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The contribution of South Africa's insurers to systemic risk: thoughts for policymakers

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ABSTRACT
The rationale for regulating financial markets is strong. First, these markets have a critical role to play in the well-being of economies of all sizes. Second, the consequences of failure of these markets is frequently felt well outside of the markets themselves. This regulation should be based on the foundation of a clearly-written publicly-stated set of objectives. One of these objectives ought to be the mitigation of systemic risk, that is the risk that the actions of a financial-sector entity could trigger widespread damage to large parts of the financial markets and to the real economy. Establishing and utilising an appropriate mix of regulatory methods, however, is rendered extraordinarily challenging by the intrinsic complexity, delicacy even, of these markets. This paper explores these issues, applies them to insurance markets, in general and then in South Africa, and asks whether more could be done by South Africa's insurance regulators to mitigate the systemic risk attributable to the country's insurers. At heart is the concern that increasingly sophisticated efforts to measure and manage entity-specific risk may have the consequence of adding materially to systemic risk.

KEYWORDS
Financial markets, insurance, systemic risk, regulation

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1. INTRODUCTION

1.1 Financial intermediaries like banks and insurers play a very significant role in servicing economic players in a country and around the world. The financial markets of which these intermediaries form a part are subject to considerable frailty. Failure of these markets can have a considerable impact, not just on intermediaries and their customers, but on national and global economies and all of those who participate in these economies. Regulation plays a critical role in mitigating this risk, but this responsibility is not easily carried out.

1.2 The global financial crisis of 2008–09 brought to the fore the challenges of systemic risk in financial markets, that is the risk that actions taken by players in these markets could have repercussions well beyond the reach of those players or even the markets in which they participate. It is not clear that the steps taken by policymakers and regulators to manage these risks have always been appropriate. This article focuses on the insurance space. Notwithstanding the high-profile failure of American International Group (AIG) and other insurers, during or after the financial crisis, the role of insurers in the development of systemic risk is insufficiently understood. While the model adopted globally for regulating insurers focuses attention on a special grouping of these insurers, colloquially labelled "too big to fail", it is not clear that such an approach to these entities is merited or if sufficient attention is given to the risks incurred by insurers falling outside of this group.

1.3 This paper asks a number of questions regarding the contribution to systemic risk by South African insurers and puts forward recommendations in this regard for consideration by regulators. More specifically, it asks whether policymakers, regulators and market participants risk being misled by the sophisticated approach to idiosyncratic risk that might actually be contributing to elevated levels of systemic risk.

1.4 The section that follows this introduction describes the complexity of financial markets, the significance of their role, the potential for market failure and the widespread consequences of that failure. In the process it builds the rationale for regulating these markets. Section 3 builds a case for insurance by considering the theoretical and empirical evidence that insurance contributes to economic and social value added. Section 4 turns to the topic of systemic risk: how it is defined, whether insurers contribute to systemic risk and how such risk might be mitigated. That section closes by describing the philosophical basis underpinning the regulation of insurance. Section 5 describes the South African market and the basis for insurance regulation in this country and Section 6 draws the discussion to a close by considering the effectiveness of this system. Section 7 proposes further research and Section 8 concludes.

1.5 Notwithstanding the fact that the paper takes a generally broad view of the subject that it explores, it is limited in an important respect. It is largely constrained, in its framework and argument, to the presuppositions of neo-classical economics. While it does not support the

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pursuit of economic growth at all costs, it also does not consider the potential consequences of this pursuit.

2. RATIONALE FOR REGULATING FINANCIAL MARKETS

The discussion that follows builds the case for regulating financial markets by pointing out, first, the significance of financial markets to those who depend on them, second, the intrinsic complexity of these markets and, third, a number of ways in which these markets might fail. This establishes the rationale for regulation but also explains recent trends under which regulatory models are developed on the foundation of a set of objectives, typically to mitigate the impacts of market failure.

2.1 The nature and substance of financial markets

2.1.1 It is difficult to express with any accuracy the importance of financial markets to the parties that they serve. The discussion that follows considers the functions of these markets and then describes their complexity and the ways in which they might fail.

2.1.2 Financial systems play a critical role in facilitating transactions between sectors and players in an economy of any size, allocating resources between these players across time and space. Among the functions played by financial markets are (CFRNZ, undated; Fohlin, 2014; Merton, 1995; OECD, 2010 and World Bank, 2012):

— facilitating payments for the exchange of goods and services,
— pricing, pooling, managing and transferring risk,
— pooling and mobilising resources for capital expenditure and infrastructural or social development,
— mobilising savings and financial liquidity, and
— facilitating trade in goods and services between countries and regions.

2.1.3 Whether the financial system plays a part in fostering economic development has been the subject of debate for some time. Commentators like Bagehot in the 1870s (World Bank, 2012), Schumpeter in the 1930s and a number of economists in the 1960s (Reid, 2010) argued that the financial system plays a significant role in development.[1] Lucas (1988), on the other hand, cited by the World Bank (2012) and by Stanley Fischer (2003)[2] took the alternative position, suggesting that it would be an exaggeration to describe financial markets as driving development. Perhaps the most important contributions in this regard have come from those who have suggested that it would be better for policymakers to focus on the needs of economic players in their countries rather than aiming for a financial

1 This is not to suggest that these writers claimed that development would follow smoothly. Schumpeter, for example, advocated the need for so-called creative destruction to remove inefficient entities and support economic growth (Dekker, 2018; Perelman, 1995; Smart, 2012). Markets, furthermore, can fail, with widespread adverse consequences (see Section 2.2 and writers like Sarkar, 2012).

2 Fischer, S (2003). 'The Importance of Financial Markets in Economic Growth', speech delivered in Brazil in his capacity as Citigroup executive, 21 August, mimeo. Fischer described himself as holding to the same view in the 1980s.

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system with a specified set of characteristics (Reid, 2010).[3] Section 3 considers evidence for the corresponding economic and social contributions of insurance.

2.1.4 Another question much debated is whether increasingly integrated financial markets have led to improved or poorer stability. Some (ADB, 2017; Schmukler, 2004) have suggested that increasing integration of financial markets contributed to a number of the financial crises of the last two decades. Others have questioned the extent of this link, raising questions of measures of financial risk (Smaga, 2014), definitional challenges (Bisias et al., 2012; Oosterloo & De Haan, 2003) and the assessment of financial stability (Fell & Schinasi, 2005, and see Section 4). Winkler (1998) considers the financial sector a facilitator of development and source of crises. This is widely echoed by more recent research suggesting the existence of tipping points in market stability, famously expressed by Andrew Haldane, director of financial stability at the Bank of Economy, as both "robust and fragile".[4]

2.1.5 In summary, while intense debate continues regarding the roles played by financial markets and the possibility of their contribution to systemic risk, there is little doubt regarding the significance of these markets.

2.1.6 Financial markets are not only highly significant, they are also complex. Financial systems vary considerably country by country, not only by the extent of development, which might be measured by attributes such as depth, access, efficiency and stability (World Bank, 2012), but also by their fundamental attributes, often linked to their origins. Systems may, for example, be bank-based or market-based (Detzer, 2014; Vitols, 2001), which tends to influence the mix and strength of other market participants. Banking services may be specialised by institution or universal and they may be provided through direct relationship between investor and recipient or on an arms-length basis (Fohlin, 2014).

2.1.7 Readers of this paper will be familiar with many of the financial intermediaries contributing to the operation of the system. An incomplete list of these entities includes (ECB, 2012; CFRNZ, undated; Merton, 1995; Tagoe, 2016):

— banks of various types,
— non-bank deposit-takers,
— other types of credit institution, for example, specialist mortgage- or microfinance providers,
— insurers and reinsurers,
— unit trust or collective investment vehicles;
— operators in foreign-exchange markets and capital markets,
— intermediaries and service-providers of various types in money-market, debt and equity markets,
— providers of saving facilities like banks, investment intermediaries, burial societies and mutual-assistance organisations, many of which provide other products and services as well,

3 This leaves open the point of whether the intermediaries that make up the financial system are themselves also economic players.

4 Haldane, AG (2009). 'Rethinking the Financial Network', speech delivered at the Financial Student Association, Amsterdam, April, page 3

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— financial vehicle corporations and others carrying out securitisation activities,
— stock- and bond exchanges,
— security- and derivative dealers,
— venture capital providers and other forms of development entities,
— providers of payment services,
— central counterparties and other settlement systems,
— entities offering custodial services of various types, and
— those participating in extensive derivative markets or in the development of other financial instruments.

2.1.8 Markets are also subject to rapid forces of change. The products offered by providers are converging. Global conglomerates have arisen providing a full suite of financial services to a range of customers (OECD, 2010) in turn adding to market complexity (Erskine, 2014).

2.1.9 This complexity of markets may be illustrated, along with their significance to the economies that they serve, with reference to the impacts of their failure. Instances of such failure are widespread (Reinhart & Rogoff, 2008 & 2011) but the corresponding financial and social impacts of such failures are typically difficult to measure after the event, much less predict in advance.[5]

2.1.10 This is problematic, for if the regulation of financial markets (see Section 2.3) is to add value, credible ways need to be established to demonstrate this value. Regulatory Impact Assessment (RIA) is the term typically used to determine the value of any regulatory initiative. RIA is mandated by governments in many jurisdictions, in principle at least, to assess the benefits and corresponding costs of regulation across a number of fields (Adelle et al., 2015 and 2016; OECD, 2009; Radaelli, 2005). RIA has been shown to provide significant benefits to the regulatory process (Gordon, 2014; Posner & Weyl, 2013a; Rose & Walker, 2013; Sunstein, 2015). A number of practical difficulties of implementation in financial regulation exist, however (Bartlett, 2014; BDI, 2016; Cochrane, 2014; Parker, 2002; Posner & Weyl, 2015; Revesz, 2016; Zilgalvis, 2014). These difficulties lead some to suggest that doggedly insisting on RIA in the financial-market space is counter-productive (Arthur & Booth, 2010; Coates, 2015; Cochrane, 2014; Gordon, 2014).

2.1.11 The next part of this discussion considers the fragility of financial markets. This leads to consideration of the role of regulation to mitigate the risks associated with this fragility.

2.2 Financial market failure and its consequences

2.2.1 The regulation of financial markets is frequently justified on the basis that such regulation protects against the prospect of market failure (Falkena et al., 2001; Llewellyn, 1999; OECD, 2010; NTSA, 2011b). If that is the case, then the types of failure

5 See Coates (2015), Cochrane (2014) and Posner & Weyl (2013b), for example, for illustrations of the range of estimates of the cost of the 2008–09 financial crisis on the global economy.

and its potential impacts ought to be soundly understood. Some commentators prefer terms such as 'imperfections' or 'distortions' to 'failure' when referring to the shortcomings in financial markets. Such imperfections, however, may be used to describe market attributes that, perhaps violating the underlying assumptions of neo-classical economics, are less likely to have deeply deleterious consequences. Such impacts may better be considered a poor market outcome rather than a failure (FCA, 2013).[6]

2.2.2 If regulation is to be designed to address market failures, it would be useful to establish a sound system for describing and classifying these failures. Researchers, however, have taken various approaches to this problem and have come up with different categories of the causes of market failures (Brunnermeier et al., 2009; CFRNZ, undated; De la Dehesa, 2010; FCA, 2013; OECD, 2010; Parker, 2002). The most commonly mentioned candidate causes of the failure of financial markets appear to be the following:

— Externalities are the costs (and benefits) experienced by those outside of the financial system that result from the actions of those operating within that system (Brunnermeier et al., 2009; Carvajal et al., 2009; IMF, 2013, 2014b and 2018; Grochulski & Morrison, 2014). These are sometimes also called social costs or spillovers.[7] The widespread impacts of the 2008–09 financial crisis, which impacted poverty levels around the world, represent perhaps the best-known recent examples of externalities.
— Information inequity, sometimes called information asymmetry or information imperfection, is represented by differences in the levels of information available to the two parties to a transaction (Healy & Palepu, 2001; Barr & Diamond, 2006). Information inequity is well known in insurance circles to operate, between insurer and customer, in both directions.[8]
— Market-power imbalances result from excessive concentration of power in the hands of a few market players and may result in rent-seeking actions that take advantage of this power, potentially costly to the economy (Khwaja & Mian, 2011).
— Principal-agency conflict typically results from inequity of incentives of the parties to a transaction (Gintis, 2009), inducing agents to put their own interests above those of their customers (CFRNZ, undated; Laffont & Martimort, 2002). It can also have widespread adverse impacts (see, for example, NTSA, 2012 and 2013a for South African application). Principal-agency conflict is frequently associated with moral hazard and the market distortions and rent-seeking associated with pricing choices.

6 Syll (2010) discusses the gap between the standard assumptions of economic theory and the real world that such theory aims to describe. Behavioural biases and their impacts on decision-making, for example, have been the subject of economic research for some time (see Tversky & Kahneman, 1991; Johnson et al., 1993; Benartzi & Thaler, 1995 and 2007; Chuah & Devlin, 2011).

7 Cost-shifting is the term typically given to known or deliberate negative externalities (see Martínez-Alier, 2012; Spash, 2019 and Swaney & Evers, 1989). Environmental externalities frequently fall into this category.

8 The existence of information inequity in those instances in which the customer is aware of features of the risk that the insurer does not know about, provides additional rationale for insurance regulation, because it demands of the insurer a conservative approach to estimating its liabilities (Swarup, 2012).

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2.2.3 With the global financial crisis of 2008–09 fresh in the mind, the first of these typically gains the lion's share of the attention of researchers and regulators. It is the key focus of this paper, which considers the potential for a material contribution to systematic risk by South African insurers. The list in paragraph 2.2.2 would nevertheless not be complete without consideration of the possibility of regulatory failure (Acharya et al., 2011; Cochrane, 2014; FCA, 2013; Gillingham & Sweeney, 2010; Parker, 2002; Winston, 2006), which ought to give policymakers careful pause for thought.

2.2.4 Increasing market complexity brings elevated levels of uncertainty regarding, in general, the future of markets and their effects and, in particular, the impacts of regulation (Whitehead, 2012) and the potential for regulatory errors (Bisias et al., 2012). Regulation can do more harm than good (Australian Government, 2014; Falkena et al., 2001). Regulators, themselves with the power to impact significantly the nature of the markets that they regulate (Weiß et al., 2014) often find themselves having to undo the adverse impacts of pre-existing regulations (Cochrane, 2014). Regulators often exert profound impacts on markets, even if unintentional, for example, by introducing moral hazard through the approach to systemically significant entities (Kim, 2011; Ötker-Robe et al., 2011, see Section 4.3). The complexity faced by these regulators is intrinsically intractable (Weber, 2011, 2012), calling ideally for an understanding of the concepts underpinning complexity theory itself (Battiston et al., 2016).

2.2.5 Financial markets, in summary, are complex networks of intermediaries that play a critical role within or between the economies in which they are located. Failure of these markets, which may take a number of different forms, can have substantial impacts that are felt not only within but also far outside of the markets themselves.

2.3 The role of regulation of financial markets

2.3.1 The rationale for financial regulation is frequently expressed in terms of efforts to mitigate against the potential for market failure (OECD, 2010; Schwarcz, 2019). This typically finds its expression in objectives-based regulatory models under which the success of regulation is judged by the extent to which pre-stated objectives are met.

2.3.2 The regulation of financial markets has a history stretching back for centuries (Atack, 2009; Gilligan, 1992; Komai & Richardson, 2011; Markham, 2000; Quinn & Roberds, 2009; Shea, 2009; Velde, 2009). The regulation of insurance developed organically in the 19th century alongside the industry (Swarup, 2012). Models of objectives-based regulation made a relatively recent appearance in the unfolding of regulatory approaches. These models may be traced back roughly to the development of the Financial Services Authority, as the single regulator in the United Kingdom, which took place in phases between 1997 and 2001 (Black, 2004; FSA, 2006 and 2007; Llewellyn, 1999). The approach was further refined by models of risk-based regulation in various countries that sought to apportion effort and resources to those parts of the regulatory environment that would most benefit from such allocation (Baldwin & Black, 2016; Black, 2004; Black & Baldwin, 2010 and 2012; FSA, 2012). Objectives typically also play a key role in the establishment of regulatory infrastructure focused on market conduct (see, for example, APRA, 2014;

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Australian Government, 1997; Feasibility, 2010; FSA, 2006 and 2012; NTSA, 2011a) and on systemic risk (NTSA, 2011a). In both instances such initiatives seek to defend against the impacts of one or more of the market failures identified in Section 2.2.

2.3.3 Three reasons may be put forward for the use of objectives in financial regulation. First, objectives promote accountability, a key determinant of good governance in a democracy (Brandsma & Schillemans, 2012; Gyong, 2011; Sarker, 2009). For this purpose, the success of any actions of government should ideally be assessed against pre-determined publicly-stated objectives (CFRNZ, undated). Second, objectives, appropriately translated into measurable outcomes (Black, 2012), provide the means to track and report progress (Knot, 2014; Baldwin & Black, 2016). Third, the objectives themselves help to provide the rationale for regulatory intervention in financial markets. They should do this by identifying market failures or desirable social outcomes and showing how the intended regulatory interventions are designed to mitigate the impacts of these failures or support the achievement of the outcomes (OECD, 2010; NTSA, 2011b; Cochrane, 2014).

2.3.4 The rationale for regulating financial markets on the basis of their significance and complexity may be sound, but these attributes must surely call for careful attention to the challenges intrinsic to this regulation, given its potential to cause harm (see Sections 2.2.3 and 2.2.4). Regulation is not cost-free (see Section 2.1.10).[9] Furthermore, the assumption that market failures can be identified and corrected has been strongly criticised (Zerbe & McCurdy, 2000). Researchers have also pointed out the danger of ignoring the potential for interaction between market failures (FCA, 2013; Murray et al., 2017). Julia Black (2013, see also Black & Baldwin, 2010) argues that the very concept of these markets within an economic framework is inappropriate because markets are essentially social entities. Policymakers have increasingly recognised that framing the objectives of regulation as merely the absence of market failures is not necessarily acceptable to society at large, because markets do not naturally meet wider societal objectives (NTSA, 2011a).[10]

2.3.5 In short, while the regulation of financial markets is justifiable, exactly how to exercise this responsibility is far from clear; yet the consequences of errors can be enormous and wide-ranging.

3. THE ECONOMIC AND SOCIAL CONTRIBUTIONS OF INSURANCE

3.1 Introductory comments

3.1.1 Having considered the role and intricacy of financial markets and the merit of their regulation, the discussion now focuses more narrowly on insurance. The fundamental question to ask is whether insurance plays a meaningful role in the economic and social development of the people that it serves. This is not intended as a challenge to the right of

9 Refer to Colliard & Georg (2020) for an assessment of regulatory complexity and Chenyu et al. (2019) and Fidrmuc & Lind (2018) for discussion of the cost of raising minimum capital requirements.

10 The supportive priority given by governments to the development of the microinsurance sector is a useful example of policymaker focus on encouraging markets to meet a social imperative (see, for example, Churchill, 2008; Churchill & McCord, 2012; Cohen & Sebstad, 2008; Deblon & Loewe, 2012; Jacquier et al., 2008 and NTSA, 2011a).

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the existence of insurance. If insurance is to be effectively regulated, however, then its value needs to be understood and, as far as possible, quantified. This in turn might form the basis for the regulatory impact assessment that ought to undergird any regulatory intervention in insurance markets.

3.1.2 The United Nations affirmed in the 1960s, admittedly perhaps a different era of economic thought, the importance of insurance to economic development, stating, "a sound national insurance and reinsurance market is an essential characteristic of economic growth." (UNCTAD, 1964:55). The discussion that follows starts by outlining the theoretical benefits of insurance. This is followed by a description of the technical models linking insurance to growth of the wider economy.

3.2 Theoretical case

3.2.1 The most significant theoretical economic and social benefits identified[11] are as follows (Bajar & Rajeev, 2015; Borensztein et al., 2017; Cai et al., 2015; Cai, 2016; Carter & Barrett, 2006; Chamberlain et al., 2017; Chatterjee & Turnovsky, 2012; Clarke et al., 2017; Cole et al., 2013; Deblon & Loewe, 2012; Dercon & Christiaensen, 2007; Dickinson, 1998; Guochen & Chi Wei, 2012; Jacquier et al., 2008; Janzen & Carter, 2018; Karlan et al., 2014; Kugler & Ofoghi, 2005; Outreville, 2013; Radermacher et al., 2012; Skipper, 1997; Thom et al., 2019; UNCTAD, 2015; UNEPFI, 2014):[12]

— insurance accepts risk of various types, transferring it away from economic entities unable or unwilling to bear that risk at acceptable cost, in the process promoting the financial resilience of businesses and households, reducing the anxiety associated with such risk (and the consequences should it be realised), allowing consideration of riskier ventures at similar cost, freeing resources for more productive uses and giving access to services such as credit, health-care and education;
— insurance also promotes the effective management of risk, not only through the pricing and acceptance of risk, but through mechanisms of pooling and risk reduction and through signalling competitive pricing of risk to economic entities;
— insurance mobilises and allocates saving, providing a security buffer to households that facilitates income- and consumption smoothing, and supporting economic growth in the process;
— insurance helps to grow markets for credit by protecting against default and contributing to appropriate pricing of risk;
— insurance contributes to the development of capital markets by adding significantly to the available pool of investable assets and encouraging the allocation of new capital,

11 Some of the authors cited also report on assessments of the microeconomic benefits of insurance. These are not considered further in the discussion of empirical evidence that follows in Section 3.3, which summarises findings on the corresponding macroeconomic benefits of insurance.

12 A number of authors, also exploring the benefits of insurance, tend to focus on a smaller set, typically risk transfer and management, financial intermediation and the contribution to the development and deepening of capital markets through investment activities (Hussels et al., 2005; Lee et al., 2013; Liedtke, 2007; Liu et al., 2014; Nektarios, 2010; Njegomir & Stojić, 2010).

particularly because insurance liabilities are typically long-term in nature, and aids in the development of the physical and social infrastructure that supports economic growth and can improve the productivity, earning potential and welfare of the poor, reducing inequality in the process;

- insurance plays a number of financial intermediation roles, facilitating mechanisms of trade, commerce and entrepreneurial initiative, and fostering the efficient allocation of capital;
- insurance substitutes or complements state-led efforts to provide social security to its citizens, through enabling (typically savings) and protective (typically insurance) vehicles, or through providing protection against natural disasters and the potential for rapid recovery; and
- insurers typically have economic incentives to reduce the losses faced by the businesses that they insure, bringing their expertise to the benefit of the insured.[13]

3.2.2 The diversity of insurance business types and hence liabilities encourages the investment of assets into a wide range of needs. It is acknowledged that not all of the activities of insurance are necessarily always in the interests of all of society. The typically narrow subdivision of policyholders into risk categories, for example, may mitigate against social objectives of sharing risk more widely (McLeod, 2005). The concerns that the private operation of markets can mitigate against social objectives are not unique to insurers within the broader financial-market sphere.

3.3 Macroeconomic empirical evidence

3.3.1 Is there evidence that insurers indeed contribute to economic growth and development? This has proven a difficult question to answer, perhaps well illustrated by the assertion of Rudra Pradhan and his colleagues that: "There is no universally held view of the nature of causality between insurance market activities and economic growth" Pradhan et al. (2017:18).[14]

3.3.2 Evidence exists that, in many countries, and over many periods, insurance and economic growth are strongly correlated and that insurance indeed contributes to economic growth, but that this is by no means universally the case. The presentation starts

13 Sources from insurance providers or representative bodies, or those funded by the industry have been assessed with caution. Among the additional benefits cited by these sources are (Brainard, 2008; Cummins et al., 2018; Grant, 2012; Kessler et al., 2016; Weisbart, 2018): (1) insurance allows households and small businesses the opportunity to assess opportunities that they might not otherwise be able to consider, in the process fostering economic growth, (2) the long-term capital provided by insurers stabilises economic volatility and provides finance for infrastructure development, and (3) insurance helps to contribute solutions to global challenges like population ageing, climate change and cyber risk.

14 Pradhan et al. (2017) also describe the level of attention given to the nexus between insurance and economic growth as "scant" (page 20). Perhaps this is expressed in contrast to the correspondingly significant volumes of work concerning the analogous impacts of banks and stock markets (see Arena, 2008, Haiss & Sümegi, 2008, for example).

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with the helpful summary of Pradhan et al. (2017) setting out the four possible causal relationships between insurance markets and economic growth:[15]

— the supply-leading hypothesis takes the position that causality runs from the activities of insurance markets to economic growth,
— the demand-following alternative adopts the opposite direction of causality, in other words that economic growth stimulates the development of insurance markets,
— the feedback hypothesis rests on the viewpoint that economic growth and the development of insurance markets mutually stimulate one another, and
— the neutrality hypothesis takes the view that there is no causal relationship between economic growth and the development of insurance markets.

3.3.3 Early research tended to focus on the second hypothesis as it sought to understand the factors that stimulated the development of insurance markets (Outreville, 1990 and 1996; Ward & Zurbruegg, 2000). The bulk of this work concluded that, indeed, economic growth contributes to the development of insurance markets.[16] For the purposes of this study, however, evidence is sought supporting the existence of the supply-leading hypothesis, but any signals that development is mutual, along the lines of the feedback hypothesis is helpful as well.

3.3.4 A number of empirical studies have been published considering the thesis that insurance contributes to economic growth.[17] On the whole, recent papers are more inclined to assess the markets of multiple countries together and to study the relationship in terms of Granger causality rather than merely correlation or cointegration.

3.3.5 In the pursuit of a definitive answer to the direction of impact, the research is not easily summarised. Evidence, for example, is found of a positive impact of insurance on economic growth in India, China, the emerging economies of Europe and, over a long period, in Sweden:

— life insurance in India appears to stimulate economic growth (Ghosh, 2013; Verma & Bala, 2013) and evidence for the reverse relationship has not been found (Ghosh, 2013),
— a causal link between insurance and economic growth is found across the provinces of China, except for low-income provinces in the case of life insurance (Guochen & Chi Wei, 2012),
— a study of emerging European markets for 2010–2014 shows a positive impact of insurance on economic growth (Stojaković & Jeremić, 2016), and
— insurance in Sweden appears to have exerted a positive effect on economic growth over the period 1830–1998 (Adams et al., 2008).

15 Pradhan et al. (2017) also provides a list of papers that indicate research into each of these models. The literature surveys by Outreville (2013) and Din et al. (2017) are also recommended.
16 Tien & Yang (2014) find higher growth among smaller insurers during times of stronger economic growth in Taiwan, suggesting that the economic growth is positive for competitive dynamics across the market. This possibility is worthy of further research.
17 Further related studies are available at Enz (2010), Garcia (2012) and Li et al. (2007).

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3.3.6 In studies covering the developed countries of the OECD and EU, however, while some evidence of this relationship is found, it appears to be limited to certain countries, or temporary in nature:

- across 55 countries, for the period 2006–2014, both life and non-life insurers have a significant causal impact on economic growth, but for life insurers this is prevalent in high-income countries and for non-life insurers in low-income countries (Arena, 2008);
- in ten OECD countries for the period 1979–2006, one-way Granger causality is found from insurers to economic growth in five countries, causality the other way for three countries (but in one such instance only for life insurance, not non-life), in both directions for one country, and not at all in the case of four countries (Chang et al., 2014);[18]
- life insurance is found to have a positive impact on economic growth in 18 Western European countries but, for new European Union member states from eastern parts of the continent, the causal link insurance and economic growth is found in the case of liability insurance rather than life insurance (Haiss & Sümegi, 2008);
- mixed results are found from a study of European countries, 2004–2015, where three countries show causality from insurance to economic growth, two present evidence of the flow the other way, one shows causality in both directions and a final country shows no causal relationship at all (Peleckienė et al., 2019);
- while long-run evidence exists in a 34-country EU study spanning the years 1988 to 2012 that insurance supports economic development, short-run variations appear, suggesting the possibility of feedback loops in the pattern of development (Pradhan et al., 2015; Dash et al., 2018);
- evidence of causality from insurance to economic growth is found in analysis of 19 EU countries for 1980–2014, but the consistency of this relationship appears to be weak (Pradhan et al., 2017);
- the relationship between insurance and economic growth in nine OECD countries between 1961 and 1996 shows Granger causality running in one direction in some countries and in the opposite direction in others (Ward & Zurbruegg, 2000); and
- a strong causal relationship across 55 countries, for the period 1980–1996, appears to exist from both insurers and banks to economic growth, controlling for a number of alternative variables regarded as contributing to growth (Webb et al., 2002).

3.3.7 Mixed evidence also appears to be uncovered concerning the differences between developed countries and their developing counterparts. Pradhan et al. (2016) report significant cointegration of insurance market activities, economic growth, financial depth and government consumption expenditure across 18 middle-income countries, including South Africa, between 1980 and 2012. They also found significant causal impacts of insurance on economic growth. Han et al. (2010) describe the relationship between insurance and economic growth as stronger in developing countries than in developed, while Haiss &

18 Some countries are included in more than one of these categories in respect of different periods or different classes of insurance.

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Sümegi (2008) reported finding this relationship only in the case of developed economies. Din et al. (2017) found that the role of insurance in promoting economic growth is more significant for non-life insurers than for life insurers. Outreville (2013) suggests that these differences may be attributable to the distinct strength of the relationships in the cases of life and non-life insurance and the relative weightings of the business lines in different markets, life insurance typically playing a small role in developing markets than non-life insurance.

3.3.8 Mixed results are also evident from studies of African countries.

— Insurance markets appears to contribute significantly to economic growth in a panel study of 30 sub-Saharan African countries for the period 1986 to 2011 (Akinlo & Apanisile, 2014).
— Mixed results are shown from a study of a set of countries for the period 1970 to 2013. Significant causality is found between insurance and economic growth for Egypt. For Kenya, Mauritius and South Africa, this relationship appears to be present but only in the long run. In contrast, negative impacts of insurance on economic growth are uncovered in Algeria, Nigeria, Tunisia and Zimbabwe (Olayungbo & Akinlo, 2016).
— The result for Nigeria appears to be confirmed in a separate study (Olayungbo, 2015), but contradicted by another, considering the period 1986 to 2010, that suggests strong cointegration of insurance with economic growth and statistical significance of the contribution of insurance to economic growth (Yinusa & Akinlo, 2013).
— A positive relationship between insurance and economic growth is shown for Kenya (Ndalu, 2016), but it is not clear whether the study demonstrates causality as well as correlation.
— A significant relationship is found in South Africa, for the period 1990 to 2012, between long-term insurance and the economy where causality is found to run from the economy to the industry. In contrast, no causal relationship is found between short-term insurance and economic growth (Sibindi & Godi, 2014).

3.3.9 Some studies consider different measures of financial market development, alongside insurance and different measures of economic growth. Ramoutar (2020), for example, assessing 33 developed and developing countries—South Africa included—over the period 2000 to 2016, considers life insurance and non-life insurance premiums and assets, mutual fund assets and pension fund assets. He finds positive relationships between insurance assets and GDP, between mutual fund assets and GDP and between non-life insurance premiums and GDP, but a neutral relationship between pension fund assets and GDP and a negative relationship between life insurance premium volumes and GDP. The study-of-studies by Zuzana Richterková and Petr Koráb (2013) concludes that insurance activity indeed has a positive impact on economic growth.

3.4 Concluding thoughts

3.4.1 In summary, a robust foundation exists for the theory that insurance markets support economic growth. This appears to occur primarily through the mechanisms of risk management, financial intermediation and capital-market development.

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3.4.2 The empirical evidence that the same relationship holds is more difficult to confirm. This should perhaps not be surprising. Numerous studies have been undertaken, but they have utilised different definitions of insurance market size and economic growth, considered different countries or combinations of countries, assessed different periods and applied different technical methods. Despite these differences, there appears to be support for the position that insurance markets and economic development are strongly cointegrated. Causality is more difficult to establish and appears to run in both directions for different countries and at different times.

3.4.3 Overall, taking theoretical and empirical research into account, a reasonably strong case may be made that insurance plays a meaningful role in stimulating economic growth. This in turn encourages the conclusion that sustaining healthy and growing insurance markets represents a sound and logical objective of insurance regulation.

4. INSURER CONTRIBUTION TO SYSTEMIC RISK

Having considered the nature and frailty of financial markets, the rationale for regulating them and the contribution of insurance to economic development, the discussion turns to systemic risk, the core subject of the paper. It seeks to define and describe systemic risk and considers the nature and extent of the insurer contribution to systemic risk. It then outlines some of the methods typically used to mitigate systemic risk and summarises the concerns that have been raised regarding these methods, closing the discussion with a focus on insurers. This leads to the discussion of prudential regulation of South African insurers in the following section.

4.1 Systemic risk across financial markets

4.1.1 What is systemic financial risk? While the concept of systemic risk has been considered from a number of different angles (Claessens, 2015; ECB, 2010; Eling & Pankoke, 2016; Galati & Moessner, 2014; Hansen, 2013), broad consensus on the nature of this concept, let alone on the metrics that might be used to describe it, seems elusive:

> One possibility is simply to concede that systemic risk is not something that is amenable to quantification. Instead it is something that becomes self evident under casual observation. (Hansen, 2013:1)

4.1.2 As difficult as it might be to define with precision, most researchers have recognised the importance of some form of description of systemic risk, to delineate it from other forms of financial distress or market failure. They have done so (Acharya et al., 2017; Bisias et al., 2012; Cerra & Saxena, 2017; Cummins & Weiss, 2014; De Bandt & Hartmann, 2000; Eling & Pankoke, 2016; Geneva Association, 2010b; Georg, 2011; Group of Ten, 2001; Harrington, 2009; Kessler, 2014; Nier et al., 2007; Safa et al., 2013; Weiß & Mühlnickel, 2014), with reference to a number of attributes, for example:

— widespread adverse impacts on the financial sector, typically based on the pre-conditions of extensive market interdependencies and the associated risk of contagion,
— externalities or market failure of some form,

— significant loss of confidence, typically resulting in an associated loss in economic value, and
— severe and widespread impairment of financial-sector entities, often spilling over into the wider economy.

4.1.3 Georg (2011) suggests that the financial upheaval of 2008–09 and the contagion that followed it stimulated a significant change in the meaning attributed to systemic risk. Before the crisis, the term was typically used to describe the potential for contagion-stimulated default cascades. The crisis, he proposes, showed that systemic risk may also be attributable to a common shock that leads to simultaneous default or informational spillovers increasing the cost of debt.

4.1.4 A number of researchers have utilised a range of approaches in an effort to quantify systemic risk or the respective contributions of financial institutions to systemic risk. Refer to Acharya et al. (2017), Bierth et al. (2015), Chen & Sun (2019), Dijkman (2010), Hufeld et al. (2017) and Kanno (2016), and the survey of alternatives in Bisias et al. (2012). Where researchers or commentators adopt a definition of systemic risk, they commonly do so with reference to the definition adopted by the Financial Stability Board, quoted by the Geneva Association as follows:

> The risk of disruption to the flow of financial services that is (i) caused by an impairment of all or parts of the financial system; and (ii) has the potential to have serious negative consequences for the real economy. Fundamental to this definition is the notion that systemic risk is associated with negative externalities and/or market failure and that a financial institution's failure or malfunction may impair the operation of the financial system and/or the real economy. (Geneva Association, 2010b:23, citing the Financial Stability Board)

4.1.5 This definition is helpful to this research because it links systemic risk directly to the existence of externalities, one of the market failures identified in Section 2.2. It also helps regulators to delineate the impacts of the risks incurred by financial-sector entities into two broad categories: (1) those with direct adverse effects on the entities themselves and (2) those that spill over to others, in other words, externalities or systemic risk. While regulated entities have a natural incentive to identify and manage risks whose impacts have a direct effect on them, they do not have the same incentive to put time, effort and money into mitigation of the potential for externalities. This represents a key responsibility of regulation (Schwarcz, 2008).

4.1.6 The South African Reserve Bank (SARB), operating as central bank and regulator of banks, also defines systemic risk in a manner that draws attention to the possibility of externalities and their impacts. A stable financial system is defined by the SARB in the following terms:

> […] a financial system that is resilient to systemic shocks, facilitates efficient financial intermediation, and mitigates the macroeconomic costs of disruptions in such a way that confidence in the system is maintained. (SARB, 2017b: inside cover page, no number).

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4.1.7 Before turning to questions on the causes of systemic risk and the means typically utilised by regulators to mitigate systemic risk, it is appropriate to note the avenue of research that assesses the financial system as a network of connected entities. The nature of this network and the extent and form of its interconnectedness are explored to shed light on the options available for mitigation of the potential of contagion, that is, the propagation of distress through the network.[19] South Africa's financial markets appear to show high levels of concentration and interconnectedness (see discussion in Section 5.2), suggesting the possibility of fruitful further analysis in this regard (as considered in Section 7).

4.1.8 What are the sources of systemic risk? Of the authors consulted, Allen & Gu (2018) appear to consider these sources most widely. They list banking crises due to panic or to falling asset prices, contagion, the financial architecture itself, foreign exchange mismatches in the banking system and the behavioural impacts attributable to incomplete knowledge. Harrington (2009) suggests four, a spiral of falling asset prices, the domino effect of counterparty defaults, a loss of confidence resulting from opaque information on institutions and irrational withdrawals of funds. Others have taken a slightly different approach, distinguishing for example between direct financial exposures between banks and correlated exposure to a common asset (De Bandt & Hartmann, 2000; Nier et al., 2007) and suggesting the following broad classification between sources:

— contagion attributable to the sale of assets at inopportune times, triggering a spiral of falling prices,[20]
— contagion caused by counterparty defaults, in turn resulting in the failure of others,
— contagion resulting from unclear information about institutions, provoking cautious unwillingness to engage financially with parties and a spiral of failures, and
— irrational contagion, typically resulting in withdrawal of funds by customers regardless of the financial strength of affected institutions.

4.1.9 How then might regulators mitigate or manage systemic risk? Notwithstanding the substantial weight of literature and policymaker focus on the problems associated with systemic risk, this remains a deeply challenging problem, beset by extraordinary complexity. It is clear that mistakes have been made in the past. The Group of Ten (2001), representing a gathering of central bankers and transnational financial institutions, while acknowledging signals of increasing risk, expressed itself satisfied that: "Existing policies appear adequate to contain individual firm and systemic risks both now and in the intermediate term" (Group of Ten, 2001:7 and again on page 18). This thinking appears to have been overturned by the financial events of later that decade.

19 Refer, for example, to Andries & Galasan (2020), Babus (2016), Caccioli et al. (2018), Chinazzi & Fagiolo (2013), Gai & Kapadia (2010), Georg (2013), Klinger & Teply (2015), Langfield & Soramäki (2014), Levy-Carciente et al. (2015), May & Arinaminpathy (2010), Rigobon (2016), Upper & Worms (2004) and, for application to South Africa's banking market, Walters et al. (2018).

20 News of distress does not necessarily produce negative impacts in other market players. Brewer & Jackson (2002) show that such news can have positive impacts on the share prices of competitors that may stand to benefit from the financial distress of a market entity. Financial networks are complex.

4.1.10 A number of improvements were implemented to regulatory systems across jurisdictions in response to the financial crisis of 2008–09.[21] Perhaps most notable of these was the implementation of special measures to address risks associated with those banks and insurers that became regarded as, in the popular parlance, 'too big to fail', which is considered in more detail in Section 4.3.

4.1.11 Yet questions remain about the framework that is now in place. May & Arinaminpathy (2010) ask whether the possibility of unintended consequences has been considered adequately, pointing out that the harmony underpinning the Basel accords, beneficial perhaps to individual institutions, may represent a concentration of risk to the system as a whole because it encourages herding of practices of risk- and solvency management. Concerns have been raised regarding regulatory approaches to increasing market complexity (Weber, 2012). Furthermore, existing models, focused on the nature of the idiosyncratic risks of insurers and resting on a foundation of minimum capital requirements, may have underestimated the corresponding possibility of systemic risk, of regulation itself as a contributor to systemic risk and even of regulatory capture (Schwarcz & Schwarcz, 2014; Smaga, 2014; Weber, 2010, 2011 and 2012).[22] The discourse in Section 5.1 considers this and other criticism levelled on the Solvency II framework, upon which South Africa's approach is based, asking in particular whether that framework actively enhances systemic risk rather than mitigating it.

4.1.12 The discussion that follows considers the contribution of insurers to systemic risk and the next section tackles the tricky issue of regulating systemically significant entities. Regulatory approaches to Europe and South Africa are described in Section 5.

4.2 Insurers and systemic risk

4.2.1 A number of researchers have asked questions concerning the extent to which insurers contribute to systemic risk.[23] Though this work has a reasonable history (see, for example, Haley & Sigler (1996), which sought evidence for consumer panic linking four separate failures of insurance companies) it gained impetus following the rather public and very large bail-out of AIG during the financial crisis.

21 A more complete treatment of the subject puts these responses in the context of the full suite of tools available under the general subject of macroprudential policy along with their interaction with other central-bank tools such as monetary policy and microprudential regulation (Aikman et al., 2013; Carreras et al., 2018; Claessens, 2015; ECB, 2010; Galati & Moessner, 2014; Lim et al., 2011; Shin, 2013). This is included in the proposals for further research (Section 7).

22 Coglianese & Lazer (2003) describe an alternative approach to regulation that seeks to impose on private-sector entities the obligation to achieve public-sector outcomes, leaving to them the freedom to determine how to do so. Most financial-sector regulators, in their defence, indeed aim to meet a set of social objectives. Those that are more transparent in their approaches also set out these objectives and demonstrate the extent to which they are measured.

23 Helpful literature reviews are provided by Bierth et al. (2015), Benoit et al. (2017), Chen & Sun (2019), Eling & Pankoke (2016), Elyasiani et al. (2015), Hauton & Héam (2015), Kanno (2016), Kaserer & Klein (2019) and Van Lelyveld et al. (2011). The work of Eling & Pankoke (2016) is particularly noteworthy for its thoroughness in this regard.

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4.2.2 Before that time, one of the more high-profile studies of risk in the insurance industry was the so-called Sharma Report (EU, 2002). The study was thorough, competent and highly influential in directing the course of insurance regulation in Europe, and across the world, putting risk management and its failures at the centre of its conclusions. Though it identified systemic risk as important, it did not place significant emphasis on those issues in insurers that might impact systemic risk.

4.2.3 A follow-up to the Sharma Report (EIOPA, 2018) set out to explore the causes and contributing factors to all instances of insurer failures or near-failures in the EU over the period 1999 to 2016. The report confirmed the exposure of the insurance industry to the effects of the financial crisis, noting a clear peak in insurer malady corresponding to the period 2008 to 2009, during which time some 37% of all EU entities on the EIOPA database "suffered impairment or failure" (EIOPA, 2018:3). Nevertheless, this adversity was not reported as an unavoidable consequence of widespread contagion, but rather of inadequate corporate governance, or of management inattention or ineptness:

> The two most common general causes of failure and near miss reported in the EIOPA database are linked to underlying internal risks of the insurer, namely: (1) the risk that management or staff lack the necessary skills, experience or professional qualities; and (2) the risk of inadequate or failed systems of corporate governance and overall control. (EIOPA, 2018:3)

4.2.4 Concerning the financial crisis itself, while insurance group AIG gained a certain notoriety, not only for itself but for insurers in general, for the size of the bailouts received, it stood almost alone among insurers in this regard.[24] Total capital raised after the financial crisis was USD1 470bn for banks, 58% of shareholder equity, compared to USD170bn for insurers, 16% of shareholder equity (Kessler, 2014; Geneva Association, 2010b). While the Treasury Troubled Asset Relief Program (TARP) paid an initial amount of USD40bn to AIG, only two other insurers received financial support, to the total of USD4.35bn. This compares to USD245bn paid to 592 banking recipients, of which the largest ten received a total of USD190bn (Harrington, 2009).[25] This is not to say that challenges to insurance markets do not occur.[26] The impact of the financial crisis on insurers, however, was considerably lower than on banks.[27]

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24 See Harrington (2009) for a detailed description of the events leading to AIG's financial challenges. The total amount authorised for financial support to AIG was USD182.3bn. The amount actually advanced amounted to USD134.9bn, USD81.9bn from the Federal Reserve Bank of New York and the balance from the US Treasury (Harrington, 2009:795, possibly now dated).

25 The amounts cited are until 16 July 2009 (Harrington, 2009). AIG also received a commitment for an additional USD29.8bn.

26 Some ten banking panics occurred in the US between 1873 and 1933 and in the third quarter of 2009, 50 US banks went bankrupt (Kessler, 2014). A number of insurers went out of business in the US in the mid-1980s and the Lloyd's insurance market nearly went under in the early 1990s, but these have been isolated events rather than bearing the hallmarks of contagion (Baluch et al., 2011). Such events are less common than for banks (Kessler, 2014)

27 Studies of other aspects of insurers during the financial crisis appear to support this broad view. Berry-Stölzle et al. (2014) found that, notwithstanding losses experienced during the course of the crisis,

> The insurance business model enabled the insurance sector to weather the effects of the crisis better than some other financial institutions. This is largely because the underwriting cycle is, in general, not correlated with the business cycle; in particular, the inverted production cycle – the upfront accumulation of premiums and the deferred nature of payment of liabilities – means that insurers are unlikely to fail in the same way as banks. However, where insurance groups engage in activities that expose them to active developments or movements in financial markets, they become more susceptible – and can indeed contribute – to systemic risk. (Adams, speech, 2014)[28]

4.2.5 The weight of studies of various kinds suggests that the overall contribution of insurers to systemic risk is small in comparison with the corresponding contribution of banks (Baluch et al., 2011; Bierth et al., 2015; Billio et al., 2012; Bobtcheff et al., 2016; Eling & Pankoke, 2016; Kaserer & Klein, 2019; Van Lelyveld et al., 2011). Banks appear to have a greater impact on insurers than the other way around (Chen et al., 2013). That insurers are expected, on the whole, to contribute less to systemic risk than banks is supported also by general argument (Bobtcheff et al., 2016; Kessler, 2014) that insurers retain their risks on balance sheet, explicitly match assets to liabilities and outsource risk largely to reinsurers using a structure based on hierarchy rather than on peer-to-peer support. Systemic risk in reinsurance markets is also regarded as relatively limited, though in this case, the positive impacts of hierarchy are somewhat diluted by the network effect of reinsurers supporting one another (Kanno, 2016).[29]

4.2.6 Against this are those who argue that the contribution of insurers to systemic risk is indeed significant. The list starts with those researchers who have pointed out the increase of this contribution during and following the financial crisis (Baluch et al., 2011; Bierth et al., 2015; Cummins & Weiss, 2014). The systemic risks attributable to insurance appear to be higher when insurers have strong bancassurance alliances or form part of financial groups (Baluch et al., 2011; Hauton & Héam, 2015). The Hauton & Héam (2015) study of the French market suggests that being part of a larger financial group improves the robustness of the insurer but increases overall levels of systemic risk, surely a warning for regulators of the possibility of an exchange of idiosyncratic risk for systemic risk in such instances.[30]

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insurers were, on the whole, easily able to raise new capital, unlike many of their peers in other parts of the financial sector. Paulson & Rosen (2016) explored the thesis that, under financial pressure, US insurers might sell corporate bonds in large number, triggering a downward price spiral. They found evidence that insurers indeed tend to absorb liquidity risk by purchasing bonds when these bonds are less liquid than average. This suggests the possibility of a counter-cyclical stabilising role for insurers. However, the authors found no evidence of increased buying or selling around the time of the crisis.

28 Adams, J (2014), 'Global systemically important insurers: issues, policies and challenges after designation', Speech to The Geneva Association, published by the Bank of England, March

29 The technical arguments of sources such as the IAIS (2011, 2012), the Geneva Association (2010a, 2010b) and Rudolph (2017) are broadly supportive of these conclusions, but the sources should be considered less credible due to their positions in the market.

30 In related research that studies tie-ups of insurers and banks, the systemic risk of insurers after a deal appears to fall but the corresponding systemic risk of banks rises (Elyasiani et al., 2015).

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4.2.7 The contribution to systemic risk is particularly noteworthy in those instances in which insurers participate in ventures outside of core insurance activities (Baluch et al., 2011; Bobtcheff et al., 2016; Cummins & Weiss, 2014; Eling & Pankoke, 2016; Koijen & Yogo, 2017; Weiß & Mühlnickel, 2014).[31] The logic underling this evidence is succinctly expressed by Catherine Bobtcheff and her colleagues:

> By the law of large numbers, traditional lines of insurance with idiosyncratic non-catastrophic risks cannot be systemic. On the contrary, undiversified insurers specialised in activities whose insured risks are highly correlated with GDP are systemic. (Bobtcheff et al., 2016:73)

4.2.8 Increased concentration of insurance markets appears to raise the corresponding propensity of these insurers to contribute to systemic risk, supporting the so-called "concentration-fragility" view (Shim, 2017). Van Lelyveld et al. (2011) finds little evidence of systemic risk across insurers in the Netherlands but raises concerns regarding the contagion risk associated with in-house reinsurance. Kanno (2016), studying global reinsurers, finds high levels of resilience but notes the importance to the network of a handful of highly connected entities.[32]

4.2.9 Insurers potentially contribute to systemic risk through policyholder behaviour, particular policy lapses and surrenders. Barsotti et al. (2016) link policyholder behaviour to economic factors. Policy lapses tend to be highest at time of economic difficulty (Russell et al., 2013), exactly when the stress on insurers is likely to greatest. Barsotti et al. (2016) conclude the possibility that typical stress-testing methodologies may under-estimate lapses under extreme economic scenarios. Insurers specialising in a single product type are more likely to provoke contagion should they fail than their diversified counterparts, particularly if operating in concentrated markets with poor substitutability (Geneva Association, 2010b). The same applies to insurers operating in niche product lines that are poorly regulated (Rudolph, 2017), though typically these lines are small and would not be expected to contribute substantially to systemic risk.

4.2.10 The most vehement warning against the position that insurers are unlikely to contribute materially to systemic risk, even in their core activity, is provided by Daniel and Steven Schwarcz (2014). Acknowledging efforts by US regulators, after the 2008–09 crisis, to manage the potential systemic risk of individual insurers, they warn that insufficient attention is given to the potential systemic correlations of risks across groups of insurers. As significant asset owners, as members of complex financial groups and as owners of significant tail risks, insurers, the authors argue, contribute significantly to systemic risk. This is not helped by the deep complexity of risks managed by insurers, the dependence of regulators on the work of rating agencies and the potential for errors in the calculation of reserves for liabilities. In this regard, the authors raise particular concerns around the incentives for insurers to under-

31 Refer, in addition, to Allen & Carletti (2006), who consider the systemic risks associated with the transfer of credit risk between banks and insurers.

32 Related but slightly dated research is undertaken by Minderhoud (2003), who finds extreme co-movements of the share prices of financial institutions that suggest evidence for contagion, though correlation of share prices does not of itself constitute a strong case for systemic risk by insurers.

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reserve in periods of financial stress and the technical difficulties of reserving through the cycle of hard and soft markets in non-life insurance markets.

4.2.11 Policyholder interests are protected in a number of ways. Prominent among these is the imposition of minimum capital requirements on insurers. The models utilised to set these requirements have been rapidly improving (see the discussion of this development in Section 2.3) and are now based on frameworks that take into account the risks to which insurers are exposed. Serious concern has been raised, however, that efforts to establish minimum capital requirements based on the risk profile of insurers actively contribute to levels of systemic risk (refer to the discussion of the issue in Section 5.1).

4.2.12 Apart from these concerns, researchers have put forward a number of proposals for regulators in response to the potential contribution of insurers to systemic risk including (Ho et al., 2013; Hufeld et al., 2017; Kaserer & Klein, 2019; Klein, 2012b; Koijen & Yogo, 2017):

— identifying and mitigating potential market failures in insurance, for example, the possibility of insurers taking excessive risk or engaging in activities that are harmful to customers,
— focusing on the resilience of the network rather than exclusively on the financial robustness of regulated entities,
— considering the activities in which entities engage and the potential for these activities to contribute to systemic risk,[33]
— enhancing market conduct, the transparency of market activity and the alignment of incentives, in the interests of better-informed customers and stronger competitive dynamics, and
— considering limits on certain market activities, or taxes on those activities that might contribute to the development of systemic risk.

4.2.13 In summary, notwithstanding a few high-profile insurer crashes during the financial crisis, the conventional wisdom is that insurers engaging in traditional insurance activity across a diversified portfolio are unlikely to contribute significantly to systemic risk. It follows from this that supervisory authorities should focus their attention on those insurers engaging in non-traditional non-insurance activity, those whose product lines are unique or difficult to replace and those forming parts of larger financial groups. The warnings of those who suggest that this strategy represents an unduly carefree approach to the potential for the aggregation of idiosyncratic insurer risk, however, should not be ignored.

4.3 Regulating systemically significant entities

4.3.1 One of the results of the regulatory changes that followed the 2008–09 upheaval was the establishment of special regulatory requirements on those entities regarded

33 Considering the financial market as a network, entity-based regulation targets the nodes of the network, the insurers, and activity-based regulation focuses on the network edges, the activities that link these insurers (Kaserer & Klein, 2019).

as systemically significant. Identified as SIFIs (globally systemically important financial institutions) in the banking space and G-SIIs (globally systemically important insurers) in insurance, these entities fall into a group of those colloquially known as 'too big to fail'. The financial crisis appeared to confirm the willingness of authorities to step in to prevent the collapse of these entities (Ueda & Di Mauro, 2013).

4.3.2 This raised a number of questions regarding the special status of these entities. Boyd & Heitz (2016) take the position that the cost to society of elevated systemic risk exceeds the benefit of the scale economy associated with these large entities. Others examine the significance of the moral hazard and potential for international externalities associated with these entities, calling for concerted international efforts to manage their corresponding systemic risk (Kim, 2011; Ötker-Robe et al., 2011). A staff note of the International Monetary Fund (IMF) succinctly states the nature and scale of the problem:

> The unprecedented scope and intensity of the recent financial crisis underscored the too-important-to-fail (TITF) problem associated with systemically important financial institutions (SIFIs). Ahead of the crisis, implicit government backing permitted these institutions to take on greater risks without being adequately subject to market discipline and to enjoy a competitive advantage over systemically less important institutions. And when the crisis broke, their scale, complexity, and interconnectedness, which had made them difficult to manage and supervise, also proved too significant to permit them to fail. (Ötker-Robe et al., 2011:2)

4.3.3 Perhaps unsurprisingly, financial markets seemed to regard 'too big to fail' as a label worth having. Share prices reflected perceptions of the designation as advantageous (Moenninghoff et al., 2015). Entities falling into this group appeared to benefit from the special advantage of lower funding costs (Araten & Turner, 2013) and evidence was produced that the margin in funding costs had further improved by the end of 2009 (Ueda & Di Mauro, 2013).[34]

4.3.4 The financial crisis, however, or the actions of the authorities following the crisis, may have exacerbated the moral-hazard challenges:

> Yet, some SIFIs have already become bigger and even more complex following the crisis, and risky lending practices have begun to reappear. The restructuring following the crisis increased the level of concentration in many advanced economies' financial systems, with implications for stability and competitiveness. Policies are therefore needed to make financial institution failures less likely and less devastating when they occur, re-establish market discipline, level the playing field, and spare governments and taxpayers the costs of future bailouts. (Ötker-Robe et al., 2011:2)

4.3.5 What followed was a process of improving the regulatory measures, both in banking and in insurance, that were applied to these entities. Regarding the insurers,

34 Crawford (2017) calls for regulators to recognise the benefit of the credibility of loss among SIFI creditors, suggesting that it makes the damage caused by SIFI failure less severe when it happens but also less likely to occur in the first place.

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policy measures to be applied to G-SIIs were first put forward in 2013 (IAIS, 2013). These measures included special minimum capital requirements (Fung & Yeh, 2018; IAIS, 2013 and 2015) and a detailed forward plan required of these entities in the event of financial distress (IAIS, 2013). Significantly enhanced supervisory powers over the affected entities were also proposed, specifically with regard to systemic risk management planning and the treatment of non-traditional non-insurance activities (IAIS, 2013).

4.3.6 The Financial Stability Board (FSB) identified nine insurers as falling into the category of G-SIIs, based on the methodology of the International Association of Insurance Supervisors (IAIS). The US Financial Stability Oversight Council followed the FSB recommendation, designating all three US-based insurers, AIG, Metlife and Prudential Financial as G-SIIs (Chen & Sun, 2019). It is fair to say that the road has not been smooth since then, all three of these companies shedding their G-SII label following a successful ruling in favour of the Metlife appeal to have the status removed in 2016 (Chen & Sun, 2019). In Europe, Assicurazioni Generali S.p.A. reduced the size of its business and sold reinsurance and banking units in a successful attempt to have itself removed from the list of G-SIIs.

4.3.7 A number of papers specific to insurers followed the announcement of these measures. On the one hand, the difference between the systemic risk of G-SIIs and other insurers, as measured by stock-market indicators, appeared to fall after the publication of policy measures (Fung & Yeh, 2018), suggesting a broadly successful approach. On the other hand, the significance of the size of the insurer to systemic risk was said to be overstated and a number of factors utilised in the methodology were regarded as not statistically significant indicators of systemic risk (Weiß & Mühlnickel, 2014). A few insurers that did not fall under the G-SII designation were found to contribute more to systemic risk than some of the G-SIIs, notwithstanding the finding that the G-SIIs were, on average, more systemically significant than those insurers falling outside of the G-SII group (Chen & Sun, 2019). It was suggested that a stronger focus on country-specific attributes of insurers might be appropriate, with a particular focus on the risks associated with the non-traditional or non-insurance activities of the insurer (Jobst, 2014).

4.3.8 The wisdom of the approach under which globally significant insurers are identified for special regulatory attention is not clear, particularly if this distracts regulators from the potential for the aggregation of risk from other insurance sources, in these and other insurers, that might have systemic impacts.

4.4 Concluding thoughts

4.4.1 The discussion in this section explores the nature of systemic risk in networks of interconnected financial markets and how this risk might be measured. It considers the sources of systemic risk and the broad options available for mitigating this risk. It investigates whether and how insurers might contribute to systemic risk. It summarises the approaches hitherto adopted in the regulation of those entities, banks and insurers, regarded as potentially contributing significantly to systemic risk.

4.4.2 Uncomfortable questions have been asked about the success of the approaches used. While the 2008–09 setbacks made clear the existence of systemic risk

and the failure of regulatory models to manage this risk, it is not clear that the approaches adopted since then have been particularly effective either. In the discussion that follows, heading towards an assessment of the corresponding approaches used in South Africa, further questions are asked about aspects of the regulatory framework in Europe intended to unify country-specific approaches to enhanced stability and security of insurance markets.

5. PRUDENTIAL REGULATION OF INSURERS IN SOUTH AFRICA

Like many countries around the world, South African policymakers have taken great strides forward in their efforts to improve the operation of insurance markets in this country. The prudential regulatory framework is described in Section 5.3. This is preceded by an assessment of the corresponding framework upon which this is built, Solvency II, and a summary of the nature of South Africa's insurance markets.

5.1 Solvency II: The modern model of insurance regulation

5.1.1 The discussion that follows summarises the system for regulating European insurers known as Solvency II. Motivation for this focus rests partly on the adoption by South Africa of the system in the development of its own risk-based regulatory model called the Solvency Assessment and Management (SAM) framework. Solvency II is also considered as part of this research because, notwithstanding significant criticism (see discussion that follows), it represents a significant improvement in existing arrangements in Europe (Doff, 2016) and has exerted a strong influence on the corresponding regulatory systems elsewhere (Elderfield, 2009).

5.1.2 Solvency II was developed over a number of years to improve its predecessor, Solvency I, by introducing principles of risk-based regulation. This did not happen in isolation: Canada and the United States implemented elements of risk-based capital in the early 1990s and they were followed by Japan, Australia, the United Kingdom and Switzerland, as part of a global process of standardisation (Elderfield, 2009; Eling & Holzmüller, 2008). Giving birth to Solvency II was not a straightforward process, however, starting with the establishment, on 17 July 2000, of the Committee of Wise Men on the Regulation of European Securities Markets, passing through two pieces of legislation (EU, 2009 and 2014) and the drafting of substantial technical specifications that led to implementation on 1 January 2016 (Rae et al., 2017). The stated objectives of Solvency II are to "deepen the integration of the EU insurance market; enhance the protection of policyholders and beneficiaries; improve the international competitiveness of EU insurers and reinsurers; and promote better regulation" (Doff, 2016:588).

5.1.3 Solvency II, like its South African equivalent (NTSA, 2011a, see Section 5.3) is based on rigorous management of risks by insurers, largely following the corresponding systems of banking regulation in the Basel system (DNB, 2016). Both systems are based on the three pillars that the Dutch Central Bank (DNB, 2016) refers to as risk quantification, risk management and transparency (see also IAIS, 2018). The second pillar calls for sound attention to minimum standards of corporate governance oversight. The third pillar requires high levels of technical disclosure to tight timescales, in the process testing the capacity of

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insurers to manage the risks to which they are exposed. For the purposes of this discussion, however, the focus falls on the first pillar, which sets standards of minimum capital for insurers.

5.1.4 The principles underpinning the minimum capital requirements in Solvency II utilise mark-to-market values and realistic projection assumptions to determine an appropriate capital buffer (DNB, 2016). Insurers may use a standard formula for the solvency capital requirements (SCR), which combines a number of modules and sub-modules (Steffen, 2008). This is supported by an absolute solvency floor called the Minimum Capital Requirement (MCR), easier to calculate (Steffen, 2008). Insurers must also demonstrate, however, that the assumptions underpinning the SCR are appropriate to the insurer, failing which they must make adjustments to the standard formula or utilise an internal model, which is subject to separate regulatory approval (DNB, 2016).

5.1.5 Two further principles underpinning Solvency II are worth noting before turning to an assessment of the methodology. The first is that Solvency II is essentially principles-based rather than rules-based (Elderfield, 2009).[35] While rules exist, for example covering the SCR, boards of directors must apply their minds to the appropriateness of the level and quality of available capital to their current and projected financial position, under best-estimate and stressed conditions. The second is that the system is supported by considerable disclosure, both public and confidential to regulators (DNB, 2016).

5.1.6 René Doff (2016), building on the corresponding assessment carried out prior to the finalisation of Solvency requirements (Doff, 2008), provides a systemic assessment of Solvency II. His assessment is carried out against a defined set of 12 criteria (Cummins et al., 1993; Holzmüller, 2009, with two more added by Doff, 2016), which are as follows:

— provide incentives to insurers to hold sufficient capital,
— reflect the risks to which insurers are exposed,
— calibrate the formula appropriately to weight risks in proportion to their impact on the risk of insolvency,
— prioritise those insurers most likely to cause the greatest damage to the economy,
— focus on realistic, economic values,
— discourage misreporting or other forms of distortion,
— anticipate systemic risk and avoid causing insurers to fall into a downward spiral in time of crisis,
— take appropriately into account soft issues, such as the quality of management,
— ensure flexibility of the framework over time,
— strengthen the practices of risk management and transparency,
— provide appropriate powers of intervention, and
— ensure sufficient skills and capacity of the respective supervisory authorities.

35 Where rules apply, in any regulatory system, regulated entities are incentivised to take any advantage of leeway within those rules. See Becker & Ivashlina (2015), for example, for evidence of such a tendency among US insurers.

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5.1.7 Doff (2016) describes Solvency II as a considerable improvement on Solvency I, but raises a number of concerns. He suggests, for example, that operational risk (see also Eling & Holzmüller, 2008) and liquidity risk are not managed sufficiently well under standard requirements, that the systemic risk contribution of large insurers is not appropriately recognised and that a commitment to economic values is not completely realised. He also points out that a great deal of responsibility for the success of Solvency II rests on the technical proficiency of supervisors and their ability to detect flaws in governance structures.

5.1.8 Comparisons of Solvency II with the corresponding systems in other countries (Eling & Holzmüller, 2008; Holzmüller, 2009; Klein, 2012a; Liu et al., 2019) have cast the European framework in a broadly positive light. Nevertheless, criticism of a variety of types has been levelled.[36] These include:

— the need for more emphasis on appropriate governance (Eling et al., 2007; Gatzert & Wesker, 2012),
— the risks associated with the use of internal models (Eling & Holzmüller, 2008),
— the potential for review of technical aspects of the SCR (Cerchiara & Demarco, 2016; Christiansen & Niemeyer, 2014; Foroughi, 2012; Frölich & Weng, 2015 and 2018),
— the concerns that interest-rate risk is significantly dependent on the choice of model (Martin, 2013),
— the risk that flexible principles might shift to rigid rules over time (Gatzert & Wesker, 2012),
— the possibility of regulatory arbitrage and related concerns of inconsistency with Basel requirements and variations in the outcomes of SCR calculations across countries (Laas & Siegel, 2017; Liu et al., 2019; Martin, 2013),[37]
— the call for a model of improved market transparency to be considered as an alternative or complementary approach (Eling et al., 2007),
— the costs of implementation to insurers and supervisors that may raise barriers to entry, undermining the benefit of the approach (Swarup, 2012), and
— undue complexity of approach, adding not only to cost but to the risk of arbitrage and supervisory ineffectiveness (Casarano et al., 2017; Eling et al., 2007; Gatzert & Wesker, 2012; Swarup, 2012).

5.1.9 Of greatest concern to this study, however, is criticism of the Solvency II framework for inadequate attention to the issue of systemic risk. This takes broadly two

36 Sources in this list are, as far as can be seen, unbiased and subject to peer review. Industry comment is nevertheless interesting (Insurance Europe, 2019). It suggests that a majority of insurers reported that Solvency II was inhibiting investment in the real economy and that insurers had shifted away from the provision of guarantees. These may be unforeseen consequences, but they are not necessarily wrong if they are the result of a more accurate assessment of the risk associated with these actions.

37 Liu et al. (2019) point out the rational basis for the significant differences in SCR outcomes across countries. They explain their finding that the parameters used in specific jurisdictions tend to require higher capital for asset classes that exist in high volume and lines of business that are subject to greater volatility because of low volume. The risk of regulatory arbitrage surely still exists.

forms. Some critics adopt the position that the uniformity of the solvency framework would itself add to systemic risk because it incentivises behavioural herding or undue allocation of assets to sovereign debt (Al-Darwish et al., 2011; Floreani, 2013; Rae et al., 2017; Swarup, 2012). Consider, for example, the statement of the Institute and Faculty of Actuaries working party assessing the success of Solvency II:

> This concern around procyclicality is such that our working party is unanimous in its view that Solvency II has fallen short of its goal of aiding financial stability. (Rae et al., 2017:9)[38]

5.1.10 Others take issue with technical aspects of the Solvency II calculation, for example its dependence on value at risk as the primary determinant of the SCR rather than alternatives such as expected shortfall, which is the approach used in Switzerland and under Basel III (Barth, 2000; Boonen, 2017; Eling & Holzmüller, 2008; Wagner, 2014).[39]

5.1.11 The issue of value at risk as the central measure is not merely an issue of detail, with second- or third-order impacts. The SCR formula focuses on idiosyncratic risk, not the contribution of the insurer to systemic risk. It is not the only option. Alternatives to value at risk have been developed that have a specific focus on the contribution by the financial entity to systemic risk. Adrian & Brunnermeier (2016) propose a measure of systemic risk based on the impact in the value at risk of the entire financial system of the distress of a single institution relative to what they refer to as its median state. They refer to this as ΔCoVaR, the change in the system-wide value at risk conditional on an institution being in a distressed state, in comparison with the corresponding value at risk with the institution in its median state. This approach has been thoroughly tested and expanded (Acharya et al., 2017; Adams et al., 2014; Bui et al., 2017; Fong et al., 2009; Gauthier et al., 2012; Hautsch et al., 2015; Sedunov, 2016; Zhang et al., 2015).[40] A number of alternatives have been considered (Acharya et al., 2012; Brownlees & Engle, 2017; Giglio, 2016; Huang et al., 2012; Segoviano & Goodhart, 2009).[41]

38 Caruana (2010) points out that one way of dealing with systemic risk is to require higher margins of capital (and liquidity) during times of economic prosperity and permit some relaxation during times of stress.

39 This is not a trivial matter but neither is the choice a simple one. Value-at-risk calculations are typically simpler than expected shortfall alternatives, but ignore tail risks (Yamai & Yoshiba, 2004; Boonen, 2017) besides other technical deficiencies (Boonen, 2017). The expected shortfall approach had been considered by the designers of Solvency II (Boonen, 2017) and appears to have been discarded on the grounds of additional complexity. It is pertinent to the issue of systemic risk, however. Companies, complying with solvency requirements based on value-at-risk measures, may be exposed to raised expected shortfall, in the process contributing to systemic risk (Wagner, 2014).

40 Both Sedunov (2016) and Zhang et al. (2015) present evidence that the CoVaR method of Adrian & Brunnermeier (2016) is better than its alternatives at identifying systemic risk, but Zhang et al. (2015) express concern that its predictive ability appears to be limited in instances outside of the crisis of 2008–09.

41 SRISK, for example, is calculated as the shortfall experienced by a firm conditional on severe market conditions (Acharya et al., 2012; Brownlees & Engle, 2017), which is closely related to the Adrian & Brunnermeier (2016) CoVaR methodology. Giglio (2016) proposes a method based on the spreads on credit default swaps. Billio et al. (2012) test several different methods.

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5.1.12 Leukes & Mensah (2019) report on their assessment of the contributions of a number of South African entities to systemic risk using a number of different tests. Some of their findings are intuitively comfortable. Banks contribute the most to systemic risk and then insurers. Contagion is more likely during distressed periods. Others are more difficult to swallow. Perhaps most concerning is the disparity of results between the ranking of institutions on the basis of CoVaR and the corresponding ranking based on a standard value-at-risk approach.

5.1.13 The use of value at risk as the primary measure of insurance risk in Solvency II appears to be a potentially problematic compromise. Not only might it underestimate the expected shortfall in the event of severe adversity because it does not consider the tail risk, it also appears to fall short on its capacity to identify an entity's contribution to systemic risk.[42]

5.1.14 At the heart of the matter is the profound problem that the pursuit of diversification by the entity tends to contribute to systemic risk (Acharya, 2009; Allen & Carletti, 2006; Checkley, 2009; Ibragimov et al., 2011; Wagner, 2010).[43] The benefits of diversification to individual entities, these authors contend, has led to its widespread encouragement in regulatory models, without appropriate consideration of the potential systemic impacts:

> While it is true that diversification reduces an institution's overall likelihood of failing, it also increases its inclination to fail at the same time as other institutions. Since externalities are typically associated with systemic failures rather than isolated institutional failures, our analysis suggests that there is hence a rationale for discouraging diversification. With respect to capital requirements this would imply that banks with more diversified portfolios should be subjected to higher capital charges. (Wagner, 2010:374)

5.1.15 This begs the question of how the designers of the Solvency II framework intend to modify its approaches to risk management in future. The European Insurance and Occupational Pensions Authority (EIOPA) has acknowledged the need for additional regulatory tools to address macroprudential risk (EIOPA, 2019a and 2019b) following two discussion papers by the European Systemic Risk Board on the measures that may be available to address systemic risk in the insurance industry (ESRB, 2018 and 2020). In its comprehensive discussion of the issues, EIOPA (2019b) acknowledges the real potential for insurance to contribute to systemic risk, suggesting that these could arise from individual entities, activities across the industry and behaviour across the industry, particularly regarding herding by insurers in response to regulatory requirements.

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42 This should perhaps not be surprising, given the concerns raised about the technical complexity of Solvency II. Much of the delay in the development of Solvency II, furthermore, was attributable to technical issues.

43 This is not a criticism of diversification as a strategy for managing portfolio risk, as developed in the capital asset pricing model and many iterations of testing with which a number of readers are familiar (see, for example, Markowitz, 1952; Sharpe, 1964; Lintner, 1965; Samuelson, 1967; Black, 1972; Black et al., 1972; Roll, 1978; Lakonishok & Shapiro, 1984; Fama & French, 1993 and 2004; and Rossi, 2016).

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> EIOPA is of the view that a comprehensive macroprudential framework addressing the specific sources of systemic risk identified for the insurance sector should be implemented in the context of the Solvency II review. (EIOPA, 2019b:627)

5.1.16 EIOPA has identified a number of options for addressing macroprudential risks more explicitly, including a capital surcharge for systemic risk, concentration thresholds and expansion of the prudent person principle (EIOPA, 2019b). The changes recommended are part of ongoing review of the Solvency II system.

5.2 The South African insurance market

5.2.1 By a number of measures, the South African insurance industry is large and sophisticated. The IMF (2014a) uses these words to describe South Africa's financial sector as a whole, pointing out that total industry assets, at just under three times GDP, are higher than the corresponding ratios of most emerging markets. The Prudential Authority (PA, 2019) reports the assets of South African insurers and reinsurers at just over R3 000 billion, some two-thirds of seasonally adjusted GDP,[44] and the corresponding assets of entities operating in the non-life industry at just under R200 billion. Global reinsurer Swiss Re describes South Africa's life insurance penetration in terms of premiums as a percentage of GDP as 10.3%, third in the world.[45] This is perhaps unlikely but the corresponding figure based on PA figures, 6.2%, would still put South Africa in the top ten countries in the world.[46] These figures may serve to illustrate the South African dichotomy of sophisticated financial services in an unequal society. They nevertheless confirm the significance of the industry.

5.2.2 The South African insurance industry is also concentrated. According to the IMF (2014a), the top five banks in 2013 held more than 90 percent of banking assets, well above the corresponding figures for the other BRICS countries, along with Chile, Mexico and Turkey. The top five insurers "account for 74 percent of the long-term insurance market" (IMF, 2014a:10).[47] It is also highly interconnected (IMF, 2008 and 2014a). All of the largest

44 South African Reserve Bank, 30 June 2019, R4 510 billion, accessed on 21 April 2020 from https://www.resbank.co.za/Research/Statistics/Pages/OnlineDownloadFacility.aspx. The quoted proportion of GDP in the text compares well to the 67.4% of GDP cited by the IMF (2014a) for 2013.

45 Swiss Re Institute, downloaded 21 April 2020 from www.sigma-explorer.com/, figures for 2018.

46 Comparability must be regarded with care. Figures reported by the PA (2019) are net premiums. As they include the corresponding net premium received by reinsurers, however, they may approximate the gross-of-reinsurance premiums received by insurers.

47 This statement deserves more attention, in particular whether concentration might be growing or not. The Herfindahl–Hirschman Index is commonly used as a measure of industry concentration, for example, in numerous studies of fledgling insurance markets in Central and South-eastern Europe showing largely improving competition (Dimić et al., 2018; Kafková et al., 2005; Kostić et al., 2016; Pavic Kramaric & Kitic, 2012; Tipurić et al., 2008; World Bank, 2020), improving competitive dynamics in Thailand (Sukpaiboonwat et al., 2014) and strong competition in Australia (Arych & Darcy, 2020). The index is also commonly used to assess competitive dynamics in US health insurance markets (for example, in Dafny et al., 2012). A number of these authors utilise other measures of concentration. Alhassan & Biekpe (2019), analysing South Africa's non-life insurers, cite low Herfindahl–Hirschman Index values but, on the basis of the Lerner competitive index,

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banks are linked to insurers through direct ownership or holding companies, and the level of related-party transactions within financial groups is significant.[48]

5.2.3 This has implications for the regulatory framework:

> The large fiscal and current account deficits, a weak growth outlook, the reliance of banks on money market funds (MMFs) for short-term wholesale funding, and banks' active trading in the over-the-counter (OTC) derivatives market make South Africa susceptible to contagion and sudden stops of capital flows. This susceptibility and potential for spillovers have been exacerbated by the significant concentration and interconnections in the financial system, and the substantial expansion of South African banks into sub-Saharan Africa. (IMF, 2014a:7)

5.2.4 Alongside broad commendation for the progress made in improving the regulatory framework for South Africa (IMF, 2015a and 2015b), the IMF recommends closer attention to liquidity risk (IMF, 2015c) and a stronger approach in mitigation of the potential for systemic risk (IMF, 2014a). Tools proposed in this regard included stronger powers of regulatory intervention and regular stress tests, across the system as a whole but also on systemically significant entities. While it expressed satisfaction with well-contained vulnerability to financial contagion throughout the transition of African Bank to curatorship in 2014, it nevertheless urged that the South African Reserve Bank devote additional resources to meeting its mandate as systemic regulator (IMF, 2014a). While the IMF mentions the existence of asset-backed commercial paper issued by the securitisation vehicles established by banks, statistics from the Association for Savings and Investment South Africa (ASISA) suggest that life insurer involvement in investment vehicles outside of the mainstream is limited.[49] Finally, the IMF called for efforts to promote greater competition to reduce the adverse impacts of high levels of concentration.[50]

5.3 Prudential regulation of South African insurers

5.3.1 Having described the Solvency II system, upon which South Africa's framework is based, and set out the essential features of South Africa's insurance market, the discussion turns to that framework, its development and its detail.

5.3.2 South Africa commenced a comprehensive review of its financial-sector regulatory framework in 2007, but expanded the scope of this review following the

express concerns regarding the high pricing power of these insurers, linking this pricing power to an increased probability of insurance insolvency.

48 The IMF (2014a:16) specifically notes: "Substantial interconnectedness within the financial system could amplify risks. […] A bank failure could have a significant impact on the asset quality of the affiliated NBFIs, while a sudden large withdrawal from NBFIs could cause liquidity stress for banks."

49 The Association for Savings and Investment South Africa reports structured notes and collateralised securities at long-term insurers amounting to 0.62% of those assets linked to policy values and 4.38% of non-linked liabilities at the end of 2019 (ASISA Life Statistics, downloaded from https://www.asisa.org.za/statistics/long-term-insurance/ on 19 May 2020).

50 This is echoed in policymaker calls for improved liquidity, competition and transparency of South African securities markets (NTSA, 2018).

financial crisis of the next two years. Policymakers concluded that the key priorities for this framework were financial stability, consumer protection, access to financial services and combating financial crime (NTSA, 2011a). The principles of risk-based supervision were introduced at the same time, with the launch of the SAM framework, based largely on the corresponding Solvency II approach (FSB, 2010). The chosen structure of the regulatory framework followed the stated priorities, as recommended by the OECD (2010).

5.3.3 Does the structure of the model of regulation and supervision make a difference to overall effectiveness? The issue has been subject to discussion for some time. Fay & Parent (2004) cite the seminal work of Goodhard et al. (1998) in support of their position that structure indeed has an impact on regulatory effectiveness. Schmulow (2015) considers some approaches better than others but Čihák & Podpiera (2006) express the view that no particular structure is inherently superior, each one bringing pros and cons. In the context of rapidly changing approaches in a number of countries, it is difficult to suggest clear direction (Čihák & Podpiera, 2006; Group of 30, 2008; Llewellyn, 2006; Zimková & Vargová, 2006). Policymakers have largely improved the extent to which structure follows purpose. The dominant models of the previous century, either institutional, in which oversight is allocated on the basis of legal status, or functional, where the responsibility for supervision follows the business transacted by the entity, have largely been replaced by more holistic models, integrating approaches across the available financial sectors. The key structural decisions now appear to be whether to combine all regulation under one body and how closely to integrate financial-sector regulation and the more traditional roles of central bankers (Di Noia & Di Giorgio, 1999; Goodhart & Schoenmaker, 1992; Llewellyn, 2006; Schmulow, 2015).

5.3.4 South African policymakers chose to split the oversight of insurers (and most other financial-sector institutions), along the respective lines of prudential- and market-conduct supervision (NTSA, 2011a and 2013b). The former is concerned largely with the financial security and stability of regulated entities, and the latter with the extent to which they meet the needs of their customers. Policymakers elected also to wrap the responsibility for prudential supervision into the central bank, the South African Reserve Bank (SARB), at the PA.[51] Concerns have been raised regarding the complexity and expense of the structure, suggesting that the rationale for the approach has been inadequately set out and that the expected benefits have not been weighed against the corresponding costs.[52]

5.3.5 The stated goals of the Prudential Authority (PA, 2018) include enhancing the soundness of financial institutions and the corresponding soundness of the market infrastructures within which these institutions fall, and protecting the customers of these institutions against the risk that they fail to meet their obligations to these customers. The

51 New Zealand has a similar structure (CFRNZ, undated), notwithstanding the potential for conflicts of interest between the monetary and regulatory authorities in the central bank (Godwin & Schmulow, 2015).

52 Robert Vivian, Professor of Finance & Insurance, University of Witwatersrand, writing for the Free Market Foundation, 4 June 2016, accessed at http://www.freemarketfoundation.com/article-view/case-against-introducing-the-twin-peaks-regulatory-system, on 5 February 2018.

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goals also include assisting in the maintenance of financial stability, in other words mitigating systemic risks. At the heart of this paper is the question of how well it is able to do this with the tools currently at its disposal or in development.

5.3.6 Market conduct regulation is now the responsibility of the newly-created Financial Sector Conduct Authority (FSCA). The FSCA, seeded by the pre-existing Financial Services Board, whose mandate was dominated by prudential concerns, has also put out a paper describing its priorities (FSCA, 2018). This includes a commitment to strengthening the efficiency and integrity of financial markets, but not (explicitly at least) to identifying and managing systemic risk. While the SARB has played a large part in addressing systemic risk (see SARB, 2017a, for example), formal responsibility for managing the risk and effects of contagion now falls to the Financial Stability Oversight Committee (SARB, 2017b).[53]

5.3.7 The discussion turns now to the principles underpinning the prudential regulation of South Africa's insurers, which has also been undergoing considerable change. The course of developing and implementing the SAM framework took a number of years and included dry runs and a full period of parallel processing of the old and new approaches. It was formally implemented on 1 July 2018, as evidenced by the effective date of all regulatory standards.[54] The methods underpinning the standard calculation, spanning dozens of discussion documents and position papers that have since been converted into the regulatory standards, largely follows the corresponding methodology of Solvency II, adapted to local conditions.[55]

5.3.8 As in Europe, the boards of directors of South African insurers are required, under the regulations supporting the Insurance Act, 2017, to:

— take full and direct responsibility for ensuring ongoing solvency of insurers in line with regulatory requirements, for putting in place and maintaining sound systems of risk management, and for meeting all standards of reporting to the regulatory authorities,
— establish a system of internal controls for the purpose of mitigating and managing risks that includes control functions focused on compliance, risk management, actuarial risks and internal audit and headed by suitably qualified individuals,
— meet minimum solvency requirements that are governed by the detailed technical specifications underpinning the standard calculations, the Solvency Capital Requirement (SCR), and a sub-minimum, the Minimum Capital Requirement (MCR), and
— undertake all calculations on a best-estimate basis along with an explicit risk margin, taking into account all options, guarantees, policyholder behaviour, future discretionary benefits,

53 Attention to financial stability is not new. The Financial Stability Oversight Committee effectively replaces an earlier committee of the SARB, called the Financial Stability Committee, which was established in the year 2000 (SARB, 2017b).

54 Not included in the list of references to this paper are the regulatory requirements of the Prudential Authority that stipulate the requirements of governance, risk management and the valuation of assets and liabilities. These take the form of prescribed Standards or Guidance Notes, for example, 'Prudential Standard FSI 2.2: Valuation of Technical Provisions' and 'Prudential Standard GOI 3: Risk Management and Internal Controls for Insurers'.

55 Closely following the Solvency II methodology is important if South African regulatory standards are to be regarded by regulators in other countries as achieving appropriate standards, in turn considered important to insurers regulated in South Africa that have any business in these countries.

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management actions and the risk of counterparty default, and separately accounting for cashflows attributable to reinsurance arrangements, and

— carry out a rigorous process called the Own Risk and Solvency Assessment (ORSA), at least annually but also in the event of a significant change in the circumstances of the insurer, that involves assessing the current and likely future solvency of the insurer, under both best-estimate circumstances and a range of adverse scenarios, considering the implications of this assessment, writing a report regarding the assessment and its impacts on strategy and maintaining a record of the activities that went into the assessment for audit purposes.

5.3.9 While actuaries still have a degree of latitude in the calculation of technical provisions, the methodology underpinning the SCR is largely stipulated in regulation, leaving virtually no latitude for interpretation. The primary element of self-regulation left to the Actuarial Society of South Africa concerns the nature and responsibilities of the Head of the Actuarial Function, defined under Pillar II governance requirements as providing independent oversight on a number of issues of an actuarial nature. (ASSA, 2018 and 2019).

5.3.10 South African insurers, like their counterparts in Europe, have the option of submitting an application to the regulatory authority to utilise an internal model in preference to the standard calculation. Unlike their European counterparts, however, it is understood that no more than a handful of insurers applied for permission to use such a model and that very few insurers are in the position of using such a model. All insurers, however, must demonstrate that they have considered the extent to which the actual risk profile of the insurer deviates from the corresponding profile implied by the standard calculation. They must also determine the impact that this difference has on the calculated MCR and SCR. Notwithstanding the provision of a standard formula, in other words, the boards of directors of all insurers must assess the risk profile of the insurer and consider the appropriateness of current and future capital in light of this profile.

5.3.11 As in Europe, sovereign debt is considered risk free:

> Unless otherwise approved by the Prudential Authority, insurers must use the government bond curve published by the Prudential Authority as the risk-free interest rate term structure to discount cash-flows for the purpose of valuing technical provisions. (PA, FSI2.2, paragraph 13.1)[56]

5.3.12 The solvency calculation includes an element of dependence on the views of ratings agencies, as under Solvency II. The standard adjustment for counterparty default, for example, uses credit ratings to estimate the probability of default of that counterparty.

5.3.13 Perhaps the most significant difference between the requirements of Solvency II and the corresponding stipulations of SAM is that South African insurers are not (currently) required to publish a publicly-available version of the ORSA report as stipulated

56 Prudential Authority, 'Prudential Standard FSI 2.2: Valuation of Technical Provisions', page 17, July 2018

under Solvency II (see paragraph 5.1.5). EIOPA proposes not only to continue its requirement that insurers publish the Solvency and Financial Condition Report (SFCR) but to subject it to external audit and to split it between a short public-facing version and a more detailed version for the so-called professional public (EIOPA, 2019b).

5.3.14 Observers have considered the possibility that developing accounting standards contribute to systemic risk by magnifying market movements (Ellul et al., 2014; Hufeld et al., 2017; Koijen & Yogo, 2017). The approach underpinning calculations under the SAM methodology is largely consistent with the corresponding approach adopted under the accounting standards that are utilised in South Africa, the International Financial Reporting Standards (IFRS). IFRS17 is a forthcoming standard that is expected to increase significantly the complexity of accounting for insurance. It requires (1) a comprehensive assessment of the profitability of a contract when it is sold, on the basis of the expected future cashflow of that contract, and (2) an accounting, for the remaining life of the contract, of the profit as it emerges (IFRS Foundation, 2017).[57] IFRS17 may prove helpful to assist insurers to understand and report more accurately on the risks to which they are exposed.

5.4 Concluding comments

South African policymakers have made substantial progress in implementing a framework of risk-based insurance regulation comparable to the corresponding systems in a number of advanced countries, notably Europe. Insurers are subject to a demanding set of requirements spanning reporting, governance, internal documentation and complex actuarial calculations. These are designed to enhance the soundness of these institutions, the protection provided to their customers and the financial stability of the system as a whole.

6. THE SOUTH AFRICAN REGULATORY MODEL AND SYSTEMIC RISK

The discussion that follows applies to the South African environment the thoughts of Section 5.1 regarding insurer contributions to systemic risk. It is sparingly referenced as it aims not to introduce new information. The enquiry starts by considering whether the rationale for the regulation of financial markets holds in this country and explores the legitimacy of the role of the South African insurance industry in meeting wider social and economic needs. It then turns to the potential contribution of South Africa's insurers to systemic risk and investigates possibilities for new or modified forms of regulatory intervention.

6.1 The rationale for regulation of South Africa's insurers

6.1.1 The case for regulating financial markets in general and insurers in particular is strongly made (see Section 2.3), but do the arguments apply to this country? South Africa's insurance market is substantial, complex and concentrated. It is subject to

57 Supporting information is available at Deloitte (2017a), 'Implementing IFRS17 in South Africa', Deloitte (2017b), 'IFRS17 – Insurance Contracts', Technical summary of IFRS17, EY (2018), 'Applying IFRS17: A closer look at the new Insurance Contracts Standard', May and PWC (2017), 'IFRS17 Marks a new epoch for insurance contract accounting', In Depth No. INT2017–04.

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high levels of inter-connectivity with other financial intermediaries (Section 5.2), particularly the banks which, it is generally accepted, are more prone to risks of contagion (Section 4.2.5). The consequences of a market failure depend significantly on the type and depth of the problem, but concerns regarding systemic risk are justifiable. Widespread contagion of the industry could have substantial knock-on effects on other parts of the financial market, potentially causing substantial hardship in the real economy.

6.1.2 It is submitted, in conclusion, that South Africa has extensive rationale for regulating insurers and associated intermediaries in the pursuit of the outcomes that it has put forward. These intended outcomes are (Section 5.3.5): to enhance the soundness of financial institutions, to improve the strength of the corresponding financial market infrastructure, to protect the customers of these institutions and to maintain financial stability. That the fourth outcome has been included is specifically noted.

6.1.3 Questions have been asked about the appropriateness of the chosen structure and its associated expense. Assessing the cost-benefit trade-offs of alternative regulatory frameworks is an intractable problem with a number of issues of great complexity (Section 2.1.10). Two particular difficulties are worth pointing out in the context of systemic risk for South Africa: first, quantifying the probability or consequences of a systemic event; and, second, putting a value to the impact of positive and negative externalities of the financial system, especially its ability to add to or detract from the imperatives of improving social cohesion and reducing economic inequality. Improving access to effective financial products and services is likely to be critical in this regard, as considered in the discussion that follows.

6.2 The economic and social contribution of insurance in South Africa

6.2.1 Research regarding the direction of influence between growth in the South African insurance market and the corresponding growth in the economy is inconclusive. This investigation suggests, for long-term insurance, that insurance growth follows economic growth, not the other way around. In the case of short-term insurance, it finds no evidence of a relationship (Section 3.3.8). It is nevertheless reasonable to posit, on the basis of theoretical work and household-level modelling, that insurance, appropriately utilised, provides significant microeconomic benefits to its customers and hence to society more widely (Section 3.2.1). Of course, in order for insurance to do so, it must meet the identified needs of customers, which is what South Africa's market-conduct framework seeks to ensure (Section 5.3.6).

6.2.2 More difficult to answer is the question of whether South Africa's insurance markets meets appropriate social objectives. The take-up of long-term insurance products by low-income customers appears to have increased rapidly in recent years (FMT, 2015 and 2018), but the increase appears to be limited to funeral products.[58] Short-term insurers, in particular, appear to have had little success in growing take-up among low-income customers,

58 Not all insurance products are beneficial to society. Thomson & Posel (2002), for example, express concern that the provision of funeral products to South Africa's low-income customers through funeral undertakers undermines the benefits of community-orientated burial societies.

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even in the largest consumer segments of motor and household risks,[59] let alone in agriculture where insurance has tremendous potential to support government policy (Section 3.2.1).[60]

6.2.3 South African policymakers have indicated their commitment to expanding access to insurance by lowering barriers to entry (NTSA, 2011a). Regulatory commitment to transformation of the ownership patterns of insurers has also been made clear (FSCA, 2018). Evidence for this is provided in the Prudential Authority stipulation that applications for converting the licences of insurers to the requirements of the Insurance Act, 2017, include plans for such transformation, failing which these applications are unlikely to be granted.

6.2.4 Considerable scope nevertheless remains for the insurance industry to contribute to meeting a wide range of social objectives. They could do so by providing products designed to meet the needs of low-income South Africans, perhaps focusing on economically- or socially significant parts of the economy like small businesses and agriculture. Insurers could also devote a greater share of their assets to economic and social development. They could work alongside government to improve social cohesion through provision of disaster management services. If insurance has economic benefit, it would be helpful if the insurers themselves were to demonstrate this. Perhaps insurers could be called upon, under the terms of market conduct regulations, to report to FSCA their commitment to meeting specified social objectives and the progress that they have made in this regard. This information could be made public.

6.3 Potential for insurance-industry contribution to systemic risk in South Africa

6.3.1 What then is the potential contribution of South Africa's insurance industry to systemic risk? The discussion that follows utilises the evidence referred to in this paper and applies it to local insurers in the South African context. First, the 'case against' is considered, bringing to the fore all of the evidence suggesting that any contribution to systemic risk is not significant. The 'case in favour' then follows.

6.3.2 The rationale against a significant contribution to systemic risk by South African insurers is built on the following:

— these insurers have a long history of careful prudential management that is built on the foundation of (1) careful oversight by the most experienced members of the actuarial profession, and (2) a prudential regulatory framework inherited from the United Kingdom, itself marked by a careful and conservative approach to insurance markets;
— they have relatively little involvement in the non-traditional non-insurance activity and in the risky assets, credit default swaps for example, that were significant contributors to the downfall of insurers in the 2008–09 financial crisis in other parts of the world (Sections 4.2, 4.3 and 5.2);

59 South African Insurance Association, 'Insights from the FinScope SA 2018 Study for non-life insurers', SAIA Bulletin, Jan 2019, accessed at https://saia.co.za/saia-news/2019/01/30/insights-from-the-fi/ on 23 April 2020.

60 Among the sources cited in Section 3.2.1, a number confirm the benefits of insurance for agricultural risk, for example, Cai et al. (2015), Cai (2016), Cole et al. (2013), Janzen & Carter (2018) and Karlan et al. (2014). The Land Bank and its insurance arm appear to be making progress in providing support for agricultural protection and development.

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— they have, over the last two or three decades, modified their products to share significant investment risk with their policyholders, initially through with-profit arrangements and subsequently through issuing unit-linked policies, and have much lower risk attributable to investments and to the provision of products with guaranteed returns than do their counterparts in many other parts of the world, Continental Europe, for example;[61]
— they have been subject to substantial recent improvements in the extent to which they are required (1) to meet risk-based capital requirements and (2) to demonstrate a serious and concerted effort to the identification and management of the risks to which they and their policyholders are exposed (Section 5.3); and,
— they have been subject to a gradually intensifying reporting regime that serves to improve the transparency with which they are viewed by the investment community and are soon to be subject to an intensive escalation in this process, through the imposition of international accounting standard IFRS17 (Section 5.3.14).

6.3.3 To this is added the widely-accepted point that insurers in general are less likely than other financial institutions, particularly banks, to contribute materially to systemic risk (Section 4.2.5).

6.3.4 That South African insurers indeed contribute significantly to system risk is supported by the following arguments:
— EOIPA recognises the potential for the contribution to systemic risk by insurers in Europe and is considering introducing significant changes to the Solvency II framework in order to improve the extent to which macroprudential protection may be enhanced (Section 5.1.15);
— the concentration levels of the industry, notably in the case of long-term insurance, are particularly high, as disclosed by international experts (Section 5.2), suggesting that industry exposure to any difficulties experienced by just one of the largest insurers is high;
— insurers have high levels of inter-relationships with other entities in financial markets, notably the banks, typically regarded as contributing significantly to systemic risk due to high levels of leverage and inter-dependence (Sections 4.2.5 and 5.2);
— with very large asset pools and similar liability profiles, the assets of South Africa's long-term insurers may be expected to be characterised by high levels of common holding, correlated exposure to the drivers of corporate value and a degree of direct investment in one another;
— as the value of insurance assets and liabilities are significantly tied to the discount rates available on sovereign bonds, long-term and short-term insurers are respectively subject to highly correlated exposure to the yields on these bonds though, in mitigation, assets and liabilities are effectively tied to the same rates through the solvency-assessment methodology;

61 Beneficial to the management of risks for the insurer this may be, but whether it provides an appropriate service to the customer is surely questionable. A key role of the insurer is to take on risks that policyholders cannot easily mitigate themselves.

— the products offered by the largest long-term insurers are not materially different from one another, increasing the risk of concentration of sources of risk on the liability side of balance sheets, similarly for the most significant short-term insurers;
— both types of insurers are strongly exposed to fluctuations in the economic cycle and to other types of business risks, though the avenues of transmission of risk are most likely different; and,
— insurers have common exposure to the potentially damaging behaviour of policyholders, linked to economic well-being, though the nature of the policies currently sold limits the extent of insurer exposure to policy lapses.[62]

6.3.5 To this list may be added the potential for contributions to systemic risk from specific sources, notably market risk, operational risk and liquidity risk. Perhaps the most prominent of these is the continued insistence by the authorities that investment in the sovereign bonds issued by the South African government are to be regarded as risk free.[63] Citing spreads in bond yields is risky at a time of high volatility but it is difficult to describe South Africa's bonds as risk free with all three of the major rating agencies, since March (SARB, 2020) taking the opposite position. South Africa's long-term insurers are reported as having relatively low allocations to government bonds.[64] Nevertheless, the SCR appears to include systemic under-estimation of the risk associated with investment in government bonds and all other asset types whose risks are determined with reference to government bonds. Concerns regarding the contribution to systemic risk arising from a distorted risk metric in the regulatory approach to minimum capital requirements deserve more attention.

6.3.6 Operational risk, which encompasses a wide range of possibilities that can have considerable impact, forms a somewhat simplified part of the SCR calculation, and may merit further attention by insurers. Liquidity risk is identified by the IMF as requiring further attention (Section 5.2.4). Though the comment applies to banks, it may be appropriate for insurers more likely to experience liquidity stress to consider this risk more closely. Scenarios of liquidity stress should take into account the possibilities that the normal sources of emergency liquidity may not be available and that liquidity may be obtained from longer-term assets only at significant loss of value and the potential for a contribution to an asset spiral. Finally, the use of credit ratings in some parts of the technical specification may contribute to systemic risk.

62 More generally, the events of 2020 may call for reconsideration of the assumed correlation between market risks and underwriting risks.
63 "Unless otherwise approved by the Prudential Authority, insurers must use the government bond curve published by the Prudential Authority as the risk-free interest rate term structure to discount cash-flows for the purposes of valuing technical provisions." (Paragraph 13.1, Prudential Standard FSI 2.2: Valuation of Technical Provisions, Prudential Authority)
64 The Association for Savings and Investment South Africa reports that 12.7% of the assets of long-term insurers were invested in government bonds (ASISA Life Statistics, downloaded from https://www.asisa.org.za/statistics/long-term-insurance/ on 19 May 2020). This considers only those assets outside of those allocated to investment funds and only those that are not linked explicitly to policyholder liabilities.

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6.3.7 Perhaps the most important source of concern lies in the deception of safety. The aftermath to the 2008–09 financial crisis was marked by an acknowledgement that financial markets were not as secure as regulators had thought they were. At this time, soon after formal implementation of the SAM system, complacency may represent a significant risk. Yet researchers have presented substantial evidence that the most significant contributor to systemic risk in a capital-management system such as Solvency II may lie in its key asset, the appearance of sophistication in its attention to idiosyncratic risk (Section 5.1).

6.4 Regulatory options

6.4.1 Financial-sector regulators have an enormously challenging task. Their reward is typically characterised by little upside, as commendation for establishing a stable environment is rare, and enormous downside, for they frequently attract a large share of the blame when things go wrong. For this reason, regulators are constantly on the watch for sources of systemic risk. The Prudential Authority, within the context of the South African Reserve Bank, is surely no exception to this. Lecturing the regulator on what it should be doing to address the potential for systemic risk is not the purpose of this paper. Thoughts for consideration are regarded as more appropriate.

6.4.2 The discussion that follows consists of a series of questions that decisions-makers at the PA may wish to think about:

— Is the potential for systemic risk across the insurance industry a subject that should be taken more seriously by the regulatory authority? Is it worth exploring the appropriateness of the changes under consideration by EIOPA in advance of their potential implementation in Europe?
— Has sufficient attention been devoted to the possibility of correlated assets and liabilities across insurers of similar types? Could insurers themselves not be required to devote attention to this possibility, showing how their actions may contribute to systemic risk and how they have taken steps to mitigate this risk? Would a stronger emphasis on a realistically-determined economic capital requirement enhance the attention to systemic risk or might it merely improve insurers' assessments of their own risks at the cost of improved assessment of their contribution to systemic risk?
— How is model risk addressed? Is the appropriateness of the SCR calculation frequently reconsidered? Are alternatives to the value-at-risk approach evaluated for their potentially stronger indications of the entity contribution to systemic risk? Is the calibration of the model appropriate and is it reviewed from time to time? In particular, might the assumed correlations between elements of the calculation need to be reconsidered, in particular the link between market risk and underwriting risk? What might the impacts of treating government bonds as risk-free be on both idiosyncratic and systemic risks? Could elements of that calculation be improved to recognise differences in the attributes of insurers? Are approved internal models subject to regular testing and updated in response to evidence of the need for change? Are the skills available at the regulator sufficient to detect the potential for adverse impacts attributable to these models?
— How well is the potential for the propagation of risks within a financial group understood?

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The framework for group regulation exists but the nature of this propagation can be difficult to conceptualise. Are the current demands on boards of financial groups sufficient to mitigate this risk? How is the corresponding potential for the transfer of risk between entities with significant operational bonds that do not form part of the same group managed? Liquidity risk, for example, may not appear significant to insurers but, taking into account their relationships with other members of a group, could prove potentially problematic.

— More difficult, how well are the links between financial sectors understood, particularly where these links might facilitate the propagation of risks? Where the regulatory authorities may have developed robust views on the profile of risks across an industry sector, perhaps with the benefit of network modelling, have they been able to expand the concepts to take into consideration the links across industry clusters?

— Is sufficient attention given to those types of risks that typically fall outside of the realm of actuarial modelling but can have a significant impact on the risk profile of an organisation and its contribution to systemic risk? Operational and strategic risks fall into this category, as do other risks related to an organisation's internal culture.

— Are there ways to improve organisational transparency? These should not unnecessarily burden regulated entities. They should also not risk providing opportunities to mislead the public through issuing complex but unhelpful documents, which public-version ORSA reports could do?

— Having avoided the pitfalls of public declarations of too-big-to-fail, does the regulatory framework appropriately consider the potential contribution of entities to systemic risk to the extent that it is related to the size of these entities? Some suitably graduated approach that provides for responsibilities that increase with size or connectedness may be appropriate.

6.4.3 Perhaps it is appropriate to close with a reminder that what distinguishes systemic risk from idiosyncratic risk is the externality. Entities have a natural incentive to manage idiosyncratic risk because they would feel direct pain should it materialise. Systemic risk is different because the incentive to manage it is less likely to exist. Others get hurt. The regulatory authority has a key responsibility to do all that it can to avoid this propagation.

7. FURTHER RESEARCH

A number of areas for further research are touched upon through this paper. These thoughts are summarised in the list that follows.

7.1 Financial market networks

The excellent analysis of South Africa's banking network carried out by Dr Walters and her colleagues (Walters et al., 2018) may be taken forward in a number of ways. Tests of the sensitivity of results to assumptions would be helpful, but perhaps more insightful would be an examination of the effects of material changes to the nature of the network assumed. This could be supported by an empirical examination of the network attributes of the South

African banking market. More ambitiously, extensions of the model to include insurers and to test the impacts on the economy are worth considering.

7.2 Benefits of insurance in South Africa

7.2.1 Further work on the economic and social benefits or harms of the South African insurance industry on the people of the country would be helpful. This research could be empirical or theoretical. It could include macroeconomic and microeconomic considerations or focus primarily on social impacts. It could allow more rigorously for the social and environmental costs of the profit- and growth-orientated thinking of neo-classical economics.

7.2.2 This type of work would be of great benefit to regulators and insurers interested to know where the positive effects and the potential for pitfalls are greatest. It may assist in the development of a sound framework of Regulatory Impact Analysis and help in the shaping of policy.

7.3 Empirical tests of the insurance industry

7.3.1 Research concerning aspects of the South African insurance industry in a number of respects may be fruitful. Possibilities include exploring the incidence of overlapping assets and liabilities across long-term and short-term entities in order to understand the potential for this overlap to contribute to systemic risk. The nature and impacts of intra-group relationships could fruitfully be explored. As touched upon in Section 5.2.2, the level and trends of concentration indices covering South Africa's insurance industry, and concerns over high levels of pricing power, could usefully be explored as these attributes may contribute to levels of systemic risk.

7.3.2 Technical tests could be undertaken regarding the impacts of changing the assumptions that underpin the existing solvency framework. How would minimum capital requirements change, for example, if government bonds were no longer treated as free of risk or if a higher correlation were assumed between market risk and underwriting risk? On the basis that a dependence on credit ratings may enhance the risk of systemic contagion to the system, it would be useful to understand what the extent of this dependence might be. A number of other tests are worth exploring.

7.3.3 Consideration could be given to the potential for a graduated regulatory approach to entities that, by virtue of their size or connectivity, might contribute more significantly to systemic risk. Ideally this approach should avoid splitting insurers into inflexible categories, based on size for example.

7.3.4 Finally, the available measures of entity-specific contributions to systemic risk tested elsewhere could be applied to South African insurers to test the possibility of a modified approach to minimum solvency requirements.

7.4 Contributions to strengthen the regulatory framework

7.4.1 South Africa's legislated and regulatory objectives appear to be sound. Further work may be helpful to motivate an improvement to the breadth of these objectives

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or the extent to which success could be demonstrated by defining impartial outcomes and publishing the extent to which these outcomes are achieved.

7.4.2 Options for an integrated approach to macroprudential regulation could be considered, bringing existing approaches to microprudential oversight, the disciplines of monetary policy and the alternative macroprudential tools together into a coherent whole.

7.4.3 A better articulated approach to Regulatory Impact Analysis in financial markets could be considered. As this paper shows, the obstacles are considerable. A framework would help, though, so that progress in any of the other research areas considered here might be fruitfully applied to improving the approach to the regulation of insurers and other financial entities.

8. CONCLUDING COMMENTS

8.1 Notwithstanding the significance of their contribution to an economy, financial markets are characterised by remarkable complexity and fragility. The challenges of regulating these markets to achieve a set of pre-defined objectives should not be understated.

8.2 Do South Africa's insurers contribute materially to the country's systemic risk? On the face of it, this contribution appears to be relatively low. For regulators to adopt this position would be irresponsible, however, given the potential consequences of financial contagion on the market, its customers and the economy more widely.

8.3 Recent efforts to improve the awareness, measurement and management of risk in South Africa's insurers represent substantial movement in the right direction. Two concerns are raised in this paper regarding these steps, however, and the illusion of security that they might create. First, care needs to be exercised to understand tail risks at entity-level, recognising that these tail risks may be correlated across market players, contributing to systemic risk. Second, the pursuit of an improved assessment of entity-specific risk may actively contribute to the incidence of poorly-recognised systemic risk. Measures may need to be considered to overcome this potential weakness in the regulatory system.

8.4 It is hoped that the thoughts set out in this paper prove useful to policymakers, regulators and participants in South Africa's insurance market.

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