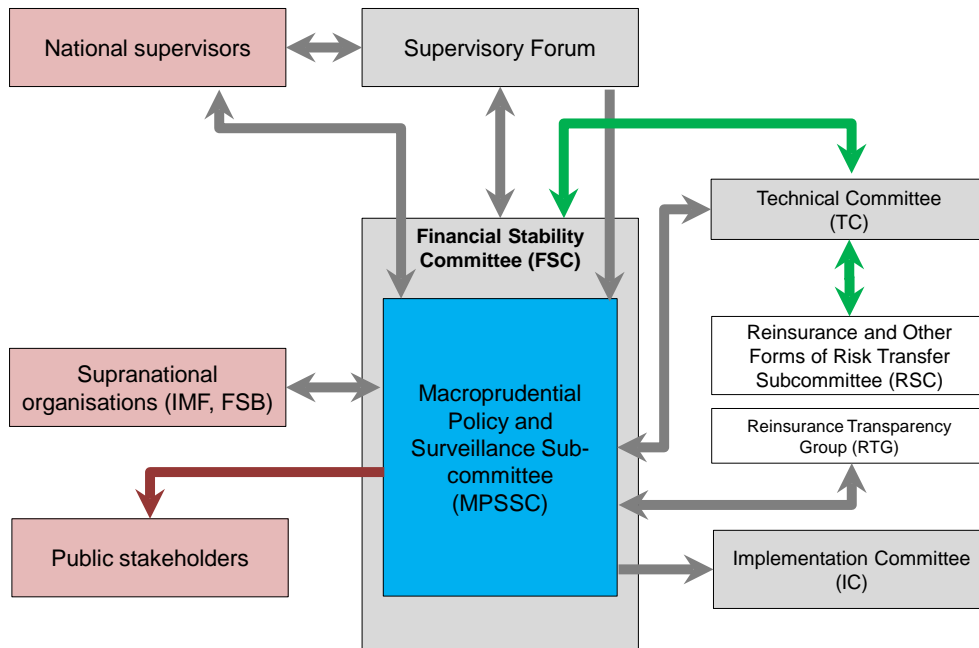
Appendix 2. Organisational structure of the IAIS and the role of the Macroprudential Policy and Surveillance Subcommittee

Fig. A1. The MPSSC in the IAIS committee architecture



Source: IAIS (2013)

Fig. A2. Financial stability hub and spokes in the IAIS



| | |
|---|--|
| ↔ | Risk identification, monitoring and reporting through macroprudential surveillance framework, comprising various reports, such as the Key Insurance Risks and Trends (KIRT), and the Global Insurance Market Report (GIMAR). |
| ↔ | Advice on best practices, development of guidelines, and standard-setting. |

Source: IAIS (2013)