NAIC
National Association of Insurance Commissioners

JOURNAL OF INSURANCE REGULATION

Cassandra Cole and Kathleen McCullough
Co-Editors

Vol. 38, No. 4

When Insurers Have Discretion: Lessons for Regulators from UK Insurers' Response to the Global Financial Crisis

Christopher David O'Brien

JIR-ZA-38-04

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Printed in the United States of America

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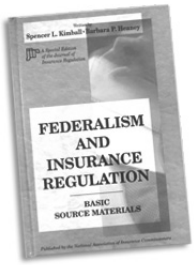

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When Insurers Have Discretion: Lessons for Regulators from UK Insurers' Response to the Global Financial Crisis

Christopher David O'Brien*

Abstract

This paper examines the steps taken by life insurers writing participating business in the UK to protect their solvency during the global financial crisis of 2008. It highlights two areas where the insurers had discretion and the interest that regulators have in controlling that discretion. The first is that the regulations then in force allowed discretion to insurers in the discount rate they used to calculate their liabilities in the calculations of solvency that were required. This paper finds that one of the main responses of the insurers to the global financial crisis was to reduce the margin of prudence in the discount rate they used to value their liabilities, meaning that their liabilities were given a lower value than otherwise, with a consequent increase in their reported solvency. Insurers also used their discretion to increase their charges to and reduce the payouts to policyholders, while they also reduced risks by adopting a more conservative investment strategy. This paper then considers the effect of Solvency II regulation introduced in the European Union (EU) in 2016 and the implications for regulators generally. Regulators need to be wary of rules that offer insurers discretion in calculating their liabilities; they may use it to enhance their reported financial position in a way that is essentially artificial. Solvency II removes the discretion in choice of discount rate, implying that insurers need to review how they manage solvency in adverse circumstances. It is also suggested that European regulators review their rules to ensure that policyholders are fairly protected when insurers have discretion on charges and payouts.

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Introduction

European Union (EU) insurers have, from 2016, been subject to the Solvency II regime, its design having taken account of the global financial crisis of 2008. EU insurers had largely survived the crisis. However, they had to overcome problems as their assets (at market value) took a hit from the decline in prices of shares, corporate bonds and real estate, while the value of their guaranteed benefits increased as they were valued by discounting at market rates of interest, which fell rapidly.

The aims of this paper are to: 1) ascertain the response to the global financial crisis of one set of insurers—UK life insurers writing participating business—which enabled them to survive the rigors of the markets in 2008; 2) suggest how, in the new era of insurance regulation introduced by Solvency II in 2016 (Braun & Weber, 2017), insurers and regulators may need to manage their responsibilities differently; and 3) highlight the implications of regulations that allow discretion to insurers.

One particular focus has implications for regulation in general. In Solvency I, the regime that preceded Solvency II, insurers exercised discretion in choosing a margin for prudence when determining the interest rate to value their liabilities. In the difficult financial circumstances of 2008, they might reduce that margin, producing a lower reported level of liabilities than otherwise and a reported level of solvency that was higher. However, such changes in the figures reported would not be true representations of the underlying financial position. To the extent that this was the case, it implies that regulators need to monitor insurers who can use discretion in valuing their liabilities. That discretion in choice of interest rate has been removed in Solvency II but may still be available in other aspects of valuations and in other jurisdictions.

Another issue relating to insurers' discretion is their ability to change the charges on and payouts to policyholders. Insurers' conduct in these areas, especially when they face difficult financial conditions, is a matter of interest to regulators.

After setting out the background to participating business and its regulation, this paper reviews the literature on the approaches a life insurer in a weak financial position can take to preserve the solvency figures that it reports. These approaches fall into five categories. First are techniques to improve the reported, rather than the underlying, financial position of the insurer. They might be regarded as cosmetic changes that enable a firm to meet regulatory requirements on capital but do not provide a genuine representation of its ability to meet its obligations under various scenarios. Secondly, an insurer can share the burden of adverse conditions with policyholders. Thirdly, it can move to a less risky investment strategy to avoid further deterioration in its solvency. The fourth possibility is that insurers increase their reinsurance, again protecting them against a further worsening of solvency. Lastly, they can reduce the impact on their solvency of the new business they write.

The literature on how insurers can protect their solvency in adverse conditions is largely from (theoretical) actuarial papers, and a contribution of this paper is to establish which management actions were important in practice in the global

financial crisis. This is done with data covering the period 1999—2010 so that the context of the crisis can be properly understood.

However, following the changes introduced by Solvency II, the techniques to protect solvency used in 2008 may not be suitable in the future. This paper, therefore, considers the insurers' management actions found to be prominent in 2008, namely reducing the prudence in the discount rate chosen to value their liabilities, increasing charges to and reducing the payouts to policyholders, and moving to a less risky investment strategy. This paper also assesses the implications now that Solvency II is in operation. In particular, insurers and regulators need to recognize that the insurers' discretion over the discount rate to value their liabilities has been largely removed, while the European Insurance and Occupational Pensions Authority (EIOPA) may need to place greater emphasis on those regulations intended to ensure that insurers' actions, which affect policyholders, are consistent with their obligation to treat policyholders properly ("conduct regulation").

This paper continues by explaining participating life business in the UK and its regulation, followed by a review of the literature to ascertain how insurers can protect their solvency in adverse conditions. Subsequent sections set out the hypotheses being tested and the methodology described, the data used and the findings. Next is an assessment of whether these actions can apply in Solvency II and the implications for insurers and regulators. A final section concludes.

The Operation of Participating Life Business in the UK

The study covers the UK life insurance industry which, in 2007, was the second largest in the world, measured by premiums (Swiss Re, 2008). Participating business represented a significant part of the UK life insurance business, with £286 billion liabilities at the end of 2007.[1] The policies provide guaranteed payments to policyholders, who also expect to receive a share of the profits that are earned (from insurers declaring "bonuses"). However, insurers were taking significant risks by, typically, investing a substantial part of their assets in equities and real estate, notwithstanding the substantial guarantees they were providing. This, therefore, gives rise to a significant challenge in risk management. At the end of 2007, 39% of their asset exposure was to equities, 11% to real estate and 39% to bonds. This contrasted with the strategy of life insurers in many other countries, where investment was more focussed on bonds (OECD, 2011).

The insurers faced a major challenge to their solvency from the global financial crisis. First, the market value of their assets fell markedly. The Financial Times Stock Exchange (FTSE) 100 Index dropped by 31% from 6457 at the end of 2007 to 4434 by the end of 2008. It fell further to 3461 on March 9, 2009. The Investment

1. The industry data used are, unless stated otherwise, from the SynThesys Life database of Standard & Poor's, which covers all UK-authorized life insurers.

Property Databank (IPD) UK annual property index, based on the real estate portfolios of institutional investors, showed a fall of 26.3% in 2008. Corporate bond spreads widened. For example, one major life insurer (Legal and General) reported the yield on its BBB-rated securities as 1.86 percentage points above UK government bonds at the end of 2007 but 5.2 above at the end of 2008.[2] Second, the value of insurers' liabilities increased. This was the result of a sharp decline in yields on UK government bonds in the second half of 2008, from 5.18% at the end of June to 3.74% at the end of the year (15-year bonds). Those yields were used as the basis for discounting insurers' liabilities for guaranteed benefits, which were, therefore, revalued upwards. Nevertheless, all these insurers met regulatory capital requirements at the end of 2007, 2008 and 2009.

These problems were not new. At the end of 1999, the FTSE 100 Index reached 6930. The bursting of the dot-com bubble was the start of the 53% decline in the index to 3277 on March 12, 2003. Yields on 15-year UK government bonds fell from 5.15% at the end of 1999 to 4.35% in February 2003. As a result, it will be useful to examine recent trends in order to put the 2008 crisis in context.

Summary figures for life insurers' solvency are shown in Table 1, which covers the whole of the participating business market, using data at insurers' financial year-ends, usually Dec. 31. At the end of 1999, participating insurers' average solvency ratio was 16.41% (i.e., assets were 16.41% more than liabilities). By 2002, this was only 4.40%. There was an improvement thereafter and by 2006, the average ratio was up to 9.04%. However, it fell to 5.09% in 2008. (Ratios are weighted unless stated otherwise.)

Table 1:
Summary Data

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
No. of insurers	122	118	109	110	107	99	89	84	79	77	71	68
Admissible assets (£bn)	674.1	688.2	654.2	604.2	641.3	668	784.4	753.1	783.1	665	694	735.8
Policy liabilities (£bn)	521.2	563.7	567.3	550.9	569.5	585.3	666.3	615	641.3	560.5	584.7	608.9
- including participating business (£bn)	313.0	345.2	350.7	338.3	333.2	329.7	327.4	303.9	286	268.3	256	250.6
Solvency ratio	16.41%	10.15%	6.49%	4.40%	5.91%	5.71%	6.42%	9.04%	7.66%	5.09%	6.19%	6.46%

Policy liabilities = Liabilities valued in accordance with Solvency I rules and net of reinsurance, excluding expected distributions of surplus from funds closed to new business.
Solvency ratio = Admissible assets divided by liabilities, minus 1, in accordance with Solvency I rules.

Some further explanation of participating policies will be useful. Many of these are endowment policies, the description of which illustrates the issues involved. These policies guarantee policyholders a minimum sum insured, payable on the earlier of death or reaching the maturity date, often 25 years after the policy commenced. The guaranteed sum is calculated assuming a very modest investment return, hence with an expectation that the fund will earn significant profits. At the

2. Data from Legal and General's regulatory returns to the Financial Services Authority.

annual valuation of the assets and liabilities of the fund, some of the surplus is distributed as an "annual bonus." An insurer may declare a bonus rate of, for example, 2%, meaning that the guaranteed sum insured is increased by 2%. Hence, if the policyholder survives to maturity, as is usually the case, the guaranteed sum insured is then substantially more than was guaranteed at the outset. However, the insurer then checks that the policyholder receives a fair return for the premiums paid and calculates the notional share of the assets in the fund attributable to the policy ("asset share"), being the premiums paid on the policy, together with the return on the investments, minus expenses and the cost of claims. The insurer can then add a "terminal bonus" to the guaranteed benefits so that the maturity value is about equal to the asset share. If the policyholder dies before the maturity date, the insurer will add a terminal bonus to the guaranteed benefits in order to reflect the investment return, etc., on the assets underlying the policy in the years the contract has been in force. Some participating policies are designed to pay a pension, the maturity date being chosen to coincide with retirement, and the sum then payable is used to buy an annuity. Participating policies amounted to 22% of the liabilities of UK life insurers in 2008.

The problem for an insurer is that if the assets have declined in value, the asset share may be lower than the guaranteed benefits, in which case it needs to use its capital to ensure that its obligation to policyholders is fulfilled.

A particular feature of this business is "smoothing." This means that while, in principle, terminal bonuses could change frequently so that maturity values reflect asset shares accurately, terminal bonuses were, in practice, usually changed only once a year, and the changes were moderated or "smoothed." In the 1990s, insurers' practice, although it was not a contractual requirement, was to limit the percentage change in the maturity value on policies from year to year to a figure such as 10% (Harley and Davies, 2001).[3] A number of actuarial papers also assumed this to be the case in their modelling (Eastwood et al., 1994; Nowell et al., 1999).

Most of the business is done by stock insurers, with profits being divided between policyholders (typically 90%) and shareholders (10%). In mutual insurers, all distributed profits are available for policyholders, although there is no shareholder capital to fall back on. The insurers usually write some non-participating policies as well.

Regulation

The industry was regulated by the Financial Services Authority (FSA), which was replaced in 2013 by the Prudential Regulation Authority (PRA). The FSA monitored solvency by checking that the excess of an insurer's assets over liabilities

3. For example, the payout on a 25-year endowment assurance policy with a premium of £50 per month for a 30-year-old and maturing in 1999 would not be more than 10% more or less than on such a policy maturing in 1998.

was at least equal to the minimum capital requirement using Solvency I rules, which depends on the value of an insurer's liabilities and the death benefits it provides; there was a reduction where benefits are reinsured. This monitoring uses the traditional valuation that insurers carried out. Assets are largely at market value, although certain assets are excluded (inadmissible assets). Liabilities are calculated using prudent actuarial assumptions based on market interest rates.

The challenges of financial conditions in 2000–2003 led the industry to press for a new approach to the valuation of insurers' assets and liabilities, and the FSA also favored change, looking for a more transparent way to measure insurers' solvency. It introduced, from 2004, new requirements for insurers that had more than £500 million of liabilities on participating business. They were required to prepare a "realistic balance sheet" and are termed "realistic reporters." They accounted for the vast majority of this business, with 89% of participating insurers' assets in 2008. The main points follow, taken from the FSA's rule book. Assets were at market value and included items previously inadmissible. Policy liabilities were the sum of asset shares, plus the value of additional payments expected as a result of guarantees or options or because of smoothing. The discount rate was consistent with market interest rates, without discretion. Indeed, all calculations were to be on a market-consistent basis. Tax and other miscellaneous liabilities were added in. Deductions were allowed for charges that insurers made for guarantees, options and smoothing. Realistic reporters were required to have a minimum level of capital that enabled them to pass specified stress tests—for example, if share prices fell by 20% or interest rates changed by 17.5%. In addition to this new approach, realistic reporters still had to carry out the traditional valuation and meet capital requirements under the Solvency I rules. Insurers issued "regulatory returns" that reported their financial position.

The way in which the valuation is market-based meant that the insurers were exposed when the global financial crisis struck. As Schich (2009) commented, values of equities and corporate bonds declined almost simultaneously, while the decline in government bond yields meant that there was a substantial increase in liability levels.

Literature Review

The approaches that management can use to protect solvency are in five categories: 1) implementing changes to improve the reported, rather than the underlying, financial position of the insurer; 2) sharing the burden of adverse conditions with policyholders; 3) moving to a less risky investment strategy; 4) increasing reinsurance; and 5) reducing the impact of new business being written. Tuley (2009) indicates that an insurer's financial position is a key factor in deciding what action to take. It is reasonable to suppose that, at times of crisis, these actions will have become especially significant.

Implementing Changes to Improve the Insurer's Reported Financial Position

The first approach is to improve the reported financial position through "cosmetic changes" that do not truly improve the ability of the insurer to meet its obligations. This covers two possibilities.

First, in the traditional valuation of liabilities, the regulations require an insurer to use "prudent" assumptions, but the extent of that prudence can be reduced, leading to a lower value of liabilities and higher reported solvency than otherwise. Bunch (1988, p. 78) described this "evidently a useful short-term expedient." In particular, an insurer can choose to increase the rate at which it discounts future claims, subject to a maximum specified in the regulations, based on government bond yields. As the chief executive of the UK's Financial Reporting Council (FRC) said, "Discounting is like a magic financial telescope - designed to be looked through the fat end. The purpose of a normal telescope is to make small things in the distance appear larger. The magic discounting telescope has the opposite effect by making large things in the distance appear smaller" (Boyle, 2009). He went on to highlight the power of the magic telescope as enabling the choice of a higher discount rate to reduce the reported present value. Indeed, it has been found that pension funds that are financially weak tend to use a higher discount rate than funds that are strong (Asthana, 1999). Similarly, insurers may reduce the prudence margin in the discount rate they use. Second, an insurer can sell inadmissible assets, and then buy assets that are admissible. For example, inadmissible assets may be sold to a non-insurance company in the group to which insurance regulations do not apply (Kerr and Rogers, 1990). However, FSA rules from 2005 led to realistic reporters (who accounted for most of the business) being able to include assets previously inadmissible, so that this may not be material for actions in 2008.

Sharing the Burden of Adverse Conditions with Policyholders

The second approach is to share some of the burden with policyholders when a financial crisis reduces an insurer's surplus assets. In particular, as the profits in which they are participating are lower, rates of bonus are expected to reduce (Bunch, 1988; Hare et al., 2004). Insurers would reduce the rate of annual bonus to limit the build-up of guaranteed benefits, while terminal bonus rates would be reduced so that maturity values reflect lower asset values. In a crisis, insurers may reduce maturity values by changing the smoothing they do (Dullaway and Needleman, 2004), enabling them to reduce bonus rates more quickly and deeply than otherwise. Harley and Davies (2001, p. 41) said, "If faced with insolvency they would have the option of changing the (smoothing) rules and making more abrupt changes; indeed it would be very odd if companies clung to rules that threatened them with imminent ruin."

Insurers can also reduce the amount they pay when policyholders surrender their policies. Additionally, insurers can increase the charges they make for guarantees, options and smoothing (Dullaway and Needleman, 2004). A survey in

2000 found that only eight out of 33 insurers made such charges, although several others intended to start doing so (Tillinghast-Towers Perrin, 2001).

However, insurers cannot be unfair in their treatment of policyholders in order to protect solvency. They also need to balance the interests of current and future claimants, while there are also some difficult issues in ensuring that shareholders' interests are not favored over those of policyholders (O'Brien, 2012).

Moving to a Less Risky Investment Strategy

The third approach is to reduce the risk of further declines in solvency by changing investment strategy. In principle, asset-liability management in a way that protects an insurer from the effect of changes in financial markets implies that it would have sufficient investments in bonds to match its guaranteed liabilities, with equities and real estate only bought from surplus funds. Traditionally, though, insurers have used their often substantial surplus of assets over guaranteed liabilities to justify taking investment risks, holding more equities and real estate and fewer bonds than matching implies (Elliott, 1988). As solvency declines, it is less easy to justify this "mismatching," and insurers are, therefore, expected to reduce their equity and real estate holdings and increase bond holdings (Nowell et al., 1999; Hare et al., 2004; Tuley, 2009). Such a reduction in risks is consistent with the finite risk theory of risk management as referred to by Baranoff and Sager (2011). They propose that firms plan a given level of risk and if, for example, asset values reduce, exposing firms to greater risk, they will reduce risks elsewhere to compensate. A number of studies of U.S. life insurers by Baranoff and Sager (2002, 2009, 2011) found mixed evidence, with increased financial risks not always being fully compensated for by actions elsewhere to reduce risk.

On the other hand, there could be an incentive for a weak firm to take greater risks (in investment strategy, for example). If they do not succeed, the firm can increase shareholder value by exercising the put option to default, not meeting all its liabilities because its assets are insufficient (the excessive risk theory: Baranoff & Sager, 2011). Meanwhile, statutory guarantee funds ensure policyholders' claims are paid. However, UK regulators were taking an increased interest in insurers' risk management, finding improvements over time (FSA, 2003, 2006), so UK life insurers looking to take extra risks to rescue them from adverse financial conditions would face difficulties from regulators.

Increasing Reinsurance

A fourth possibility is to buy more reinsurance to reduce risk. Adams, Hardwick and Zou (2008), in a panel data analysis of UK life insurers, found that a lower solvency ratio was associated with greater use of reinsurance. Indeed, some reinsurance products were specifically designed to assist weak insurers whose financial position appeared especially poor when measured using the (prudent) traditional valuation. When realistic reporting was introduced in 2004, the rationale

for such products (intended to counteract "unrealistic" rules) fell away, and some deals were terminated. An example was a large reinsurance between Sun Alliance and London Insurance Company and a combination of three reinsurers, originally effected in 2000.

Reducing the Impact of New Business Being Written

The final set of actions addresses the problem that writing new business depletes surplus ("new business strain": Bunch, 1988). This is because when a premium of X is received on a new policy, the assets increase by less than this because of acquisition costs, while the liabilities may increase by more than X because they are calculated on a prudent basis (in the traditional valuation). The realistic reporting regime helped insurers avoid the negative impact of new business on their balance sheet if it was expected to be profitable, although high acquisition costs were still an issue. To reduce new business strain an insurer can:

- **Write less new business** (Bunch, 1988). Indeed, a fund could cease writing new business, becoming a "closed fund" (Hairs et al., 1999). This is more likely if an insurer's solvency level is low (O'Brien and Diacon, 2005).
- **Write a higher proportion of its new business using products that produce low new business strain.** Such "low strain products" can be regarded as policies where only a single premium is paid, or if written on a "unitized" basis, where the guarantees relate only to benefits secured by premiums that have been paid (O'Neill and Froggatt, 1993), as distinct from the "conventional" basis, where guarantees relate to all premiums over the policy term.
- **Reduce acquisition costs.** Siglienti (2000) suggested that insurers cut costs in response to financial weakness resulting from lower interest rates. There were also other incentives for this, such as the introduction in 2001 of "stakeholder pensions," where insurers' charges were limited to 1% p.a. of the fund (from 2005, the charge in the first 10 years could be 1.5%). Such charges were well below what insurers were previously charging, adding to the pressure to reduce costs—in particular, commission to agents.

Hypotheses and Methodology

The hypotheses in this study are that, in 2008, insurers:

- Reduced the prudence margin in the discount rate.
- Reduced maturity and surrender values and increased charges.
- Increased the proportion of assets in bonds with reductions for equities and real estate.
- Increased reinsurance.

- Reduced the amount of new business, increased the proportion represented by low strain products and reduced acquisition costs.
- Possibly, reduced their inadmissible assets.

The methodology is to examine indicators of management actions, such as the prudence margin in the discount rate in 2007 and 2008, and use paired t-tests to compare the indicators in those two years.

Having established what management actions were used to a significant degree in 2008, we supplement the findings by determining how many insurers used all or most of those actions.

It is useful to examine the indicators over a longer period, namely 1999–2010. We identify certain years as "bad" in economic terms, where interest rates and share prices both fell (2000, 2002, 2008), and those years that were "good" (interest rates and share prices both increased: 2003, 2006, 2009). We then use paired t-tests to assess whether the hypotheses tested for 2008 are also valid for the other "bad" years and whether the reverse is true for the "good" years (i.e., an increase in the prudence margin, etc.). However, there was a strong trend to reduce maturity values over the period, which we will study more fully later. Therefore, it is appropriate to use the change in maturity value from year to year as the relevant indicator in the t-tests.

Data

The main source of data is the SynThesys Life database of Standard & Poor's, which is compiled from insurers' regulatory returns. In 1999, there were 122 UK-authorized life insurers that had liabilities on participating contracts.[4] By 2010, that number had decreased to 68, evidencing industry consolidation, with the assets and liabilities of some insurers being transferred to others.

The prudence margin in the valuation of liabilities is estimated as the excess of the 15-year government bond yield over the discount rate used by the insurer. Data are hand-collected from insurers' regulatory returns where available (Table 2). Admissible assets are from SynThesys Life.

To investigate maturity values of policies, we use an annual survey carried out by *Money Management* magazine (see Wassall, 2011 and earlier issues) showing the values on 25-year endowment assurance policies, which are commonly affected to help policyholders repay a mortgage loan. The data show the proceeds of a policy effected by a 30-year-old male paying a premium of £50 per month and maturing in February (Table 3). This reflects decisions taken by the insurer at the end of the previous year on the bonuses to be added to policies. The values for policies maturing in February 2009 are, therefore, attributed to 2008 and so on. In some

4. Excluded are two insurers whose only participating contracts were health insurance products, and one insurer where the policies participating in profits were, unusually, unit-linked, i.e., without the guarantees and smoothing that usually characterize participating policies.

cases, an insurer operates two funds, usually having acquired another insurer, the liabilities of which are retained in a separate fund. The maturity values are given for each. Data on surrender values are taken from the same magazine, although starting only in 2006 as the sample was very small previously.

Table 2:
Prudence Margin in Discount Rate

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Prudence margin in discount rate												
No. of insurers	41	51	41	29	51	45	40	40	40	39	35	34
Mean	1.60%	1.45%	1.33%	0.54%	0.83%	0.44%	0.26%	0.40%	0.32%	-0.17%	0.45%	0.40%

Prudence margin in discount rate = Redemption yield on 15-year UK government bonds minus discount rate used in calculating life insurance business liabilities (in each case net of tax).

Charges to policyholders are available for realistic reporters, which disclose the value of their future charges as an asset. This is divided by the value of policy liabilities to give a "charges ratio" from SynThesys Life.

Table 3:
Management Actions to Share Burden with Policyholders

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Maturity values												
No. of funds	35	33	29	31	30	31	49	54	63	65	62	60
Average (£)*	98,370	95,718	87,169	72,732	63,551	56,799	50,430	54,596	50,930	45,236	39,652	38,957
Surrender values												
No. of funds								35	36	47	40	32
Average (£)*								6,038	6,050	5,605	5,814	6,780
Charges ratio												
No. of insurers						38	37	35	36	37	33	32
Average						3.34%	3.06%	2.51%	2.47%	3.20%	2.86%	2.61%

*Unweighted
Maturity value = Maturity value on a 25-year endowment assurance policy effected by a 29-year-old male paying a premium of £50 per month, maturing 1–2 months after the end of the year shown.
Surrender value = The surrender value on a similar 25-year endowment assurance policy surrendered 10 years after commencement.
Charges ratio = Present value of charges divided by policy liabilities.

Investment strategy is considered using the proportion of each of bonds, equities and real estate in the assets attributable to participating business. Data are available from SynThesys Life from 2005. Prior to that, we rely on industry averages published in *Money Management*. Table 4 also shows these figures for 2005, which are generally close to those in SynThesys Life.

Table 4:
Investment Mix

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
No. of insurers							75	70	64	63	58	57
Bond proportion												
from SynThesys Life							40.4%	40.3%	39.4%	47.6%	49.7%	46.7%
from *MM**	21%	20%	23%	36%	33%	34%	38%					
Equities proportion												
from SynThesys Life							39.6%	39.2%	39.0%	28.9%	27.7%	29.1%
from *MM**	66%	67%	60%	43%	48%	47%	40%					
Real estate proportion												
from SynThesys Life							11.3%	12.2%	11.2%	9.5%	8.8%	9.3%
from *MM**	9%	9%	11%	11%	12%	11%	10%					

*Industry average (unweighted) from *Money Management.*
Bond [equities; real estate] proportion = Bonds [equities, real estate] relating to participating business as a proportion of all participating business assets (based on economic exposure.

Reinsurance is assessed using the ratio of reinsured to total liabilities, from SynThesys Life (Table 5). While this may not adequately express the impact of non-proportional reinsurance, it is a reasonable reflection of risks being transferred, given the data available.

Table 5:
Reinsurance

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Reinsurance ratio	14.6%	15.8%	15.8%	16.8%	19.2%	22.3%	19.7%	27.5%	26.1%	27.4%	26.8%	27.8%

All insurers included as in Table 1.
Reinsurance ratio = Reinsured liabilities as a proportion of total liabilities.

The amount of new business is examined using the measure used by the industry, namely new annual premiums plus 10% of new single premiums (O'Sullivan and Diacon, 2003). The "low strain" proportion is the proportion of new business represented by "low strain products" as described previously. Acquisition costs are divided by the amount of new business. Hence, an acquisition cost ratio of 47% indicates that such costs would be £470 on a policy where annual premiums of £1000 (or a single premium of £10,000) were payable. Data are all from SynThesys Life (Table 6).

Table 6:
Management Actions on New Business

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Amount of new business (£m)												
New participating business	3,714	3,285	3,410	2,927	1,569	1,326	1,020	811	946	1,137	831	889
New business (total)	8,752	8,817	10,950	10,900	9,655	10,347	9,431	10,862	12,666	11,592	8,391	8,670
Low strain proportion	87.9%	90.7%	90.8%	90.7%	85.5%	88.3%	89.0%	91.1%	91.6%	91.6%	85.5%	85.2%
Acquisition cost ratio	65.9%	67.5%	62.9%	62.5%	66.7%	62.8%	63.1%	55.0%	46.9%	47.1%	47.6%	45.1%

All insurers included as in Table 1.
Amount of new business = Annual premiums plus 10% of new single premiums.
Low strain proportion = Of new business from low strain products as a proportion of total amount of new business, where low strain products are unitized products or other products where only a single premium is paid.
Acquisition cost ratio = Acquisition costs (including commission) as a proportion of the amount of new business.

The data in Tables 2 to 6 illustrate trends over the period, and Table 7 shows the results of the paired t-tests.

Table 7:
Results of Paired T-Tests

Year type	Discount rate	Increase in maturity values	Surrender values	Charges ratio	Bonds propn	Equities propn	Real estate propn	Reins ratio	Amount of new business	Low strain propn	Acquisition cost ratio
'Bad'											
2000	**.0000**	**.0046**	n.a.	n.a.	n.a.	n.a.	n.a.	**.0134**	.4877	.3013	X
2002	**.0000**	.0507	n.a.	n.a.	n.a.	n.a.	n.a.	**.0081**	.4891	X	X
2008	**.0001**	**.0000**	**.0000**	**.0046**	**.0000**	**.0000**	**.0000**	.0549	.0862	.1740	.2206
'Good'											
2003	.0598	**.0202**	n.a.	n.a.	n.a.	n.a.	n.a.	X	X	**.0035**	X
2006	**.0051**	.3138	n.a.	.0580	**.0158**	.1538	**.0280**	X	**.0042**	X	X
2009	**.0000**	.2118	.1946	**.0323**	X	.1599	.1217	X	X	**.0348**	.1756

n.a. indicates that data are not available.
Bold figures indicate significant at the 5% level.
X indicates that the change in the indicator was in the opposite direction to that hypothesised.

A brief comment is appropriate regarding inadmissible assets. They amounted to only 0.78% of all assets in 1999. Hence, any reduction could not have a major effect on reported solvency. There was indeed a reduction to 0.06% in 2002, consistent with expectations at a time of adverse financial conditions. Subsequent

to that, they increased, though never to more than 1%. This largely reflects realistic reporters being able to include inadmissible assets in the realistic valuations after 2005. For other insurers, inadmissible assets were at the barely troublesome level of just over 0.1% of total assets. Hence, in practice, inadmissible assets were not a material issue in the global financial crisis because where it mattered (for insurers that were not realistic reporters), actions to reduce inadmissible assets had already been taken in the downturn of 2000–2003. Therefore, this issue is not investigated further.

Findings

This section considers whether the approaches to solvency protection described in the literature review were deployed in 2008 and the other "bad" and "good" years.

The approach of improving the reported (rather than the underlying) financial position is examined using Table 2. In 2008, when the yield on UK government 15-year bonds fell from 4.55% to 3.74%, the problem of increasing liabilities was indeed mitigated by insurers reducing the prudence margin in the discount rate—by 0.49 percentage points on average, from 0.32% to -0.17%. The increase in the margin in 2009 confirms Bunch's (1988) description of a weaker valuation basis as a temporary measure. The t-tests in Table 7 confirm that the reduction in prudence margins in 2008 was significant, indeed at the 0.1% level.

In the two other "bad" years, the reductions were significant at the 0.1% level. In the three "good" years, there were increases, significant at the 0.1%, 1% and 10% level. This is strong evidence that changes in prudence margins were a common response to changes in financial conditions.

The second approach, sharing the burden with policyholders, is examined using Table 3. There was a substantial reduction in maturity values on a 25-year endowment over the period, the mean figure falling by 60% from £98,370 just after the end of 1999 to £38,957 just after the end of 2010. Insurers were reflecting poor investment conditions over 2000–2010 in lower bonuses for policyholders.

Each of 2002-2004 saw average reductions greater than 10%, so the precedent was set for insurers to ignore traditional smoothing practice and to take decisions that fully reflected current adverse circumstances if the situation demanded it, as it did in 2008. This is consistent with insurers regarding a 10% constraint as not sustainable.

Table 7 confirms that the reduction in maturity values in 2008 was significant—indeed, at the 0.1% level. Significant findings at the 5% level apply in another "bad" year (2000) and in a "good" year (2003), while in 2002, it was nearly significant at the 5% level. We conclude that while there was a structural decline in maturity values, insurers often reflected favorable or unfavorable financial conditions in the extent of the decline, and especially so in 2008.

Although the decline in surrender values in 2008 (7.4%) was less than in maturity values, the paired t-tests confirm this was a significant reduction (at the

0.1% level). Surrender values did increase in the "good" year of 2009, though this was not significant at the 10% level.

Information on charges to policyholders is available for realistic reporters from 2004, when 28 out of 38 insurers made charges. Table 7 indicates that the increase in charges in 2008 was significant at the 1% level. The reductions in the "good" years of 2006 and 2009 were significant at the 10% and 5% levels, respectively. The link between charges and financial conditions is, therefore, consistent.

Investment strategy is considered in Table 4, which confirms that 2008 saw insurers moving to a less risky portfolio when solvency was in question. The proportion of assets in bonds increased, with equities and real estate decreasing. The t-tests in Table 7 confirm that all these changes were significant at the 0.1% level. Also significant was the change in the bond proportion in the "good" year of 2006. It increased in 2009, despite this being a "good" year, perhaps reflecting that insurers were unable to move fully to a new desired investment strategy in 2008. In the case of equities and real estate, the proportions moved in the expected direction in the "good" years of 2006 and 2009, although significant in only one case.

Movements in market values likely contributed to these trends, but it was open to insurers in 2008 to restore their equity proportions by buying equities (at bargain prices). The fact that they did not supports that the changes were a response to the global financial crisis. Indeed, it is clear that some insurers were far from passive, with a number of references to actions in 2008 in their annual report and accounts: 1) Homeowners Friendly Society sold all its equities, moving wholly into government bonds and cash; 2) Friends Provident reduced its exposure to equities; and 3) Aviva hedged against further declines in equity prices. Therefore, it is fair to conclude that financial conditions prompted a change in insurers' investments in 2008 and, to some extent, in other years.

Table 5 shows that the reinsurance ratio increased in 2008, as expected, although the t-test indicates that it was not significant at the 5% level (Table 7). This may reflect, to some extent, reinsurers also being subject to financial pressures, which curbed their enthusiasm for new business. The increases in the other "bad" years were significant at the 5% level, but it is hard to interpret whether these were specific responses to adverse financial conditions because the changes in the "good" years were in the opposite direction to that hypothesized. This may reflect that there were other motivations to reinsure. For example, reinsurance helps finance new business, but the volume of new business was falling. Further, the realistic reporting regime meant there was less incentive after 2004 to reinsure in order to avoid the artificialities of the traditional valuation.

Trends in new business are seen from Table 6. New participating business declined sharply from £3,714 million to £889 million over 1999–2010. Although the non-participating business written by these insurers did increase, the total fell. The trend is not surprising: The reducing solvency of these insurers provided insufficient capital to finance large volumes of new business. The growing popularity of unit-linked business, where policyholders received an investment return without smoothing or guarantees, was largely met by other insurers, with

stock firms preferring to establish separate entities to write such business since all profits would then be available for shareholders.

Examining 2008 in particular, the total new business did decrease, although the matched t-tests indicate that it was significant at the 10% rather than the 5% level. From examining the other "good" and "bad" years, it is difficult to conclude that insurers used new business volumes to control their solvency in response to financial conditions. In only one year (2006) was there a relationship as hypothesized and significant at the 5% level.

The year 2008 did see an increased proportion of new business that was products with a design that minimizes new business strain, but the paired t-tests indicate that this was not significant even at the 20% level. While in two "good" years there was a significant reduction in the low strain ratio, we also find that in two of the six years investigated, the effect was in the opposite direction to that hypothesized. The weak relationship may reflect that: 1) most new business was already of the "low strain" variety (85% or more); 2) the amount of new business was low relative to business in force; and 3) for firms that were "realistic reporters," the rules from 2005 reduced the impact of product design on new business strain.

The acquisition cost ratio did decline in 2008, but the matched t-tests indicate that this was not significant even at the 10% level. In none of the six years was the effect as hypothesised and significant at the 10% level.

Focusing on changes in 2008 that were significant at the 5% level, the conclusion is that insurers responded to the adverse financial conditions in seven ways:

- Reducing the prudence margin in the discount rate, leading to a lower reported value of their liabilities than otherwise.
- Reducing maturity values.
- Reducing surrender values.
- Increasing charges.
- Increasing the bonds in the investment portfolio.
- Reducing the equities in the investment portfolio.
- Reducing the real estate in the investment portfolio.

It is also useful to examine to what extent insurers used each of the above seven actions in 2008. There were 22 firms where we have the necessary data. Eight insurers used all seven actions; 10 used six; two used five; and two used four. This confirms that these actions were common responses at the time of the crisis.

It is useful to estimate the impact of these changes on the overall reported solvency ratio. The data do not permit precise calculation, but an approximate assessment can be made. The average prudence margin in the discount rate reduced by 0.49 percentage points from 2007 to 2008. (See Table 2.) It is reasonable to think that, on average, policies have around 10 years to maturity. This suggests that the

change in margin would have led to about a 5% to 6% reduction in liabilities on participating business,[5] or about 2.5% to 3% of overall liabilities.

The solvency ratios reported at the end of 2008 reflected lower claim payments during 2008 as a result of reduced bonuses, which led to lower payouts. Table 3 shows that the bonus decisions in early 2008 reduced maturity values by 6.7% on average. (There was little change in surrender values.) Given that, on average, maturity claims in 2008 were 4.3% of total liabilities, and assuming that 48% of claims related to participating policies (the same as the proportion of liabilities), this implies that the effect of reducing maturity values was 0.14% of liabilities.[6] There were also some reductions in maturity and surrender values over the remainder of 2008, perhaps increasing the effect nearer to 0.2%, although precise information is not available. Further, the increase in the value of charges in 2008 amounted to 0.2% of total liabilities. Regarding the change in the asset mix, this does not change the value of assets as these are at market value; the focus is managing the risk of adverse changes in the future.[7]

As stated earlier, the overall reported solvency ratio was 5.09% at the end of 2008. Given the approximate assessment that lower prudence margins in the discount rate, lower maturity and surrender values and higher charges improved the ratio by 2.5–3, 0.2 and 0.2 percent points, respectively, it is estimated that the overall reported solvency ratio at the end of 2008 would probably have been around 2% without these management actions.

Managing the prudence margin was, therefore, an important part of managing the reported solvency ratio. Having a flexible prudence margin in their valuation assumptions gave insurers room to maneuver in adverse conditions. The increase in prudence in "good" years suggests it was a short-term expedient (see Bunch, 1988). The prudence margin would be evident from scrutiny of an insurer's returns to regulators who would, however, have limited ability to act if an insurer complied with the regulations. Those returns were not commonly studied by consumers or analysts, who would not find it easy to ascertain each insurer's degree of prudence and the effect on reported financial strength. This suggests that customers and their advisers would not respond adversely to manipulation of the prudence margin. This contrasts with other actions that would attract greater publicity and could damage business prospects, namely: 1) reducing payouts; 2) increasing charges; or 3) moving to a more conservative investment strategy. But although manipulating the prudence margin had short-term merit, insurers appeared to see benefit in reinstating a higher prudence margin when conditions permitted, possibly in case analysts

5. Some policies are valued using a discount rate that is gross (as opposed to the above calculations using a rate that is net of 20% tax), so the average reduction in discount rate margin would be around 0.5 to 0.6 percentage points. Broadly, a 1% change in the discount rate would lead to a reduction in the liability by about 10%. This means the liabilities would reduce by around 5% to 6%.

6. The greater reductions in maturity values after the end of 2008 would have affected claims paid during 2009.

7. The timing of changes is relevant: Switching out of equities into bonds before the October 2008 crash would have benefited solvency, but data on when changes were made is not available.

commented adversely on diminished prudence as an apparent permanent feature, and to ensure that, if there were a future crisis, the room to maneuver was available.

The move to a less risky investment strategy is consistent with the finite risk hypothesis, which implies that when firms suffered from losses (in the form of adverse investment returns in 2008), they would take decisions elsewhere to reduce the likelihood of further changes having adverse effects.

Implications for Regulation and Insurance Company Management

Solvency II, the regime now operational in the EU, covers a wide range of matters for the prudential regulation of insurers. It should be seen in the context of the principles we expect to apply to insurance regulation. The view of Skipper & Klein (2000) was that regulation should promote fair competition to promote the goal of having quality, reasonably priced products available from reliable insurers; reliability was especially important, with solvency standards essential for meeting the objective of insurance insolvencies being at an acceptable minimum. Klein (2012) drew attention to the case for regulatory action to prevent insurers from engaging in unfair practices that harm consumers.

Solvency II is not specifically concerned with competition, although, unique to the UK, the PRA has an objective of facilitating competition as far as is reasonably possible (PRA, 2018). Neither does Solvency II regulate insurers' conduct, which the UK covers by a separate body, the Financial Conduct Authority (FCA).

Detailed rules in Solvency II cover the assessment of solvency and capital requirements, with further provisions on enterprise risk management (ERM) and governance. Many insurers have developed their modelling capabilities consistent with the new requirements. Overall, it is fair to think that insurers will be less vulnerable to financial crises in the future.

However, Solvency II does introduce an important change that will restrict how insurers respond to adverse conditions, which inevitably will arise from time to time. While adjusting prudence margins was an important response under Solvency I, this is not possible under Solvency II, which largely removes the prudence and discretion since the discount rate is specified as a risk-free rate. Each month, EIOPA issues the risk-free rates for different terms and currencies and prescribes the Smith-Wilson formula for interpolation and extrapolation. Insurers do have the option of some refinements. In particular, firms that have liabilities with long-term guarantees may seek to use a "matching adjustment," which enables them to use a higher discount rate (PRA, 2015). However, discretion is tightly controlled by the need to meet several conditions, including holding high-yielding assets that match those liabilities.

Therefore, insurers must take a different approach to capital management. In conjunction with defined rules on valuing liabilities, Solvency II introduced a "ladder of intervention" (Swain and Swallow, 2015) with two specified capital

levels; breaching the lower level (minimum capital requirement) leads to more intrusive intervention than breaching the higher level (solvency capital requirement [SCR]). Without flexible prudence margins, it is reasonable to think that insurers will wish to operate with capital above the SCR. Indeed, regulators have found that this appears to be insurers' clear preference to meet rating requirements and to provide a margin of safety against an inadvertent or unforeseen breach (Bulley, 2016). This is a more transparent approach than incorporating prudent margins in discounting liabilities. This approach is acceptable to regulators and should not adversely affect policyholders.

The removal of discretion should benefit regulators, who ought to find it easier to monitor that insurers are using compliant discount rates. A contrast is that, in the case of Equitable Life under Solvency I, regulators had questioned the discount rates used by the insurer's actuary but failed to resolve whether the rates used were within the rules (Parliamentary and Health Service Ombudsman, 2008). In principle, the removal of discretion should also improve competition in the market, as intermediaries and consumers will have access to more consistent data on insurers.

A general lesson for regulators is that insurers may use discretion in valuing their liabilities, if permitted, to manipulate their reported financial position. Regulators expect insurers to manage their business prudently, accepting their obligations to policyholders and managing the risks. However, prudence does not need to be interpreted as requiring liabilities to be overstated (see International Accounting Standards Board, 2018).

Liability calculations involve not only a discount rate but also estimates of future claims. Solvency II requires insurers to use probability-weighted expectations, without prudence in the sense of higher estimates. Because insurers' claim expectations do, however, involve discretion, possibly greater for property/casualty (P/C) than for life insurers, regulators need to monitor how that discretion is used.

UK life insurers also shared the burden of the global financial crisis with policyholders by using discretion to reduce claim values and increase charges. The change to lower-risk investments may also lead to lower claim values. Insurers' discretion in these areas is not affected by Solvency II. The regulators' concern is that policyholders are treated properly and, in particular, that those who claim at a time of crisis are not treated unfairly in comparison with future claimants and/or shareholders. This is an area where regulators accept that insurers use discretion to manage their business, but they can monitor how that discretion is used and intervene if they deem insurers are acting improperly.

EU regulators may need to review whether they have appropriate conduct regulation to check whether policyholders are being treated properly. The FSA (2005, 2011) introduced rules intended to ensure that insurers' conduct treats holders of participating policies fairly. However, the FSA (2011) admitted that one of its rules, concerning how the corporation tax burden on insurers was divided between shareholders and policyholders, had attracted a considerable level of opposition, illustrating that conduct issues are not always straightforward to conclude and implement.

Following the major volume of work to design and implement the prudential regulation that is Solvency II, regulators may now find it easier to prioritize conduct issues. Indeed, EIOPA (2016) has issued a strategy for regulating conduct of business and followed it with a "next steps" document (EIOPA, 2018). But, regulators face a balancing act as they wish insurers to remain solvent and, to do so, insurers naturally wish to exercise discretion on charges and payments to policyholders as fairly provided for in the contracts. Indeed, policyholders who were participating in profits could not reasonably expect to be unaffected by the global financial crisis, which led to reduced profits. However, the way in which insurers cut the benefits to and increased charges on policyholders in adverse conditions highlights the importance of regulators monitoring and, as appropriate, challenging, insurers' conduct of insurers in such circumstances.

Other actions for insurers to improve their finances, although not significant factors in 2008, remain available under Solvency II. These were to increase reinsurance, reduce new business, concentrate further on products with low new business strain and reduce acquisition costs.

The position of UK insurers is complicated by the announcement of the UK's exit from the EU. It is expected that, for a time after the exit, there will be a transitional period when EU rules continue to apply in the UK. Thereafter, a future UK regime could depart from Solvency II, although regulators have declined to speculate on where and how (PRA, 2018). The UK's Treasury Committee (2017) raised a number of concerns about Solvency II, including the capital that insurers are required to hold. Regulators accept some of the comments, although they refer to constraints in the Solvency II rules. These may be relaxed following the UK's exit, although significant departures from Solvency II may mean it is less easy for UK insurers to trade in the EU. There have been no suggestions for reverting to the discretion that insurers had on discount rates in Solvency I.

Conclusions

The first decade of the 21st century was clearly a difficult one for participating life insurers. Insurers needed to be aware of the consequences of low interest rates and falling equity prices. Additionally, they needed to have plans to deal with the problems before they ended up in a situation with no room to maneuver. The analysis confirms that the insurers have business models where the risks can be managed, although it is arguable that some firms where the reported solvency fell to relatively low levels may wish they had taken action earlier.

One of the major steps taken by insurers to preserve their solvency was to use their discretion to reduce the prudence margin in the interest rate used to discount their liabilities. That discretion is not available under Solvency II, and insurers need an alternative approach to financial management in order to avoid solvency difficulties.

Insurers also shared the pain of the global financial crisis with policyholders. It is not suggested that this was done unfairly, although clearly there is the potential for customer detriment when benefits are reduced and charges increased, and it is appropriate that EIOPA develops its approach to conduct regulation.

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Journal of Insurance Regulation

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Submissions should relate to the regulation of insurance. They may include empirical work, theory, and institutional or policy analysis. We seek papers that advance research or analytical techniques, particularly papers that make new research more understandable to regulators.

Submissions must be original work and not being considered for publication elsewhere; papers from presentations should note the meeting. Discussion, opinions, and controversial matters are welcome, provided the paper clearly documents the sources of information and distinguishes opinions or judgment from empirical or factual information. The paper should recognize contrary views, rebuttals, and opposing positions.

References to published literature should be inserted into the text using the "author, date" format. Examples are: (1) "Manders et al. (1994) have shown. . ." and (2) "Interstate compacts have been researched extensively (Manders et al., 1994)." Cited literature should be shown in a "References" section, containing an alphabetical list of authors as shown below.

Cummins, J. David and Richard A. Derrig, eds., 1989. *Financial Models of Insurance Solvency*, Norwell, Mass.: Kluwer Academic Publishers.

Manders, John M., Therese M. Vaughan and Robert H. Myers, Jr., 1994. "Insurance Regulation in the Public Interest: Where Do We Go from Here?" *Journal of Insurance Regulation*, 12: 285.

National Association of Insurance Commissioners, 1992. *An Update of the NAIC Solvency Agenda*, Jan. 7, Kansas City, Mo.: NAIC.

"Spreading Disaster Risk," 1994. *Business Insurance,* Feb. 28, p. 1.

Footnotes should be used to supply useful background or technical information that might distract or disinterest the general readership of insurance professionals. Footnotes should not simply cite published literature — use instead the "author, date" format above.

Tables and charts should be used only if needed to *directly support* the thesis of the paper. They should have descriptive titles and helpful explanatory notes included at the foot of the exhibit.

Papers, including exhibits and appendices, should be limited to 45 double-spaced pages. Manuscripts are sent to reviewers anonymously; author(s) and affiliation(s) should appear only on a separate title page. The first page should include an abstract of no more than 200 words. Manuscripts should be sent by email in a Microsoft Word file to:

Cassandra Cole and Kathleen McCullough
jireditor@gmail.com

The first named author will receive acknowledgement of receipt and the editor's decision on whether the document will be accepted for further review. If declined for review, the manuscript will be destroyed. For reviewed manuscripts, the process will generally be completed and the first named author notified in eight to 10 weeks of receipt.

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