

# The 'Low for Long' Challenge

Socio-economic implications and the  
life insurance industry's response



November 2017

## The Geneva Association

The Geneva Association is the leading international insurance think tank for strategically important insurance and risk management issues. The Geneva Association identifies fundamental trends and strategic issues where insurance plays a substantial role or which influence the insurance sector. Through the development of research programmes, regular publications and the organisation of international meetings, The Geneva Association serves as a catalyst for progress in the understanding of risk and insurance matters and acts as an information creator and disseminator. It is the leading voice of the largest insurance groups worldwide in the dialogue with international institutions. In parallel, it advances—in economic and cultural terms—the development and application of risk management and the understanding of uncertainty in the modern economy.

The Geneva Association membership comprises a statutory maximum of 90 chief executive officers (CEOs) from the world's top insurance and reinsurance companies. It organises international expert networks and manages discussion platforms for senior insurance executives and specialists as well as policymakers, regulators and multilateral organisations.

Established in 1973, The Geneva Association, officially the 'International Association for the Study of Insurance Economics', is based in Zurich, Switzerland and is a non-profit organisation funded by its Members.

# The 'Low for Long' Challenge

Socio-economic implications and the  
life insurance industry's response

## The Geneva Association

The Geneva Association—International Association for the Study of Insurance Economics  
Talstrasse 70, CH-8001 Zurich  
Email: [secretariat@genevaassociation.org](mailto:secretariat@genevaassociation.org) | Tel: +41 44 200 49 00 | Fax: +41 44 200 49 99

Photo credits:

Cover page—Phongphan, Shutterstock.

---

November 2017

Life Insurance in a Low Interest Rate Environment

Copyright 2017 © – The Geneva Association

Published by The Geneva Association—International Association for the Study of Insurance Economics

# Contents

<b>Acknowledgements</b>	<b>4</b>
<b>Foreword</b>	<b>5</b>
<b>Executive summary</b>	<b>6</b>
<b>1. The impact of ultra-low interest rates on key economic sectors</b>	<b>7</b>
1.1 Households	7
Box: The arithmetic of longevity risk in a low interest rate environment	10
1.2 Governments	14
1.3 The non-financial sector	15
1.4 The financial sector	16
1.4.1 Banks	17
1.4.2 Life insurers	17
1.5 An assessment	18
<b>2. Life insurers adapting to low interest rates</b>	<b>19</b>
2.1 The big reset	19
Sidebar: Life insurance products and terminology	20
2.2 Extracting customer value and business efficiencies	23
Sidebar: What is in-force management?	23
2.2.1 In-force management	23
2.2.2 Cost management	26
Sidebar: How in-force management benefits policyholders	26
2.3 Towards a new business mix	27
2.3.1 Product and portfolio management	27
2.3.2 Innovation and new business models	28
2.3.3 Investment management	29
2.4 Remaining challenges	30
2.5 An assessment	32
Sidebar: The role and impact of regulation	32
Sidebar: The challenges of InsurTech	34
<b>3. The socio-economic role of life insurers</b>	<b>36</b>
3.1 The challenges of longevity risk in a low interest rate environment	36
Box: Why longevity risk is challenging	38
3.2 Indicators for the socio-economic contribution of life insurers	39
Box: Retirement systems under stress and the potential for insurance solutions	42
3.3 Funding the economy	44
3.4 Assessment and outlook	47
<b>4. The future of life insurance</b>	<b>48</b>
4.1 Three points of agreement	48
4.2 Three points of divergence	49
<b>5. Conclusions and policy implications</b>	<b>51</b>
<b>Appendices</b>	<b>52</b>
A1 The macro-financial environment	52
A1.1 Transitory factors	52
A1.2 Structural, long-term factors	53
A1.3 What next?	56
A2 References	57

## Acknowledgements

This report was written under the general guidance of Daniel M. Hofmann, the Geneva Association's Senior Advisor for Financial Stability and Insurance Economics. Individual contributors include Matt Gosden, Christian Hott, Ronald Klein, Stephan Leppla, Christian Schmidt, and Peter Skjoedt. Comments on earlier drafts were made by Elia Berdin (Generali), Richard Jackson (Global Aging Institute), Bryan Pickel (Prudential Financial) and Stefan Kröpfl (Zurich Insurance Group). While the many helpful insights received from referees are gratefully acknowledged, the authors alone are responsible for the report's content.

The core of the study is based on in-depth interviews with senior executives of large life insurance groups, complemented by a quantitative survey completed by all participants and a follow-up conference with representatives of participating firms to validate the survey. Interviews were conducted with senior executives from AIG, Allianz (USA), AXA, CNP Assurances, ERGO, ManuLife, NN, Prudential Financial, Sun Life, and Zurich Insurance Group. Participants in the follow-up conference also included representatives from Aegon, Allianz (Germany), Aviva, and Nippon Life. In total, the study is based on the responses of 15 industry leaders.

The study was further complemented by industry statistics and balance sheet data of a sample of the five largest life insurers in six key markets (Germany, France, Italy, Japan, the U.S. and the U.K.). This leaves out emerging market economies (EMEs). The omission of these markets can be justified on the grounds that interest rates tend not to be ultra-low in most EMEs, and their population dynamics are in most cases entirely different from those observed in more mature economies. Special thanks go to the German Insurance Association (GDV) for providing detailed balance sheet data on the German life insurance industry.

# Foreword



**Anna Maria D'Hulster**

*Secretary General,  
The Geneva Association*

This study is limited in scope but expansive in content. Its narrow focus is on the impact that low interest rates continue to have on life insurers and their customers. The broader content centres on the question of whether an extended period of low interest rates could impair the socio-economic role life insurers have played for so many years.

The question is even more important in light of the fact that the world's population is ageing rapidly. The financial risks associated with longevity rank at the top of social, economic and political issues that will need solutions over the coming decades. Low interest rates exacerbate the problem. They penalise individual retirement savings. And they induce insurers to withdraw certain product offerings, which customers had relied upon in the past, but which can no longer be adequately priced in the current macro-financial environment. At the same time, the writing on the wall is clear: many social safety nets knitted together by governments in the second half of the 20<sup>th</sup> century no longer operate on a sustainable financial basis. There is an increasing likelihood that governments will have to cut retirement benefits that were granted in the past.

This puts the socio-economic role of life insurers at centre stage. Their ability to pool longevity risks and absorb financial market fluctuations in a long-term Asset Liability Management framework enables life insurers to offer retirement solutions that cannot be matched by other financial service providers. To be sure, low interest rates are a challenge. But this report's message is cautiously optimistic. The industry is in the midst of adapting to a difficult macro-financial environment, and its leaders are convinced that life insurance will continue to play an important socio-economic role in the future.

Although insurance continues to be tightly regulated, this report does not address issues pertaining to regulation in the current environment. A cursory glance makes clear, however, that most solvency regimes were not designed with a protracted period of low and ultra-low interest rates in mind. The appropriate regulatory response to the challenges triggered by these developments will arguably deserve future studies. Regulators and policymakers are undoubtedly aware of what is at stake. We trust that they will make their considerate contribution towards eliminating deficiencies in regulatory frameworks that were conceived in a starkly different macro-financial environment.

But first and foremost, industry leaders must manage well the transition to a future where the industry can continue to play a meaningful socio-economic role. It requires not only dealing with the legacies of the past but also harnessing the capabilities of new technologies to achieve better customer engagement. Insurance executives should also become more articulate in addressing societal problems and reaching out to policymakers in an effort to jointly work towards sustainable solutions. It is in this cooperative spirit that this report offers concrete building blocks for a meaningful dialogue about the role of life insurance in ageing societies.

Anna Maria D'Hulster  
Secretary General of The Geneva Association

# Executive summary

The role of life insurance in helping individuals achieve peace of mind and financial security is significant. Its societal role, therefore, is critical and pervasive. Life insurers assume risks that are more effectively borne by institutions than by individuals. In particular, longevity risk and mortality risk provide diversification benefits when grouped together and are much more predictable when pooled across large numbers of people.

In a low interest rate environment, life insurers have an even bigger role to play. Individuals may struggle to find investment vehicles that offer meaningful returns. Life insurance can often provide solid investment performance, while simultaneously providing the added benefits of a secure insurance guarantee and a death benefit for beneficiaries. Similarly, annuities can often provide solid investment performance, combined with income guarantees.

However, life insurers are not immune to low interest rates. This paper describes how low interest rates affect the business of life insurers and, more importantly, how the industry responded to the many challenges created by the current environment. It places this response in the context of the impact that low interest rates have had on the broader economy, and it reviews the likely future of life insurance and the societal role it should continue to play.

After long periods of low interest rates, their pervasive impact is undisputable. They affect savings, making it in most cases more challenging to accrue desired retirement funds. They lull governments into seemingly effortless debt financing, threatening fiscal sustainability and the stability of state-sponsored pension systems. They erode the financial health of corporate-sponsored pension plans. And they compress margins in the financial sector, which ultimately could undermine the delivery of broader economic services to our societies. The first chapter analyses these trends and how they affect key economic sectors.

The second chapter presents the industry's response to the low interest rate challenge based on interviews with senior executives. While their answers differed, executives made clear that in their view the challenges are a 'manageable headwind' rather than one requiring a fundamental redesign of the business. Many initiatives are under way that will adapt life insurance business models to the changed macro-financial environment. Roughly 90 per cent of companies have embarked on initiatives towards business model adaptation, and 60 per cent called the development of new business models a stated objective. But first and foremost, life insurers are focusing on the in-force business. Extracting value from legacy books and, more broadly, getting a better grip on costs, are the top priorities in the companies surveyed.

The third chapter reviews the socio-economic role of life insurance. It benchmarks three essential services delivered to policyholders and society. Insurers protect against the financial consequences of biometric risks; they provide saving and retirement solutions; and as institutional investors, they play a key role in funding the real economy and the public sector. While there were no conclusive trends in the protection business, insurers appear to have gained a slight foothold in the retirement solutions markets. However, low interest rates will likely make further gains a tough challenge, despite the fact that they are also likely to impair the income of retired populations and thus increase the need for insurers to provide more retirement solutions. The protracted period of low interest rates also seems to have adversely affected the role of insurers in funding the real economy.

As discussed in chapter four, executives agreed that the socio-economic role of life insurance would remain central; that insurers need to adopt new technologies to better realise efficiency gains; and that distribution will have to become even more efficient and customer-engaging. But they left open whether the industry would continue to evolve along a traditional, evolutionary path; follow a disruptive, 'digital first' transformation; or cooperatively partner with new technology firms. Conversations with senior executives also made it clear that customers must see value in product offerings. Failing to reach this goal would put at risk the socio-economic role of life insurance at a critical time when ageing societies face a growing need to access sustainable retirement solutions.

The many factors explaining the current level of interest rates suggest that it might be imprudent to expect a significant cyclical recovery, and that low nominal and real rates of interest will continue to linger on for some time, as discussed in Appendix A1. It implies that life insurers should not expect relief from changes in central bank policies. They should rather respond to the structural factors bearing on their business environment. This calls for a decisive response to demographic trends. In addition, there are broader structural challenges, such as the disruptions caused by digital transformation. While some of these factors are bound to be adverse, others entail new business opportunities. It would therefore be naïve to assume that the future of the life insurance industry is dependent on a trend towards a reversal of interest rates. The future of the industry will depend on its ability to tackle a number of structural challenges, including low interest rates, while at the same time harnessing new business opportunities in order to deliver value to customers.



# 1. The impact of ultra-low interest rates on key economic sectors

After long periods of declining and ultimately ultra-low interest rates—nearly three decades in Japan and close to ten years in most other advanced economies—it has become clear that they have had and continue to have a pervasive impact. Low interest rates affect individual savings, making it in most cases more challenging to accrue desired retirement funds. They lull governments into seemingly effortless debt financing, thereby in the long run threatening fiscal sustainability and state-sponsored pension systems. They erode the financial health of corporate-sponsored defined benefit pension schemes. And they compress margins in the financial sector, which ultimately could undermine the delivery of broader economic services on which societies have depended in the past. It is against the backdrop of these developments that this chapter summarises the impact that low interest rates have on key sectors of our economies—households, governments and firms in the real and financial sectors.

## 1.1 Households

Interest rates impact the savings and consumption decisions of households. The outcome of these decisions and the answer to the question whether they are net savers or net debtors depends on where in the life cycle households are. In short, low interest rates adversely impact pension funding and the financial well-being of future retired populations.

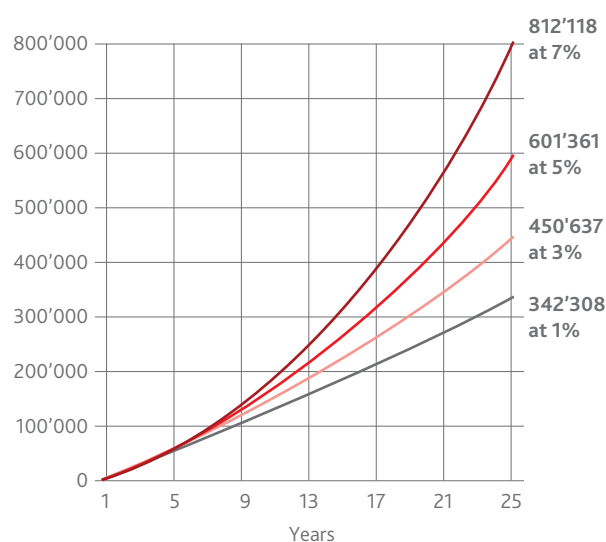
Several factors make the financial challenges of households increasingly complex. Individuals are living longer. They have to fund longer retirements, and they must also shoulder a larger proportion of rising healthcare costs. Yet, retirement outcomes are becoming less certain, as many employers have shifted from defined benefit (DB) pension plans to defined contribution (DC) plans. Moreover, while government social security programmes are a critical component of the retirement plans for individuals around the world, governments simply cannot afford to sustain programmes due to many factors, including changing workforce demographics.

For example, assume three individuals in three countries, each of whom is 40 years old and earns USD 100,000 annually. Using average retirement income replacement rates based on mandatory social programs in the

respective countries, these individuals would obtain about USD 35,000 of retirement income per year in the U.S., USD 45,000 in Australia, and USD 55,000 in France. These numbers illustrate that individuals cannot rely on government programmes alone to help them maintain their standard of life in retirement.

These factors make saving enough for future consumption or retirement one of the most important financial decisions households must make. Moreover, the prolonged period of low interest rates makes it even harder to accumulate savings. The simple arithmetic of saving at various interest rates is summarised in the figures below.<sup>1</sup> Assuming a saving horizon of 25 years, Figure 1.1 shows the amount to which savings of 1,000 monetary units (MUs) per month would accumulate. It ranges from 342,308 MUs at an interest rate of 1 per cent to 812,118 MUs at an interest rate of 7 per cent, which is more than double the amount accumulated at the lowest interest rate.

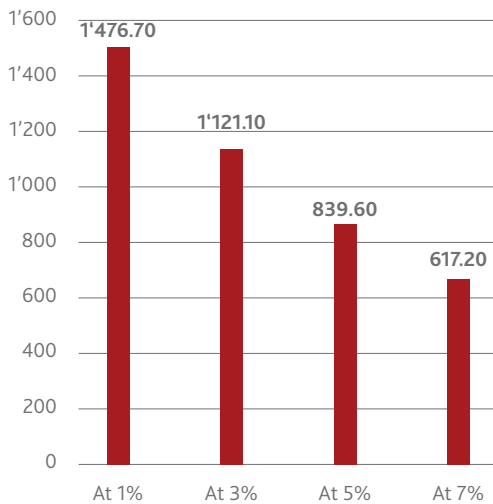
**Figure 1.1: Accumulated annual savings of 12,000 monetary units after 25 years**



Source: The Geneva Association.

<sup>1</sup> This example abstracts from the fact that retirement saving portfolios typically include real assets such as stocks and real estate in addition to fixed income securities. Consequently, total investment yields are in most cases appreciably bigger than the yields on interest-bearing securities.

**Figure 1.2: Monthly savings needed to attain 500,000 monetary units after 25 years**

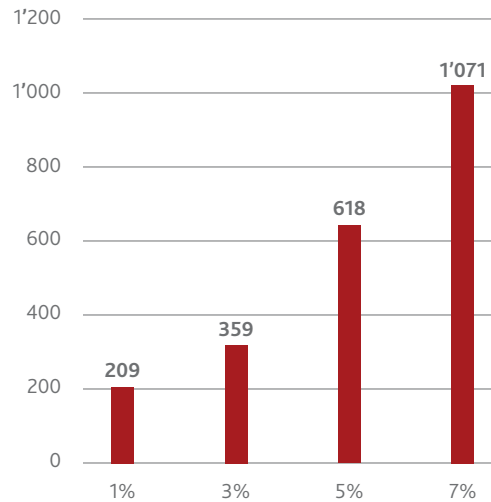


Source: The Geneva Association.

Figure 1.2 approaches the question in reverse by showing how much a household would have to set aside each month for 25 years to achieve total savings of 500,000 monetary units at different interest rates. The bottom line is, of course, the same. At an interest rate of 7 per cent, the household would have to set aside less than half the amount per month than what it would have to save monthly at an interest rate of 1 per cent. These simple examples illustrate that low interest rates may make it very challenging indeed for households to attain a desired savings target.

After many years of saving, people expect to draw on their retirement capital. The interplay between savings and retirement annuities is highly sensitive to interest rate assumptions. Figure 1.3 shows the monthly life annuity of a U.S. individual, who saved USD 100 per month for a period of 30 years. At age 65, the individual retires, drawing a monthly annuity for his or her remaining lifetime. Assuming the individual accumulates savings at the same rate of interest that he or she eventually annuitises, monthly savings of USD 100 accumulated over 30 years would allow for a monthly annuity of USD 359 at an interest rate of 3 per cent.

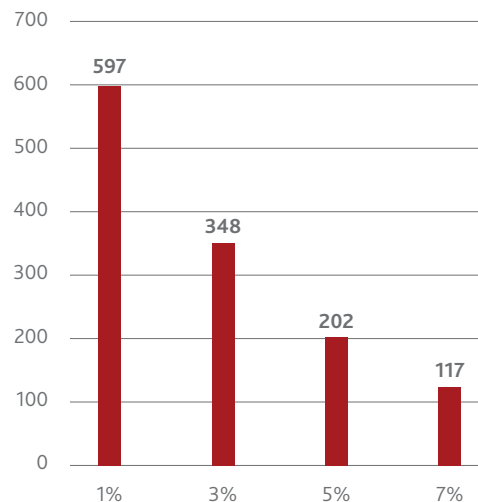
**Figure 1.3: Interest rate sensitivity of a U.S. life annuity**



Source: The Geneva Association.

Calculated for a U.S. individual saving USD 100 per month for 30 years and then converting the accumulated savings to a life annuity (based on U.S. combined male and female mortality in 2013).

**Figure 1.4: Required savings to meet U.S. life annuity at 60 per cent of last income**



Source: The Geneva Association.

Based on a 401k plan with fully matched employer contribution; the average U.S. salary for ages 60-64 was USD 50,000, giving rise to an expected life annuity of USD 30,000.

The annuities depicted in Figure 1.3 have to be seen in the broader context of widespread retirement under-savings (see below) and against the backdrop of ongoing changes in pension schemes. In most advanced economies, defined benefit (DB) plans, where an individual can expect a fixed pension based on a fraction (typically 60 per cent) of the last income, are replaced by defined contribution (DC) schemes, in which pensions depend on contributions (typically shared between employers and employees) over the working lifetime.

Depending on interest rate assumptions, the switch from a DB to a DC plan can be materially significant. In the U.S., the average salary of people aged 60 to 64 is USD 50,000 according to the Census Bureau's 2016 population survey. In a DB plan, promising 60 per cent of the last salary and assuming an interest rate of 3 per cent, an employer would have to set aside USD 405,900 in order to grant a lifetime annuity of USD 30,000. This number contrasts with the 401k savings of USD 200,358 of an average American aged 65 or older (based on Vanguard data). The DB pension plan, which is fully guaranteed by the employer, is worth more than double the amount accumulated in the average 401k plan. The difference between the two plans can be interpreted as a proxy for the 'retirement wealth' loss an average American would suffer through switching from DB to DC pension plans. Clearly, individuals need to save more in the changed scheme, and they need to save more the lower the interest rate.

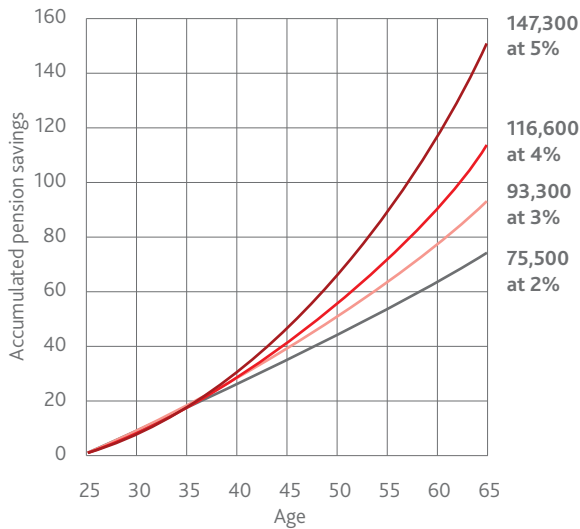
Figure 1.4 summarises these considerations for an individual putting money away in a 401k account with fully matched employer contributions. At a constant interest rate of 3 per cent throughout their lifetime, they would have to save USD 348 per month in order to receive a life annuity of USD 30,000 in retirement (assuming that employers matched the savings month for month during active employment). Such a savings requirement may be difficult, particularly for people at the lower end of the income distribution scale. According to the U.S. Census Bureau, in 2015 the median annual salary of workers with no high school diploma was USD 32,906. Monthly savings of USD 348 would absorb 13 per cent of this income. If the interest rate were to drop to 1 per cent, the monthly requirement would jump to USD 597. This would demand 22 per cent of income, an almost unreachable goal.

These calculations assumed that interest rates stay constant for a very long period. In reality, interest rates will of course not remain constant. Recent U.S. history shows (see also Figure A1.5 in Appendix A1) that the 10-year treasury yield declined from roughly 4 per cent prior to the financial crisis to about 1.5 per cent in the years thereafter. An individual aged 40 who wanted to build a nest egg of USD 500,000 by age 65 would have to set aside ambitious monthly savings of USD 973 at a constant interest rate of 4 per cent for the whole 25 years. If, however, after five years the achievable market rate dropped to 1.5 per cent and stayed there for the remaining 20 years, required savings would jump to USD 1,477 per month, a steep increase of nearly 52 per cent.

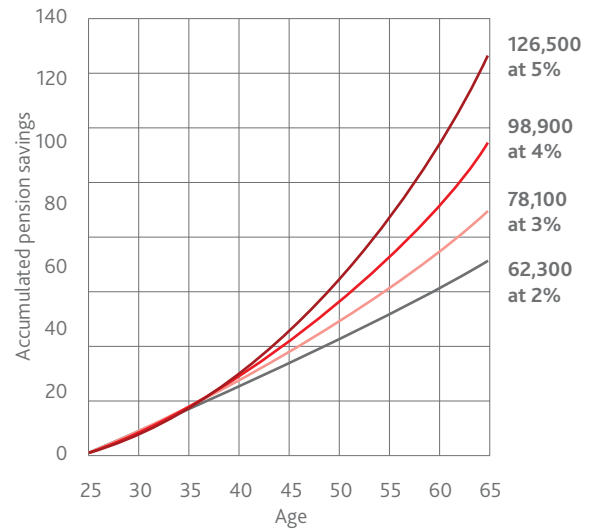
## Box: The arithmetic of longevity risk in a low interest rate environment

To illustrate the interaction between interest rates and longevity, we look at the life cycle of a Swiss male. At age 25, he enrolls in a pension plan that requires annual contributions of 10 per cent of salary until retirement at 65. The calculations assume two different scenarios for the annual growth rate at the real starting salary of 10,000 monetary units (MUs) and various (but again constant) real interest rates ranging from 2 to 5 per cent. Abstracting for the sake of simplicity from payments into, and withdrawals from, a governmental social security system, the available pension funds at 65 are summarised in Figures B1 and B2.

**Figure B1: Pension funds at 65 assuming 1.5 per cent annual real wage growth and interest rates ranging from 2 to 5 per cent**



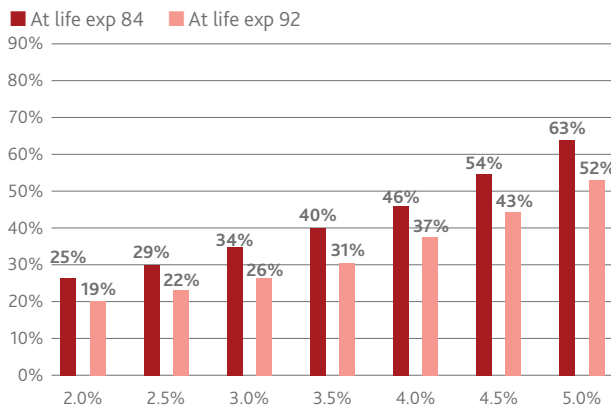
**Figure B2: Pension funds at 65 assuming 0.5 per cent annual real wage growth and interest rates ranging from 2 to 5 per cent**



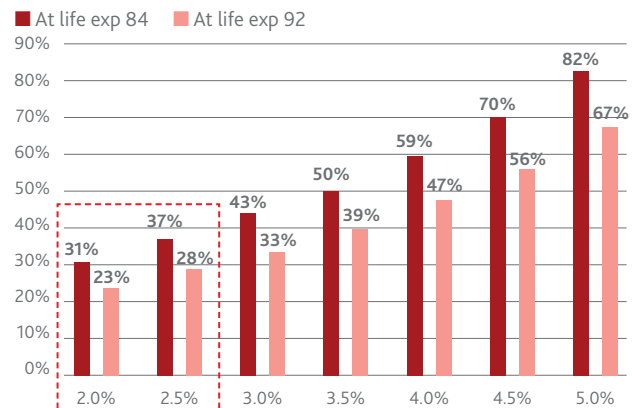
Source: The Geneva Association.

The calculations are based on annual contributions of 10 per cent of salary. The starting salary is 10,000 monetary units (MUs). The calculations further assume 0.5 per cent in annual administration fees.

**Figure B3: Final salary replacement rate with different life expectancy assumptions and after 1.5 per cent annual real wage growth**



**Figure B4: Final salary replacement rate with different life expectancy assumptions and after 0.5 per cent annual real wage growth**



Source: The Geneva Association.

The final salary after a 40-year career with 1.5 per cent annual real wage growth and a starting salary of 10,000 monetary units (MUs) is 18,140 MUs. After a 40-year career with 0.5 per cent annual real wage growth it would be 12,200 MUs. Calculations further assume 0.5 per cent in annual administration fees.

At the beginning of retirement, the question is how high the final salary replacement rate can be, given life expectancy. According to mortality tables, Swiss males at age 65 can expect to live for another 19.2 years. Of course, that is true only for the average. Roughly half of today's 65-year olds will live through the age of 85, and survivors will enjoy a remaining life span of yet another 7.2 years. This means that one quarter of today's 65-year olds can expect to live through the age of 92. For this reason, we calculate final salary replacement rates for life expectancies reaching to the ages of 84 and 92.

The replacement rates are of course sensitive to interest rates. For simplicity's sake, it is assumed that the interest rates observed during the accumulation phase will be the same in retirement. Given these admittedly unrealistic assumptions, replacement rates are summarised in Figures B3 and B4.

Both figures make it clear that replacement rates are higher the higher the interest rate is, and that they get smaller with increasing life expectancy. The differences are substantial, and could constrain the standard of living of individuals with no other sources of income.

The differences between the two figures also highlight an often overlooked positive aspect of the current low interest rate / low economic growth environment. It is in most cases a world with low real wage growth. In such a world, the final salary will be lower, making it easier to save for retirement—even at low interest rates. Consequently, the replacement rates shown in Figure B4 (which assumes 0.5 per cent wage growth) are substantially higher than those in Figure B3 (which assumes 1.5 per cent wage growth). If low interest rates go hand in hand with low wage growth, the plight of savers and retirees may not be so dire. Although they still make the hill hard to climb, the hill is not as high if wage growth is also low.<sup>2</sup>

Adopting the analysis of the 'new normal' presented in Appendix A1, it is reasonable to expect a low interest rate, low wage growth environment to last for a long time. Thus, one is likely to experience a situation in which real wages grow at 0.5 per cent and real interest rates do not exceed 2.5 per cent. This would leave us with replacement rates that are lower than 40 per cent, as highlighted by the dotted box in Figure B4. Clearly, these low rates would be inadequate if the individual had no other income sources in retirement.

This is another way of saying that the current low interest rate environment could pose existential challenges for individuals with inadequate savings. Future replacement rates would be appreciably higher if annual pension contributions were to increase. Based on an annual contribution of 20 per cent of salary and a 40-year contribution period, the replacement rate would be 63 per cent at an interest rate of 2 per cent and 73 per cent at an interest rate of 2.5 per cent.

So far, the analysis has been limited to a world with no inflation. While inflation and interest rates have been low for a considerable period, it is clear that higher nominal interest rates can be achieved only at the price of higher inflation. This will quickly erode living standards, particularly so for retirees with pensions fixed in nominal terms. At 5 per cent inflation, the purchasing power of an annuity worth 10,000 (monetary units) would erode to 6,140 after ten years; after nine more years, it would decline to a mere 3,560 units.

These examples illustrate that the financial consequences of longevity risk (depleting assets prematurely) in combination with low interest rates and inflation may leave individuals in precarious financial conditions the older they get. It makes self-insurance, where individuals save for retirement without protection against the financial consequences of longevity risk, a risky proposition. Life insurance does provide this protection.

---

<sup>2</sup> See Jackson and Nakashima (2015) for further discussion of this intriguing paradox.

Not all households are savers; some are also incurring debt. In general, the net-saving position of households differs across major age groups (the following three bullets ignore inflation and other considerations that may also impact savings decisions):

- **Younger households** (up to 29) save little, and in many countries, they tend to incur mortgage debt.<sup>3</sup> As net debtors, younger households benefit from low interest rates. The flip side of the beneficial impact entails the risk that households assume excessive levels of debt. This will invariably turn out to be burdensome once interest rates start rising again.
- **Middle-aged households** (between 30 and 64) tend to be net savers, in particular for retirement. They suffer from low interest rates. However, homeowners may benefit from valuation gains on real estate, especially in those countries where home equity loans are easily available (in the U.S. and the U.K., but not in continental Europe).
- **Older households** (65 and over) tend not to save anymore. Where possible, they draw on investment income or on divestments of financial assets that have increased in value due to low interest rates. They benefit from the current environment as long as they can liquefy capital gains on investments. However, the bulk of older households is not in such a comfortable position. They are risk averse and their financial assets are disproportionately held in low-yielding bank deposits. Low interest rates impair the financial well-being of these households.

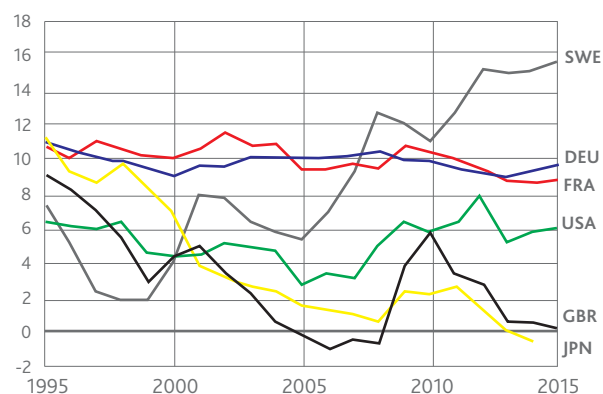
Statements about the saving behaviour of various age groups should not gloss over the fact that in most advanced economies a substantial portion of households either do not save at all or, if they save, do not save sufficiently for their retirement. A study of the U.S. National Institute on Retirement Security found that, 'The average working household has virtually no retirement

savings.'<sup>4</sup> And a meta-study commissioned by the National Research Council summarised the academic findings for the U.S. as follows:

Research suggests that between one-fifth and two-thirds of the older population can be said to have under-saved for retirement. Moreover, these studies assume that Social Security and Medicare benefits will be paid as scheduled. Since this is improbable, the chances of shortfalls are likely even greater.<sup>5</sup>

Thus, the real challenge of retirement financing is not so much the low interest rate environment as under-saving by large parts of the population. For example, almost half of all children in the U.S. are born into low-income families, and the inequality gap keeps growing.<sup>6</sup> Low interest rates are likely to exacerbate the problem as they provide little incentive to save. For that reason, increasing the savings of low- and middle-income earners by various policy measures should have a high priority. It is bound to have a much bigger impact on overall retirement security than raising interest rates and investment yields.<sup>7</sup>

**Figure 1.5: Net household savings in per cent of disposable income**



Source: OECD.

3 In the U.S. one should add the problems associated with growing student debt. The average 2016 college graduate left school with USD 37,172 in student loans, nearly triple the average two decades earlier, as documented by Josh Mitchell, *Student Debt Is about to Set Another Record, But the Picture Isn't All Bad*; The Wall Street Journal, May 2, 2016.

4 Rhee (2013).

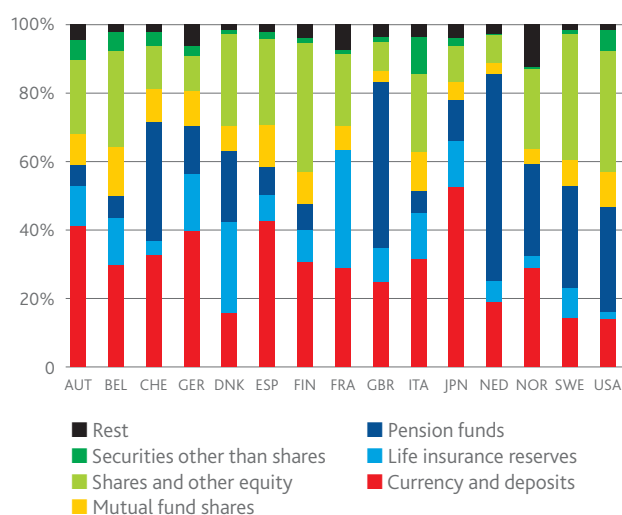
5 National Research Council (2012).

6 Aspen Institute (2015), *4 ways to address economic and opportunity inequality in the U.S.*

7 See The World Economic Forum (2017).

That said, it is perhaps surprising to see how much savings rates differ across selected advanced market economies. Figure 1.5 shows a huge difference between Japan and Sweden, two countries that also display a high variation in the savings rate over time. Such differences seem to indicate that the decision to save is not determined by interest rates alone. Asset prices, the level of public debt, demographic and cultural factors also play an important role.<sup>8</sup>

**Figure 1.6: Allocation of financial assets held by households**



Source: OECD.

In light of positive savings in most countries, the net wealth of households grows under normal conditions and in absence of financial crises, although in each country it starts from different levels and grows at different speeds. Countries also differ with respect to the allocation of financial assets (Figure 1.6). Austrian, German and Spanish households allocate about 40 per cent of assets to cash and short-term deposits. In Japan, the share of cash and short-term deposits is in excess of 50 per cent. Since interest rates in Japan have been so low for so many years, alternative investment opportunities seem to have dried up. There simply are no higher-yielding assets with longer duration

available in which Japanese households could invest.

To ascertain whether households benefit or suffer from low interest rates, one has to also consider tax incentives and broader market features that might generate certain savings and dissavings patterns. Households in countries such as Germany (low interest rates, high savings and a high share of short-term assets) are more likely to suffer than households in the U.K. and the U.S.<sup>9</sup> In addition, as Duca and Muellbauer point out, homeowners in the U.K. and the U.S. benefit from low interest rates through a well-developed home equity channel.<sup>10</sup> Low interest rates not only make mortgages cheaper, they also inflate real estate prices and thus the collateral for home equity loans. This effect is weaker in most of continental Europe, where it is not as easy to access home equity wealth.<sup>11</sup>

However, the lure of cheap mortgages may induce households to assume more debt than they can manage once interest rates start rising again. Although there is no uniform pattern, in a number of countries regulators voiced concerns about the risk of new housing bubbles. According to the Bank of International Settlements, in Sweden the debt of households grew from 63 per cent of GDP ten years ago to 86 per cent of GDP at the end of 2016, and in Switzerland it grew from 110 per cent to 128 per cent of GDP over the same period. Should interest rates start rising again, some of these debts may turn out to be no longer sound and may become unsustainable for many households.

Finally, one should consider that low interest rates may positively impact household wealth through the valuation channel. The value of fixed income securities increases with declining interest rates and so do the values of real estate and equity holdings. According to Swiss Re, in the years 2008 to 2013, U.S. households suffered a USD 470 billion net reduction of interest rate income due to the monetary policy implemented by the Federal Reserve in the wake of the Great Financial Crisis.<sup>12</sup> But over the same period, households benefited from USD 10 trillion in valuation gains on their real estate and equity securities holdings. As pointed out in the report, the positive wealth

<sup>8</sup> See The World Economic Forum (2017).

<sup>9</sup> See also Muellbauer (2016).

<sup>10</sup> See Duca and Muellbauer (2013).

<sup>11</sup> Denmark being one of the exceptions.

<sup>12</sup> See Swiss Re (2015).

effect differed across households. Both, interest income and wealth, are concentrated in households in the top 1 per cent of the income/wealth distribution. Monetary policy may thus have contributed to rising inequality in income and wealth.<sup>13</sup>

**To summarise, low interest rates tend to punish savers. They receive smaller returns on retirement savings. At the same time, longer life spans require them to accumulate larger retirement funds. And to make an already dire predicament worse, state-sponsored pay-as-you-go pension schemes are under increasing funding pressure due to demographic changes (ageing) and a growing public-sector indebtedness. These developments result in a growing pension gap. They make the design and provision of sustainable retirement solutions for current middle-aged households a big challenge. Insurers should step up to the challenge in helping households in their endeavour to close the gap.**

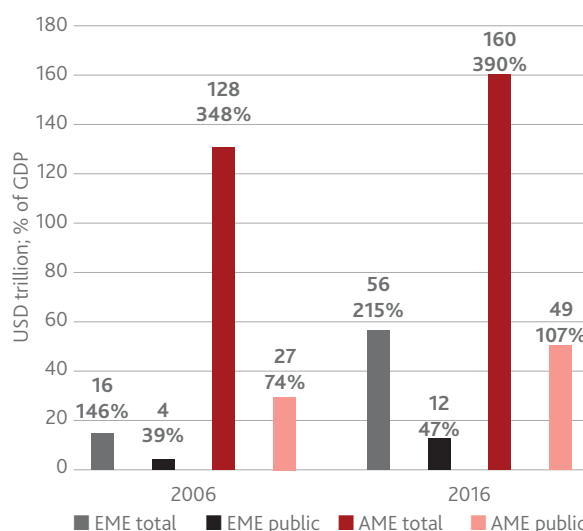
## 1.2 Governments

*Over the last 10 years, government debt has increased sharply. This was mostly in response to the Great Financial Crises, but in part also because low interest rates made debt financing of government expenditures seemingly effortless. These developments entail the risk of sovereign debt crises further down the road, particularly if debt was used to finance consumption rather than productive investments in support of long-term prosperity.*

In the wake of the Great Financial Crisis (GFC), public sector debt in many advanced economies has increased sharply. Government funds were used to absorb toxic financial sector debt, soften the economic contraction, and stimulate the recovery. Figure 1.7 shows that public sector debt in advanced market economies (AMEs) now stands at USD 49 trillion (107 per cent of GDP), an increase of 80 per cent since 2006.<sup>14</sup> This increase is largely responsible for the growth of total private and public sector debt in AMEs to USD 160 trillion, a staggering 390 per cent of GDP in AMEs. This contrasts sharply with developments in emerging market economies (EMEs), where growth in total debt to USD 56 trillion (215 per cent of GDP) was mainly incurred by the private

sector. In 2016, public sector debt in EMEs was still at a sustainable 47 per cent of GDP.

**Figure 1.7: Global private and public debt levels**



Sources: IIF, IMF, BIS, Haver Analytics.

Some of the growth in public sector debt was arguably facilitated by low interest rates. Ironically, central banks ended up fighting the GFC, which started as a private sector debt crisis, by lowering the price of debt (i.e., interest rates), thus promoting further increases of debt levels (also in the private sector) and possibly planting the seeds of the next financial crisis.

While the use of public sector funds can be justified to prevent a systemic financial sector meltdown, the current low interest rate environment may have created new challenges further down the road. New debt can be issued cheaply, and servicing existing debt becomes less burdensome the longer the low interest rate environment lasts. For that reason, economists and policymakers often argue that governments have lots of room for debt-financed infrastructure spending. Such spending promises to stimulate economic growth, make the private sector both more productive and more profitable and, through higher tax returns in an unspecified future, contribute to long-term fiscal consolidation.

<sup>13</sup> See also BIS (2016a).

<sup>14</sup> The increase of 80 per cent corresponds exactly with the average growth rate of public sector debt experienced after previous financial crises as documented by Reinhart and Rogoff (2009).



Because they sound like the proverbial free lunch, such arguments must be examined with caution. First, fiscal flexibility exists only to the extent that the observed real rate of interest is indeed below the natural real rate of interest.<sup>15</sup> This is at best difficult to ascertain. Second, governments would have to pick just the right infrastructure projects. They would need to be well-managed, and they would have to be rolled out quickly (i.e., they must be shovel-ready) before the business cycle recovers for other reasons. These are criteria that governments have often failed to meet in the past. And third, policymakers should be mindful that debt incurred at low rates must eventually be rolled-over at higher rates, thus jeopardising the long-term goal of fiscal consolidation.

Finally, the inconvenient arithmetic of generational accounting tells us that low interest rates drive up the unfunded liabilities of current entitlement programs, thus exacerbating existing large and unsustainable fiscal gaps in most advanced economies. Most governments have yet to show how they intend to lower these gaps. On the contrary, it seems plausible that neither the tax increases or the spending cuts needed to mitigate the risks associated with fiscal gaps are feasible in the prevailing political climate.

In short, low interest rates should not be considered a blank check for governments to engage in pump-priming the economy. Fiscal stimulus, even when dressed up as infrastructure spending, is no panacea for rekindling sustainable economic growth. There are many reasons behind the current low growth and low interest rate environment. Addressing them convincingly will likely require a multipronged approach involving structural reforms. The current environment seems to lull governments into complacency. Thus, the unintended consequences of low interest rates are that reforms are postponed because debt is cheap.

### 1.3 The non-financial sector

*Although low interest rates can stimulate private sector investments, the recent experience does not jibe with standard economic theory. Demand for credit was and continues to be subdued in most AMEs, capital expenditures*

*were low, and the recovery from the Great Recession was slower than after typical post-war business cycles. Moreover, low interest rates were to a large part responsible for the soaring liabilities of many corporate-defined benefit pension plans.*

Non-financial corporations (the real sector) tend to finance operations and capital expenditures (investments in new capacity) not only with equity and retained profits but also with short- and long-term debt and bank credit. Thus, low interest rates should benefit the real sector. However, a closer look reveals that the positive effect is limited, as corporate borrowing continues to be subdued in many advanced economies.

There are a number of reasons behind this seemingly unexpected result. First, the financial crisis revealed a large proportion of non-financial corporations to be over-indebted. Some of them are still busy reducing their debt load, a process called deleveraging. Second, the aftermath of the crisis was characterised by a high degree of economic, financial and political uncertainty. This uncertainty curbed the corporate sector's propensity to invest.<sup>16</sup> These factors in turn reduced the demand for new bank credit.

Low interest rates can also adversely impact corporate sector balance sheets for non-operational reasons. In countries such as Germany and the U.S., occupational pensions are an important pillar of retirement systems, and corporations are liable for the funding risk and/or the longevity risk of pension plans. Low interest rates, and consequently low discount rates, have boosted pension liabilities. At the same time, pension assets have yet to fully recover from the losses suffered during the Great Financial Crisis. According to Milliman, in the U.S., the 100 largest corporate-defined benefit pension plans closed in 2016 with assets of USD 1.4 trillion and projected benefit obligations of USD 1.7 trillion, resulting in a funding gap of USD 323 billion.<sup>17</sup> Figure 1.8 depicts the development of annual funding balances for these companies since 2000. It shows that deficits are the norm with only three exceptions. (The situation is worse in the public sector. According to Moody's, in 2015, state, federal and local government pension plans were USD 7 trillion short

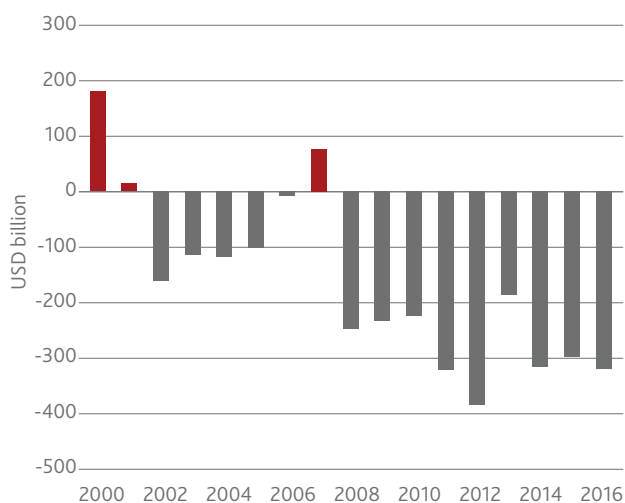
<sup>15</sup> The real natural rate of interest is defined in appendix A1 as the rate commensurate with an economy expanding at full potential and stable inflation.

<sup>16</sup> See Summers (2014).

<sup>17</sup> Milliman (2017).

in funding<sup>18</sup> At the same time, the funding gap of the social security system was estimated at USD 13.4 trillion, bringing unfunded pension liabilities of the U.S. public sector to more than USD 20 trillion.)

**Figure 1.8: Funding balances of defined benefit plans offered by U.S. corporates**



Source: Milliman.

For these reasons, low interest rates did not bring the widespread benefit one would have expected. Demand for new bank credit continues to be subdued in the post-crisis 'new normal.' This underscores the need for governments to improve the policy framework for corporate investment and, where applicable, to help the corporate sector find solutions that mitigate the risks associated with unfunded pension liabilities.

## 1.4 The financial sector

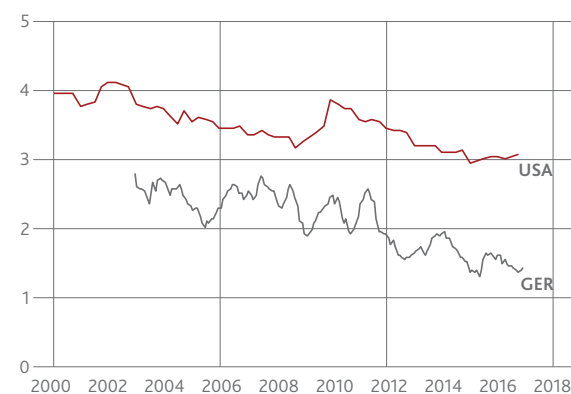
*Low interest rates contributed to margin pressures in banks and life insurers alike. As a result, the financial intermediation of banks is currently not working as smoothly as in the past. In the insurance sector, low interest rates affected the industry regarding products, investment returns, and valuation of assets and liabilities.*

### 1.4.1 Banks

The business model of banks is maturity transformation; they collect short-term deposits and provide longer-term loans.<sup>19</sup> In principle, this makes the profitability of banks relatively independent of the level of interest rates. More important is the difference between short- and long-term interest rates, or in other words the steepness of the yield curve. However, the extraordinarily low interest environment makes it currently difficult for banks to maintain profit margins comparable to the levels seen prior to the Great Financial Crisis.

First, central banks not only lowered short-term policy rates close to zero, and in a number of countries even into negative territory, but quantitative easing programmes also resulted in lower long-term interest rates. This flattened the yield curves in most advanced economies. Moreover, banks find it difficult to pass on negative interest rates to their customers.<sup>20</sup> Interest rate margins thus came under pressure everywhere, and they became particularly challenging for European banks (Figure 1.9).

**Figure 1.9: Banks' net interest rate margins (in per cent)**



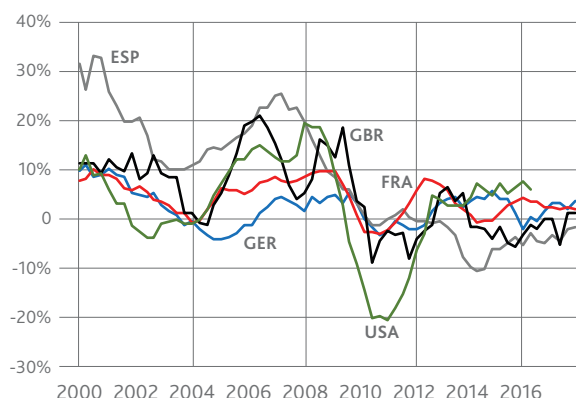
Sources: ECB and St. Louis Federal Reserve.

18 Moody's (2016).

19 Maturity transformation is the main reason why banks are susceptible to financial crises. They incur considerable liquidity risk (i.e., the risk of short-term funding becoming unavailable), while their assets in the form of long-term loans are highly illiquid.

20 See Jobst and Lin (2016).

**Figure 1.10: Corporate loans, annual growth rates in per cent**



Sources: ECB and St. Louis Federal Reserve.

Second, banks do not seem to be in a position to compensate for lower margins with higher business volume. Capital requirements implemented in the wake of the Great Financial Crisis make them reluctant to extend new loans with longer maturities, and in particular, loans for infrastructure investments. In Europe, many bank balance sheets continue to be filled with non-performing loans. And because other income sources, such as fees, commissions and trading revenues, declined (partly in compliance with new regulations), bank profitability has come under pressure in most advanced economies.<sup>21</sup> As a consequence, the growth rate of corporate loans is currently smaller than prior to the financial crisis (Figure 1.10).

These developments indicate that financial intermediation from banks to the real economy is not working as smoothly as prior to the financial crisis. This is particularly relevant in Europe, where firms have traditionally been reliant on bank borrowing. It is less of an issue in the U.S., where larger firms tend to fund operations through the issuance of debt securities. Such market-based funding was relatively stable in the aftermath of the financial crisis, thus mitigating the strong decline of U.S. corporate loans depicted in Figure 1.10. That said, the currently observed reluctance of banks to offer new loans with longer maturities raises the broader question of whether this opens a gap that could be filled by the life insurance sector, which, by virtue of its business model, does have an appetite for longer-dated assets.

<sup>21</sup> See IMF (2016).

<sup>22</sup> For the sake of completeness, one should add that the premiums insurers charge policyholders for set benefit levels increase with lower interest rates.

<sup>23</sup> See ECB (2016b) and EIOPA (2016).

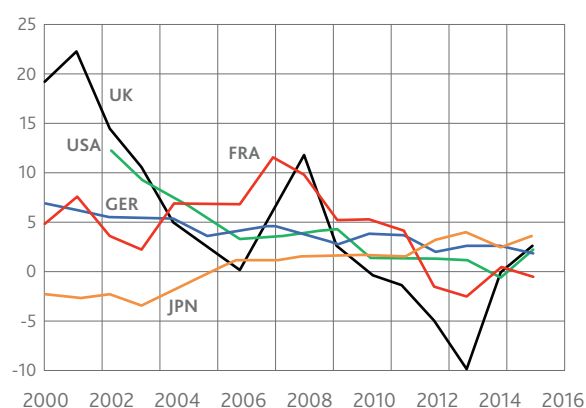
## 1.4.2 Life insurers

Interest rates impact life insurance in three important ways: first, as a key factor behind the demand for some life insurance products; second, as a determinant of investment income; and third, as a key variable for the valuation of assets and liabilities. This sub-section will review these three factors or channels in turn.<sup>22</sup>

### A. Demand for life insurance

Many life insurance products are tied to investment returns, with a fair proportion including guarantees in some form. In sync with the secular decline of interest rates, insurers have reduced guarantees on new products. Although this made the products less attractive for policyholders,<sup>23</sup> life insurance premium volumes have been surprisingly stable in most markets with the exception of the U.K. (Figure 1.11). It is also remarkable that premium growth in Japan shows a moderate upward trend despite the protracted, nearly three-decade-long low interest rate environment in this country.

**Figure 1.11: Smoothed growth rates of life insurance premiums (in per cent, rolling 5-year averages)**

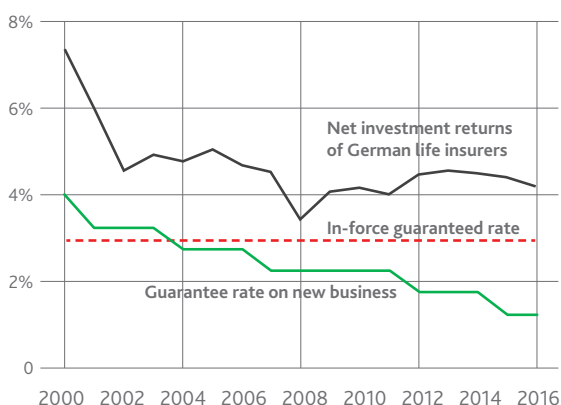


Sources: Axco.

*B. The investment channel*

Earnings of life insurers for certain products depend to a large extent on the spread between investment returns and the interest rate insurers have guaranteed they will credit to their policyholders. Given that life insurers tend to hold a large portion of their assets in fixed income securities, it is readily apparent that decreasing interest rates tend to compress spreads. Moreover, duration mismatches exacerbate reinvestment risk, as expiring fixed income assets have to be reinvested at ever lower yields. According to EIOPA, more than half of savings products on the balance sheets of EU life insurers currently incur negative investments spreads. Figure 1.12 summarises developments for German life insurers. While the numbers attest to a steady decline in net investment returns since their peak at the turn of the millennium (and thus to a spread compression relative to the in-force guaranteed rate), the absolute low was caused by the financial market meltdown in 2008 and not by low interest rates.

**Figure 1.12: Margin developments of German life insurers**



Sources: GDV, Bundesbank.

However, not all life insurance products are alike, and not all guarantees are structured in the same way. Insurers may offer different profit-sharing agreements, and they have a choice of investment strategies. Finally, tax incentives for policyholders may impact both the demand for and the supply of products. These factors foster many different offerings, which makes it difficult to generalise across markets. That said, Figure 1.13 illustrates interest

rate sensitivities of major life insurance products in the U.S. market. Products with fixed guarantees, such as fixed annuities, are most sensitive to interest rates, while those without them, such as variable universal life products, lie at the opposite end of the spectrum.

**Figure 1.13: Interest rate sensitivities in the U.S. life insurance market**

Fixed annuities	Universal life, guaranteed investment contracts	Deposit liabilities, variable and indexed annuities	Whole life, term life	Variable universal life, group life, retirement saving
-----------------	---	---	-----------------------	--

High ← → Low

Source: Oberstedt, A. et al. (2013).

*C. The valuation impact*

The valuation of financial assets and liabilities is sensitive to the interest or discount rates used, and the impact will be particularly strong when assets and liabilities are not well-matched. A large mismatch makes insurers vulnerable to downward movements in interest rates, as the valuation of liabilities will increase faster than the valuation of assets. A duration mismatch also implies that a trend reversal in interest rates would relieve pressure on life insurers, as the valuation of liabilities will fall at a faster clip than the valuation of assets.

**1.5 An assessment**

Policymakers typically use low interest rates as a tool to fight economic recessions. However, this rationale does not apply in the current macro-financial environment. Rather, low interest rates reflect (as discussed in Appendix A1) a 'new normal' of diminished growth expectations, which implies that they are likely to prevail for some time.

For the reasons touched upon in this chapter, the 'new normal' has created severe headwinds for a number of key sectors in our economies. It is in this challenging environment that life insurers have to examine their business plans (and possibly even their business models) and explore their strategic options to ensure that they can continue to play a meaningful socio-economic role in the future.

## 2. Life insurers adapting to low interest rates

*This chapter presents the industry's response to the low interest rate challenge based on in-depth interviews with senior executives of leading life insurers. While their answers differed, executives made clear that they perceived the challenge as a 'manageable headwind' rather than one requiring a fundamental redesign of the business model. Many initiatives are underway that, over time, will adapt life insurance business models to the changes in the macro-financial environment. Roughly 90 per cent of companies embarked on initiatives towards business model adaptation and 60 per cent called the development of new business models a stated objective. But first and foremost, life insurers are focusing on the in-force business. Extracting value from legacy books and, more broadly, getting a better grip on costs, are the top priorities in the companies surveyed.*

Although interest rates in advanced economies have been on a secular downward trend to unprecedented lows for a long time,<sup>24</sup> visible changes in the business of life insurers are more recent. This should not be surprising. Life insurance is a long-term business with some contracts extending to 40 years and longer. Owing to the inverted business model of insurance, it can take a long time for the cost of policies to materialise.<sup>25</sup> At the same time, assets in support of life insurance liabilities are turning over very slowly, and again it takes a long time for investment returns to decline and for margins to become compressed. For these reasons, it is often said that insurers are operating on a very long-term horizon. Building on prudent asset liability management, they have the capacity to ride out short-term setbacks in the demand for their products and they can 'see-through' financial market fluctuations.

However, such an ability could be a double-edged sword. Corporate decision makers could fail to detect subtle but nevertheless deep structural changes in the business environment, and corrective measures could be delayed for too long. In that sense, the predicament of life insurers has often been compared to a slow bleed. It does not look alarming at any given point, but once the patient has become anaemic for all to see, it may be too late for life-saving remedies. Complacency may be the industry's hidden enemy.

This chapter's message is not one of complacency. On the contrary, based on in-depth interviews with close to 20 senior executives of the world's major life insurers, it attests to the industry's resolve in dealing with the challenges created by the current, protracted low interest rate environment. Life insurers have seen the writing on the wall. They are implementing corrective measures. And they are determined to weather what one executive called a 'manageable headwind.' This chapter tells a story of change and adaptation. It is based on real-time cases as told by people in the line of fire.

### 2.1 The big reset

As discussed in Chapter 1, low interest rates affect both the demand for and the supply of life insurance products. Products that were once in high demand and profitable for insurers and policyholders have now been repriced to reflect the new environment and have become significantly less attractive for both parties. Also, many products were withdrawn and are no longer available to help policyholders plan for their financial needs in old age. However, customers with locked in policies at high interest rate guarantees in the past fared better. Most of those with insurance products that have guaranteed interest as the main benefit are now enjoying interest rate guarantees that are well 'in the money' and provide material financial protection. Nevertheless, a reset of customer expectations is underway, and there continues to be room for additional resets in the future.

24 The Bank of England's Chief Economist remarked once, perhaps a bit tongue-in-cheek, that we're witnessing the lowest level since Babylonian times, i.e., the lowest in 5,000 years (Haldane (2015)).

25 Insurers must price and sell a policy long before its actual cost (claims on the policy) is realised.

## Sidebar: Life insurance products and terminology

This paper refers to two main **customer needs** served by life insurers around the globe:

1. **Protection against biometric risks:** The purpose is to pay policyholders a sum or an income, typically on the occurrence of some biometric event. Insured events may be death, disability or a specific critical illness. Protection can also be provided as income for policyholders who outlive their retirement funds.
2. **Long-term savings and retirement solutions:** The purpose of these products, which also include some form of biometric protection, is to grow savings for policyholders over the long-term that will ultimately be paid out in the future. Products may include some form of protection against financial market risk through bonuses and interest rate guarantees (traditional or hybrids—see below) or they may come entirely without guarantees (unit-linked products). Products with large savings elements are typically used for long-term savings or accumulation towards pensions.

The details of life insurance products around the globe vary significantly depending upon the local social security system and local tax rules. Also, the terminology and product names vary. To reduce confusion, when we refer to types of life insurance products in this report, we will use the following **terms in bold** for the **main product types**:

**Term protection:** These products pay out a lump sum or an income upon death or disability or diagnosis of a particular illness. Insurance is provided for a set number of years (e.g., 10 or 20 years). Products are often used by policyholders to protect surviving family or to pay off a mortgage on death.

*Also called:* 'life insurance' and 'term life insurance.'

**Whole life protection:** Products are related to term protection, but rather than providing cover for a fixed number of years they offer cover for the rest of life. The products often have larger savings elements and are frequently used by older customers to plan for inheritance savings or funeral costs.

*Also called:* 'Whole life insurance' and 'funeral plans.'

**Savings products with interest rate guarantees:** The focus is on savings but products also include a small amount of protection. Traditional products usually offer a profit-sharing agreement that splits investment returns between policyholders and shareholders.

Many products offer guarantees, usually money-back or minimum interest rate guarantees on the invested savings. Policyholders use the products for long-term savings needs or pension savings. They are attractive to policyholders who want a certain degree of protection against financial market risk.

*Also called:* 'Guaranteed insurance contracts' (in North America), 'with-profits', 'traditional life,' and 'klassische Rentenversicherung / Kapital-Lebensversicherung' (in Germany).

**Unit-linked savings:** In the same way as savings products, these products are used by policyholders for long-term savings needs or pension savings. However, investments on behalf of policyholders are similar to mutual funds and therefore policyholders bear all the investment risk of unit-linked asset prices rising or falling. Customers using these products are prepared to accept more investment risk than customers acquiring savings products.

*Also called:* 'Linked life insurance' and 'fondsgebundene Lebensversicherung' (in Germany).

**Hybrid savings:** This broad class of products may comprise a blend of savings and unit-linked concepts, or they may rely entirely on unit-linked concepts with guarantees on the savings parts. Policyholders use the products for long-term savings needs or pension savings.

*Also called:* 'Unit-linked with guarantee' and 'variable annuities.'

**Retirement solutions:** These products provide an income in retirement for policyholders. In Europe, most products offer an income guaranteed for life, thus protecting the customer against outliving their assets (protection against longevity risk). In North America, most annuities do not include a longevity guarantee; they are so-called withdrawal plans. In recent times, hybrids have emerged that combine fully guaranteed and non-guaranteed withdrawals.

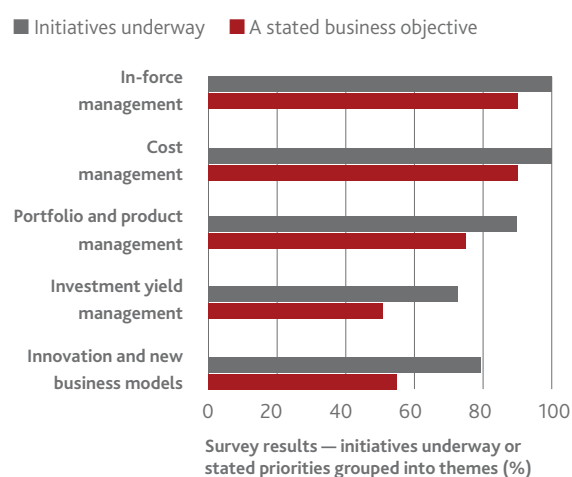
*Also called:* 'Payout annuities,' 'retirement income products,' and 'sofortbeginnende Rentenversicherung' (in Germany).

Table 2.1 summarises the impact of low interest rates from a customer and an insurer perspective. The synopsis provided in the table is a general analysis across a broad range of products. Individual products in different markets may vary somewhat as product terms and conditions vary, which in turn may reflect differences in tax treatment and regulatory requirements.

Looking across the whole range, two product lines stand out as being impacted most negatively for new customers: (i) retirement annuities and (ii) savings products (see sidebar on terminology). As will be discussed in Chapter 3, as a result of lower interest rates, retirement annuities now provide a significantly lower lifelong income for retirees. The impact is further compounded by the improved longevity of the population. In certain markets, such as the U.S., due to less attractive conditions on new policies, fewer retirement annuities are now bought. The same holds for savings products that offer substantially lower interest rate guarantees.

The remainder of this chapter presents the industry's response in more detail. They were asked about past and current actions, key barriers to change in their organisations, and for their view of the future of life insurance. While their answers differed, reflecting different regulatory environments and, above all, what economists call 'path dependence,' executives made it clear that they perceived the low interest rate challenge as a 'manageable headwind' rather than one requiring a fundamental redesign of the business model. That said, the responses made clear that many initiatives are underway that, over time, will adapt life insurance business models to the salient changes in the macro-financial environment. Roughly 90 per cent of companies have embarked on initiatives towards business model adaptation and 60 per cent called the development of new business models a stated objective. Five top-priority areas are summarised in Figure 2.1.

**Figure 2.1: Relative importance of adaptation priorities**



Source: The Geneva Association.

**Table 2.1: How low interest rates are affecting key life insurance products**

Product type	Impact on existing customers	Impact on new customers	Impact on life insurers
<b>Term protection</b>	<b>Neutral</b> Product premiums and benefits are generally unchanged unless there are renewals.	<b>Neutral</b> Slight worsening of pricing for term insurance with long durations, but often offset by improving mortality.	<b>Neutral</b> Manageable; low interest rates are a bigger concern for long duration term protection.
<b>Whole of life protection</b>	<b>Neutral</b> Product premiums and benefits often guaranteed and therefore unchanged. Implicit interest rate guarantees embedded in the products are generally better than alternative investment options for new policies offered.	<b>Negative</b> New products become more expensive or have been withdrawn from the market as interest rates have reduced the expected investment returns on the significant savings element in whole of life protection products.	<b>Negative</b> Existing products with long durations now harder to fund due to lower interest rates. Long-term protection is most impacted. Repricing new products or withdrawing them entirely where products are uneconomic due to implicit interest rate guarantees.
<b>Savings products</b>	<b>Neutral / slightly negative</b> (Products may not meet customer expectations and are perceived as negative). Existing products have a guarantee which is often very attractive in current low interest rate environment. However, profit-sharing on top of guarantees is now lower or even zero, which is lower than the original expectation when the product was bought.	<b>Significantly negative</b> Traditional guarantees have been reduced to nearly zero or withdrawn in most markets. Impact of the strain of guarantees on the in-force traditional book means that future profit sharing may be low. Hybrid products have been introduced in some markets to give a low guarantee coupled with more options for investment upsides.	<b>Significantly negative</b> Traditional guarantees on the in-force book remain and are often above current interest rates. Insurers must fund these through additional reserves if they cannot find extra yield to fund the gap. To manage the book and capital position, the profit share of extra returns to customers has come down significantly. Many insurers have closed traditional products or are focusing on hybrid alternatives. New business may decline.
<b>Unit-linked savings</b>	<b>Neutral / negative</b> Unit-linked savings have performed as expected, but depending on the funds the customer invested in, the returns may be good or bad. For future investment returns, the expectation of growth in savings is lower due to low interest rates. Unless customers chose riskier assets, it means that they need to invest more now and in the future to achieve their savings or pension goals.	<b>Neutral / negative</b> The expectation of growth in the savings is lower due to the low rate environment. Unless customers choose riskier assets, it means that they need to invest more now and in the future to achieve their savings or pension goals.	<b>Neutral</b> These products are invested in stock markets via unit funds. As there are no guarantees to fund directly, the low rate situation has not hit insurer profitability directly on unit-linked products. The insurer is remunerated by fees on the units or premiums.
<b>Retirement annuities</b>	<b>Neutral</b> Retirement annuities in payment lock in the income benefit for policyholders, and this does not change, irrespective of changes in interest rates.	<b>Significantly negative</b> Guaranteed incomes on retirement annuities have declined significantly due to low interest rates. These products are now often perceived as unattractive for many policyholders due to the low conversion factors from the accumulated capital into annual income payments.	<b>Negative</b> In most markets insurers cannot fully match retirement annuities with assets of the same duration. Where the duration of investments is shorter than the duration of liabilities, lower interest rates have had an earnings and capital impact. Insurers have repriced new retirement annuities significantly or withdrawn products since the start of the low-rate environment.



## 2.2 Extracting customer value and business efficiencies

It is not surprising that the responses collected in Figure 2.1 should reveal equal weight given to cost and in-force management as top priorities. Life insurers have a history of nurturing archaic IT systems and a comparatively expensive agency sales model. This can weigh on production costs, forcing insurers to embark on an almost perennial search for cost efficiencies. In the wake of the Great Financial Crisis, tighter margins and a decline in sales in some markets have exacerbated some of these issues. However, adjustments are now well underway. If and when conditions improve, the industry should be well positioned to harvest the benefits of cost-related adjustment efforts. That said, it is fair to expect other

management levers—such as the development of new business models—to gain in importance the longer the low interest rate environment lasts.

### 2.2.1 In-force management

In-force management is a fairly new discipline. It has emerged in life insurance (although it can also apply to non-life or general insurance) in the last three to five years. In-force management is generally described as a focused set of activities around the existing book of insurance policies (and their owners) and on balance sheets. Its objective is to create more value by actively and better managing a business that may have been on the books for decades in some cases. The value extracted from these activities can be accrued to both shareholders and customers.

### Sidebar: What is in-force management?

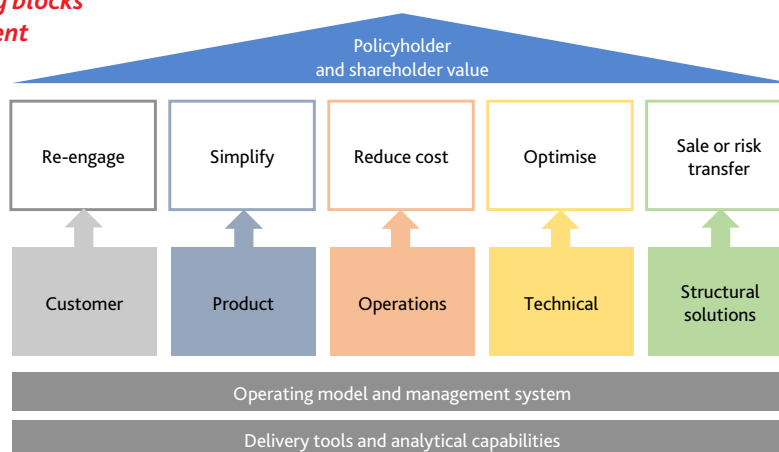
The in-force is a life insurer's existing business. It is usually defined as everything that was sold in the past and is still active on the books. The in-force includes both very old products that are closed to new business (often called 'legacy') and current products that have been sold in recent years and continue to be available.

In-force management has always existed in some form, but it now seems to have developed into a discipline of its own, helping insurers extract more value from their in-force business. This aspect had often been deprioritised in the past to focus on new business acquisition. But the bulk of the value for many insurers continues to be in the in-force business, and in-force management focuses on managing this better for the benefit of policyholders and shareholders.

- From a policyholder perspective, the in-force customer base may have received a lower priority at most life insurers due to the focus on new business and their cost-reduction initiatives. But effective in-force management initiatives add value for policyholders by allowing insurers to pass on a share of improved investment returns, cost efficiencies and, more broadly, better service or benefits.
- From a shareholder perspective, due to the challenging low interest rate environment and less profitable new business lines, in-force management has been useful in helping insurers to meet shareholder profit objectives, typically expressed as a return on equity (RoE) target. Insurers can focus on two levers: (i) improving the profitability of the business, and (ii) freeing up capital that is tied up in the in-force business. Together these actions can generate sizeable RoE improvements.

The stylised building blocks of in-force management, which support the creation of policyholder and shareholder value, are summarised in Figure S1.

**Figure S1: The building blocks of in-force management**



Source: inforcehub.

## Sidebar: What is in-force management? (continued)

In-force management brings together disciplines from many business areas. The management levers typically fall into one of these categories:

- **Policyholder in-force management:** The focus is on better managing the in-force customer base, usually through closer engagement and better value proposition offers such as:
  - Customer retention,
  - Reinvestment of paid out policy benefits,
  - Increasing customer density through cross-selling (more products per customer) and up-selling initiatives (higher cover per customer),
  - Alternative offerings.
- **Product in-force management:** These levers focus on more active management of the in-force products and customer propositions, of which there may be hundreds or thousands, through, for example:
  - Upgrades, or additional features or benefits,
  - Alternative product offers or cash out options,
  - Optimising profit sharing,
  - Simplification or rationalisation of in-force products.
- **Operations actions:** The focus is on improving the efficiency of operations, systems and business processes.<sup>26</sup> Levers include:
  - Cost efficiency actions,
  - Automation of processes and software robotics,
  - Outsourcing and near-sourcing of operations or systems,
  - Consolidation and migration of old legacy systems,
  - Facilities and location optimisation.
- **Technical levers (asset side):** These levers focus on making better use of the in-force balance sheet. Actions can optimise the asset-side or liability-side of the in-force business and thereby optimise returns, risk and capital for shareholders, as well as improve returns for customers. Actions include:
  - Improving asset liability matching,
  - Optimising asset management fees,
  - Alternative asset classes to improve expected risk-adjusted yield,
  - Optimising existing reinsurance arrangements,
  - Optimising capital allocation and risk reduction efforts.
- **Structural in-force actions:** The focus is on the sale or restructuring of specific blocks of business (usually old legacy business closed to new business). Examples include (illustrative only):
  - Offloading legacy blocks of business to closed-book specialist (re)insurers,
  - Risk transfer in the form of block reinsurance or other hedging instruments on the in-force book,
  - Rationalising and merging old legal entities.

<sup>26</sup> Some of the insurers interviewed do not include these levers in their definition of in-force management, as the accountability for operations may lie elsewhere in the business. Nevertheless, these levers are important business levers on the in-force and they are included here.

As interest rates have declined, a number of senior executives referred to in-force management as a tool to help maintain shareholder and policyholder returns. Others saw it as a natural progression from an exclusive focus on new business to a better-balanced focus on new business and the existing book. The survey results in Figure 2.2 show that all insurers are working with a high degree of intensity on these activities. More than 80 per cent assigned it either top priority or classified it as a key objective.

Although all insurers have in-force management initiatives underway, there are significant differences in how they are proceeding and what the scope of activities

comprises. Figure 2.2 illustrates that the overall priority for in-force management does not translate equally into different initiatives for different insurers domiciled in different geographies.

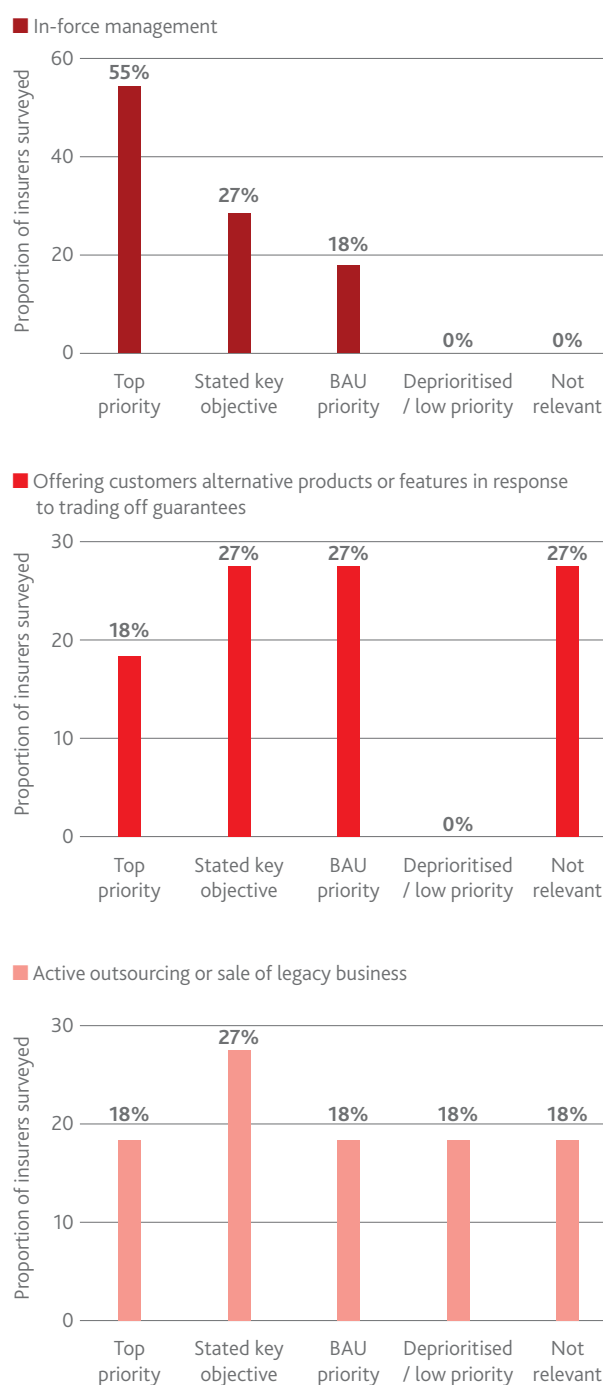
- A handful of large global life insurers have set up structures to push forward in-force management across all of their group entities. At the time of the interview, one insurer was actually in the process of setting it up more formally. Others, however, saw it as an important activity but confined it to their local entities.
- Many insurers cited asset-liability management as an important in-force management activity to improve

the expected risk / return characteristics of the assets used to back the liabilities of their policy books. This activity was mentioned explicitly by about half of the respondents in the sample.

- The question of whether in-force customers should be offered alternatives in the form of buy-outs or new products with terms and conditions better reflecting the changed macro-financial environment triggered polarising responses. Some insurers, particularly those with operations in the U.S., were working on programmes offering policyholders alternatives to current in-force policies. There were also a few, but more limited examples of alternative offerings in Europe. Others, however, were concerned about market perceptions triggered by new product offerings with changed conditions. Some refrained from making such offers. They perceived such offers as not worth putting well-established customer relations at risk.
- Most polarising was the discussion on structural in-force management actions which include selling old entities or legacy books of business. A number of insurers have already done such transactions on parts of the in-force book or are planning to do so, and at least one respondent was thinking about creating an industry-wide consolidation vehicle. Others, however, had the polar opposite view and voiced strong philosophical objections to selling old books, wishing instead to retain in-force customers for the long-term. Differences in attitudes may have to do with broader institutional and regulatory factors that may differ from jurisdiction to jurisdiction. Transaction statistics reveal that the majority of in-force or legacy book deals were performed in the U.S. and the U.K., whereas numbers and volumes of such deals were considerably lower on the European continent.

*'We would never sell a legacy book of business. It's not who we are.'*

**Figure 2.2: In-force management priority and priorities for two specific in-force levers**



Source: The Geneva Association.

While in-force management activities are well established, particularly in larger life insurance groups, more needs to be done. The sentiment of senior executives is summarised in Figure 2.3. Slightly less than one-tenth of projects have been completed. Although a little more than one-third has been implemented, management continues to work towards full delivery. And more than half of the projects are considered either underway or still in early stages. One firm in particular emphasised that the more it looked into in-force management, the more room for improvement it saw. It is probably fair to assume that in-force management will be firmly institutionalised even after the current initiatives are done.

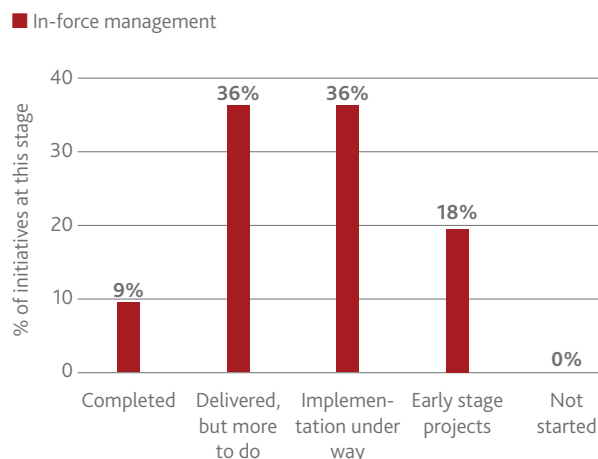
### Sidebar: How in-force management benefits policyholders

Insurance companies are known to have in use scores of different administrative systems or platforms that are the legacies of acquisitions or in-house development. The legacies are burdensome, thus providing a major rationale for in-force management activities.

One way to reduce costs on in-force policies is to combine them on fewer systems or on one new platform. However, this can be difficult because of the many different features (such as interest rate guarantees and policy options on redemption) included in existing policies. It is not unusual for insurers to 'upgrade' all policies to the best of all features currently in force and bring them onto a new, much simpler platform. This will reduce administrative costs, and a portion of the gains may be passed on to the customer side, benefitting at least some of the old policyholders.

Some in-force blocks of policies are either sold to a third party or reinsured, where the reinsurer also manages (or administers) the policies. A third party that takes on the risk and administration from a block may also enhance certain policy features to reduce administration costs. In addition, these parties typically service old policies better than the direct insurer as it is the acquiring company's main line of business, while the direct insurer looks on these in-force policies as an expense. Thus, policyholders may often receive better service after such a transaction.

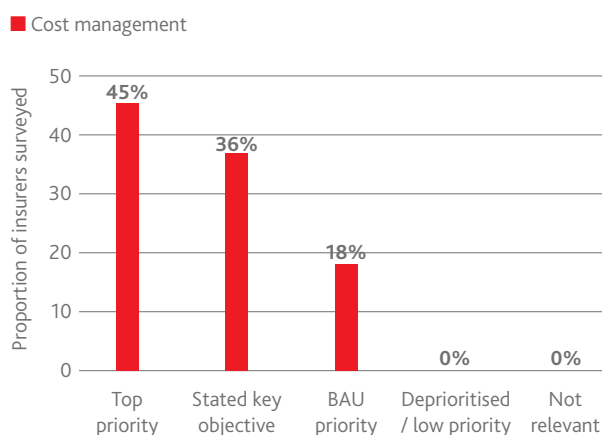
Figure 2.3: In-force management implementation status



Source: The Geneva Association.

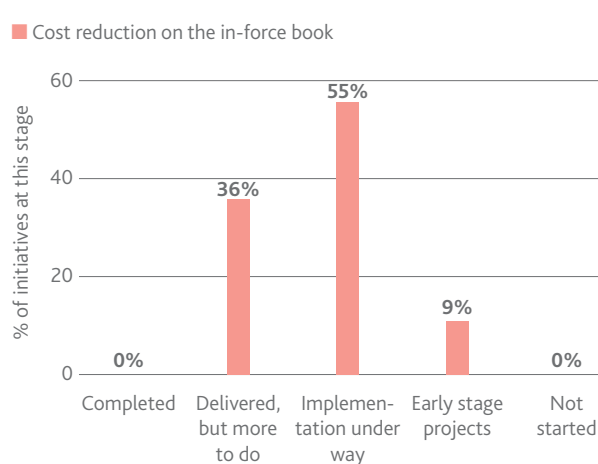
### 2.2.2 Cost management

Cost reduction ranks at the same high-priority level as in-force management, although the motives are quite different and not necessarily shared by all respondents. For many survey participants, cost management is common sense; they perceive the life insurance sector as not being as efficient as it could be. Others underlined the importance of cost reductions to mitigate the adverse impact of lower investment returns in order to benefit insurers and/or policyholders. And a third group of executives called for insurers to become more efficient in order to prepare for future competition against InsurTech companies that are not saddled with any legacy burdens.

**Figure 2.4: Cost management priority**

Source: The Geneva Association.

However, achieving the desired cost reductions can be rather difficult. While one executive called cost reduction 'just common sense,' the devil is in the details. One of the major challenges executives referred to arises from complicated IT legacy systems that were built decades ago. They are often not well integrated, creating a high barrier for speedy efficiency gains. Many respondents also saw a need for the corporate culture to change towards an even more cost and customer-centric mind set. The survey revealed that cost work is an ongoing process (Figure 2.5), and even more so than in the area of in-force management. Consequently, respondents believed that even more can be done to improve the cost efficiency of life insurers, and particularly so in light of technological progress.

**Figure 2.5: Cost management implementation status**

Source: The Geneva Association.

## 2.3 Towards a new business mix

The protracted period of low interest rates has not only made a number of products unattractive for customers, it has also revealed areas for improvement in product design and pricing techniques. These developments brought life insurers back to the drawing board. The charge is to develop products that are not only better suited for the changed macro-financial environment, but that are also attractive for customers. This section looks into the priorities assigned by various companies and the implementation status of actions currently underway.

### 2.3.1 Product and portfolio management

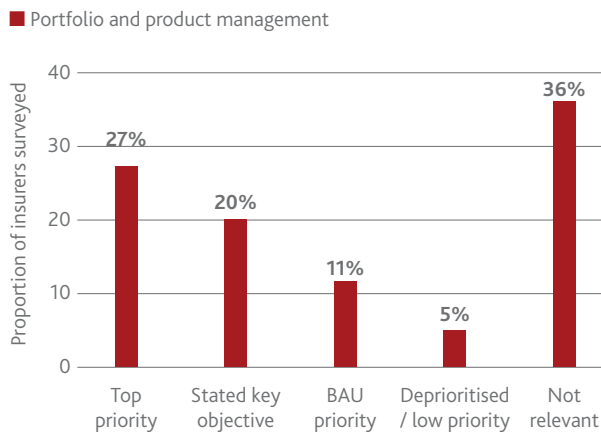
By now, insurers have made significant progress with initiatives rebalancing their new business mix towards more sustainable products that are, from both a policyholder and shareholder perspective, better adapted to the current low interest rate environment. Focus areas highlighted by survey participants include:

- Reducing the reliance on savings products (with high interest rate guarantees) and replacing them with unit-linked and hybrid products that feature more sustainable guarantees,
- Developing a stronger focus on biometric risk or term protection products,

- Focusing on wealth management for high-net-worth individuals and more broadly on asset management products,
- Focusing on corporate customers by offering unit-linked pensions and corporate protection business.

Figures 2.6 and 2.7 summarise the priority assigned to product and portfolio management and its current state of implementation, respectively. The priorities may perhaps be a bit surprising. Fewer than half of the respondents assigned top or key objective status to activities in this area, and more than one-third deemed them entirely irrelevant. Or phrased differently, more than half of the respondents appear to be quite happy with their current portfolio mix.

**Figure 2.6: Product / portfolio management priority**



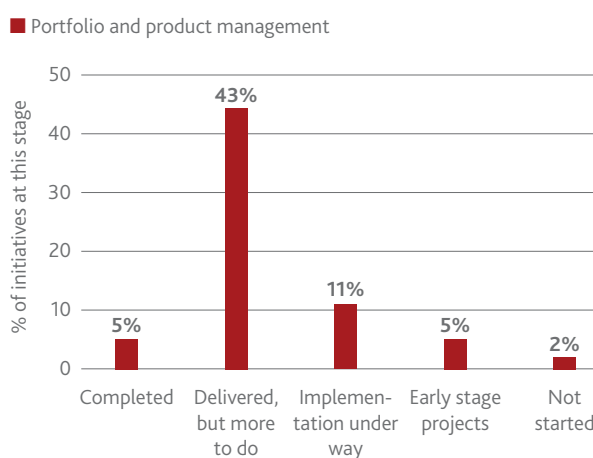
Source: The Geneva Association.

Behind this seemingly reticent attitude lies the fact that a number of insurers may have already revamped their portfolios. They exited certain, no longer viable lines by withdrawing from the market or by accounting for the current interest rate situation in their pricing, resulting in some products becoming unattractive for new customers. As not all competitors are moving in lockstep, revamping their business mix might even have entailed the loss of market share for some firms.

The slightly lower priority assigned to product and portfolio management (see Figure 2.1) is also reflected in the fact that the implementation of projects in this area is

less advanced (Figure 2.7). Only 5 per cent of projects are considered complete, while the remainder continues to need more work or is still in an implementation phase.

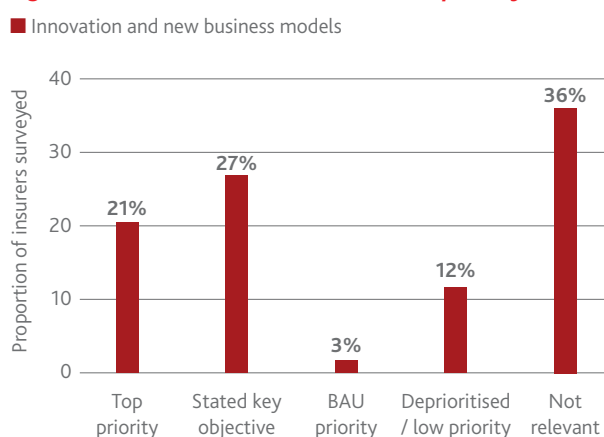
**Figure 2.7: Product / portfolio management state of implementation**



Source: The Geneva Association.

### 2.3.2 Innovation and new business models

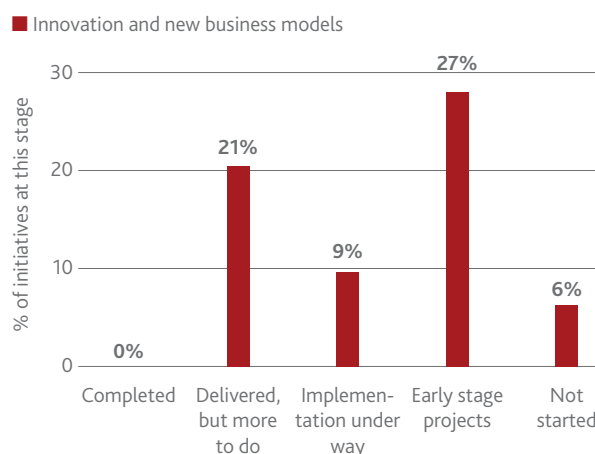
When looking further ahead, interviewees saw the need to adapt business models to compete against potential competitors with a high-technology background, although few were prepared to anticipate how innovative business models would apply. However, they all agreed that businesses will need to be more digitally enabled and that technologies could both open up new distribution channels, helping them to achieve lower cost levels, and generally be much more engaging to customers. That said, it is still a bit surprising to see the nearly perfect bi-modal distribution of priorities in Figure 2.8. While almost half of the respondents assigned top or key priority to innovation, more than one-third deemed it not relevant. This echoes the bi-modal split seen in the priorities assigned to portfolio management.

**Figure 2.8: Innovation / business model priority**

Source: The Geneva Association.

The responses to questions about the implementation status of innovation and business models were in line with the generally reserved approach to projects (Figure 2.9). Only one-fifth of respondents had delivered projects on hand, while more than one-third reported that they had just started or were in slightly more advanced stages of implementation.

A tentative conclusion could be that industry leaders need more information about the potential of new technologies and how to harness them best. For the time being, industry practitioners appear to believe that it is difficult to see how technology-enabled business models that disrupted competition in other industries (such as the taxi and hospitality industries) could be successfully transformed to the insurance sector (see also sidebar on InsurTech). There are also a number of hurdles that make market entry for potential non-insurance competitors very difficult, rendering the need to face the challenge posed by new technologies less urgent than in other industries. That said, industry leaders are aware that parts of the value chain could be disrupted and that the potential for challengers building on new technologies should not be neglected.

**Figure 2.9: Innovation / new business models state of implementation**

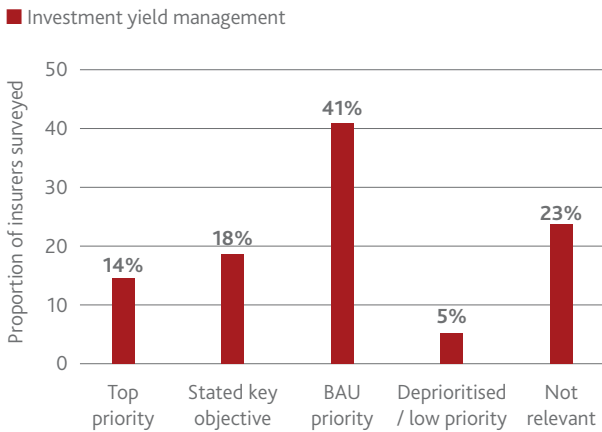
Source: The Geneva Association.

### 2.3.3 Investment management

As interest rates declined, many insurers sought additional investment yield to fund the (high) guarantees promised to policyholders on in-force policies and retirement income benefits, or simply to maintain attractive pricing on new business. Since the duration of life insurance liabilities tends to be long and the products rather illiquid, it has often been argued that life insurers are also predestined to hold relatively illiquid assets with durations matching the long liabilities. While there is anecdotal evidence that a number of insurers are trying to lock in such illiquidity premiums,<sup>27</sup> nearly half of survey respondents thought that a permanent review of investment management activities should be 'business as usual' (Figure 2.10). In individual interviews, they also made clear that such reviews typically cover a whole range of activities, such as implementing sophisticated IT systems to better match assets and liabilities, and outsourcing investment functions to third party asset managers.

27 See, for example, the chapter on the insurance sector in the European Central Bank's Financial Stability Review (2017).

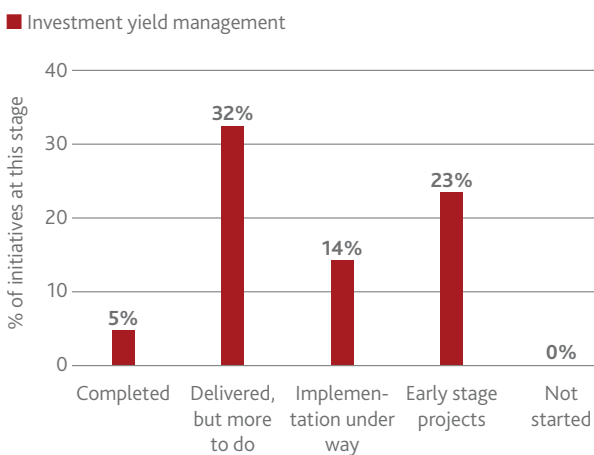
**Figure 2.10: Investment management priority**



Source: The Geneva Association.

In line with the near-permanent objective to better manage the investment function, all insurers report projects in various stages of implementation (Figure 2.11). The fact that almost one-quarter of projects are in a very early stage of implementation seems to indicate that the low interest rate environment may have contributed to a renewed sense of urgency.

**Figure 2.11: Investment management state of implementation**



Source: The Geneva Association.

## 2.4 Remaining challenges

Figure 2.12, followed by a brief synopsis, summarises some of the key challenges senior executives are faced with when implementing initiatives to improve performance metrics. They range from internal obstacles (related to talent pools, the legacy book, or the inertia of distributors, for example) to a number of external challenges, such as changing regulatory requirements and customer behaviour.

**Figure 2.12: Key challenges in implementing initiatives**



Source: The Geneva Association.

- Customer inertia to adapt to the new environment:** Demand for life insurance products has been slow to change in many markets. Customers continue to demand traditional, more familiar products, even if they may not be the best choice in the current macro-financial environment. But preferences vary significantly. For instance, unlike in North America and the U.K., there is no well-developed equity culture in many continental European countries. This has constrained the ability of insurers to rebalance their business portfolios away from savings products with interest guarantees to unit-linked products that offer lower or no guarantees at all. Senior executives see a need for insurers to do a better job in engaging customers and communicating with them on the changing macroeconomic environment and what it means for them.

*'We need to do a better job in engaging customers and communicating with them.'*



*'The lack of an equity culture in most of Europe means it is difficult to sell unit-linked products; our customers prefer guarantees.'*

- **Distribution inertia to adapt to new the environment:** Similar to customer inertia, distribution inertia has made it hard for many insurers to proactively rebalance their products and portfolios ahead of the market. There is a fair amount of lead time to teach agents about new product offerings, especially if the products are completely different from existing products (for example, offering protection to replace savings products). This also carries over to the bancassurance model in a number of markets. Life insurance continues to be seen as something that needs to be sold to, rather than bought by, customers. The question is whether, and to what extent, digital technologies will change this view.
- **Competition inertia:** Those insurers that made bold steps in adapting products and portfolios faster than the market often reported that it had been a high-risk strategy. Many competitors, trying to manage through the cycle, continue to offer traditional products popular with customers, which has led to significant declines (up to 50 per cent in one case) in new business for those insurers that aggressively adapted portfolios.

*'We were one of the first to move to unit-linked products. It was difficult at the time but now with hindsight it has worked out well for us.'*

- **Legacy challenges:** The long-term nature of many life insurance products implies that the in-force business is complex and usually contains a large number of old policies, many from previous decades. They tend to remain on IT systems that in the past were termed to be too costly to migrate to new platforms. This adds complexity and cost and slows the pace of change when implementing new initiatives. Some insurers, however, are more active in offloading old legacy blocks to third party insurers or in using outsourcing. It enables them to focus on more relevant new business and simplify the in-force book. Particularly in the U.S. and the U.K., many transactions have been completed on this basis. However, in continental Europe, legacy business sales volumes have been much lower owing to a combination of lack of suitable outsourcers and/or IT systems.

Another obstacle may have been the more complicated regulatory requirements that made it difficult to efficiently dispose of an old block of business.

- **Attracting talent:** Many respondents felt that the industry's image had worsened as a result of the Great Financial Crisis and the subsequent stagnant investment environment, particularly so in North America and Europe, but to a lesser degree in Asia. Moreover, the low interest rate environment has called for increased cost-cutting efforts. This seems to have adversely affected the attractiveness of the industry in the eyes of young talent entering the workforce and of qualified people already employed by the industry. Therefore, attracting new talent into the field of insurance and maintaining employees appears to have become a bit more difficult than in the past.

A number of executives made the point that talent is vital if the industry is to adapt quickly and compete effectively in the future as business models become more digitally enabled. According to one executive, the ability to attract young talent is particularly pressing as the industry's workforce appears to be ageing rather quickly. Many respondents see the important socio-economic role of life insurance as a positive recruiting argument. However, to keep that role, the industry needs to do a much better job of getting the message across to potential talent.

- **Lack of appropriate long-term assets:** A number of executives surveyed mentioned that attractive long-term and often illiquid assets with the right risk/return characteristics are not easily available in the market. Some reported that the dearth of assets with these characteristics has become even more acute in recent years. A number also mentioned that regulatory frameworks in Canada and Europe, which require assets to be marked to market, make it harder still to find assets that are attractive, feasible, cost-effective and acceptable from a regulatory point of view..
- **Reputation risk:** Executives were concerned how their initiatives might be perceived by conduct regulators and customers. Particular issues were associated with cases where in-force customers were offered alternatives, even when the alternatives had better customer value. Another concern was reputation

risk related to the sale of legacy books to third parties. Executives underlined the need to avoid misperceptions, which requires open communication channels to policyholders and regulators alike.

- **Financial and social cost:** The cost of change is particularly high in terms of financial spending and social impact when cutting headcount. These initiatives require significant cash outlays, which can be difficult to justify at a time when earnings are compressed due to low interest rates.
- **Regulatory challenges:** There is an increasing amount of regulation of life insurance in the interests of customer protection and overall financial stability. Life insurers are good at implementing rules and regulations, but it often requires significant budget and focus that might crowd out other business projects.

## 2.5 An assessment

Life insurers have come a long way in tackling structural weaknesses exposed by ultra-low interest rates. The adaptation to the likely 'new normal' of perennially low interest rates is well under way. First and foremost, life insurers are focusing on the in-force business. Extracting value from legacy books and, more broadly, getting a better grip on costs, are top priorities. The fact that the industry is able to harvest efficiency gains on legacy books entails an admission that it did not always operate at the efficiency frontier in the past. In that sense, low interest rates appear to have served as a wake-up call. But it is fair to say that the industry has responded well.

A slightly lower priority appears to have been given to the interest rate challenge in the area of investment management. Reducing cost through outsourcing and searching for ways to achieve higher expected investment returns is seen as 'common-sense' and 'business as usual.' The absence of radical change takes away support for the frequently expressed view that life insurers are desperately chasing higher investment yields. Continuous improvements based on well-established principles and prudent asset-liability management rules (also enforced by regulators) are the norm.

But the industry cannot rest on its laurels. The slightly lower priority assigned to portfolio and product management, and the even lower priority assigned to innovation and new business models, indicate that the next challenge—preparing the industry for the future—has still to be addressed. It must be forcefully confronted if life insurers are to continue to play a meaningful role in serving the needs of policyholders and the demands of shareholders in the future.

## Sidebar: The role and impact of regulation

Insurance has always been, and continues to be, a heavily regulated industry. In the view of industry leaders, regulation has often been perceived as intrusive, and regulation is consistently ranked as one of the top three risks affecting the industry. That said, one should not overlook the fact that regulators and policymakers are not working in complete isolation. They often listen to industry concerns in an effort to provide a regulatory framework that not only protects policyholder interests but also endeavours to steer the industry towards sustainable outcomes. Viewpoints obviously differ, reflecting the differing realities of regulation in different jurisdictions. Nevertheless, there are a number of common themes coming to the fore that are highlighted in this sidebar.

1. **Keep the socio-economic role of life insurance front and centre.** A number of insurers observed that the socio-economic benefits provided by the life insurance industry are rarely front and centre in the discussions around regulation and management of the sector. However, this topic should gain more attention in the future as pension gaps keep widening and growing fiscal gaps make it increasingly likely that governments will not be able to meet the promises made under current entitlement programmes (see also Chapter 3). Life insurers capable of fulfilling their economic role could make a central contribution towards stabilising the social compact in the long run. For that reason, senior executives felt that the industry should gain more visibility by better communicating how it could strengthen its value propositions to fulfil the socio-economic role of life insurance.

*'In the past, we saw a better alignment between the insurance industry and the public sector. Insurers would demonstrably provide solutions better than the public sector, and they were a reliable holder of public debt. This tacit understanding has changed dramatically. Insurers need to regain an active voice in the public policy discussion.'*

2. **Proactively manage the transition to financial stability.** Life insurers appreciate where policymakers have introduced proactive measures to help the industry in the transition to business sustainability. One example mentioned by European executives is the 'Zinszusatzreserve' (ZRR) in Germany. It requires insurers to build up reserves to close gaps arising from the difference between guaranteed interest rates and actual market rates. The approach chosen by Germany's BaFin allows the sector to build additional reserves incrementally over time rather than in one large step. In a different vein, French and Japanese authorities have codified circuit breakers to prevent large cash outflows caused by mass surrenders.<sup>28</sup> The circuit breakers would prevent asset disposals during stressed market conditions, which are seen as not necessarily being in the best interests of all policyholders (those wishing to surrender and those wishing to continue their policies).

*'Probably 30 to 40 per cent of our project spend is regulatory-related.'*

3. **Reduce the regulatory burden.** In line with the perception of regulation as one of the top risks impacting the industry, senior executives were unified in calling for an appreciable reduction in the regulatory burden. The rate and volume of regulatory change is seen as adding significant costs and complexity to life insurers. Some insurers also pointed to the problem posed by inconsistent demands on the industry, when policymakers on one side encourage the insurance industry to invest in

long-term infrastructure projects, while regulators on the other side demand higher capital charges for precisely such investments.

*'New solvency regulations make it hard to use attractive illiquid debt on our books.'*

4. **Contested calls for cross-border consistency.** Rather controversial, however, were calls for more regulatory cross-border consistency. Such consistency seems to be of particular interest to large, globally active insurers that would like to harness efficiency gains in their capital allocation and would prefer to see a uniform treatment of business transactions across the jurisdictions in which they operate. In their view, the different regulatory treatments of one and the same transaction in different jurisdictions limits how much insurers and customers can benefit from global scale and global diversification.
5. **Use regulation to protect incumbents.** In an interesting twist, a small number of respondents saw strong regulation and high capital requirements as one line of defence against non-insurance competitors. This may however backfire if the societal consensus about the purpose of insurance regulation should change.

*'Strong capital regulation is likely to protect incumbent life insurers.'*

<sup>28</sup> The French circuit breaker is based on the *Code monétaire et financier*, while Japan's equivalent is based on the *Japanese Insurance Business Act*.

## Sidebar: The challenges of InsurTech


The majority of survey respondents saw the digitisation of insurance—InsurTech in short —mainly as an opportunity to harness efficiencies, broaden distribution channels, and facilitate direct customer contacts. They did not expect dramatic changes to happen overnight, justifying their wait-and-see attitude. The widespread expectation appears to be that the challenges of InsurTech would evolve slowly for life insurers, and senior executives were not overly concerned that new, non-insurance competitors would take away market share from incumbents. A small number perceived high capital requirements and regulatory complexity as de facto entry barriers, keeping out tech-savvy non-insurance competitors. To this deterrent, one could add the low profitability of the capital-heavy life insurance business when compared to other financial services with lower capital requirements and consequently higher returns on capital deployed.

The reticent attitude of senior industry insiders contrasts with what appears to be the predominant view of external analysts. After many false dawns, they now see the insurance industry—like many other industries—at a tipping point, enabled by ever more sophisticated algorithms, the availability of massive cloud storage, and sheer computing power. Representative for many, Rafal Walkiewicz, CEO of Willis Towers Watson Securities, recently described the InsurTech challenge in these terms:

*InsurTech is a burgeoning phenomenon that is modernising the insurance industry. It is disrupting the traditional value chain whereby insurers offer loss protection, and shifting the emphasis to risk mitigation. Incumbents face disintermediation as investors in search of higher yields pour money into insurance-linked instruments in the capital markets. And entrepreneurial businesses are targeting friction costs and inefficiencies within every aspect of the traditional value chain.<sup>29</sup>*

In this view, InsurTech is bound to disrupt the industry at all stages of the value chain, from underwriting through the final point of sale. While most examples of changes triggered by InsurTech relate to non-life insurance (such as tech-enabled driver analytics and claims handling in motor insurance, or usage-based cover where premiums are linked to specific and limited customer needs), it is not difficult to see that InsurTech may also make inroads into life insurance, thus undermining the long-held belief that life insurance is different because it has to be sold. How InsurTech could change the decision to purchase life insurance was recently spelled out in a McKinsey study, as summarised in the table below.

**Table: How InsurTech may change the purchase of life insurance**

From 	To
<ul style="list-style-type: none"> <li>Initiated by a cold call from agent</li> </ul>	<ul style="list-style-type: none"> <li>Triggered direct-to-consumer based on customer's life event</li> </ul>
<ul style="list-style-type: none"> <li>Confusing set of complex policy variations</li> </ul>	<ul style="list-style-type: none"> <li>Simple, tailored set of product options based on customer's unique needs</li> </ul>
<ul style="list-style-type: none"> <li>Blood- and urine-based underwriting</li> </ul>	<ul style="list-style-type: none"> <li>Fluids-free underwriting, informed by public and private databases</li> </ul>
<ul style="list-style-type: none"> <li>Lengthy underwriting duration</li> </ul>	<ul style="list-style-type: none"> <li>Instant underwriting, quoting and policy issuance</li> </ul>

Source: McKinsey (2017).

The illustrative examples listed in the McKinsey study underline that InsurTech may indeed generate sizeable efficiency gains. According to an older study conducted at Oxford University, many functions currently carried out by insurance professionals are near the top of the list of jobs that may be automated in the future.<sup>30</sup> While such forecasts are dire for employment prospects in insurance, they also entail severe consequences for

29 Walkiewicz (2017).

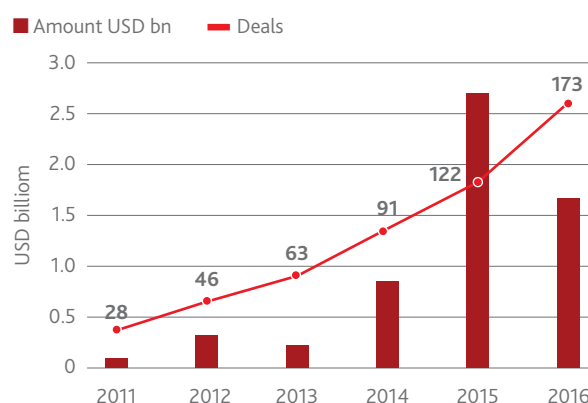
30 Frey, C.B. and Osborne (2013).

companies. Those firms that fail to harness tech-enabled efficiency gains will eventually find themselves in an ever-tighter cost and profitability squeeze. They will be leapfrogged by early adaptors of InsurTech, and before too long they may no longer be competitive.

On a more fundamental, strategic level early signs are that InsurTech could rewrite the fundamentals of the insurance business. Risk pooling based on the law of large numbers may be replaced to a considerable degree by individualised underwriting based on the exploitation of big data. Non-insurance competitors may offer products bundled with insurance features. And customers may refrain from seeking cover after having analysed their own risk characteristics and concluded that risk prevention through better risk management may be better than buying insurance. Traditional insurers would be relegated to mere utility providers; they could no longer claim to fulfil a more meaningful socio-economic role.

In light of such scenarios, a number of market participants have started to wet their feet in the waters of InsurTech, although they continue to struggle when it comes to picking the most promising strategy. In principle, they have three options. They could (i) put their chips down on in-house development by creating their own 'digital garages'; (ii) take the venture capital route by assembling portfolios of promising tech start-ups with the potential to profoundly impact their core business or at least generate an acceptable return on investment; or they could (iii) acquire (presumably at a high price) start-ups that have already developed winning technologies. In recent years, the latter two options appear to have become the ones insurers are likely to pursue. Since 2011, the number of deals has steadily increased, with the volume of these deals now firmly entrenched over USD 1 billion (Figure S1).

**Figure S1: Investments in InsurTech start-ups—number and value of deals**



Source: CB Insights.

That said, survey participants were probably right in assuming that InsurTech will not materialise, like the mythological Athena, fully formed and ready to conquer the world of insurance. To that extent, they appear to have taken note of Amara's law that says, 'we tend to overestimate the effect of a technology in the short run.' However, industry leaders should also heed—and act according to—the law's concluding sentence, which adds that we tend to 'underestimate the effect [of new technologies] in the long run.'<sup>31</sup>

31 The law is attributed to the American scientist and futurist Roy Amara (1925-2007).

## 3. The socio-economic role of life insurers

*Life insurers deliver three essential services to policyholders and society. They protect against the financial consequences of biometric risks; they provide saving and retirement solutions; and as large institutional investors, they channel long-term funds to the corporate and public sectors. Like any other business, life insurance also provides jobs for employees, either directly in insurance undertakings or indirectly in various distribution channels, such as agencies, banks and brokers.*

*The first two roles make for unique value propositions.<sup>32</sup> Retirement savings products often include an element of asset protection in the form of guaranteed investment returns or guaranteed minimum retirement benefits. Products with these features are delivering unique retirement benefits. They are distinctly different from all-purpose savings products offered by other financial institutions. No matter the interest rate environment, the ability of life insurers to invest and pool risks will almost always result in insurers providing more effective options than individuals can find when they try to manage risk on their own.*

*Life insurers are also channelling substantial funds into the corporate sector and governments. Research has shown that a vibrant insurance industry is a significant determinant of economic growth, thus ensuring the prosperity of current and future generations.<sup>33</sup> And in line with their long-term investment horizons, insurers help to promote economic and financial stability.*

*This chapter benchmarks the genuine insurance activities for a number of advanced economies. While there were no conclusive trends in the protection business, insurers appear to have gained a slight foothold in the retirement solutions markets. However, the current environment is likely to make further gains a tough challenge, despite the fact that low interest rates will likely impair the income of retirees in the future and thus increase the need for insurers to provide even more retirement solutions. The protracted period of low interest rates also seems to have adversely affected the role of insurers in funding the real economy.*

To benchmark these roles, the chapter starts with an analysis of broader societal trends (such as ageing) and the current macro-financial environment characterised by ultra-low interest rates. They constitute both a threat and an opportunity. The threat is that inadequate personal savings in combination with ever longer life expectancies and fiscally strained governments will make it increasingly difficult for individuals and societies to provide for adequate retirement funding. In short, there is a growing pension gap. The opportunity is for life insurers to offer solutions that can mitigate the risks associated with the pension gap.

The analysis in this chapter builds on industry data and a sample of large life insurance companies. The focus is on five insurance markets in advanced economies: Germany, France, Japan, the United Kingdom and the United States. Each country is represented by the five largest, publicly listed life insurers. The tacit assumption is that they are by and large fairly representative of the whole industry in their particular countries.

### 3.1 The challenges of longevity risk in a low interest rate environment

*Low interest rates make it hard to accumulate adequate retirement savings, and once savings are accumulated, they constrain future retirement incomes. Increasing longevity exacerbates the challenges created by low interest rates.*

In 2020, for the first time in history, there will be more people on the Earth over the age of sixty-five than under the age of five. During the second half of the 20th century, life spans increased dramatically. Today, the average life expectancy of a 65-year-old female is higher than ever—86 years in the U.S. and the U.K., 87 years in Australia, and 89 years in Japan.<sup>34</sup> Although rising longevity is neither bad nor undesirable, providing financial security for the elderly has become a challenge in most societies. This section summarises a few salient issues related to the financial consequences of longevity risk. It shows how they are exacerbated by low interest rates, and it reviews potential solutions.

<sup>32</sup> It is, of course, understood that this unique role is also supported by regulation, which excludes banks and other financial service providers from offering an insurance contract.

<sup>33</sup> See Outreville (2013) for a comprehensive survey.

<sup>34</sup> Center for Disease Control (2015).

When talking about longevity risk, it is important to distinguish between individual and aggregate perspectives. In an individual perspective, longevity risk is defined as the risk of a person living longer than the average life expectancy of his or her cohort. Insurers call it a specific risk that they mitigate through pooling and diversification. In the aggregate perspective (insurers and public and private pension funds), the challenge of longevity risk arises from the potential misspecification of future mortality trends. This is a systematic risk that cannot be mitigated as easily as the specific risk (see Box 'Why longevity risk is challenging').

From the perspective of individuals, the financial predicaments associated with longevity risk are exacerbated by behavioural characteristics that make most people ill-prepared to cope with the burden of old age. First, most individuals are not saving enough and tend to make poor investment choices.<sup>35</sup> Second, they tend to underestimate longevity risk. Research has shown that subjective life expectations fall short of actuarial expectancies by roughly five and seven years for males and females, respectively. As a result, people tend to overestimate the value of their pension plans. They are under the impression of being better protected than actuarial arithmetic reveals, based on life expectancy and available retirement funds.

To this we must add the inconvenient implications of low interest rates. First, they make it hard to accumulate adequate retirement savings. And second, once savings are accrued, they either constrain the future retirement income stream that savings can generate or they deplete the capital very quickly if a retiree wants to sustain a specific income level. The challenges an individual may face over the life cycle are discussed in the box on 'The arithmetic of longevity risk in a low interest rate environment' in Chapter 1.

Insurers can absorb some— but not all—of these risks. They offer annuities granting policyholders periodic payments up to the time of their death, thus protecting annuitants from the financial consequences of longevity risk. In fact, the life industry has on offer a broad spectrum of different products catering for the different needs of policyholders.<sup>36</sup> Payments can be fixed or flexible (indexed, for example, to compensate for inflation or the performance of the stock market). They can be tax-deferred and they can be variable with and without guaranteed living benefits.

These products alleviate in part or in full the two most important concerns of retirees: first, having enough money to maintain a given lifestyle, and second, ensuring that they do not run out of money in retirement. In that sense, life annuities are an essential ingredient in an optimal retirement portfolio, and insurers fulfil a critical social function in providing them. However, because customers tend to underestimate longevity risk, the actual demand for annuities keeps lagging behind what might be considered a societal optimum. It will be a noble challenge for life insurers to help strengthen financial literacy and make a contribution to mitigating the financial consequences of longevity risk.

35 Chapter 7, *Saving and Retirement Security*, in National Research Council (2012) summarises the issues related to retirement saving.

36 Of course, insurers are also prepared to mitigate the longevity risk inherent in employer-sponsored pension funds and governmental social security schemes, with the solutions often taking the form of bulk annuities, longevity bonds and longevity swaps.

## Box: Why longevity risk is challenging

Covering longevity risks comes with a number of challenges that insurers must manage. When selling an annuity to the 65-year old Swiss male of our previous example, the insurer faces three risks: (i) the stochastic risk that the policyholder lives longer than expected and (ii) that the mortality risk of a population sub-sample of 65-year olds is mis-specified. These are so-called specific risks; they can be mitigated within the conventional insurance framework, i.e., through pooling and diversification.

But that is not the end of the story. In the past, insurers failed to correctly anticipate future mortality trends. Between 1981 and 2015, the mean life expectancy of 65-year old Swiss males rose from 14.3 years to 19.2 years, a gain of nearly 5 years, or more than a third. Annuity providers that underestimated this gain made losses. These errors constitute the third longevity risk. They are systematic, they have been one-sided, and they spread across all populations.<sup>37</sup>

**Table B1: Decomposition of longevity risk**

Risk	Definition	Nature	Mitigation
Volatility	The stochastic risk of individuals dying earlier or later than expected	Specific	<ul style="list-style-type: none"> <li>• Pooling</li> <li>• Diversification</li> </ul>
Mortality level	The risk of misestimating the current level of mortality for a population sub-sample	Specific	<ul style="list-style-type: none"> <li>• Pooling</li> <li>• Diversification</li> </ul>
Mortality trend	The risk of misestimating future trends in mortality	Systematic	<ul style="list-style-type: none"> <li>• Pooling and (geographic) diversification ineffective</li> <li>• Hedging and risk transfer to third parties possible but difficult and expensive</li> </ul>

Sources: CRO Forum (2010), The Geneva Association.

Not only do the factors underlying trend changes affect the population in any given country, they are also similar across countries. This renders ineffective pooling and geographic diversification; it is a systematic risk that cannot be mitigated with the conventional tools of risk management. Table 3.1 summarises the features and mitigation challenges associated with each component of longevity risk.

Despite the fact that mortality trend risk is systematic, the challenge is not insurmountable. Life insurers with a sizeable mortality protection portfolio could, in principle, use the gains due to decreasing mortality to compensate for losses due to increased longevity. In reality, however, the benefits of the protection book not being exposed to longevity risk may disappear rather quickly, and insurers must look for different approaches to mitigate the longevity risk. They typically involve risk transfers either to reinsurers or to the capital market in the form of longevity swaps and longevity bonds. In principle, investors should be interested in a financial asset that is not correlated with other financial assets, since it would create diversification benefits for the whole portfolio. However, they seem to shy away from the long duration such an asset necessarily requires, which may explain why investor demand for longevity bonds has not been overwhelming and the capacity to absorb the systematic part of longevity risk in that form has so far been limited.

That said, the potential volume of longevity risk transfer to the capital markets is not trivial. According to an IMF estimate, each additional year of life expectancy adds between 3 per cent and 4 per cent to the present value of pension and insurance based retirement liabilities, resulting in a range of USD 15 trillion to USD 25 trillion of properly discounted additional liabilities that must be reserved for.<sup>38</sup>

<sup>37</sup> Of course, trends may also change. Case and Deaton (2017) found that mortality rates amongst lower-income U.S. non-Hispanic white people without a college degree have significantly worsened compared to African-Americans. While in 1999, the mortality rates of white people were around 30 per cent lower than those of black people, they were 30 per cent higher by 2015.

<sup>38</sup> See CRO Forum (2010) for a comprehensive list of possible transfers. A slightly exotic, but nevertheless actuarially sound strategy, could also include tontines where the fraction of the population surviving its expected life span would benefit from those dying earlier. In the U.S., tontines were quite popular in the second half of the 19<sup>th</sup> century. They have since been banned in most jurisdictions of the world as immoral, but suitably modified, they could offer a valuable alternative. Milevsky (2015) among others has resurrected tontines, showing that they would always be fully funded and, due to their construction, are not subject to longevity risk.



## 3.2 Indicators for the socio-economic contribution of life insurers

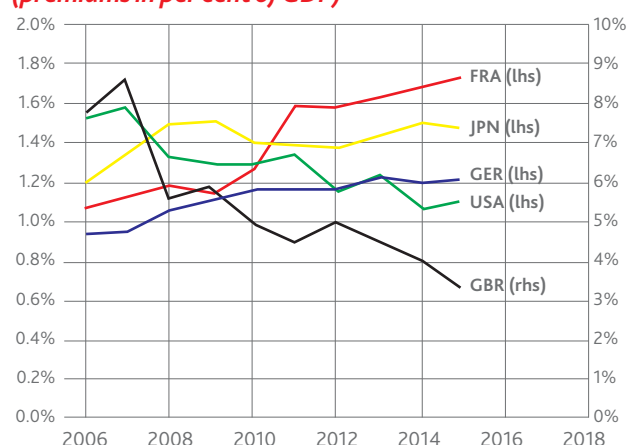
This subsection summarises selected indicators for the social and economic contribution of life insurers and their products in major advanced economies. The indicators on biometric protection and on savings/retirement solutions serve as benchmarks for the discussion of the future of life insurance in Chapter 5.

### A. Biometric risk protection

A main role of life insurers is to provide protection against the financial consequences of risks like mortality, disability and individual longevity. As these risks are idiosyncratic, i.e., independent and not systematic: they allow for insurance protection through pooling and diversification. By providing this protection, insurers significantly enhance the well-being of individuals and protect their families against financially adverse developments. In addition, as experts in risk management, insurers can help to create risk awareness, thereby contributing to risk prevention.

Figure 3.1 provides an overview of life insurance penetration rates for protection products over the past decade, i.e., how much policyholders spend on those products relative to GDP. The record is mixed. In the U.K. penetration rates declined from a very high level, and there also appears to be a decline in the U.S., which in fact started more than 30 years ago. In all other countries, protection penetration rates have increased, rising slightly in Germany and Japan and nearly doubling in the case of France.

**Figure 3.1: Penetration of protection products (premiums in per cent of GDP)**



Sources: ACLI, Axco, OECD and Geneva Association analysis.

There are many factors behind the decline in protection rates in the U.K. and the U.S. In line with the trend in declining mortality, insurers reduced rates on life protection, which contributed to declining premiums over time. This implies that the ratio could have declined without actual loss in cover. Moreover, behavioural economics has identified a number of reasons why individuals are not seeking adequate life insurance protection and may, in fact, be under-protected. In many cases, insurance is perceived to be an investment that does not offer adequate returns. It will be a noble challenge for the industry to change this perception. There are also factors that could contribute to increasing penetration rates, including higher retirement ages and an ageing workforce that is increasingly exposed to biometric risks.

### B. Savings and retirement solutions

Providing adequate and sustainable retirement solutions will be a challenge for our generation, and life insurers are bound to assume an important role in providing at least partial solutions by combining saving elements with biometric protection.

This leads to two working hypotheses to be explored more closely:

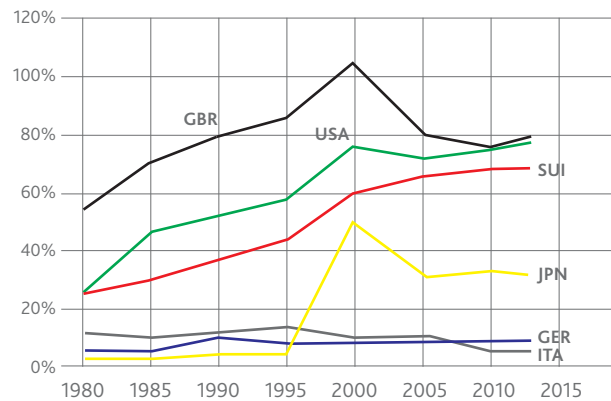
1. Over time, private retirement solution providers should be expected to play a growing role as the role of publicly provided solutions keeps shrinking, and

- 2. Retirement solutions provided by life insurers should assume a growing share in the product mix of life insurers.

Figure 3.2 depicts secular trends in the relative shares of privately and publicly provided retirement solutions. Four of the six countries depict an upward trend in privately supplied old-age benefits. The diverging developments reflect, of course, differences in attitudes towards the role of government in the selected countries. In Germany, old-age benefits have been provided by the state since the time of Bismarck. However, change is underway. In 2002, the government introduced tax incentives for retirement solutions offered by life insurers (so-called Riesters pensions). Although the annual premium equivalent of policies written under the Riesters scheme peaked in 2010, and the schemes were heavily criticised by consumer protection associations, Riesters pensions mark a step in the future of German retirement protection, where the share of privately supplied solutions will keep growing.

In contrast, the political systems in Anglo-Saxon countries always gave more weight to private solutions. Switzerland is also remarkable: there over the last 45 years, and almost in parallel to the United States, the share of privately provided solutions has tripled. Although not yet visible in Figure 3.2, in 2011 Italy reformed its pension system with the goal of gradually reducing the high reliance on public retirement funding in favour of the private sector. As a result, overall life insurance penetration has increased in Italy in the past few years. Thus, the data presented in Figure 3.2 attest to a growing role of the private sector in the provision of retirement solutions over time. Moreover, given fiscal pressures, this role is likely to continue to grow in the foreseeable future, meaning that life insurers will have an increasingly important part to play in ensuring retirement security.

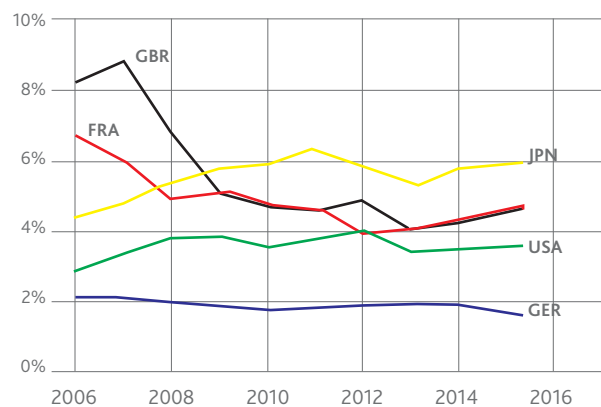
**Figure 3.2: Private relative to public old-age benefits**



Source: OECD and Geneva Association analysis.

The contours of the likely future role of life insurers are captured in the next two figures. Figure 3.3 depicts the penetration rate of savings products (as defined above). Short-term trends are slightly positive in the U.S. and Japan. That this is true in the latter is particularly remarkable, given that the Japanese economy has been exposed to an ultra-low interest rate environment since the late 1990s. This could be interpreted as meaning that low interest rates *per se* are not detrimental to the acceptance of insurance-related savings products. People must save for retirement, and well-designed products will always meet demand.<sup>39</sup>

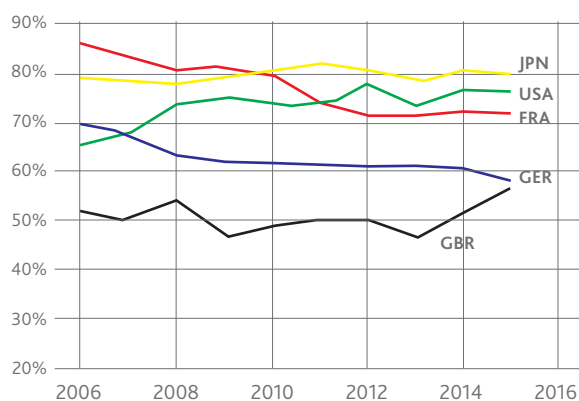
**Figure 3.3: Penetration of savings products (premiums in per cent of GDP)**



Sources: Axco, OECD, Geneva Association analysis.

<sup>39</sup> It may also reflect a specific preference of Japanese consumers. They appear to reject pure protection products in favour of products with savings components, even though the purchase of the latter may not always be economically rational, particularly in a low interest environment.

**Figure 3.4: Premium share of savings products in per cent of life premiums**

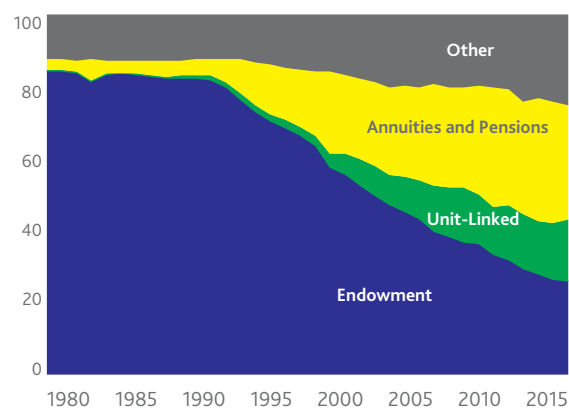


Sources: Axco and Geneva Association analysis.

However, low interest rates seem to have had an adverse impact on savings penetration rates in France and Germany (Figure 3.4). There are many reasons why this is the case. Each country started out from different initial conditions, with products offered under different regulatory regimes and with different tax incentives. And needless to say, low investment yields make these products less attractive for consumers. A tentative conclusion could be:

1. Over the long run, life insurers did indeed gain a foothold in the retirement solutions markets (Figure 3.3).
2. The current low interest rate environment is likely to make further gains in this area a tough challenge (Figure 3.4).
3. Continued low interest rate pressure could force life insurers to move away from their unique role in the delivery of retirement savings solutions with asset protection. Consumer demand for these solutions may no longer be satisfied.

**Figure 3.5: German individual life insurance premiums in per cent of total**



Source: GDV Annual Statistics.

The importance of past decisions and the changes required now are summarised in Figure 3.5. This figure switches the perspective from annual premium flows to the stock of outstanding policies. The figure focuses on Germany, where insurers continue to be burdened with a legacy book of endowment products. In the past, these products promised high interest rate guarantees to policyholders that in the current interest rate environment and under the new Solvency II regime are becoming increasingly less viable and in many cases outright unprofitable. German insurers are therefore busy restructuring their product portfolio. The focus on increasingly unprofitable endowment products is shifting towards annuities and pensions as well as unit-linked products, a trend that is underway in many other jurisdictions as well.

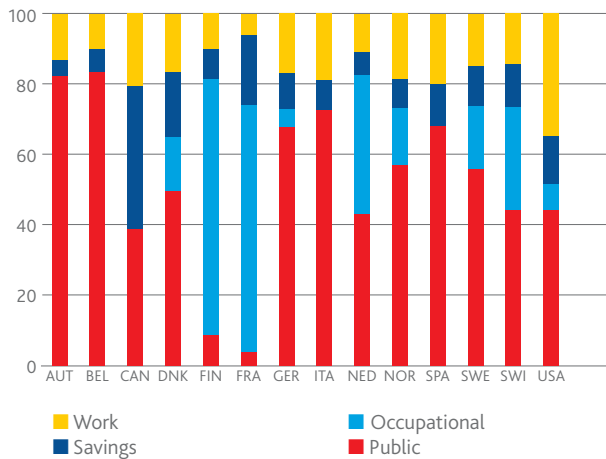
The flip side of these product adjustments entails a transfer of financial market risk from insurers to policyholders, who may not command the necessary financial literacy to make prudent investment decisions. Surveys have revealed that small investors forced to make their own decisions typically fail to diversify their assets and to rebalance their investments periodically. They are also prone to cashing out prematurely, and they tend to be poorly equipped to absorb market setbacks, which would be particularly devastating if they occurred close to, or during, retirement. In short, investment decisions are complex and prone to mistakes. As Munnell and Sundén in a study about U.S. pension plans point out, 'in practice most participants make mistakes at every step along the way.'<sup>40</sup>

40 Munnell and Sundén (2006).

## Box: Retirement systems under stress and the potential for insurance solutions

Pension systems differ across countries, and they are different in particular with respect to the funding sources available in retirement. Commonly, one talks about the three-pillar system. Pillar I is typically associated with pay-as-you-go social security systems. It is the prevalent scheme implemented in the second half of the 20th century in most advanced economies, and it continues to be the largest income source for retirees in most countries (Figure B1). Pillar II relates to employer-provided pensions. They started out as defined benefit schemes, but under increasing longevity pressure they are now being converted more and more to defined contribution schemes. Finally, Pillar III includes private retirement provisions accumulated by individuals. They often come with tax incentives, and the products for these solutions are offered in large part (but not exclusively) by life insurers (see Figure B4).

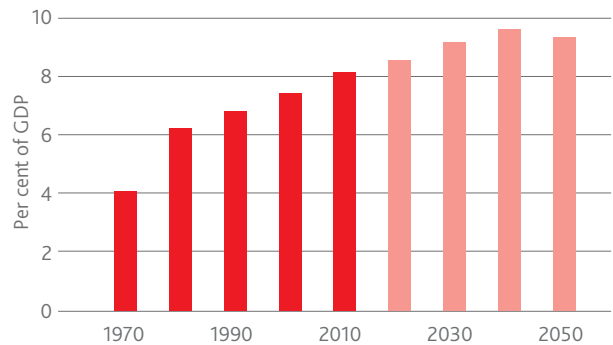
**Figure B1: Income sources of older people (2014, in per cent of total income)**



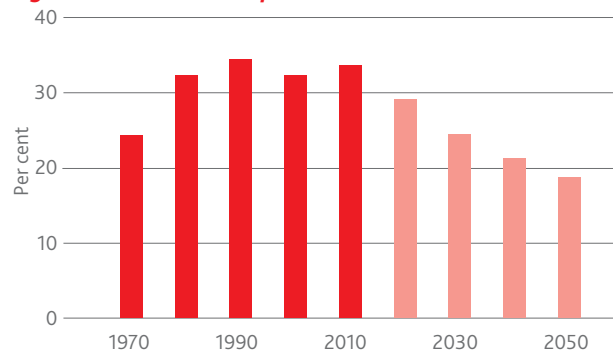
Source: OECD.

Figure B1 summarises the variation in income sources available to the elderly across a selection of OECD member states. In many countries, publicly provided pension schemes (mostly Pillar I) make up the bulk of retirement funding. They are on average 60 per cent of the total in all OECD member states and close to 80 per cent in a number of countries.

**Figure B2: Pension spending by governments**



**Figure B3: Economic replacement rates**



Sources: IMF, OECD and UN. Data after 2015 are projections.

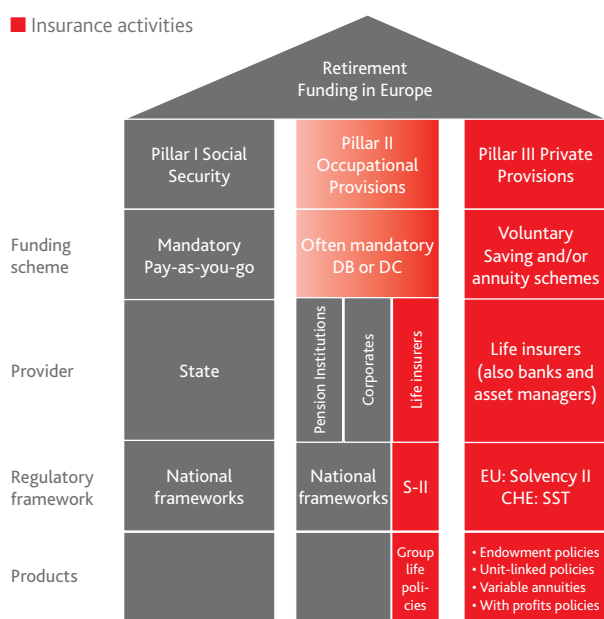
A closer look at the data and the fiscal constraints faced by governments reveals that the current pension spending by governments will likely mark a high point. Since the 1970s, public spending has grown from about 4 to 9 per cent of GDP in most advanced economies (Figure B2). To a large extent, growth in pension entitlements was caused by ageing, and in the absence of corrective measures, it would continue. However, in recent years many governments have implemented pension reforms in the form of higher retirement ages, tightened eligibility rules and reduced future benefits designed to stop and even reverse growth over time. The IMF estimates that as a consequence of these reforms by 2050 economic replacement rates in advanced economies will fall on average from 35 to roughly 20 per cent (Figure B3).<sup>41</sup>

The resizing of the government's role in providing retirement income leads to a widening pension gap. Estimates may vary, but they leave no doubt that the gap in most countries is already quite large. In a recent survey, The Geneva Association estimated the world-wide pension gap at USD 100 trillion, not counting promised pay-as-you-go benefits (which may have to be cut further in the future) and USD 41 trillion when taking

<sup>41</sup> The economic replacement rate is defined as average pension spending per individual aged 65 and older divided by GDP per capita of the population aged 15 to 64.

these benefits into account.<sup>42</sup> An even more recent study arrived at a current global gap of approximately USD 70 trillion (including pay-as-you-go systems) that, assuming unchanged policies in the future, is estimated to grow to USD 400 trillion by 2050.<sup>43</sup>

**Figure B4: The three pillars of retirement funding**



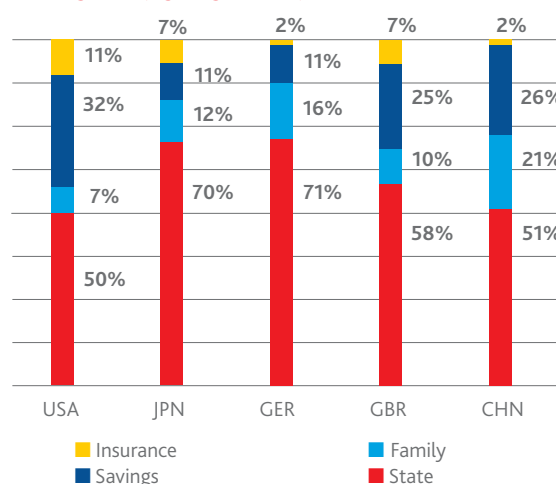
Source: The Geneva Association.

Closing the pension gap requires corrective measures on many fronts. Pension benefits will have to be redefined (and likely reduced). People will also have to work longer and save more. There can be no doubt that governments will continue to reduce the generosity of state retirement benefits in the future, leaving room for solutions provided by the private sector, including life insurers. Figure B4 provides a stylised picture of the current three pillar system in Europe. It shows that life insurers are, within the constraints of regulation, already quite active in this area.

But more can be done, in Europe and in other regions of the world. In a study of a number of advanced economies and China, Swiss Re economists found that the 'ageing wallet,' defined as annual spending on people aged 65 and over to fund retirement incomes, health and social care, and inheritances is predominantly financed through income transfers from governments and private means in the form of personal savings and family support (Figure B5). Insurance, although well established in all countries except China, plays only a small role in securing the financial needs of the elderly. An exception is the

comparatively large share of insurance spending in the U.S., which is explained by 'a relatively successful annuity market, Medicare supplemental products, and the tax benefits of whole life mortality products.'

**Figure B5: Sources of spending for the needs of people over age 65 (ageing wallet)**



Source: Swiss Re (2017).

The developments in the U.S. illustrate that there is indeed more room for life insurers to grow in the business of catering to the financial needs of ageing populations. To meet the specific challenge of low interest rates, there is a clear need to promote more private retirement savings, and once individuals have reached retirement, there is a need to protect individuals against the financial adversities of longevity risk and provide income security through their remaining lifetime. While life insurers have the products to meet the demand for retirement solutions, they will likely have to move beyond the traditional offerings of annuities and whole life mortality. In Japan, health accounts for a large and growing share of insurance spending benefitting the elderly. An innovative cancer-only critical illness plan turned out to be very successful. Japanese life insurers are operating in the country with the world's oldest population. It seems reasonable to assume that some of the solutions developed in this market would offer valuable lessons for life insurers operating in other markets as well.

42 The Geneva Association (2016b).

43 The World Economic Forum (2017).

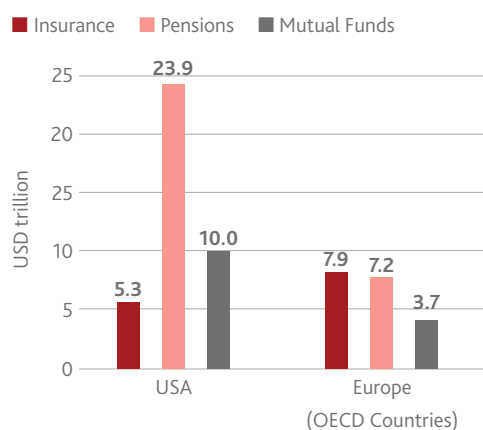
### 3.3 Funding the economy

Life insurers manage large investment portfolios and, given the long maturity of insurance liabilities, they are in strong positions to meet the long-term funding needs of our economies. However, as developments in Germany and Japan show, portfolio allocations of insurers are not immune to interest rate movements. In both countries, over a period of 30 years, funds allocated to activities in the domestic private sector declined substantially, in Japan in favour of securities denominated in foreign currencies, and in Germany in favour of sovereign debt. There is a risk that a protracted low interest environment may further erode the role of life insurers in funding the real economy.

Together with mutual funds and pension funds, insurers are the world's largest institutional investors.<sup>44</sup> According to OECD estimates, in 2016 global insurers held USD 30.8 trillion in financial assets, of which more than USD 23 trillion were held by life insurers. This compared to USD 36.0 trillion in the mutual funds industry and USD 30.4 trillion held by pension funds.<sup>45</sup> These amounts enable insurers to provide substantial funding to governments and the corporate sector. Moreover, as a result of stable premium cash flows and their long-term, liability-driven investment approach, insurers are a stable source of funding for the real economy. They play a particularly important role in meeting long-term funding needs (for example, infrastructure investments) and they contribute to financial market stability.

One should also recognise that the relative size of institutional investors differs on the two sides of the Atlantic. In the U.S. the two dominant forces are pension and mutual funds. In contrast, insurers are the largest institutional investors in Europe (Figure 3.6). As discussed in the box on retirement systems and challenges of ageing, insurers are likely to assume a more prominent role in the provision of retirement solutions going forward. Thus, European insurers may play an even more important role as institutional investors in the future.

**Figure 3.6: Total investments of insurers, mutual funds and pension funds (2015)**



Sources: OECD, EFAMA, The Geneva Association.

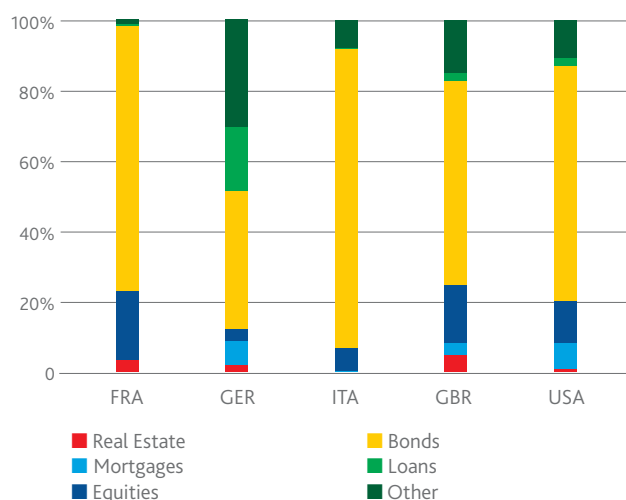
Figure 3.7 summarises the structure of insurance investments in five advanced economies (long-term trends in the investment portfolios of German and Japanese life insurers are depicted in Figures 3.9 and 3.10). The portfolio allocations reflect the lessons learned from the bursting of the dotcom bubble in 2001. When equity markets declined sharply, insurers not only incurred losses on their equity holdings (which in some cases exceeded 20 per cent of portfolios), the ensuing low interest rate environment also drove up the value of liabilities, leading to a sizeable mismatch in assets and liabilities. These developments fostered a prudent and well-aligned asset liability management, which was underpinned by a liability-driven investment (LDI) approach.<sup>46</sup> It resulted in a significant de-risking of insurance balance sheets, with a sizeable reallocation of portfolios in favour of fixed income securities.

<sup>44</sup> Institutional investors are defined as non-bank institutions or individuals that trade financial securities in sufficiently large volumes to receive preferential treatment and lower commissions. As presumably knowledgeable investors, they are also not sheltered by consumer protection laws geared to smaller retail investors.

<sup>45</sup> OECD (2015). The data refer to all OECD countries, plus the two non-OECD countries Russia and Latvia.

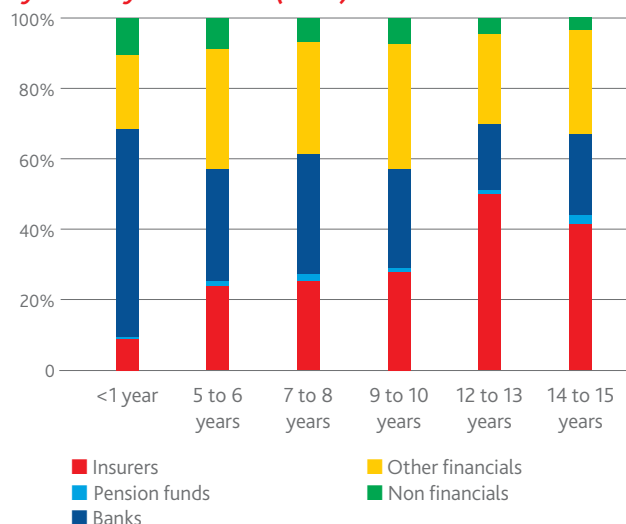
<sup>46</sup> The LDI-approach differs from an asset-driven investment strategy that pursues the goal of outperforming selected benchmarks or specific return targets.

**Figure 3.7: Structure of investment portfolios across countries (2015)**



Sources: OECD, NAIC.

**Figure 3.8: Euro area holdings of debt securities by maturity and holders (2016)**

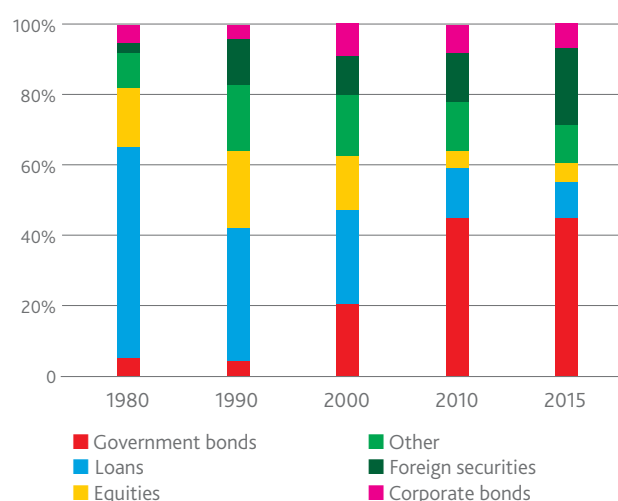


Source: ECB.

The LDI approach recognises three factors that separate the investment objectives of insurers (and pension funds) from the objectives of other asset managers.

- Life insurance liabilities tend to be long-term, with maturities often exceeding several decades.<sup>47</sup> As shown in Figure 3.8, banks hold more than half of all debt securities with maturities lower than one year, whereas insurers tend to hold securities with much longer maturities.
- Insurance liabilities tend to be illiquid. They are due only at predefined insured events, and early redemptions or surrenders are usually penalised. Thus, rapid cash drains typically seen in bank runs are unlikely in the insurance sector.<sup>48</sup>
- Because payouts to policyholders are tied to insured events, they tend to be independent of economic and financial cycles. This makes the investment behaviour of life insurers less pro-cyclical than that of other large investors, including banks. Life insurers are less likely to liquidate assets at times when other investors are forced to sell.<sup>49</sup>

**Figure 3.9: Japanese life insurers investment portfolios**



Source: The Life Insurance Association of Japan.

47 See Figure 2.10.

48 However, there are a couple of jurisdictions where regulation and established practice allow for near or entirely penalty-free surrenders.

49 This was documented in The Geneva Association (2016a). One could, of course, construe stress scenarios in which insurers would also liquidate large proportions of their financial assets over a short period. But even under such hypothetical scenarios, the pro-cyclical impact of forced asset sales by the whole insurance sector would be comparatively small.

**Figure 3.10: German life insurers investment portfolios**

Source: GDV.

In Figure 3.10, a number of asset classes were consolidated to reduce clutter: mortgages include mortgage bonds, government bonds include loans to states and bonds included in funds, corporate bonds include loans to companies, and equity shares also include participating interests.

The allocation to broad asset classes (as reported in Figure 3.7) has been fairly stable since 2008; it does not reveal a discernible interest rate sensitivity.<sup>50</sup> The picture changes, however, when one looks further back in history, as illustrated by the portfolio reallocation of Japanese life insurers in Figure 3.9. Between 1980 and 2015, the share of loans in the portfolios shrank from 60 to 10 per cent. At the same time, the share of government bonds expanded from 5 to 45 per cent, a growth that picked up sharply after 2000 when the government incurred a swelling debt burden to stimulate the economy. In insurers' portfolios, government securities replaced corporate bonds, which is another way of saying that Japanese insurers withdrew from funding the real economy in favour of the government. Also striking is the growing share allocated to foreign securities. This potentially increased foreign exchange risk, although some or all of that risk may have been hedged or (as in the case of unit-linked products) passed on to policyholders.<sup>51</sup>

Some of these trends are also observed in Germany. As in Japan, the share of government bonds held in the investment portfolios of German life insurers more than doubled after the year 2000 (Figure 3.10). This, of course, was not due to low interest rates but to deficit spending in the wake of the Great Financial Crisis. It was also the result of solvency regulations that kept capital charges on sovereign debt at zero, thus providing an incentive for insurers to hold sovereign debt instruments at the expense of other securities. The result was the same as in Japan: a declining role of German life insurers in support of private sector activities, as evidenced in the strong decline of mortgage lending (mortgages including mortgage bonds) and in lending to banks. In other words, the German government was rather successful in displacing or crowding out the private sector. To the extent that government spending went to consumption, such crowding out may have actually reduced the long-term growth potential of the German economy. One should also allow for the possibility that some changes in portfolio allocation may be attributed to a search for higher yield. In Germany, the allocation to presumably higher-yielding corporate bonds nearly doubled from 2.4 to 4.2 per cent between 2011 and 2015, a period characterised by ultra-low interest rates. And Japan entered, and never escaped, the low interest rate environment since the 1990s, which is the time when the allocation to foreign securities began. Thus, it appears that low interest rates had a discernible impact on the portfolio allocation of Japanese and German life insurers. Notwithstanding the limited sample, it is fair to expect investment yield management to assume growing importance in other advanced economies as well, should the low interest rate environment last much longer.

50 More granular data on annual allocations may tell a different story, but they are not available on a consistent cross-country basis.

51 Japanese insurers substantially increased holdings of financial derivatives after 2010, when the foreign securities position started to grow strongly again.



**To sum up:**

1. The long maturity of liabilities places life insurers in a good position to hold illiquid assets with long durations. It makes them, in principle, prime contributors to the long-term funding needs of our economies. Many governments in advanced economies suffer from a lack of funds to finance long-term infrastructure projects, and banks appear to be withdrawing from long-term lending. Thus, life insurers could potentially play a growing role in funding long-term investments and helping economies achieve sustainable growth.
2. However, as long-term developments especially in Germany and Japan show, the investment strategies of insurers are not immune to the challenges raised by low interest rates. They may result in a search for higher-yielding assets and in the withdrawal from certain domestic lending operations, as documented by the portfolio re-allocations in favour of securities denominated in foreign currencies in Japan. And the explosive growth of sovereign debt may crowd out private sector securities on insurance balance sheets, as observed in the case of Germany. Such developments should be monitored carefully if one does not want to jeopardise the role of life insurers as providers of the real economy's long-term funding needs.
3. Constant, contractually agreed premium inflows and liability-driven investment strategies make life insurers stable actors in the universe of institutional investors. Their portfolio allocations are less pro-cyclical and more stable than that of other large investors. The insurance sector as a whole contributes to financial stability.

**3.4 Assessment and outlook**

The supply of and demand for life insurance products appears to show some degree of interest rate sensitivity. Based on a sample of large life insurers in advanced economies, the market volumes of savings and retirement related products appear to have decreased in most countries. Only in Japan has the savings penetration rate increased slightly despite the fact that the country has been exposed to a low interest rate environment for decades. This suggests that low interest rates are not

necessarily detrimental to the acceptance of insurance-related savings products. People must save, and life insurers have a role to play in meeting this demand.

Low interest rates made the supply of savings products with guarantees in excess of market yields an unattractive offer. Insurers responded by adjusting guarantees on new products to the 'new normal' and emphasising unit-linked products. These developments are particularly pronounced in Germany, but trends are similar in other countries. The strong emphasis on unit-linked products entails a transfer of investment risk away from insurers to individual policyholders. In the absence of professional support, these individuals are not necessarily well-equipped to manage and absorb this risk. This may contribute to policyholder vulnerabilities at some point, which could cause reputation risk for life insurers at some point.

More worrisome is the risk that continued low interest rate pressure could force life insurers to move away from their unique role in the delivery of retirement savings solutions with asset protection.

Over the long term, investment portfolio allocations of life insurers appear to have been quite sensitive to interest rates. German and Japanese life insurers allocated a larger share of their portfolios to sovereign debt and foreign securities, respectively. It suggests that a prolonged period of low interest rates may, at least at the margin, impair the sector's ability to provide long-term funding for the domestic economy. It remains to be seen whether these were responses specific only to these countries or whether they are also true for other economies.

Given the foreseeable retrenchment of the welfare state in support of the elderly, life insurers are well prepared to assume a growing role in the area of retirement solutions. They offer a broad spectrum of protection against biometric risks. And they can combine longevity risk protection with retirement solutions that also shelter policyholders from large financial market turbulences. Of course, insurers cannot promise higher investment returns than what the market will bear. But they can harness economies of scale when managing diversified portfolios. And based on their long-term investment approach, life insurers are arguably better equipped to shelter customers against market setbacks than individuals on their own.

## 4. The future of life insurance

While the interviews allow the conclusion that industry leaders agreed on three broad objectives on which the life insurance industry has to deliver in order to successfully tackle the future, they left open which business model would be the most promising one to pursue these objectives. They agreed that the socio-economic role of life insurance would remain central, that insurers need to adopt new technologies more quickly to better realise efficiency gains, and that distribution will have to become even more efficient and customer-engaging while balancing the needed value of expert advice. It remains to be seen whether the industry will continue to evolve along a traditional, evolutionary path, or follow a disruptive, 'digital first' transformation, or choose to partner with new technology firms in a cooperative approach. That said, it is clear that for the life insurance industry, it is imperative that customers continue to see value in products offered. Failing to reach this goal would put at risk the socio-economic role of life insurance at a critical time when ageing societies face a growing need to access sustainable retirement solutions.

### 4.1 Three points of agreement

1. **The socio-economic role of life insurance will remain central.** Executives agreed that the socio-economic roles now played by life insurance (as detailed in Chapter 3) will remain important in the future and that insurers will be central in their delivery. But there was also concern whether insurers would be able to maintain trust with a broad variety of stakeholders (policyholders, governmental policymakers, and regulators) needed to ensure this outcome. In particular, there will have to be an intensified dialogue between life insurers and policymakers about how to provide retirement benefits for an ageing society (that is exposed to longevity risk) in a low interest rate environment that exacerbates widespread shortcomings in retirement funding.

*'Insurers' future is in the provision of protection against biometric risks and the management of risks through retirement.'*

*'The status of government balance sheets means we will see a continued push towards Pillar II solutions.'*

2. **Life insurers need to adopt new technologies more quickly to better realise efficiency gains.** Although cost reduction and efficiency programmes are well underway, there was unanimous agreement that life insurers should become more efficient in the future. There was an expectation that the use of digital technology and partnering with InsurTech firms will help bring costs down, but the extent to which this will be possible was seen as being constrained by the complexity of the in-force and legacy business. To bring cost down any further, life insurers will need to simplify their business and make access easier for their customers. Simpler and presumably also more cost-effective products should go a long way towards alleviating the often held perception that insurance is expensive and renders uncertain policyholder benefits.

*'The holy grail is simplicity.'*

*'We need to correct the perception that insurance is expensive.'*

A number of European survey participants were also expecting more consolidation in still highly fragmented insurance markets. According to the industry trade federation, Insurance Europe, there were about 3,600 insurance and reinsurance companies active in Europe in 2015; and more than 7,000 licensed insurance operations were overseen by national authorities on the basis of freedom of services.<sup>52</sup> These numbers suggest that the potential synergies to be harvested through intra-state and cross-border consolidation could indeed be considerable, although history is littered with transactions that failed to generate tangible benefits. Consolidation will certainly not change the economics of business models that have become unattractive because of the current low interest rate environment.

*'There will be more concentration. Some markets in Europe have far too many insurers.'*

52 Insurance Europe (2016).

3. **Distribution will have to become more efficient and customer-engaging while balancing the real and needed value of expert advice.** Many insurers saw the need for distribution to evolve into a lower cost model, bringing together the best online and offline interaction and combining robo- and human advice to deliver a better value proposition for customers. However, other insurers were hesitant as to the speed with which this would change. And most did not see a significant move any time soon to direct distribution where consumers 'buy life insurance' on their own initiative. Owing to the low engagement of consumers, executives believe that life insurance still needs to be advised and actively sold to individuals. In this view, digital distribution methods are at best seen as supporting existing distribution channels. One executive also opined that bancassurance, a model that achieved some popularity around the turn of the millennium, could come under greater pressure due to the coming digital transformation.

*'Distribution will merge seamlessly across many channels: retail, direct, on-line, robo-advice, and face to face advice.'*

*'The industry has to improve customer engagement and its message must get across much better.'*

## 4.2 Three points of divergence

As much as survey participants agreed on the need to become more efficient, transform the mode of distribution and, more importantly, strengthen the socio-economic role of life insurance, they left open which business model would be the most promising in pursuit of these objectives. We identified three diverging views:

1. **Some executives had a more traditional, evolutionary view of the industry's future.** In their view, life insurance will gradually change over time as distributors become digitally enabled and incumbents adapt. At the same time, strong regulations, high capital requirements, and, in general, a high degree of complexity coupled with the high costs of running life insurance operations constitute formidable barriers for new market entrants. It should also be noted that the return profiles of life insurers (measured in RoEs, for example) are low relative to other financial industries and especially relative to the expectation of potential disruptors, again making a foray into life insurance unattractive. The barriers are expected to remain high in the future and thus prevent (non-insurance) start-ups from entering the market.
2. **In contrast, a more radical view expects successful business models to go 'digital first.'** Once a product set has been successfully established and the regulatory hurdles are overcome, new entrants could quickly dominate the life insurance market supported by their stronger technology, their ability to scale quickly, and their more attractive customer engagement. In this view, traditional life insurance would run the risk of being relegated to niches (such as only providing biometric risk protection) or becoming obsolete in a short time.

3. **Yet other survey participants saw a partnership model emerging** in which incumbent life insurers and new technology firms would cooperate to create broad, more engaging customer value propositions. In that view, life insurance protection and retirement solutions could be part of broader offerings alongside other products, such as wearables. While insurers would focus on the insurance product and regulatory compliance, the chosen partners would drive technology and customer experience.

*'In the short term, we can manage the change. And we are confident that life insurance will continue to have an important social role to fulfil in the long run. The big question is: how do we get from one to the other?'*

*'There will be a noticeable impact from digital transformation, but regulation will likely thwart the disrupters, particularly in distribution.'*

Whichever business model ultimately succeeds, it is clear that they need to succeed, and succeed well, on all three 'must dos':

- Deliver on the **socio-economic role** of insurance,
- Deliver **superior customer engagement** and **superior customer value**,
- Deliver effectively against **regulatory requirements**.

On balance, survey participants saw these challenges as surmountable. They were not really discouraged about the short-term challenges caused and exacerbated by low interest rates, because 'in the short term, we can manage the change.' And they were reasonably confident that life insurance will continue to play an important socio-economic role in the future. The extent to which life insurers will fulfil this role depends on how successfully they can navigate the changes needed and make the most of the business assets at their command today—their in-force customer base, their superior regulatory knowledge, and their access to today's market and distribution channels. This vision for the future was widely shared. But the key question is, as one executive put it succinctly, 'how do we get from today to the future?'

## 5. Conclusions and policy implications

Life insurers are in the midst of adapting to a macro-financial environment that has led to widespread margin pressure. However, the broad consensus among senior executives was that the headwinds caused by protracted low interest rates are challenging but manageable. While the responses varied, depending on the specifics of the portfolios and the particulars of the regulatory environments in which insurers operate, the top priorities came through loud and clear. The industry must (i) address its cost structure and it must (ii) manage its in-force business better in the interest of its policyholders and the industry. There continues to be value in books written many years and sometimes decades ago, but it requires an effort to extract value for the remaining duration of these policies. To pursue these objectives, life insurers are streamlining and repositioning product portfolios. Efficiency programs are underway. And life insurers are striving to improve policyholder engagement by making products simpler and placing them on new technology platforms to facilitate direct customer access.

These actions leave no doubt that one priority of executives is to maintain strong insurance operations and create shareholder value. At the same time, they are also strongly committed to delivering value for policyholders. Protracted low interest rates, however, make this a difficult challenge. Products that once offered policyholders protection against biometric risks in combination with high guaranteed interest rates are no longer viable. This not only requires a product redesign (which insurers are tackling), but also an understanding and willingness on the side of policyholders to adapt to changed market conditions. However, survey participants believe that customers have yet to accept the new market realities. In other words, the demand for and supply of life insurance products has still to find an equilibrium commensurate with the current low interest rate environment.

If customers do not see value in product offerings, the acceptance by the public of the socio-economic role of life insurance may be at risk at a time when ageing societies face growing needs to access sustainable retirement solutions. Through the pooling of longevity risks and a disciplined, liability-driven investment management, life insurers are well positioned to mitigate at least part of the financial risks associated with ageing. It is precisely for these reasons that executives believe that life insurance will continue to have a valid socio-economic role in the future.

However, for the industry to be in a position to fulfil this role, policymakers must provide a conducive environment. Building blocks of such an environment may include:

- A stable macro-financial and regulatory environment that allows for long-term planning, reduces the risk of disruptive financial crises and promotes long-term savings. Although low interest rates make retirement savings difficult, many savers have yet to fully recover from the losses incurred during the Great Financial Crisis,
- Regulatory, accounting and risk management frameworks that are viable under many different interest rate scenarios and properly reflect the life insurance business model. It requires in particular acknowledging that life insurance liabilities are illiquid with very long durations. Insurers are therefore well-positioned to hold assets with a liquidity premium, thereby funding long-term investments in support of economic growth,
- The creation of new asset classes with durations that better match the long liabilities of life insurers,
- A global macro-financial and regulatory environment that allows for the recycling of savings from younger, dynamically growing emerging markets to older, slower growing economies. This could enable insurers to exploit long-term investment opportunities in emerging economies, thereby deepening their insurance markets and contributing to the sustainable prosperity of emerging economies,
- The promotion of financial literacy in the general public. For a number of reasons, people tend to underestimate longevity risk, and the actual protection cover of individuals and households tends to be inadequate, as are individual savings for retirement purposes. The deficiencies caused by under-savings are exacerbated by low and ultra-low interest rates. For these reasons, financial literacy programmes should be designed to create a better awareness of retirement financing needs and conditions. Their objective should be to close the gap between actual savings and expected retirement financing needs while paying proper attention to longevity risk.

# Appendices

## A1. The macro-financial environment

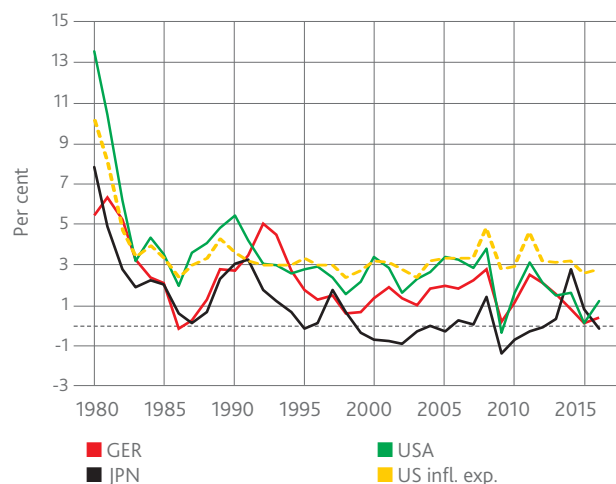
For roughly 30 years, interest rates in advanced market economies (AMEs), and to some extent also in emerging market economies (EMEs), have declined to historically unprecedented lows (Figure A1.1). The secular decline has surprised forecasters again and again and kept economists puzzled about its likely cause. Moreover, the protracted ultra-low interest rate (ULIR) environment has profound implications for households, firms and governments alike.

**Figure A1.1: Nominal yields of 10-year sovereign bonds**



Sources: ECB, Ministry of Finance Japan, St. Louis Federal Reserve, IMF.

**Figure A1.2: Inflation in three key countries; inflation expectations USA**



Sources: ECB, Ministry of Finance Japan, St. Louis Federal Reserve, IMF.

There is no monocausal explanation for the long-term downward trend in interest rates and the protracted ULIR environment. The period of the last 30 years includes the end of high inflation in AMEs and in most EMEs. It includes a number of major regional and global financial market disruptions, such as the Latin American debt crisis in the 1980s, the 1997 financial crisis in East Asia, the bursting of the dotcom bubble in 2001, the 2008 Great Financial Crisis (GFC), and the Eurozone debt crisis that started in 2010. The disruptions and crises, coupled with a persistent slowdown of economic growth, called for increasingly more aggressive measures by central banks to stabilise affected economies and the financial system.

The sections of this appendix take up different factors that led to the current ULIR environment and the question of their likely evolution in the future. In line with an analysis prepared by the U.S. Council of Economic Advisors, we will distinguish between transitory and structural factors, the latter being likely to persist for some time to come.<sup>53</sup>

### A1.1 Transitory factors

**Inflation.** For analytical purposes, it is useful to distinguish between nominal and real interest rates, with the latter typically defined as the nominal interest rate adjusted

53 Council of Economic Advisors (2015).

for inflation.<sup>54</sup> The significant decline in inflation in most countries around the world observed in the last 30 years (Figure A1.2) is obviously a main driver behind the decline in nominal interest rates. This is also reflected in survey measures of inflation expectations as represented by the Michigan Surveys for the USA in Figure A1.2. However, the decline in inflation cannot fully explain the decline in nominal interest rates, which implies that there must also have been a decline in real interest rates, a point that will be taken up in more detail in Section 1.2. dealing with structural factors.

Not only did inflation decline but also the term premium, which fell to very low and in some cases negative levels.<sup>55</sup> To the extent that term premiums reflect the sluggish recovery in the wake of the Great Financial Crisis, one should expect them to return to higher levels once macroeconomic conditions have normalised. Under normal conditions, at least long-dated interest rates should be appreciably higher than today.

*Macroeconomic policy mix.* Aggressive monetary policies in the form of quantitative easing (QE), and to a lesser degree, fiscal stimulus, were deployed to mitigate the impact of the GFC and to stabilise aggregate demand. The quantitative easing pursued in most AMEs, together with interventions by EMEs in foreign exchange markets, contributed to further downward pressures on interest rates, particularly at the longer end of the yield curve. However, these effects are expected to disappear as AME central banks exit from quantitative easing (QE) and EME authorities eventually discontinue their foreign exchange market interventions.

*Lingering impact of the Great Financial Crisis.* Reinhart and Rogoff have shown convincingly that recessions caused by financial crises tend to be severe and protracted. Consequently, recoveries from such crises take much longer than recoveries from normal cyclical downturns. Households and firms in the real and financial sectors that

had taken on excessive levels of debt in the run-up to the crisis must now restore their impaired balance sheets. In addition, the GFC and a growing awareness of heightened geopolitical instability appear to have amplified a sentiment of vulnerability, thus causing a higher degree of precautionary savings and pushing down interest rates. This is a process that will take time to run its course, particularly in the absence of adequate policy support.<sup>56</sup> During this adjustment period, financial intermediation as well as supply of and demand for new credit are subdued, a point that was examined further in Chapter 1.

Furthermore, in the wake of the Great Financial Crisis, the supply of safe assets was falling dramatically.<sup>57</sup> At the same time, the QE programmes pursued by central banks—pushing up demand for government bonds and other fixed income securities—were, and continue to be, heavily concentrated on financial assets with high credit ratings. These factors tend to exacerbate the ex-ante mismatch between demand for and supply of safe assets, which will continue to keep interest rates at low levels.

### **A1.2 Structural, long-term factors**

*Demography I: Slowing growth of the labour force.* Declining fertility rates have already led, and will continue to lead, to a declining growth rate of the labour force for decades to come. While the decline is most accentuated in advanced economies, it is nevertheless a global trend. Standard economic theory states that this development should generate an excess of capital relative to labour, depressing the return on capital and lowering the propensity to invest. This results in downward pressure on real interest rates.<sup>58</sup>

In a carefully argued paper, researchers at the Federal Reserve (Fed) conclude that demographic developments indeed led to lower real interest rates. Specifically, they found that 'demographic factors alone can account for a 1-¼–percentage-point decline in the equilibrium real

54 Economists would, of course, refer to the Fisher equation, which defines the nominal interest rate as the sum of the real interest rate and the expected rate of inflation.

55 The term premium is defined as the compensation investors require to commit to holding a bond with long duration instead of a series of bonds with short durations. This is another way of saying that the term premium reflects investor expectations about the future trajectory of short-term interest rates.

56 Reinhart and Rogoff (2009).

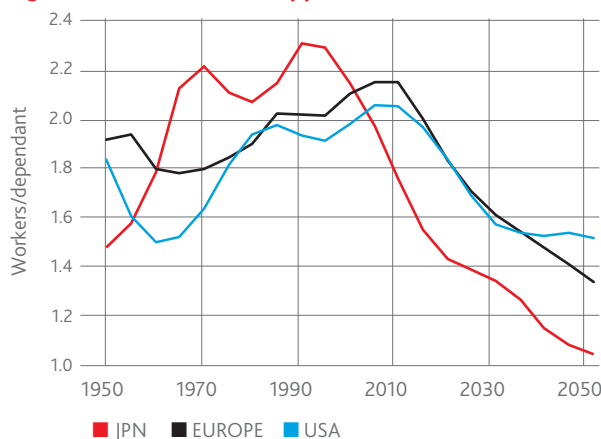
57 According to the IMF (2012a), the proportion of advanced economies with a AAA credit rating fell from 68 per cent at the end of 2007 to 52 per cent by the end of January 2012.

58 Following Samuelson (1958), real interest rates should equal population growth.

interest rate in the model since 1980.' In the 1990s, the demographic pressures on interest rates were compensated by relatively high productivity growth rates. After the turn of the millennium, when productivity growth declined in most advanced economies, the compensation effect disappeared, exacerbating the decline in real interest rates. The Fed authors believe that demographic factors are here to stay, creating the conditions for a 'new normal' of permanently lower real interest rates. This is another way of saying that the real natural rate of interest is now considered to be permanently lower.<sup>59</sup>

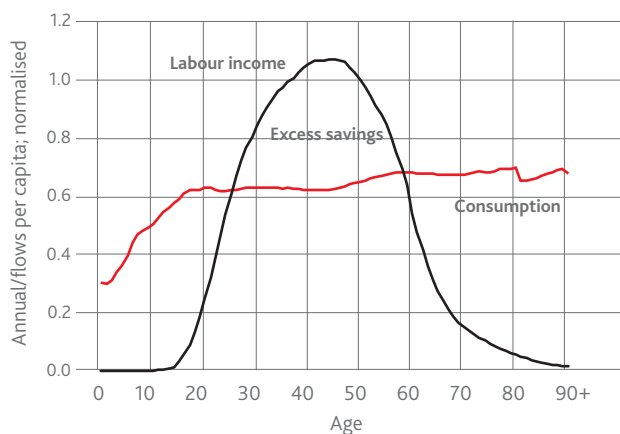
*Demography II: Reversal in support ratios.* Ageing populations across the world lead to a growing proportion of dependent non-working populations that must be supported by the working labour force. This development is summarised in the support ratio depicted in Figure A1.3. It is the ratio of the working population (numerator) to non-working dependents (denominator).<sup>60</sup> Support ratios have currently peaked in Europe and the U.S. Economic theory says that in the absence of positive supply-side shocks due to technological progress, for example, this development could have significant effects on interest rates and inflation.

**Figure A1.3: Reversal in support ratios**



Source: UN World Population Prospects.

**Figure A1.4: Consumption and income over the life cycle (annual per capita flows)**



Source: National Transfer Accounts.

Figure A1.4 depicts the well-known pattern of consumption and labour income over the life cycle of the global population.<sup>61</sup> People tend to save more in midlife and save less (or dissave in old age), but they continue to consume at a high level through to the end of their lifecycle. Hence, higher support ratios over the past

59 Economists define the real short-term natural rate of interest as a rate consistent with an economy expanding at full potential (sometimes also full employment) and stable inflation. It is, unfortunately, not observable, but all estimates point to a rather dramatic decline in recent years. For a survey of developments in North America and Europe, see Holston et al. (2016).

60 Support ratios (workers, i.e. people in age groups 15-64) relative to dependents (people in all other age groups) are the inverse of the more commonly used dependency ratios (dependents relative to workers).

61 Based on a sample of 23 countries.



decades led to increasing savings rates and decreasing consumption rates. These effects, in turn, contributed to decreasing interest rates and in particular a decreasing inflation of consumption prices.

Arguing in a monetary policy framework, research conducted at the Bank for International Settlements concludes that, at a global level, more slowly growing and declining work forces will push up global inflation 'by around four percentage points on average between 2010 and 2050.' The authors conclude that 'central banks might well have to raise real interest rates more aggressively than in the recent past to avoid higher inflation.'<sup>62</sup> These findings seem to corroborate work done by Goodhart and Pradhan.<sup>63</sup> They also argue that a more slowly growing or declining working population across the globe will lead to higher real wages, higher inflation and higher nominal, and perhaps, higher real interest rates.

*Sluggish productivity growth.* For a number of years now, total factor productivity growth has been on a declining trend across most advanced, emerging, and low-income economies.<sup>64</sup> The reasons for this development are not clear. In an exhaustive study, Gordon proposed that the big innovations that drove growth for much of the 20th century have simply run their course, that today's innovations are more incremental than transformative, and that expectations of accelerating growth fuelled by the coming Machine Age (or Fourth Industrial Revolution) are unlikely to materialise.<sup>65</sup> In light of the structural headwinds created in particular by the Great Financial Crisis, Adler et al. are also sceptical about a swift return to higher productivity growth rates. Most long-term forecasts seem to reflect such pessimism, which would indicate that interest rates will likely stay low for a considerable period.<sup>66</sup>

*The global savings glut.* In 2005, Bernanke put forward the now famous 'global saving glut' hypothesis.<sup>67</sup> It claimed that global 'excess savings' were primarily the result of saving and investment patterns in Asian EMEs and oil producing countries. In an update ten years later, Bernanke saw grounds for a slightly more optimistic assessment.<sup>68</sup> This optimism is based on the expectation that (i) China would move away from export dependence towards greater reliance on domestic demand, (ii) Asian countries would have fewer incentives to amass foreign reserves, and (iii) low oil prices would generate less pressure for surplus recycling. However, protracted low productivity growth in AMEs is likely to generate excess savings in the developed world, thus continuing to exert downward pressure on global interest rates for some time to come. While the savings glut narrative may explain low interest rates in the U.S., it may not extend to other countries and regions. Germany, for example, has a large current account surplus and one of the largest outflows of savings in the world. German interest rates are nevertheless lower than the rates in the U.S.

*Secular stagnation.* Somewhat related to the savings glut hypothesis is the idea of secular stagnation that Summers resurrected from the writings of Alvin Hansen, who coined the term in the 1930s during the Great Depression.<sup>69</sup> In a nutshell, Summers claims that aggregate demand is inadequate to maintain full employment, adding the twist that secular stagnation will also permanently reduce aggregate supply so that economies are stuck in a dismal low growth trap. In such a situation, only fiscal stimulus can produce aggregate demand high enough to rekindle growth and push economies towards more desirable growth trajectories.

However, a number of studies challenge the secular stagnation hypothesis. They claim that its advocates 'are misinterpreting the delayed recovery from the

62 Juselius and Takáts (2015).

63 Goodhart and Pradhan (2016).

64 As documented by Adler et al. (2017). Total factor productivity is the extra growth in total output (such as GDP) that cannot be explained by the growth in the so-called factor inputs of labor and capital, and is often considered a measure of long-term technological change.

65 Gordon (2016). However, Gordon's position is diametrically opposed to the optimism voiced for example in Brynjolfsson and McAfee (2014).

66 Mokyr (2014) claims that growth metrics designed for a 'steel-and-wheat economy' (i.e. economies that manufacture tangible goods only) are simply missing out on the productivity gains brought by financial services and new technologies. However, this is disputed by Byrne et al. (2016). See also Adler et al. (2017).

67 Bernanke (2005).

68 Bernanke (2015).

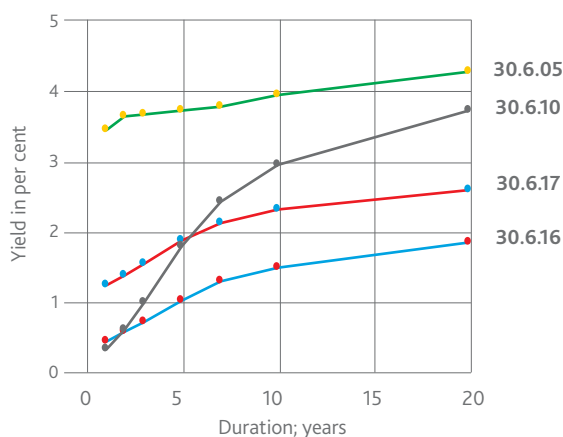
69 Summers' hypothesis was presented in a volume edited by Teulings and Baldwin (2014). Hansen's original contribution was, of course, made in 1938 at the end of the Great Depression.

Great Recession,' and conclude that the equilibrium real interest rate 'may have fallen, but not as much as the secular stagnation hypothesis would imply.'<sup>70</sup> That said, the secular stagnation hypothesis appears to describe developments in European economies, especially as far as the consequences of protracted high unemployment are concerned. In such a context, it would seem prudent to expect interest rates to stay low.

### A1.3 What next?

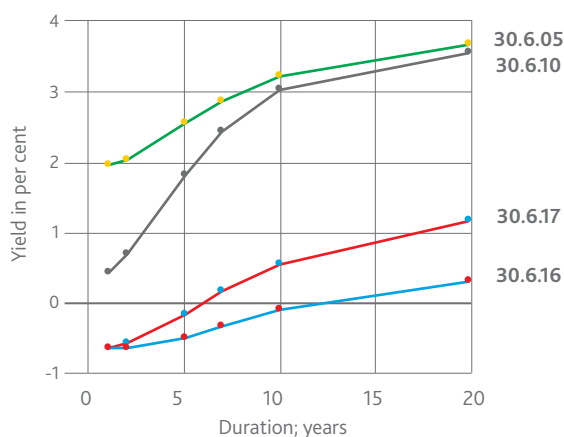
While the transitory factors affecting the level of interest rates appear to be on the retreat in the U.S., they tend to linger on in Japan and in much of Europe. The different speeds of the economic recovery are mirrored in the position of the yield curves for the U.S. and the euro area, which are depicted in Figure A1.5 and Figure A1.6 for selected points in time since 2005. Particularly for longer durations, in both the U.S. and the euro area, the low points were reached in 2016. Since then, interest rates have increased, but with distinctly different patterns in the U.S. and the euro area. While the upward parallel shift of the U.S. yield curve reflects market expectations of rising interest rates, the twist observed in the euro bond yield curve indicates that market participants expect that euro policy rates will remain low, thus keeping short duration yields in negative territory for some time, and that inflation and economic activity could accelerate at a moderate pace in the future.

**Figure A1.5: U.S. Treasury bond yield curve**



Source: U.S. Treasury.

**Figure A1.6: Euro bond yield curve**



Source: ECB.

At the same time, the structural factors, such as ageing, low productivity growth and the global savings glut, appear to have much stamina in most regions of the world. There are many reasons to support the conclusion that, on a global level, anticipated savings will continue to outstrip anticipated investments and create conditions for a 'new normal' with interest rates lower than seen in the past. Nevertheless, general statements about the persistence of ultra-low interest rates must be carefully evaluated in the context of economic developments and broader macro-financial conditions.

That said, the focus on structural factors has also underlined the importance of demography. So far, the search for policy instruments to mitigate the impact of demographic developments has turned out to be elusive. This puts a premium on policymakers to create an environment in support of sustainable economic growth. Measures to accelerate productivity growth and reduce political and regulatory uncertainties would go a long way towards compensating for demographic headwinds.

70 See for example Hamilton et al. (2016).

## A2 References

- Adler, G., Duval, R., Furceri, D., Celik, S.K., Koloskova, K. and Poplaski-Ribeiro, M. (2017), Gone with the headwinds: global productivity, IMF Staff Discussion Note 17/04, available at <http://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2017/04/03/Gone-with-the-Headwinds-Global-Productivity-44758>
- Aspen Institute (2015), 4 ways to address economic and opportunity inequality in the U.S., available at <https://www.aspeninstitute.org/blog-posts/4-ways-address-economic-opportunity-inequality-us/>
- Bank of England (2009) Quarterly Bulletin, Q3, Volume 49, No. 3, available at <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb090302.pdf>
- Bernanke, B.S., (2005), The global saving glut and the U.S. current account deficit, The Sandridge Lecture, Virginia Association of Economists, available at <https://www.federalreserve.gov/boarddocs/speeches/2005/200503102/>
- Bernanke, B.S., (2015), Why are interest rates so low, part 3: the global savings glut, Ben Bernanke's Blog, April 1, available at <https://www.brookings.edu/blog/ben-bernanke/2015/04/01/why-are-interest-rates-so-low-part-3-the-global-savings-glut/>
- BIS (2016a) Quarterly Review, March, available at [http://www.bis.org/publ/qtrpdf/r\\_qt1603.htm](http://www.bis.org/publ/qtrpdf/r_qt1603.htm)
- BIS (2016b) Annual Report, available at <http://www.bis.org/publ/arpdf/ar2016e.htm>
- Brynjolfsson, E. and McAfee, A. (2014) The Second Machine Age: Work, progress, and Prosperity in a Time of Brilliant Technologies, New York: Norton.
- Byrne, D., Fernald, J. and Reinsdorf, M. (2016), Does the United States have a productivity slowdown or a measurement problem? In: Brookings Papers on Economic Activity (Spring), available at <https://www.brookings.edu/bpea-articles/does-the-united-states-have-a-productivity-slowdown-or-a-measurement-problem/>
- Case A., and Deaton, A. (2017), Mortality and morbidity in the 21<sup>st</sup> century, Paper prepared for the Brookings Panel on Economic Activity, available at <https://www.brookings.edu/bpea-articles/mortality-and-morbidity-in-the-21st-century/>
- Center for Disease Control (2015), Life expectancy at birth and at age 65, available at [https://www.cdc.gov/nchs/data/16.pdf#014](https://www.cdc.gov/nchs/data/hus/16.pdf#014)
- Council of Economic Advisors (2015), Long-term interest rates: a survey, available at [https://obamawhitehouse.archives.gov/sites/default/files/docs/interest\\_rate\\_report\\_final.pdf](https://obamawhitehouse.archives.gov/sites/default/files/docs/interest_rate_report_final.pdf)
- CRO Forum (2010), Longevity: CRO briefing. Emerging Risks Initiative, Position Paper, available at <http://www.thecroforum.org/emerging-risk-initiative-2/>
- CRO Forum (2016) Low interest rate environment—When the going gets tough, the tough get going, available at <http://www.thecroforum.org/2016/12/23/lire>
- Deutsche Bundesbank (2015) Monthly Report, April, available at [www.bundesbank.de/Redaktion/EN/Downloads/Publications/Monthly\\_Report/2015/2015\\_04\\_monthly\\_report.pdf\\_blob=publicationFile](http://www.bundesbank.de/Redaktion/EN/Downloads/Publications/Monthly_Report/2015/2015_04_monthly_report.pdf_blob=publicationFile)
- Domanski, D., Shin, H.S., and Sushko, V., (2017), The hunt for duration: not waving but drowning? IMF Economic Review (2017) 65: 113, available at <https://link.springer.com/article/10.1057/s41308-016-0026-9>
- Dombret, A. (2017) The ECB's low-interest-rate policy—a blessing or curse for the economy, consumers and banks? Available at <http://www.bis.org/review/r170210d.htm>
- Duca, J. and Muellbauer J. (2013) Tobin lives—integrating evolving credit market architecture into flow of funds based macro-models, ECB Working Paper Series, N° 1581, available at <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1581.pdf>
- European Central Bank (2016b) Financial Stability Review, November 2016, available at <https://www.ecb.europa.eu/pub/pdf/other/financialstabilityreview201611.en.pdf>
- European Central Bank (2017), Financial Stability Review, May: Euro area financial institutions, Frankfurt, available at <http://www.ecb.europa.eu/pub/fsr/html/index.en.html>
- EIOPA (2016) Financial Stability Report, June, available at <https://eiopa.europa.eu/Pages/Financial-stability-and-crisis-prevention/Financial-Stability-Report-June-2016.aspx>

- Favero, C. A., Gozluklu, A.E., and Yang, H., (2015), Demographics and the behavior of interest rates, Working Paper, available at <https://www.imf.org/external/np/seminars/eng/2015/secularstag/pdf/Gozluklu.pdf>
- Frey, C.B., and Osborne, M. A. (2013), The future of employment: how susceptible are jobs to computerization? Working Paper, Oxford Martin School, available at <http://www.oxfordmartin.ox.ac.uk/publications/view/1314>
- Gagnon, E., Johannsen, B.K., and Lopez-Salido, D. (2016), Understanding the new normal: The role of demographics, Finance and Economics Discussion Series 2016-080, Washington: Board of Governors of the Federal Reserve System, available at <https://www.federalreserve.gov/econresdata/feds/2016/files/2016080pap.pdf>
- The Geneva Association (2016a) Insurance Sector Investments and Their Impact on Financial Stability – An Empirical Study, available at [https://www.genevaassociation.org/media/948960/060716\\_investment-behavior\\_complete\\_digital.pdf](https://www.genevaassociation.org/media/948960/060716_investment-behavior_complete_digital.pdf)
- The Geneva Association (2016b) The Pension Gap Epidemic: Challenges and recommendations, available at <https://www.genevaassociation.org/research-topics/global-ageing/pension-gap-epidemic>
- Goodhart, C., and Pradhan, M. (2016), Demography versus debt, Paper presented to the 15<sup>th</sup> BIS Annual Workshop, available at [https://www.bis.org/events/conf160624/goodhart\\_paper.pdf](https://www.bis.org/events/conf160624/goodhart_paper.pdf)
- Gordon, R.J. (2016), The rise and fall of American growth: The U.S. standard of living since the Civil War, Princeton: Princeton University Press.
- Gourinchas, P.-O., and Jeanne, O. (2012), Global safe assets, Paper presented to the XI BIS Annual Conference, available at [http://www.bis.org/events/conf120621/gourinchas\\_paper.pdf](http://www.bis.org/events/conf120621/gourinchas_paper.pdf)
- Haldane, A. G. (2015), Stuck, Speech delivered at the Open University, Milton Keynes, 30 June; available <http://www.bankofengland.co.uk/publications/Documents/speeches/2015/speech828.pdf>
- Hamilton, J.D., Harris, E.S., Hatzius J., and West, K.D. (2016), The equilibrium real funds rate: past, present, and future, Working paper available at [http://econweb.ucsd.edu/~jhamilto/USMPF\\_2015.pdf](http://econweb.ucsd.edu/~jhamilto/USMPF_2015.pdf)
- Holston K., Laubach T., and Williams J.C. (2016), Measuring the natural rate of interest: International trends and determinants, Finance and Economics Discussion Series 2016-073, Washington: Board of Governors of the Federal Reserve System, available at <https://www.federalreserve.gov/econresdata/feds/2016/files/2016073pap.pdf>
- IMF (2012a), The quest for lasting stability, especially Chapter 3: 'Safe assets: financial system cornerstone?', Global Financial Stability Report (spring issue), available at <https://www.imf.org/External/Pubs/FT/GFSR/2012/01/>
- IMF (2012b), The financial impact of longevity risk, Global Financial Stability Report (Spring), Chapter 4, available at <https://www.imf.org/External/Pubs/FT/GFSR/2012/01/>
- IMF (2016) Global Financial Stability Report, October, available at <https://www.imf.org/external/pubs/ft/gfsr/2016/02/>
- IMF (2017) Global Financial Stability Report, April, available at <https://www.imf.org/en/Publications/GFSR/Issues/2017/03/30/global-financial-stability-report-april-2017>
- Insurance Europe (2016) European Insurance in Figures, available at <https://insuranceeurope.eu/european-insurance-industry-database>
- Jackson, R. and Nakashima, K. (2015), Global aging and retirement security in emerging markets: reassessing the role of funded pensions, Washington: The Global Aging Institute, available at <http://www.globalaginginstitute.org/assets/client-assets/common/downloads/publications/2015-Global-Aging-and-Retirement-Security-in-Emerging-Markets-EN.pdf>
- Jobst, A. and Lin, H. (2016) Negative interest rate policy (NIRP): implications for monetary transmission and bank profitability in the euro area, IMF Working Paper, 16/172, available at <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Negative-Interest-Rate-Policy-NIRP-Implications-for-Monetary-Transmission-and-Bank-44183>
- Juselius, M. and Takáts, E. (2015), Can demography affect inflation and monetary policy? Working paper N° 485, Basel: Bank for International Settlements, available at <http://www.bis.org/publ/work485.pdf>
- Kotlikoff, L.J., and Burns, S. (2012) The Clash of Generations: Saving Ourselves, Our Kids, and Our Economy, Boston: MIT Press.

- Kunreuther, H.C., Pauly, M.V., and McMorrow, S. (2013), *Insurance and Behavioral Economics: Improving Decisions in the Most Misunderstood Industry*, Cambridge: Cambridge University Press.
- McKinsey (2017), *Digital disruption in insurance: cutting through the noise*, available at <https://www.mckinsey.com/industries/financial-services/our-insights/digital-insurance>
- Milevsky, M. A. (2015), *King William's Tontine: Why the Retirement Annuity of the Future Should Resemble its Past*, Cambridge: Cambridge University Press.
- Milliman (2017), *Corporate pension funding study*, available at <http://www.milliman.com/insight/2017/2017-Corporate-Pension-Funding-Study/>
- Mokyr, J. (2014), *What today's economic gloomsayers are missing*, available at <https://www.wsj.com/articles/joel-mokyr-what-todays-economic-gloomsayers-are-missing-1407536487>
- Moody's (2016), *Government of United States—government employee pension liabilities are moderate compared to social insurance programs*, available at [https://www.moody's.com/researchdocumentcontentpage.aspx?docid=PBC\\_1018420](https://www.moody's.com/researchdocumentcontentpage.aspx?docid=PBC_1018420)
- Muellbauer (2016) *The economic and financial situation, 'The Future of Savings' Conference Banque de France, Paris Nov. 4*, available at <https://www.banque-france.fr/sites/default/files/muellbauer-points-for-paris-nov-4.pdf>
- Munnell, A.H. and Sundén, A. (2006), *401(k) Plans Are Still Coming Up Short*, Issue in Brief 43, Center for Retirement Research at Boston College.
- National Research Council (2012), *Aging and the macroeconomy: long-term implications of an older population*, Washington D.C.: National Academies <https://www.ncbi.nlm.nih.gov/books/NBK144283/>
- Obersteadt, A. et al. (2013), *Study on the state of the life insurance industry: implications of industry trends*. CIPR Study, National Association of Insurance Commissioners, available at [http://www.naic.org/documents/cipr\\_home\\_130423\\_implications\\_industry\\_trends2.pdf](http://www.naic.org/documents/cipr_home_130423_implications_industry_trends2.pdf)
- OECD (2015a) *Pensions at a glance 2015*, available at <http://www.oecd.org/publications/oecd-pensions-at-a-glance-19991363.htm>
- OECD (2015b), *OECD Business and Finance Outlook 2015*, Paris: OECD Publishing, available at <http://www.oecd.org/finance/oecd-business-and-finance-outlook-2015-9789264234291-en.htm>
- OECD (2016), *Pensions Outlook 2016*, available at <http://www.oecd.org/finance/oecd-pensions-outlook-23137649.htm>
- Outreville, J. F. (2013), *The relationship between insurance and economic development: 85 empirical papers for a review of the literature*, *Risk Management and Insurance Review*, Vol. 16, N° 1, pp. 71-122, available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1540-6296.2012.01219.x/abstract>
- Reinhart, C.M. and Rogoff, K.S. (2009), *This Time is Different: Eight Centuries of Financial Folly*, Princeton: Princeton University Press.
- Rhee, N. (2013), *The retirement savings crisis: is it worse than we think?* Washington D.C.: National Institute on Retirement Security, available at [http://www.nirsonline.org/storage/nirs/documents/Retirement%20Savings%20Crisis/retirementsavingscrisis\\_final.pdf](http://www.nirsonline.org/storage/nirs/documents/Retirement%20Savings%20Crisis/retirementsavingscrisis_final.pdf)
- Samuelson P. A. (1958), *An exact consumption-loan model of interest with or without the social contrivance of money*, *The Journal of Political Economy*, Vol. 66, Issue 6, 467-482.
- Summers, L. (2014) *Reflections on the new 'secular stagnation hypothesis'*, VOX, CEPR's Policy Portal, available at <http://voxeu.org/article/larry-summers-secular-stagnation>
- Swiss Re (2015) *Financial repression: the unintended consequences*, available at [http://media.swissre.com/documents/Financia\\_Repression\\_pub\\_web.pdf](http://media.swissre.com/documents/Financia_Repression_pub_web.pdf)
- Teulings, C. and Baldwin, R., eds., (2014), *Secular Stagnation: facts, causes and cures*, London: Centre for Economic Policy Research (CEPR), available at <http://voxeu.org/content/secular-stagnation-facts-causes-and-cures>
- Walkiewicz, R. (2017), *Quarterly InsurTech Briefing, Q1 (April)*, WillisTowersWatson, available at [https://www.willis.com/documents/publications/Services/WCMA/Willis\\_Towers\\_Watson\\_Securities\\_InsurTech\\_Briefing\\_Q1\\_2017.pdf](https://www.willis.com/documents/publications/Services/WCMA/Willis_Towers_Watson_Securities_InsurTech_Briefing_Q1_2017.pdf)
- The World Economic Forum (2017), *We'll live to 100—how can we afford it?* Available at [http://www3.weforum.org/docs/WEF\\_White\\_Paper\\_We\\_Will\\_Live\\_to\\_100.pdf](http://www3.weforum.org/docs/WEF_White_Paper_We_Will_Live_to_100.pdf)



The Geneva Association—International Association for the Study of Insurance Economics  
Talstrasse 70, CH-8001 Zurich | Tel: +41 44 200 49 00 | Fax: +41 44 200 49 99

[secretariat@genevaassociation.org](mailto:secretariat@genevaassociation.org)