



CRO Forum – Low Interest Rate Environment

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Executive summary

The purpose of this paper is to analyze the current impact of the low interest rate environment on life insurers and propose relevant perspectives on its challenges. In that context, the focus topics are: product strategy and asset & liability management.

The structure of the paper looks first at the lessons learned from the previous crisis (i.e. Japan) and then continues with the current understanding of the situation of European life insurers, including deep dive case studies for the French and German markets. The paper concludes with toolboxes and conclusions from the lessons learned in the previous sections.

- Section 1 – Looking at the past: the market experience of life insurers in Japan is analysed to understand what happened on the markets, what were the reactions from regulators and the industry, and how does it compare to the current European market environment.
- Section 2 – Europe today: using and comparing multiple studies from international organizations, regulators and rating agencies, the paper deep dives into what is expected for European life insurers in the coming years and what appears to be the most likely challenges if interest rates stay very low. The section then continues with specific deep dives on the German and French markets.
- Section 3 – Getting prepared for the future: this section provides toolboxes for ALM and Product Management.

Introduction

The continuous drop in short term rates, driven in particular by the ECB pushing the borrowing rate negative and lowering its lending rate to almost zero, combined with the quantitative easing program, have contributed to a large decrease in medium- to long-term yields over the last years, and the whole yield curve falling to unprecedented low levels. This creates major challenges for life insurers since the yield of traditional investments insurers are used to invest in are not sufficient anymore to earn an adequate return.

In particular, this market environment is exceptionally challenging for those life insurers who carry long-term traditional life guaranteed products. If this low interest rate environment persists, life insurers that have not matched the duration of their long term products will suffer from low reinvestment yields and in the worst case will not be able to meet their guarantees.

For this reason, the current low interest rate environment across Europe attracts a lot of attention as rates seem to converge to zero and according to EIOPA and Moody's studies from 2016, the low yield environment is likely to remain the main concern in the Life insurance sector for the coming years, with some economists even believing that these low yields may be structural in nature.

This situation is fueled by loosened monetary policy by several central banks like ECB, BoJ, SNB, and the FED. The latter one has already limited quantitative easing and introduced one rate hike of 25bps at the end of 2015 and a similar one in December 2016 but is still hesitant to increase rates too fast, fearing adverse market movements following such a step even though economic data would justify such a move. Everything points to a persisting current low interest rate environment in the short term. Insurers are well advised, if they have not already started, to implement measures to address this situation.

In fact, what could happen if insurers do not adjust to the massively changed market environment can be observed to some extent by looking at the situation in Japan. During the late 90s early 2000s this had led to the insolvency of some companies and massive regulatory interventions in Japan. Parallels to Europe's situation can be drawn, and is most striking if you compare the European and Japanese government yields and swap rates. Even though the rate of decline in the 90s was higher in Japan than in Europe, the rate at which Japanese entities started to stumble has been already reached in Europe and even surpassed in some cases in the last couple of years.

Given the situation described above, the current low interest rate environment was identified as being a major risk by the members of the CRO forum and it was decided to form a working group in order to discuss and analyze this topic in greater detail.

There are three main ways in which a low interest rate environment poses a challenge to life insurers, a new business issue, and, depending on the nature of the insurer, two different types of value in force issues.

1. There is a new business issue. Traditionally, insurers provide 'guaranteed' products ('insuring' savings). Guarantees typically amount at least to 'money-back' guarantees. These guarantees need to be delivered by investments. To the extent that traditional investments generate negative returns, these products are no longer feasible. Risk free rates are now around zero out to at least ten years maturity. More risky credit assets may still promise a positive fixed yield, but the risks related to expected default and downgrade losses have to be taken into account and shareholders need to be compensated for taking this credit risk. In addition, some regulations like Solvency II

impose high capital costs for bearing spread risks on fixed income, only partially compensated by a volatility adjuster. Finally, the higher the maturity of the guaranteed product, the more difficult it becomes to find fixed income assets with attractive returns. In total, this provides little / no room for guarantees.

2. There is a 'value in force' issue for life insurers carrying a large book of very long-term business. This business was priced on long-term reinvestment assumptions often many years ago. Numerous insurers could not or have not hedged the corresponding interest-rate risk. Therefore, the yield on traditional investments does not meet the historical assumptions. This results in losses if / when assumptions are adjusted and / or yields turn out lower than expected.
3. There is also a 'value in force' issue for life insurers that carry a large book of 'bank-like' guarantees (immediate liquidity). As long as interest rates fall, low running yields can be financed from investments. But if interest rates no longer fall, or, worse, suddenly rise, insurers face losses. Additionally, clients may lapse their products, since the yield on new products may be higher than the yield on existing products with a legacy of losses.

Regulatory and accounting treatments typically provide some temporary buffer to recognize these issues. Economic reality warrants that the time be optimally used. Recovery and resolution solutions can damage the reputation of the whole sector.

When the going gets tough, the tough get going. The objective for the paper is to provide qualitative assessment on the impact of low rates on ALM and life product management strategies and build-up a list of potential topics to explore. Most insurers have already started to implement measures, but optimizing the toolboxes must remain a top-priority.

To do so, we begin by examining actions that have historically been taken by insurers in Japan, who faced a similar low rate environment earlier. We then survey actions that have been taken in Europe. We conclude with an assessment of the various toolboxes, notably investment and product management.

1 Looking to the past

In the midst of the economic stagnation and prolonged low interest rate environment in Europe, mainstream media, politicians and economists often cite the economic history of Japan and suggest that 'lessons can be learned' to help find solutions to the difficulties faced by Europe today. While studying the past and finding similarities with a situation today is helpful, the reader should bear in mind that we are dealing with a very complex and dynamic system.

Bearing in mind the limitations of using the economic history of Japan as a case study, it is nevertheless a worthwhile exercise as it may provide us with a view of potential pitfalls and related likely impacts on the insurance industry. Indeed, some of the measures taken in Japan could prove effective and therefore should be taken into consideration when defining the response of insurance companies in Europe.

1.1 Japan – a case study (the macro-economy)

Whilst Japanese stock markets appear somewhat less volatile than the European markets, they have experienced a decrease of a much higher magnitude. The predawn of the shock to the economic success of post-war Japan can be traced back to the late 1980s, which was marked by massive and – as it turned out – unsustainable growth in real estate and stock markets. By 1990, residential property prices in the 6 biggest cities in Japan reached 225% of their 2010 price level¹. From 1985 to 1989, the Nikkei equity market index went up by close to 325% [1], but just 10 years later lost most of its value (see Figure 1). The Japanese stock exchange has still not recovered to its peak of the late 1980s.

Figure 1: Japanese stock exchange, development of the key index² (1980 – 2000)



The next similarity to European economy is price stability. Following a period of inflation during the 1980s, Japan enjoyed relative price stability over the previous 25 years (see Figure 2). Prices fell in recession or during periods of improvement in productivity or terms of trade, increased during cyclical

¹ Based on information from Japan Real Estate Institute

² The Nikkei-225 Stock Average is a price-weighted average of 225 top-rated Japanese companies listed in the First Section of the Tokyo Stock Exchange.

booms or when oil prices increased [2]. Analysis of the causes of price stability in Japan and Europe is beyond the scope of this paper, so the comparison remains inconclusive.

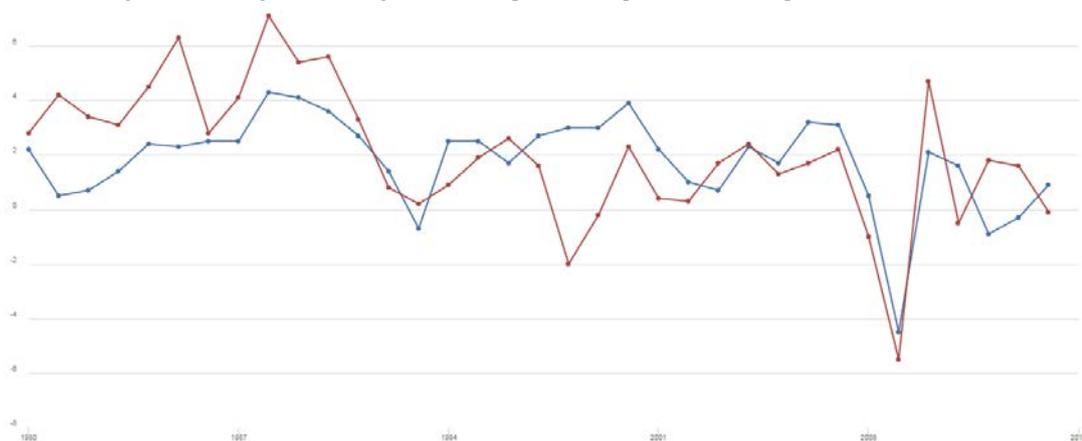
Figure 2: Consumer Price Index in Japan (1980 – 2014)



Source: Federal Reserve Bank of St. Louis

Trends in the growth of the GDP in today’s Europe and past Japan also seem to be similar. The pace of moderate growth of the Japanese economy fell in the early 1990s and has since not returned to the pre-1990 levels. With the exception of the 2008-2009 collapse and following rebound in 2010, the growth of GDP has fluctuated below the annual rate of 2.5%. The Japanese economy has become synonymous with a state of stagnation (see Figure 3). Amongst other things, this can be traced back to a decline in the working age population. This is exacerbated by a population that is ageing even faster in Japan than in Europe.

Figure 3: Annual growth of the gross domestic product in Japan (red) and Europe (blue) (1980 – 2015)



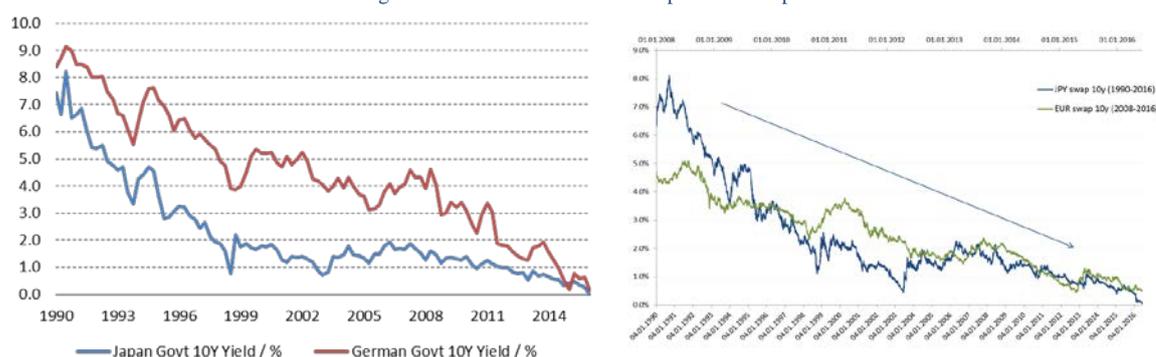
Source: The World Bank, national accounts data

In response to the 1990 asset price collapse, loose monetary policy (which had already been targeting low interest rates at that time) was supplemented by expansionary fiscal policy, both intending to stimulate economic growth. Despite (or arguably because of) those interventions the economy has not grown again at the pre-1990 pace. What has been achieved includes a steady decline in the market

rate of Japanese government debt (see Figure 4) and rapidly growing public debt (reaching 230% of the GDP in 2015³).

Lastly, the current low interest rate environment now being experienced across Europe is exactly the same as Japan has experienced since the late 1990s. A quick glance at the graph showing development of the ten year swap rate for both currencies (see Figure 4) confirms the similarity. Both rates seem to converge to zero.

Figure 4: Interest rates decline in Japan and Europe



Source: Bloomberg

Innovation and growth in the working age population, which typically boosts production growth, have been less and less noticeable in Japan since the 1990's. Periods of large appreciation of JPY lowered production costs (as imported materials became cheaper) but put negative pressure on industries focused on export. Following the collapse in asset prices, heavily indebted Japanese corporations focused on de-leveraging rather than investing. Cheap post-1990 capital circulated back into the banking system. The expansionary fiscal policy supported huge public spending, which created interference with market forces.

It is no surprise that under the aforementioned conditions, sustainable growth of the Japanese economy has simply failed to materialise whilst at the same time, the unprecedented low interest environment has ended up persisting for decades.

³ Ministry of Finance, Japan

1.2 Japan – a case study (impact to the insurance industry)

Operating in such a dire economic environment, life insurance companies not only became less and less able to offer profitable and attractive savings products but they began experiencing deteriorating economic value and profitability of their existing books of business. During the 1980s–1990s, the Japanese life insurance industry had written long dated participating business, deferred and pay out annuities promising customer rates up to 6%, with an average in-force rate of around 3.5% [1].

The rapid decline in interest rates in the 1980s induced companies to invest in stock markets, which subsequently also faced a downturn when the stock market bubble burst in 1989. The insurers also faced significant losses in foreign currency holdings in the mid-1980s, following a large appreciation of the yen. Surprisingly, insurers continued to offer guarantees to policyholders in the order of 5.5% until the mid-1990s, amid fierce competition from government-sponsored financial institutions [3].

The Japanese insurance companies having the highest asset-liability gaps begun facing ‘negative spreads’ as their reinvestment risk started to materialize. Insurers eventually had to decrease their guaranteed rates. In spite of such reductions, insurers still struggled as their in-force block with high guaranteed rates gradually matured or were surrendered, in particular in the case where there were no early surrender penalties. The companies which experienced high lapse rates (30% or more, because of group policies surrendered by companies) went bankrupt.

Consequently, seven life insurance companies were liquidated between 1997 and 2001 [4] (see Figure 5).

Figure 5: Insolvent Life insurers in Japan

Year	Company	Asset at insolvency	Net Asset at insolvency
1997	Nissan	2,100	(303)
1999	Toho	2,800	(650)
2000	Daihyaku	2,100	(318)
2000	Taisho	200	(37)
2000	Chiyoda	3,500	(595)
2000	Kyoei	4,600	(690)
2001	Tokyo	690	(73)

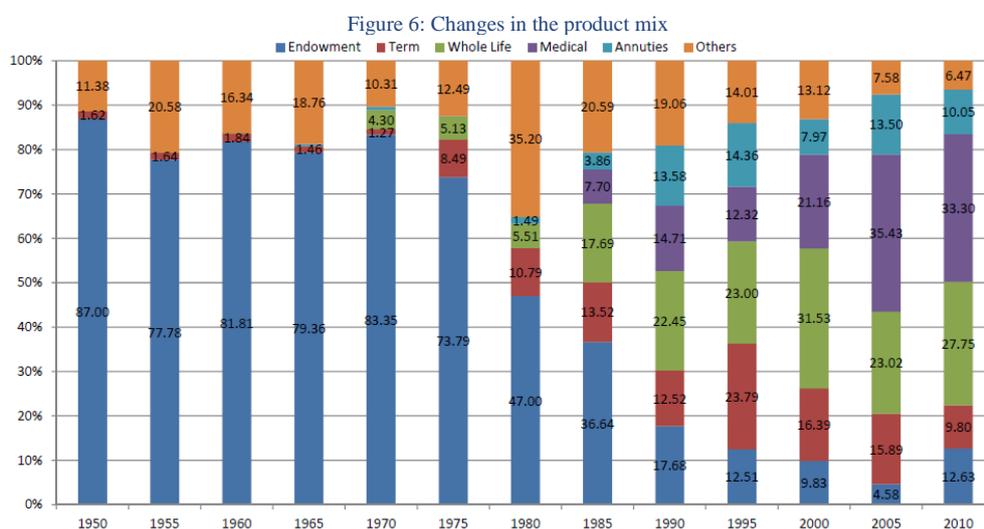
Source: The Institute of Actuaries of Japan [4]

The assets of the seven failed companies amounted to 8.6% of total life insurance assets in Japan in 2000. The impact on financial markets and the real economy remained contained. Altogether, the seven failed insurers had negative equity of JPY 2.68 trillion, or 0.5% when measured in terms of Japan’s GDP in the year 2000. No public money was used to bail out the companies. However, policyholders faced an average 10% loss in savings as the rest was borne by the industry-funded Policyholder Protection Fund [3].

1.3 Japan – a case study (response of the insurance industry)

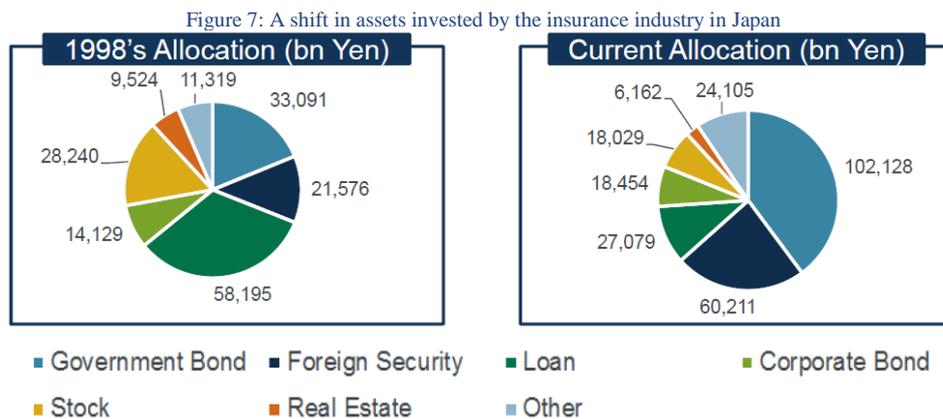
A combination of changes in product mix, asset allocation and operations efficiency accompanied by regulatory changes, constituted the response of the industry to the new economic reality.

- Life insurance companies had to find ways to offer attractive products and remain profitable under entirely new market conditions (see Figure 6).
- Accident and health (medical insurance) products began gaining importance, often with some (low) cash value offered as a complementary proposition to the low guaranteed interest rates products.
- Fixed or variable annuities, often denominated in foreign currencies, represented another area of growth.
- Most notably, lowering the guaranteed levels of the financial performance of their savings products and introducing early surrender penalties became a norm.
- Where guarantees remained relatively high, they were no longer fixed and became in some way linked to changes in the market rates.
- Where rates remained fixed, the products were offered denominated in foreign currencies (this could be then matched by investing in foreign assets – see below).
- Market value adjustments were introduced where surrenders were not explicitly penalized.
- Shift of asset allocation from loan and equity to Japanese government and foreign bonds was observed.



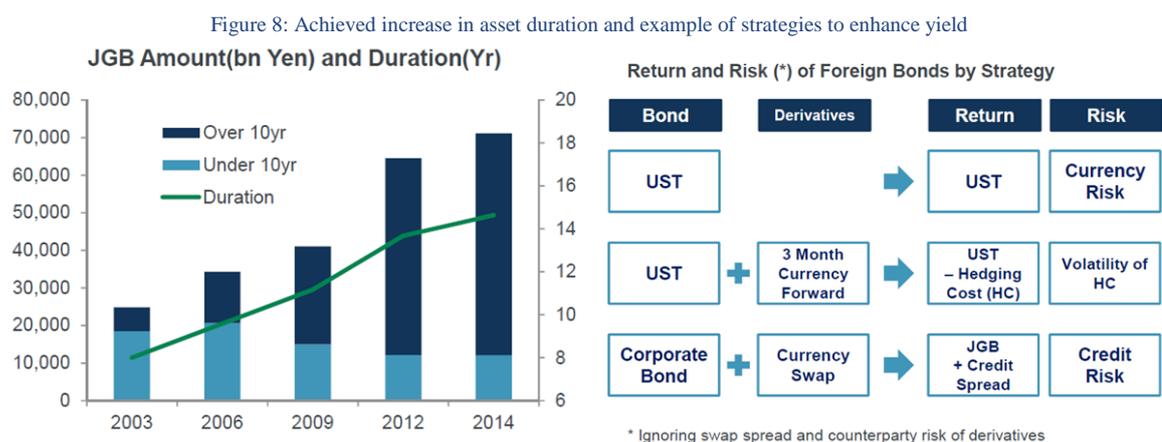
Source: The Life Insurance Association of Japan [5]

In terms of asset allocation, the shift observed over the last 20 years is significant. Equity and loans have been replaced by bonds. Japanese government bonds constituted ~45% of all assets in 2010 compared to 4% in 1990, while the share of stock and loans in the portfolios dropped in the same period from 22% to 5% and from 35% to 13%, respectively. The scale of the change is apparent on Figure 7.



Source: The Institute of Actuaries of Japan [4]

Japanese insurance companies searched for ways to improve the yields and lengthen the duration of their assets. This investment strategy was made possible thanks to the issuance of long dated government bonds, including bonds denominated in foreign currencies combined with exchange rate hedges (see Figure 8). These changes led to a strengthening of market risk management across the industry. It must be noted that yield enhancement was achieved in parallel to divesting risky assets such as stocks and loans.



Source: The Institute of Actuaries of Japan [4]

The regulatory regime played its part in the adjustments made by the insurance industry. What may come as a surprise is that the regulatory authorities to some extent relaxed the regulations. This was aimed to provide alternative paths to recovery for the companies under pressure. Most notably, the Insurance Act was amended to allow insurance companies, in agreement with the government, to renegotiate the guarantees with their policyholders. The resolution procedure has since allowed general debt reduction, policy reserves reduction or introduction of early surrender charges to existing books of policies [5]. In addition, bank distribution was allowed to be used by insurance companies.

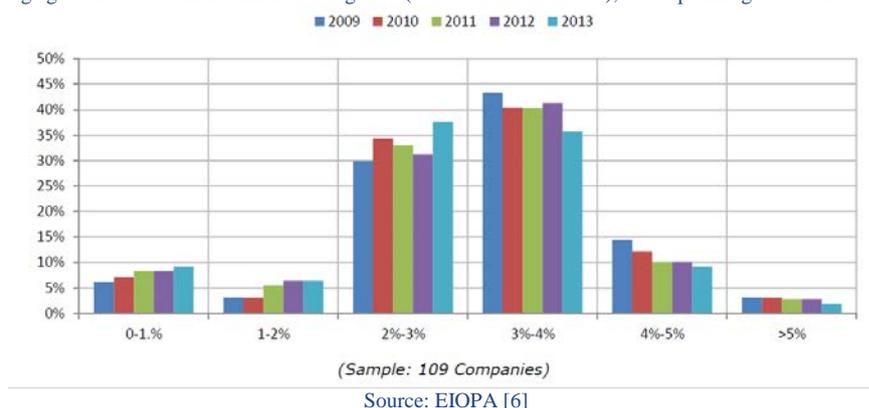
In 1996, life insurance companies were allowed to enter the general insurance segment, which could be perceived today as market deregulation. In parallel, prudential regulation emerged, including a more prudent regulation based on risk factors in 1998, followed by amendments which gradually increased requirements towards better risk management practices, and in particular of the risk of mismatch between assets and liabilities. In 1990 the Life Insurance Policyholders Protection Corporation of Japan was established, whose purpose was to provide financial protection to customers by acquiring defaulted life insurance companies. The most recent regulatory development in 2016 added requirements regarding how insurance products can be solicited.

Lastly, the insurance companies streamlined their operations to bring the cost of running the business down. Unfortunately, there is little publicly available data to understand the extent and outcome of such efforts.

1.4 What can we learn from this case study?

Let us now have a look at how the actions taken in Japan could be applicable to the insurance industry in Europe. Lowering guaranteed interest rates is a response which comes naturally. Available data shows (see Figure 9) that the industry in Europe has already begun readjusting their guarantees to an anticipated prolonged low interest rate environment.

Figure 9: Average guaranteed rate in life insurance segment (excl. unit/index-linked), with options /guarantees and surrender value



This adjustment may not seem sharp but one has to bear in mind that we are talking here of a long term business and large portfolios, so the effect to the average will naturally be subject to a time-lag.

In figure 10 a brief overview on the development of the maximum technical interest rate (defined by the various national supervisor authorities) since 2013 is presented⁴. One observes that, also driven by the regulator, insurance companies have also been forced to lower their guarantees, however, the speed of reduction lags behind real interest rates movements. Therefore, in most markets insurance companies are operating already at lower levels. Whilst in most countries the presented interest rate is an obligatory hurdle, in Spain it is a recommendation where deviations are allowed by setting additional measures (e.g. ALM).

Figure 10: Maximum technical interest rate 2013-2017

	Currency	2013	2014	2015	2016	2017
Western Europe						
Austria	EUR	1,75%	1,75%	1,50%	1,00%	0,50%
Italy	EUR	2,75%	1,75%	1,75%	1,00%	0,75%
Germany	EUR	1,75%	1,75%	1,25%	1,25%	0,90%
Spain	EUR	3,34%	2,37%	1,91%	1,39%	n/a
France	EUR	1,25%	0,75%	0,50%	0,25%	n/a
Central Eastern Europe						
Hungary	HUF	2,90%	2,90%	2,90%	2,30%	n/a
Czech Republic	CZK	2,50%	1,90%	1,30%	1,30%	n/a
Slovakia	EUR	1,90%	1,90%	1,90%	1,90%	n/a
Poland	PLN	3,28%	2,80%	2,42%	1,94%	n/a
Croatia	HRK	2,75%	2,75%	2,75%	2,00%	n/a
Bulgaria	BGN	3,50%	3,50%	3,50%	3,50%	n/a
Romania	RON	3,50%	3,50%	3,50%	3,50%	n/a

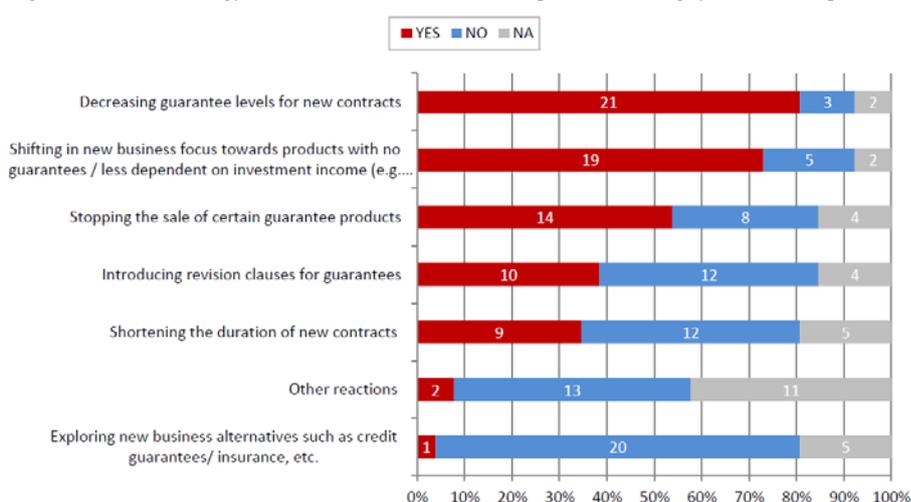
⁴ Based on a survey within members of the CRO Forum. Please note that the table always presents for each year the lowest figure set by the national supervisor authority in the corresponding year.

Looking at the assets invested in by the insurance industry (see Figure 7), there are considerably less 'controversial' assets in Europe today than in Japan in the late 1990s, and hence there is arguably less room for readjustment than there was in Japan. On average, European insurers invest mostly in fixed income assets with a clear bias towards EU government bonds. It is worth noting that the capital market, and in particular corporate bonds, in Japan at that time (as well as today) had low liquidity and depth. Therefore, their shift in investments had to rely on foreign debt or equity. Japanese insurance companies were thus able to take a moderate foreign exchange risks (which they could hedge to some extent), and effectively enhance the average yield of their assets. Similar opportunities do not present themselves to the insurance companies in Europe today. Other developed markets do not provide significantly better (i.e. higher and less volatile) yield prospects. Other markets may involve too much credit or currency risk to be taken into consideration as a viable option at a scale which would make a tangible difference.

It is tempting to make definitive statements on how assets in Japan at the time and Europe today compare. Arguably exposure to government debt was perceived as posing less risk in Japan 20 years ago than it is today, and in particular in Europe. Having said that, insurance companies in Europe face a challenging task to find an appropriate balance between their economic view of risks and statutory/regulatory treatment of risks related to holding government issued debt.

Adjusting product portfolios, in order to decrease the dependency on market yields remains a valid option. Insurance market penetration varies between the countries in Europe so there should be space for growth in segments other than traditional savings. In absence of representative data for the industry in Europe, one can only expect that some companies have already been successful in this area. Results of a survey conducted by the European industry regulator shed some light on how some companies have already adjusted their product mix (see Figure 11).

Figure 11: Product strategy for new business (number of companies answering 'yes', 'no' to a question).



Source: EIOPA [6]

By 2014, insurers seem not to have engaged in new types of businesses as a reaction to low interest rates. As such, they have generally not explored more risky business options such as credit guarantees. Lowering the guaranteed rate for newly written savings products or introducing rate revision clauses was typically combined with an attempt to shift new volumes toward unit-linked products. With these products, profits of an insurance company are less dependent on investment income [6] and a substantial part of market risk is transferred to policyholders.

Taking Japan as a reference, other measures insurance companies in Europe could take into consideration include:

- Enhancing efforts in cash-flow matching between liabilities and assets
- Looking for efficiency gains in how business processes operate
- Reducing profit shares where contractually allowed
- Setting up preventive reserve funds or additional technical provisions
- Providing opportunities for policyholders to switch to alternative products, offering comparable benefits but at a lower capital cost to the insurer
- Renegotiating contractual terms for existing business, e.g. with asset managers or outsourcing partners
- Taking more asset risks where such risk is compensated appropriately
- Put in place hedging strategies to manage short term volatility on spreads, interest rates and equity exposures

Lastly, the regulatory environment in Europe becomes more and more demanding, increasing the overall cost of doing insurance business. Prudential and customer protection regulations in Europe have caught up with those in Japan, and arguably are now more onerous.

As explained at the beginning of this chapter, making definitive statements on the future of one economy based on experience of another is inherently speculative. Comparing certain parameters from Japan in the past with those from Europe today, as has been done above, may give an impression there is a lot of similarity between the two. There are however certain differences which should be taken into account, and the major ones include the following:

- In periods of recession Europe was usually hit by an increase in unemployment, whereas Japan seems to have favored the lowering of wages. It is not obvious which of these effects gives better prospects for economic recovery (and consequently an increase in demand for insurance products).
- The relative stagnation of Japanese economy was arguably perpetuated by expansive public spending. Fiscal stimulus has so far been less pronounced in Europe, where governments on average face much larger debt to GDP ratios than Japan in the late 1980s. This may give hope for the productive economy recovering faster and in a more sustainable way than that of Japan. On the other hand, negative public sentiment towards entrepreneurs and the free market in Europe endangers swift recovery. Abundance of cheap credit thanks to quantitative easing by the ECB may also create distortions to the supply side, adding uncertainty to a long-term economic recovery.
- At the time when its stock exchange began its dive, Japan was a technologically advanced and a rich country. At the beginning of the 1990s its GDP per capita was 5% higher than that

of the USA and more than 30% higher than that of the current Eurozone⁵. The problems which Japan experienced were unfolding during a period of strong global growth. Somewhat weakening domestic demand could be at least partially offset by exports. The capital markets at that time presented opportunities for Japanese insurance companies to seek higher yields abroad. The current global stagnation means that attractive opportunities are not abundant anymore.

To conclude, there are some strong similarities but also significant differences between past Japan and Europe today. Nevertheless, remembering what has happened in Japan over the last 20+ years and looking for recommendations for the insurance industry in Europe today is helpful.

⁵ Source: The World Bank, national accounts data

2 Europe Today

This section covers first Europe from a general perspective and continues with two deep dives on the French and German insurance markets.

2.1 European life insurance market

There seems to be a consensus that the low yield environment is likely to remain the main concern. Inflation and productivity growth remain low. Given limited room for fiscal policy, monetary policy takes the brunt. The Central Bank continues to view low money-market rates and QE as the best actions to take.

This low interest rate environment comes with a generally challenging solvency environment. In particular, increased longevity have caused (mark-to-market) losses for pension-like liabilities. It also reduces insurer appetite for longevity risk. Finally, the regulatory environment in Europe has become more demanding, raising significantly the cost of writing insurance.

2.1.1 Insurance sector reaction – Product management

Product management is a natural response and an important approach to low interest rates.

Insurance appetite for interest-rate risk and longevity risk seems to be limited. Several studies [7], [8] predict that long term guarantees will reduce as they are becoming more and more costly and capital intensive. Several large German life insurers decided to stop offering traditional guaranteed products to their retail customers [9].

Product management can take place within the context of guaranteed products. There are attempts to reduce the risk of guarantees by converting existing contracts with interest rate guarantees into unit-linked guarantees (e.g. France [10]). Also, contracts have been introduced allowing revision of the promised guarantees as and when needed, or contracts that are more flexible and often not fixed [10], [11].

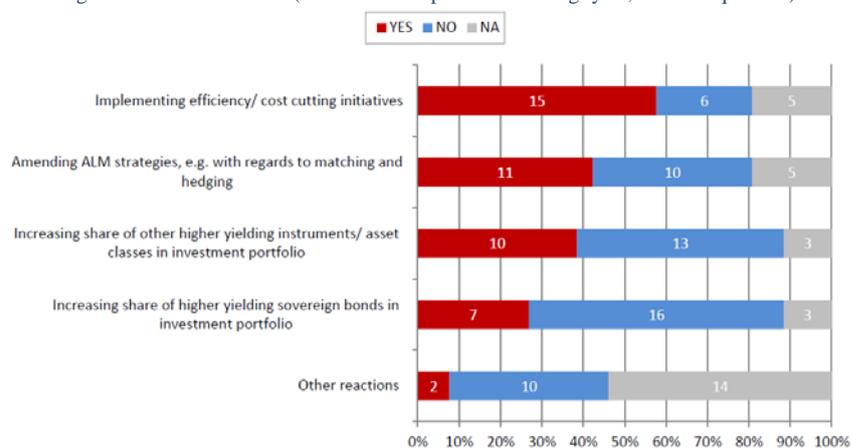
There are also developments indicating a shift to other life products, especially unit linked policies and alternative savings products as outlined by studies from [9], [10] and [12]. EIOPA [11] also notes a shift towards biometrical products such as (short-term) term life insurance or disability insurance.

Mixed insurers may increase their focus outside of life products, within the insurance sector (Non-life [10], or even outside the insurance sector (banking – [13], health / asset management – [14]). Cross-border business can also be an opportunity [10].

In response to a capital shortfall, one option is also to reduce new business. Clearly, it is not a very effective tool in the short term to restore capital shortfall, but new business is regarded by many as an important tool to restore profitability.

For more interesting details about new products, let us have a look at the results of a survey conducted by the European regulatory body in 2014 with regard to the key measures the insurance companies have already taken to respond to the low interest rate environment (see Figure 12).

Figure 12: Measures taken (number of companies answering 'yes', 'no' to a question)



Source: EIOPA [6]

The first option (lowering guaranteed interest rates) is a natural response. Available data shows [6] that the industry in Europe has already begun readjusting their guarantees to in anticipation of a prolonged low interest rate environment.

Product management – Crediting

Some policies contain discretionary profit-sharing on top of guarantees. This provides some flexibility in setting crediting rates. EIOPA [6] was constructive and detailed about ‘reducing profit shares’ as a way in which insurers handle existing business⁶. Despite the fact of being an important KPI for the competition in the sector, insurers started to adjust the crediting strategy to dampen the effects from the low yield environment (Moody’s [9] for the German insurance market as well as for global insurers.

Product management – Reinsurance

EIOPA [6] also found insurers reporting to counter a capital shortfall by increasing reinsurance. This is a natural way to reduce risk.

Reinsurance	Average share of the action (unweighted)
Increase reinsurance of in-force business	4%

Reinsurance was mentioned by EY [15]. Alternative forms of reinsurance are insurance-linked securities [12] or longevity swaps [13].

⁶ EIOPA (2014a) reported ‘reduce discretionary benefits’ under ‘other’ as a way to restore capital.. Similarly, EIOPA (2014a) mentioned ‘change in profit participation rates’ under ‘other’ as a way to restore profitability.

2.1.2 Insurance sector reaction – Asset and liability management

In this section, we describe asset and liability management actions, split into ‘investment strategy’ and ‘risk analysis’.

The second and third most observed action by NSAs ([6], chart 10) relate to ‘Amending ALM strategies’ and ‘Increase share of other higher yielding instruments’.

Investment strategy

The investment strategy is about changing the asset allocation. On average, European insurers invest mostly in fixed income assets with a clear bias towards EU government bonds (see second table of Figure 13). Just as for ALM strategies, asset allocation is an important driver of risk / return. Being in a low yield environment, the classical strategy to predominantly invest in fixed income instruments, providing sufficient yield to provide an attractive return for policyholders becomes more and more challenging.

EIOPA [6] suggests that restoring capital can be achieved by asset allocation (notably selling equities). As for maintaining profitability, this can be done by ‘chasing yield’ and by ‘other changes’:

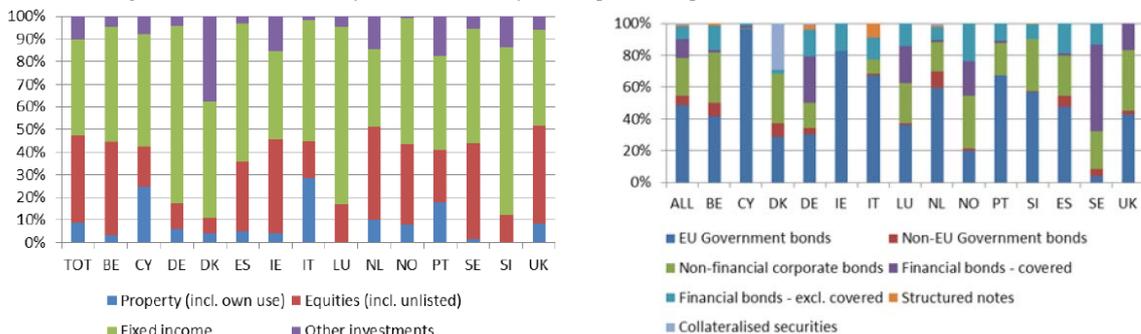
Maintain profitability – asset allocation	Average share of the action (unweighted)
Increased investment in higher yielding securities	6%
Other changes in asset composition	18%

EIOPA [6] sees evidence of the first (increasing share of higher yielding instrument / asset classes in investment portfolios).

EIOPA mentions investment classes previously dominated by the banking industry like mortgages, infrastructure loans and asset backed securities. These asset classes show promising characteristics for insurers, in particular long-term cash flows which can be used to match the long term liabilities of insurers. Similarly, the IMF [12] mentions non-traditional investments, including investment banking, direct lending, investments via hedge funds, and third-party asset management.

The key should be to take asset risks where such risks are compensated. The current environment makes that harder (witness the volatility adjustment of only around 10 to 20 basis points by the end of 2016).

Figure 13: Assets invested by insurance industry in Europe; Decomposition of fixed income assets (end 2014)



Source: EIOPA, ‘IORPs Stress Test Report 2015’

Particularly with respect to ‘chasing of yield’, regulators are concerned about a possible increase in risk. This seems to be manageable. EIOPA [10] could see only a slight increase in insurers risk appetite. This is supported by the IMF [12], who writes that, on average, insurers have been keeping the overall proportion of higher-risk assets in their portfolios roughly constant or have even reduced it. Also, Deutsche Bank finds that insurer’s balance sheets are more robustly managed and that recent years have shown significant de-risking.

Risk analysis

Management of curve exposure typically focuses on management of the interest rate risk of liabilities. The EIOPA’s qualitative survey [6] suggested that you could restore capital adequacy by ‘reducing risk on the asset side’ (only mentioning asset allocation). Insurers felt free to add under ‘other’, the following: reduce asset/liability gap’ and ‘reduce duration of bond investment’.

Maturity re-profiling was also mentioned in EIOPA [6] as a way to maintain profitability.

Maintain profitability – maturity reprofiling	Average share of the action (unweighted)
On the asset side	8%
On the liability side	2%

Since the duration gap can be seen as a measure as to how well the asset and liability side are matched (at least to the first order), closing the duration gap means reducing potential negative effects from interest rate movements. This measure was widely used by the industry to address the negative effects of falling interest rates (Bundesbank [16] for the German life insurance market and Moody’s [14] for global insurance companies).

As for profitability, the general consensus is that there is a risk premium on extending maturity. Whether or not that applies to maturities over 15 / 20 years remains to be seen.

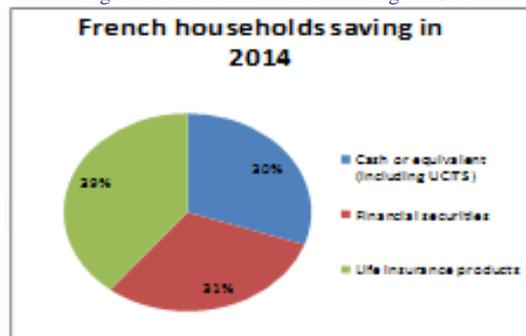
2.2 Case Study – The French experience

2.2.1 Overview of the French Life Insurance Industry

Life insurance saving is still the preferred investment of French households, representing about 1600 billion euros in assets in 2014 (39% of the total saving of households, see figure 14).

This is mainly due to the attractive annual credited bonus rates offered to policyholders up to now and the tax advantages which benefit this product. In addition, the traditional saving products are highly liquid as they are available at any time and for most of them (excluding the unit-linked representing 20% of total assets), the capital invested is guaranteed at any time (“cliquet” guarantee which means a capital and annual credited bonus rates guaranteed).

Figure 14: French households saving in 2014



Source: Fédération française des sociétés d'assurances (FFSA)

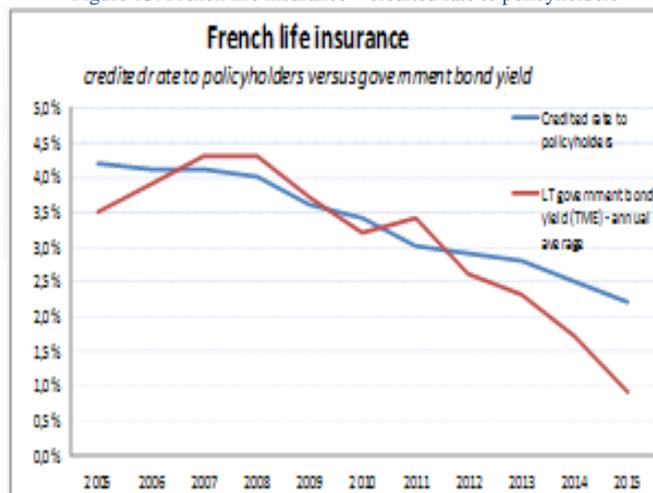
In 2015 the attractiveness of the traditional savings products was confirmed, with net premiums collected (premiums net of claims) reaching €23.8 billion. However, the guarantees associated with these products become more and more costly and difficult to bear for insurers in the current context of low interest rates as the large majority of assets (about 80% of total) are invested in a fixed-income portfolio (government and corporate bonds) and are directly affected by the decreasing yields. This trend will eventually lead to a gradual deterioration of the value of the portfolio (Value of In-Force or VIF) and an erosion of capital adequacy over the next few years, particularly under the Solvency II framework which requires more (costly) capital to be held for this business, especially when cash-flows are not properly matched.

In addition, some further regulatory reforms (at European or national level) are coming into force and may reduce the attractiveness of traditional savings products (e.g. European regulation “PRIIPS” or French legislation “Sapin 2”).

Even if the credited rates offered to policyholders have been gradually declining over the past few years, they remain attractive regarding the downward trend of government bond yields. The bonus rates offered in 2015 reached an average of 2.2% to 2.3%, about 30bps lower than 2014 while the government bond yields dropped by 80bps on average from 2014 to 2015 (see Figure 15) and the decrease in 2016 is expected to be at the same level.

Meanwhile, Insurers have increased cushions on reinforcing their profit-sharing buffer reserves (Provision pour Participation aux Excédents or PPE).

Figure 15: French life insurance – credited rate to policyholders



Source: Fédération française des sociétés d'assurances (FFSA)

This PPE reserve has indeed increased by about 30bps per year on average over the last three years, reaching a level of about 2.4% of mathematical reserves in 2015 (1,5% in 2012, 1,8% in 2013 and 2,1% in 2014).

This attractive bonus offered to policyholders has mainly been supported by the investment return of existing bonds in portfolios. The high level of unrealized gains on existing bonds due to the drop of interest rates could then give the illusion of a strong solvency position of insurers. But, given that bonds are in general held to maturity, these unrealized gains will disappear over the few next years.

Therefore, life insurers will likely still offer, albeit gradually lower, attractive credited rates to policyholders thanks to the PPE. However this situation will not last for long if the low interest rate environment persists. Indeed, the level of interest rates today (French OAT reached a historical record low of 0.10% on July 8th, 2016) will sooner or later have a negative impact on the earning of life insurers. The expected margins would not be sufficient to cover both the expenses, the technical costs and the credited rates to policyholders, let alone the cost of capital.

2.2.2 *Response of Industry and supervisors to the LIRE*

2.2.2.1 *Product Features and In-Force Business*

The French regulator and the insurers have been taking a range of measures over the last years in the face of the low interest rate environment:

➤ **Most of the new business is written today at 0% guaranteed crediting rate**

In a break with past practices, mainly due to the drop of interest rates, most of the new business is written at 0% guaranteed interest rate, leading to a gradual decrease of the in-force guaranteed interest rate which is estimated at about 1% for the French market. Compared to other European countries, like Germany, Italy or Spain, this level is less penalizing for the French market but is still high regarding the current interest rate environment. However, the vulnerability of the French market differs from one insurer to another depending on their business mix, asset allocation and source of earnings. The situation is also more heterogeneous depending on the extent of high guaranteed rates in the portfolio as the total estimated exposure to guaranteed interest rates higher than 3% in France, contracted in past years of high inflation, is estimated to be about €130 billion. For these reasons, life insurers have been asking the regulator to allow the removal of high guaranteed interest rates in order to reduce the vulnerability of some players, but without success so far.

➤ **Shifting product mix to more unit-linked business**

French insurers have also been acting over the last few years to increase the share of unit-linked products in their portfolio, hence transferring the risk to policyholders to reduce the sensitivity of their portfolios to interest rates and improve their capital adequacy.

In addition, the regulatory reform (“Fourgous” amendment) that came into force in 2005, has made it possible to transform a non-unit-linked policy into a unit-linked policy without forfeiting the tax benefits of the original policy. This amendment requires investing at least 20% of the amount transferred in unit-linked products. However, the impact of this measure has been limited. The cumulative reserve transferred at the end of 2014 was about €78 billion of which 29% (€23 billion) was invested in unit-linked products.

In addition, the UL business is closely correlated to the performance of invested assets (see Figure 16). Any hit in unit-linked performance could lead to a very significant drop in premiums collected and moreover, may raise duty-to-advise litigations.

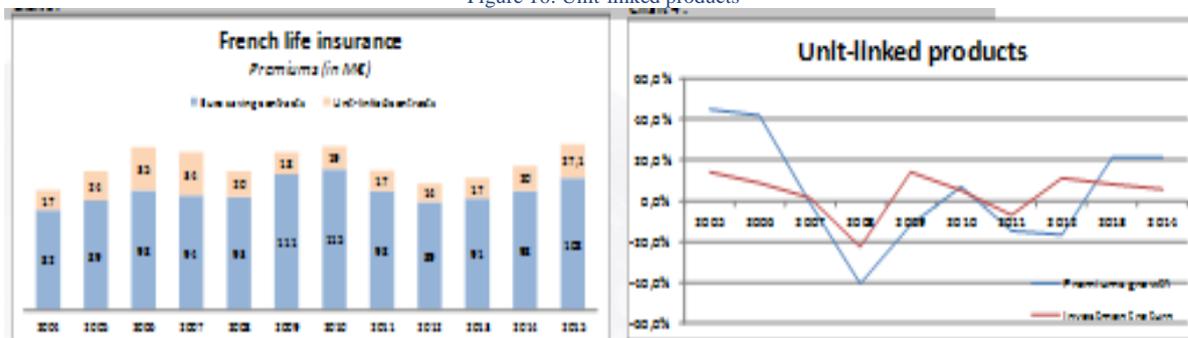
➤ **Launching a different traditional saving product : “euro-croissance”**

Given the current environment of low interest rates and solvency II requirements, it has become impossible for insurers to sell traditional saving business with the existing features without removing one of its 3 constraints: availability of capital at any time (“liquidity”), guaranteed capital (“cliquet”) at any time and attractive credited rate.

For policyholders, these products generally appear more attractive than unit-linked products which do not offer any capital guarantee even if the expected long-term performance is higher.

In this context, the “euro-croissance” (euro-growth) product including new features has been launched in 2014. “Euro-croissance” was developed to address this critical situation.

Figure 16: Unit-linked products



Source: Fédération française des sociétés d'assurances (FFSA)

For insurers, the product is less capital consuming as the guarantees have been lessened with capital and credited rate guaranteed only at the term of the policy (8 years at least), thus giving more flexibility to insurers for improving their asset-liability management. For policyholders, the cumulative term return is expected to be higher than the traditional business contract, and for the government, “euro-croissance” is meant to increase the ability of insurers to invest in the economy and to maintain their role as long-term investors.

On the technical side, the liability is composed of 2 reserves (see figure 17) :

- The “mathematical reserve” covering the term guarantee corresponding to the discounted⁷ term guaranteed capital, and
- The “diversification reserve” corresponding to the difference between the market value of assets and the “mathematical reserve” which is subject to market fluctuations.

Figure 17: Mathematical and diversification reserve

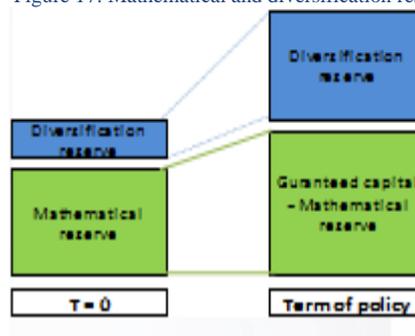


Figure 18: Mathematical versus diversification reserve

The development of “euro-croissance” is still limited, representing €770 million of premiums collected and €1.8 billion of assets in 2015, mainly due to the low interest rate environment. Indeed, as

⁷ Discounted interest rate = 90% of TEC index published by French Central Bank (“Banque de France”).

reflected in figure 18, the current investment conditions are giving fewer cushions to insurers to invest in assets for the diversification reserve.

Term of policy (in years)	10			
Discounted interest rate	0,25%	0,50%	1,00%	2,00%
Mathematical reserve in %	97,9%	95,1%	90,5%	82,0%
Diversification reserve in %	2,5%	4,9%	9,5%	18,0%

As a remedial action, insurers have been asking the regulator to adapt the legislation in order to allow the transfer of unreleased gains from existing policies to euro-croissance contracts. This condition is of utmost importance to allow the effective take-off of “euro-croissance”.

- **In addition, a minimum regulatory profit-sharing rule consisting of returning at least 85% of investment return to policyholders, compressing margins and penalizing the life insurers, have so far not been removed by the regulator**

2.2.2.2 Regulation

- **Strong recommendation from the French regulator to take great caution on the credited bonus rates**

Over the past two years, the French supervisor (ACPR) has been reiterating its strong recommendation to the market to take great caution regarding the credited bonus rates allocated to policyholders. Indeed, ACPR considers that the credited interest rates offered to policyholders in 2015 are still high regarding the economic environment. ACPR therefore recommends to smooth profit-sharing yields and lowering the credited bonus to policyholders and to reinforce the PPE.

Also, The HCSF (“Haut Conseil de Stabilité Financière”, new French public authority) has seen its powers reinforced by “Sapin 2” legislation, as it may, in case of extreme circumstances and under the ACPR’s recommendation, impose on insurers reduced bonus rates, limit surrenders for policyholders and forbid dividend payments to shareholders of insurance companies.

At the same time, the French regulator is also warning the industry against a brutal increase of interest rate followed by mass lapses of policyholders leading to potential substantial losses on assets and possible liquidity issues.

2.2.3 *What can we learn from this case study?*

- **Despite all measures taken, a long term low interest rate environment would still be unsustainable for life insurers in the current context**

The protracted low interest rate environment remains the first threat for life insurers in France as it is shrinking margins, declining the value of in force portfolios and thus weakening their solvency adequacy. This is mainly due to the predominance of non-linked traditional savings in French insurers portfolios.

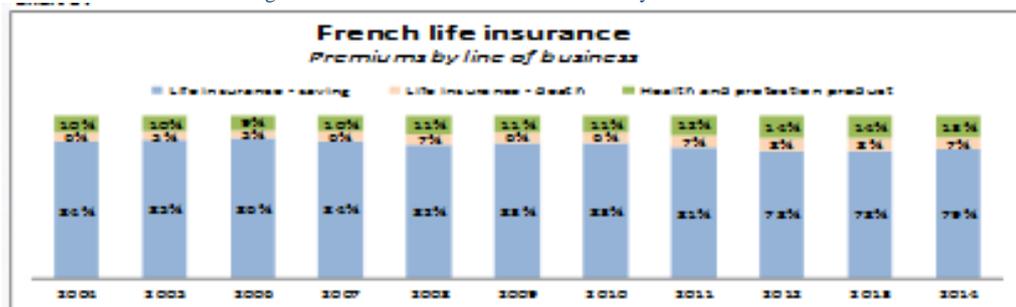
The measures taken over the last years both by the regulator and insurers would partly mitigate the risk; however the situation would be unsustainable for the years ahead, especially in the medium-long term, if things remain unchanged.

The business model of non-linked traditional savings does not appear viable for too long. For the next few next years, insurers will likely continue to offer attractive credited rates, albeit lowering their level at the same rate as observed over the last years. However, in doing so, insurers will be “cutting off their nose to spite their nose”.

Life insurers are facing many challenges over the years ahead: enhancing their product mix, improving their asset-liability management and managing their risks, costs and capital adequacy.

Players may shift toward more diversified business by increasing the share of health and protection business. Even if the maturity and the high competition of this business make it difficult to enter, the future of insurance needs resulting from an ageing population could be the opportunity to offer innovative product mixes, for example, packaged products with long term saving and protection insurance. As can be seen from figure 19, such a shift has not really taken place to date.

Figure 19: French life insurance – Premium by line of business



Source: Fédération française des sociétés d'assurances (FFSA)

2.3 Case Study – The German experience

2.3.1 Overview of the German Life Insurance Industry

Life insurance saving products are particularly popular in the German market, representing about 940bn € of assets.⁸ Almost 90% of assets are allocated to traditional life insurance products, i.e. in which the risk is borne by shareholders and typically a minimum guaranteed rate of return is offered, whereas the remainder is allocated to unit-linked in which the risk is borne by policyholders. Thus, traditional life insurance saving products still represent an important form of saving in Germany. Such products typically offer policyholders with a long term minimum guaranteed rate of return: contracts often remain in the portfolio of life insurers for 20 or 30 years, thereby exposing insurers to a considerable reinvestment risk since a large portion of the assets backing those products are bonds, which get periodically reinvested. Against this background, the current low interest rate environment and a potentially low-for-long scenario, represent not only a great threat to the profitability and solvency of German life insurers, but also for the business model of German life insurers.

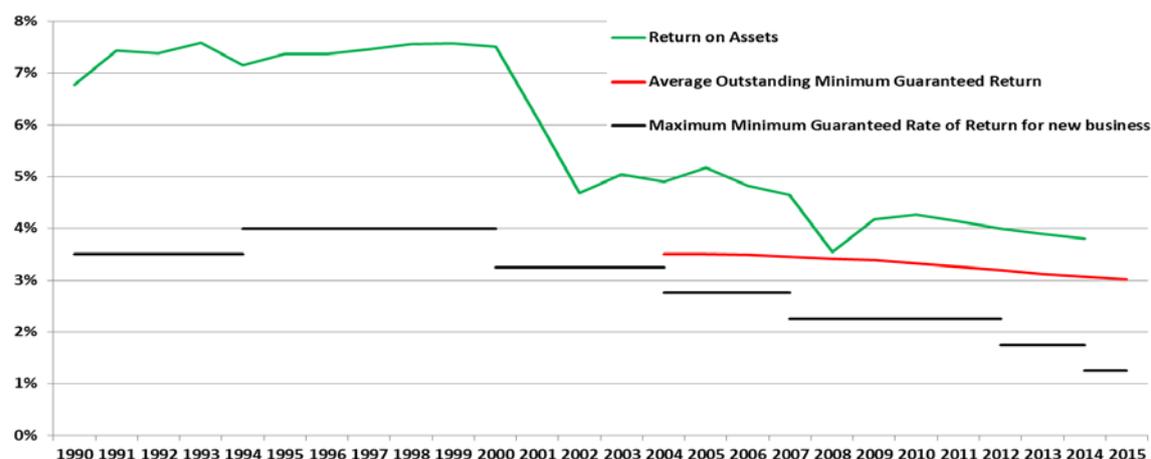
2.3.2 Response of Industry and supervisors to the LIRE

2.3.2.1 Product Features and In-Force Business

In-Force business

In Germany, the discount rates used for the reserving of new products are capped by law. Such a cap translates into a maximum guaranteed rate of return that insurers can offer to policyholders and it has become common practice in the market to offer the guarantee equal to the maximum allowed discount rate.⁹ During the past 15 years, the cap has been persistently lowered by the German regulator following the decrease in interest rates. See Figure 20.

Figure 20: the figure reports the evolution of the maximum allowed minimum guaranteed rate of return from 1990 to date.

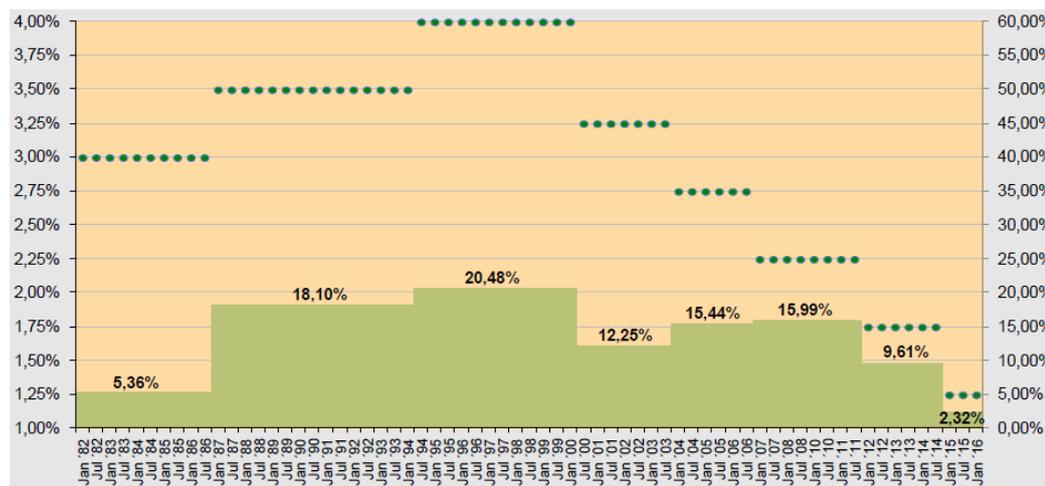


⁸ Source: GDV Lebensversicherung in Zahlen 2016. Figures refer to values in the balance sheet, of which a portion is reported at book value.

⁹ Theoretically it would be possible for insurers to offer a higher guaranteed rate of return to policyholders. However, this would imply that shareholders inject additional funds to cover the additional reserving requirements stemming from a guaranteed return higher than the applicable discount rate. Therefore, we can assume without loss of precision that by capping the applicable discount rate, the regulator effectively caps the level of the minimum guaranteed rate of return offered to policyholders.

However, the lower cap only affects new business, therefore contracts sold in the past still carry the guaranteed rate of return granted at inception. The natural implication is that currently more than 50% of the back book of German life insurers still guarantees policyholders with minimum guarantees higher than 3%. Assekurata [17] estimates in its annual survey that the average in force guaranteed rate of return at YE 2015 was ca. 3%. See Figure 21.

Figure 21: the figure reports the relative weights in terms of reserves of the different generations of minimum guaranteed rate of return. The left axis represents the level of the offered guarantee, whereas the right axis provides the amount of reserves carrying that guarantee.



Source: Assekurata [17]

An additional element of traditional life insurance saving products is the participation of policyholders to the different source of profits generated by the insurer. By law, German life insurers have to distribute every year a large portion of the financial return generated by the general account (90%), large portion of the return generated by the mortality developments (90%) and part of the profits stemming from the reduction in costs (50%). Thus, German life insurers have limited leeway and are forced to share large portions of their profits with policyholders. Nevertheless, German life insurers in the past tended to share additional (discretionary) returns, i.e. in excess of the mandatory profit participation, due to competition in the market: to this end, a special provision in the balance sheet of German life insurers (Rückstellung für Beitragsrückerstattung – RfB) allows companies to smooth additional profits overtime, thereby reducing the volatility of returns, especially financial returns.

Finally, since 2002 the German Government has subsidized life insurance products with certain characteristics, e.g. a capital guarantee, to enhance retirement provisions. The subsidy increased the production of traditional life insurance products with minimum guaranteed rates of return and the possibility of keeping the minimum guaranteed rate of return also during the decumulation phase (annuitization) typically after the age of 62. As an alternative, policyholders can receive a partial lumpsum at maturity (limited to 30%). GDV reports that in 2000 retirement products accounted for 12% of total outstanding contracts, whereas in 2015 almost 47% of existing contracts qualify as retirement products.¹⁰ As a result, the time that minimum guarantees remain on the book of life insurers has substantially increased together with the potential exposure to longevity risk.

¹⁰ Source: GDV Lebensversicherung in Zahlen 2016.

New business

The German insurance industry has responded to the low interest rate environment by both lowering the level of guarantees for new business and by changing its product mix. New business is currently sold with a maximum guaranteed rate of return of 1.25%¹¹. However, many insurers sell policies at a lower guaranteed rate, which in turn allow companies to grant policyholders with potentially higher yearly rates of return¹². In general, the business model of German life insurers remain skewed towards traditional savings products with retirement features and profit participation. Unit-linked products are gaining in importance but remain a relatively small share of existing policies, i.e. 9.6% of total technical reserves [18]. Nevertheless, the low interest rate environment has forced insurers to innovate and diversify the supply: in recent years, German life insurers have introduced more flexible products and increased the share of protection products as to both counteract the expected lower rate of return generated by traditional products and to reduce the absorption of risk capital.¹³ In some cases however, insurers took a more drastic strategic decision on guaranteed products and stopped selling long-term guarantees or even transferring books to run off companies.

Regulation

Regulators and supervisors have also responded to the low interest rate environment and have introduced substantial changes in recent years. The intention underlying those changes was to enhance the ability of life insurers to endure a prolonged period of low rates and ultimately protect policyholders. To this end, 2 major changes in the German regulation (besides the introduction of Solvency II) have occurred: the introduction of an i) additional provision for interest rate risk (Zinszusatzreserve) and ii) the reform of the German life insurance regulation (Lebensversicherung-Reformgesetz).

- i) The additional provision for interest rate risk was introduced in 2011 and forced life insurers to increase the reserve requirements for those cohorts of contracts which have a guaranteed rate of return that is higher than the reference interest rate, i.e. the 10 year moving average of the 10 year Euro Swap rate.
- ii) The reform on the German life insurance regulation has entered into force in 2014 and it foresees 2 major changes: on the one hand, the minimum share of yearly mortality profits to be transferred to policyholders has been increased from 75% to 90% and negative results on the minimum profit participation of asset returns can be compensated with mortality profits and other profits (cross-subsidization among profits sources); on the other hand, the 50% minimum participation on hidden reserves that accrues to policyholders when terminating the contract must only be distributed to policyholders if the hidden reserves of the insurer's bond portfolio exceed the positive difference between the market-consistent value of the underwriting portfolio and the technical provisions (calculated at book values).

Such regulatory changes improved the resilience of life insurers vis-à-vis low interest rates as highlighted in Berdin and Gründl [19], although they might come at both shareholders and policyholders' expense.

¹¹ From 01/2017 the maximum guaranteed rate of return will be lowered to 0.9%.

¹² A lower guarantee allows insurers to increase the return volatility of the asset allocation in their general account, thereby offering policyholders upside potential in terms of returns.

¹³ In fact, under Solvency II, long term products with guarantees are relatively expensive in terms of risk capital

2.3.2.2 Analyses of the Risks stemming from the LIRE

The relatively high level of guarantees and the very low yield achievable, especially on domestic assets,¹⁴ is a source of concern. Moreover, the outlook of a protracted period of low interest rates might endanger the stability of German life insurers. Several studies point at this risk: Berdin and Gründl [19] for instance try to quantitatively estimate the impact that a prolonged period of low rates could have on life insurers and find that there exists a relatively high vulnerability for a sub-set of German life insurers, in particular for those that are less well capitalized; Wedow and Kablau [20] use a different approach, studying the evolution of the solvency of German life insurers (under the Solvency I regime) and confirm that if interest rates remain low, a portion of German life insurers would not be in the position to meet their (Solvency I) capital requirement by 2021. The ECB Financial Stability Review [21] highlights how the mix of relatively high guarantees, relatively low returns on domestic assets, higher duration mismatches¹⁵ and strict regulation with respect to the profit participation, put pressure on the profitability and solvency of German life insurers. The study of Berdin et al. [22] provides a broader comparative analysis across major European insurers and points at the German market as particularly exposed to the low interest rate environment: the authors show that higher duration gaps, lower rates on domestic assets and stricter local regulations can be only partially offset by business diversification, in particular more diversification towards protection business. This is a relevant aspect, as insurers which relied relatively more on guaranteed business will experience more pressure on profitability and solvency should interest rates stay at present levels. More specifically on the duration mismatch, Domanski et al. [23] find that, due to the low interest rate environment, German insurers buy more long dated bonds to improve their matching strategy thereby further pushing down yield on bonds, thus creating a downward spiral which might become a further source of concern. Also the results of a recent survey by Citigroup¹⁶ point in this direction: the survey finds that duration gaps among a large number of life insurers have been reduced during 2015 and 2016, with a current average duration gap of 5 years. As a response to the low interest rate environment, insurers increased the average duration of their investment portfolio to capture additional term premia and to reduce reinvestment risk, i.e. improve the ALM strategy, thereby reducing capital absorption.¹⁷ Also the riskiness of the asset allocation has increased as response to lower achievable returns in the market. A further interesting finding is that German insurers expect traditional endowment products to be eventually phased out due to the persistent low interest rate environment.

Finally, the IMF in their Financial System Stability Assessment for Germany [24], stress that a protracted period of low interest rates has potentially severe consequences. In particular, the IMF stresses how low rates put pressure on the profitability of the traditional business model of German life insurers, making the redemption of long-term guarantees more difficult.

¹⁴ Typically life insurers tend to skew their asset allocations toward domestic assets, especially domestic sovereign. In the literature this is known as the home bias of investors. See for instance French and Poterba [25].

¹⁵ The duration mismatch indicates the misalignment between the duration of the assets and the duration of liabilities, with the latter being typically higher for life insurers.

¹⁶ See Citigroup (2016).

¹⁷ Typically, assets with longer duration have higher credit quality and therefore capital absorption under Solvency II decreases.

2.3.3 *What can we learn from this case study*

Low interest rates are having and will continue to have a profound impact on life insurers, both on the existing business and on new business. In particular, a prolonged period of low interest rates would markedly worsen the profitability and the solvency position of German life insurers, as well as strongly reduce the return policyholders can expect on their policies going forward. Should such a scenario materialize, life insurers would have strong incentives to innovate their product range. Moreover, lower achievable returns for a protracted period would negatively affect the capital accumulation for retirement. The German market is characterized by large portions of retirement products and therefore life insurers are likely to face a two-fold challenge: on the one hand, policyholders will need to save more to sustain their level of consumption during retirement and thereby the demand for retirement solutions might increase; on the other hand, the demand for retirement solutions goes along with the demand for capital protection, which will require life insurers to put greater effort in designing new solutions for policyholders as well as to find more rewarding capital allocations.

3 Getting Prepared for the Future

This section builds upon on the previous ones by providing a list of topics and perspectives dedicated to both Product Management and Asset & Liability Management in the context of low interest rates. It refers not only to the lessons learned described previously but also to best practices shared by members of the CRO forum.

The first toolbox is dedicated to product management and firstly provides content on managing in force and new business. This is followed by specific details regarding reinsurance, expense management and crediting strategies and concludes with modelling challenges.

The second toolbox is dedicated to ALM and concentrates firstly on investment strategies relevant for the low interest rate environment. This is followed by additional details on how to challenge investment strategies using risk analysis and it concludes by identifying typical modelling challenges.

The split proposed in these toolboxes is to some extent artificial, but it reflects how many insurers are structured internally, with dedicated product and ALM teams. Typically the risk functions are then involved in both areas as a second line of defense.

3.1 Product Management Toolbox

Product Management Toolbox	
In Force Management	<ul style="list-style-type: none"> Life insurers are especially affected by the low interest rate environment if they have a large in-force portfolio with high historical guarantees and do not have sufficient returns from their historical investments. For this reason, many insurers try to sell their most costly portfolios to other players or put them into run-off. Other typical strategies on the in-force book include, as mentioned in the Japanese case, transformation programs where the life insurer proposes opportunities to policyholders to switch to alternative products (e.g. unit linked), offering comparable benefits but at a lower capital cost to the insurer
New Business	<ul style="list-style-type: none"> In the current environment selling only high guaranteed products with long maturities is certainly not the best way to make profitable business for a life insurer. Therefore, many companies are trying to adapt their product mix as seen on the French and German markets. Unit Linked products offering no guarantees and consuming very little capital are offered more and more by life insurers. However, they are subject to intense competition, premium volatility in case of a market slowdown (which makes them much less popular to policyholders) and reputational risk if this leads to significant losses for clients. Several types of hybrid products are also starting to emerge in the product landscape like the “euro-croissance” discussed for the French market. They are typically a combination between a guaranteed product (e.g. 90% or 100% guarantee only at maturity) and a unit linked component that offers the upside potential. Another way to manage profitability while offering valuable products to clients is to offer protection riders as separate products on top of the base investment or savings

Product Management Toolbox

	<p>products. The positive margin of the protection business can be used to subsidize the savings part.</p> <ul style="list-style-type: none"> • Finally, product features can also be looked at to minimize interest rate risk: possibility to re-price products, resettable guarantees, lapse management by introducing surrender penalties, favorable market value adjustments, etc. • In choosing the optimal product mix, companies should also ensure that they have a robust Product Approval Process with appropriate KPIs and stress scenarios in place. Typical measures include Internal Rate of Return (IRR), New Business Margin (NBM), Payback Period and Return on Risk Capital (RoRC). It is important in this context to stress the KPIs according to relevant shocks, including for example a long lasting low rate environment. • When developing new products, special attention should be made on what the future strategic asset allocation will look like when premiums will be collected. The easiest way to have a robust ALM and cash flow matching is to have it embedded in the product design from the start.
<p>Reinsurance</p>	<ul style="list-style-type: none"> • For reinsurers, low interest rates together with the new Solvency II legislation can create new business opportunities. In particular, in Western European countries, insurance companies suffering from low interest rates and heavy regulatory constraints could use reinsurance as a capital management tool. This is particularly true for spread risk which is very penalizing in terms of capital requirements in the Solvency II context while other regulations do not consider it so severely since they consider insurers as long term “hold-to-maturity” investors with very limited exposure to spread risk. • Typical new reinsurance products could, for example, mitigate the volatility of the asset and liability cash-flow profiles on specific product portfolios which decreases significantly the Solvency II capital requirements. • In this “tailor-made” context, reinsurance companies propose more dedicated solutions than standardized products. Besides mitigating the effects from the low interest rate environment, these solutions move towards more client-focused approaches and refined risk selection in underwriting practices. This makes it also very challenging for reinsurers to properly model their risk. • The low rate environment causes typically a direct increase in longevity risk since it relates to very long term losses that are discounted at a much lower rate. For this reason, longevity reinsurance contracts like longevity swaps tend to be more popular in a low rate environment.

Product Management Toolbox	
Expense Management	<ul style="list-style-type: none"> • In a low interest rate environment, the impact of product costs on the overall product return is increasing resulting in a less attractive proposition for the client. This puts a strong pressure on costs and, as seen in the Japanese case, should be a priority for life insurers. • Distribution costs are under pressure with more and more insurers trying to sell products directly to clients through digital means. • There is a strong investment increase in “Fin Tech” companies, joint ventures between traditional insurers and digital market leaders and “big data” companies. It is difficult to see currently significant impacts, but one of the aims is to reduce the costs for life insurers. • Fund manager fees for products backed by actively managed assets are challenged with more and more companies moving to more simple index based or ETF solutions. • Changing from traditional guarantee business to more unit linked or hybrid types of products combined with a lower product maturity usually reduces the amount of assets under management, the amount of product fees received and the necessary workforce. These effects have to be carefully managed when changing the business mix, especially the total expenses in comparison to the marginal expenses and their allocation to in-force and new business.
Crediting Strategies	<ul style="list-style-type: none"> • Low rates are putting pressure on life insurers to decrease their crediting to policyholders. These decisions have to be taken, considering various dimensions like the competitive context of the company, available and sustainable unrealized gains or possible cross-selling propositions.
Modelling Challenges (General)	<ul style="list-style-type: none"> • Life products have often a very long maturity and their profitability is usually being measured according to long term simulated scenarios. In a low rate environment, this should typically include negative interest rate scenarios. To properly model negative rates and to update accordingly all actuarial assumptions is however a very complex challenge for the industry.
Modelling Challenges (UFR and LLP)	<p><u>Consequences of using a stable UFR</u></p> <ul style="list-style-type: none"> • Incentivizes long term products that are important for customers who want to save money for a long time with a guarantee included. • Pricing includes a positive view on future reinvestment yields. <p><u>Consequences of not using UFR (e.g calibration to last data point)</u></p> <ul style="list-style-type: none"> • Promotes short maturity products with significant surrender penalties and resettable guarantees or Unit Linked/Hybrid products. Significant risks are then transferred to policyholders. • Provides full mark-to-market view on current product profitability.

ALM Toolbox	
Investment Strategy	<ul style="list-style-type: none"> • As observed from the Japanese case study, keeping a high duration gap between assets and liabilities in a long lasting low interest rate environment can lead to significant losses and ultimately to bankruptcy. In addition, insufficient cash-flow matching is very capital intensive, especially under Solvency II. • For insurers with long term guaranteed products, the typical challenge for a cash-flow matching strategy is to find a sufficient amount of long dated assets while ensuring an adequate return and diversification. • Cash-flow matching can also be achieved with derivatives, but this strategy can have side effects like liquidity constraints for posting collaterals, income volatility, counterparty credit risk, etc. • A possible sharp rise in the interest rates after a long period of low interest rates may cause problems if customers take rational lapse and surrender decisions if the insurance company is not able to provide attractive returns. Thus an extensive cash flow matching strategy might be accompanied with a derivative strategy to hedge such risks. This is particularly true for the French market as we have seen that the “Fourgous” amendment has made it possible to transform a non-unit-linked policy into a unit-linked policy without forfeiting the tax benefits of the original policy. • Investment strategies should consider multiple liability characteristics such as reinvestment yield compared to guaranteed returns, key rate durations, curve sensitivities, dilution impact of new business when subsidized by a general portfolio and optimal consumption of Solvency II capital. • Liquidity premium can offer insurers additional yield when investing in illiquid assets which can be used, for example, to better match high guaranteed rates. Insurers investing with a hold-to-maturity strategy can therefore benefit from additional returns but it requires a tight monitoring of liquidity risks also for a situation of rising rates as mentioned above. • When setting-up an investment strategy, many performance indicators have to be monitored simultaneously. These can refer to accounting, economic, regulatory or mark-to market dimensions and need to be considered both as expected and after a stress. Typical KPIs to watch in a low rate environment are P&L volatility, operating earnings, regulatory capital requirements, market sensitivities, etc.
Risk Analysis	<ul style="list-style-type: none"> • After setting the investment strategy, it is important to ensure its sustainability in a risky environment. In particular, long term sustainability (more than one year) in a constant low interest rate environment should be tested. • Risk of lapses, typically low when rates decrease, has to be considered in case of a sudden rate hike which can cause mass lapses. • Risk of volatility in premiums and new business for both Life and P&C businesses can weaken the liquidity position of a company. • Risk of strong volatility in financial markets that increase the collateral constraints on hedging strategies.

ALM Toolbox	
	<ul style="list-style-type: none"> • Liquidity risk should be considered as well in the context of a stressed market environment with haircuts on asset values and very limited liquidity of risky and structured products. • Reputational risk if products that transfer market risks to policyholders are not performing as historically predicted has to be measured and monitored closely when moving product mix to unit linked types of products.
Modelling Challenges (General)	<ul style="list-style-type: none"> • Most liability models still work with Black's lognormal volatility. System providers need to be asked for progress in handling this issue. • It may be that current liability Black models can still be used, to the extent that most options deal with 'old' (out-of-the-money) options. The validity of OTM volatilities needs to be checked. • More generally, ESG models have to be able to model negative rates and therefore cannot rely upon distributions that cannot work with negative rates such as the log normal distributions. • Model validation should test model alternatives in order to appropriately capture the ultra-low / negative interest rates environment. • It is important to be clear about the definition of interest-rate risk / interest-rate shocks. If interest rates change, asset- and liability models need to be consistent in what is kept constant (absolute or relative volatility).
Modelling Challenges (UFR and LLP)	<p><u>Consequences of using stable UFR</u></p> <ul style="list-style-type: none"> • Improves stability of capital requirements against volatility of long term rates and avoids procyclical de-risking behavior. • Protects from full reinvestment risk impact. • Stable and predictable regulatory levels for UFR and LLP are important for sustainable steering. • Integral part of the Long-Term Guarantee calibration agreed for Omnibus II. Any change would require a global renegotiation which may lead to volatile expectations from markets on insurance capital requirements. • Recognizes higher expected reinvestment rates against long term average. This can be more aligned with inflation and economic assumptions. • Provides more realistic picture on what can reasonably be hedged from an asset side. Long term mismatches are less punitive in a low rate environment. • Without the compensating effect of the UFR, insurance companies are strongly incentivized to increase their yield by taking higher financial risks on long term assets (e.g. credit and liquidity risks). • Protects from rising rate scenarios that would cause significant lapse risk if customers behave rationally. <p><u>Consequences of not using UFR (e.g. calibration to last data point)</u></p> <ul style="list-style-type: none"> • Could cause significant solvency issues for some life insurers. • Some regulators (e.g. Holland) already use the approach to assess dividend policy and protect policyholders from low rates.

ALM Toolbox

- Provides full insight on the potential cash flow mismatches and incentivizes closing asset/liability duration gap also for long term maturity cash-flows.
- Regulatory incentive to buy very long term assets that are subject to significant inflation and inversion risks of long term rates.
- Could cause long term swap market to be even more driven by insurance institutions due to regulatory requirements with the potential of a strong pressure for a non-economic risk premium.
- Ensures consistency between the economic reality of the assets with a maturity that exceeds 20 years and the current market value of liabilities.

4 Conclusion and Next steps

The current low interest rate environment pushes life insurers to reinvent their business model with more focus on product management and ALM. Indeed, this new economic paradigm raises the importance of cash-flow matching and less capital intensive products. We hope this paper provides insightful lessons learned and a useful list of some of the key topics to be addressed to successfully transition to this reality. Also, it is very important for life insurers to act sooner rather than later given the long time needed to transition to a new business mix and the time needed for some in-force portfolios with very high guarantees to mature. However, this environment might also include opportunities like the potential increase in demand for income protection and pension provisions in light of an ageing European population.

The topic of low interest rates is very broad, and therefore, we have decided to focus this paper on ALM and product management challenges from a life insurance company's point of view. There are however many others topics that could be analyzed and we would like to mention a few of them:

- Low interest rates, and possibly negatives rates, are a major challenge to model properly from a value and risk management point of view. What are the key challenges and consequences?
- Many economists believe the low interest rate environment will persist in Europe for quite some time. What are the conditions and drivers that would result in rates moving higher, how probable is it and what would be the consequences if rates did increase? In particular, the current environment is closely linked in Europe to the quantitative easing strategy from the ECB, how could and when will this eventually end?
- Our paper focuses on the insurers themselves but does not detail the topic from a customer perspective. Indeed, if insurers drastically change their business mix, it will have a direct impact on what products are available. In this case will insurers still continue to meet customer's expectations and needs in this new environment?

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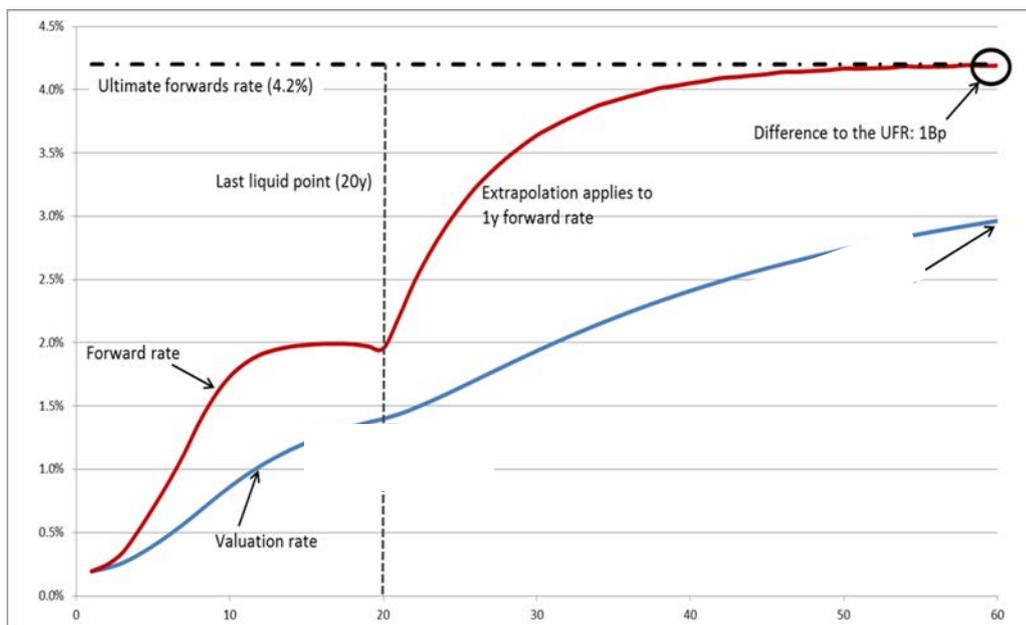
Annex – UFR Methodology

After the introduction of the UFR in 2010 by CEIOPS, EIOPA introduced the UFR method in 2012 as a liability discounting approach for European insurance companies. This methodology helps to extrapolate the ultra-long end of the liability discounting curve, (e.g. in Eurozone beyond 20 years, where market liquidity is limited).

Applying the UFR helped to reduce impact from market volatility and respective impulses for procyclical behavior in the long end of the curve. So the UFR's intention is to stabilize the capitalization and steering framework of traditional life insurance under extreme market scenarios.

Given the current low market interest rates, the level of the UFR at 4.2% has a strong impact on insurers' own funds and Solvency II capital requirement, and consequently on ALM and product decisions.

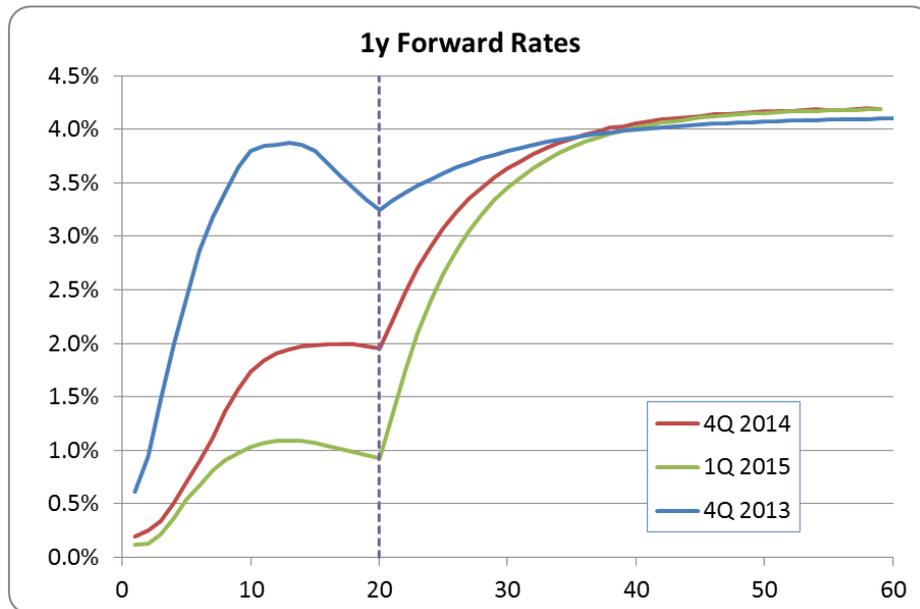
The UFR is a method to build a curve from market rates up to the Last Liquid Point (LLP) and then extrapolate to a fixed (forward) rate for longer maturities, i.e. extrapolating from year 20 (for EUR) onwards with a convergence of the 1-year forward rate to a level of 4,2% 40years later, i.e. in year 60.



Graph: EIOPA yield curve extrapolation – 4Q 2014

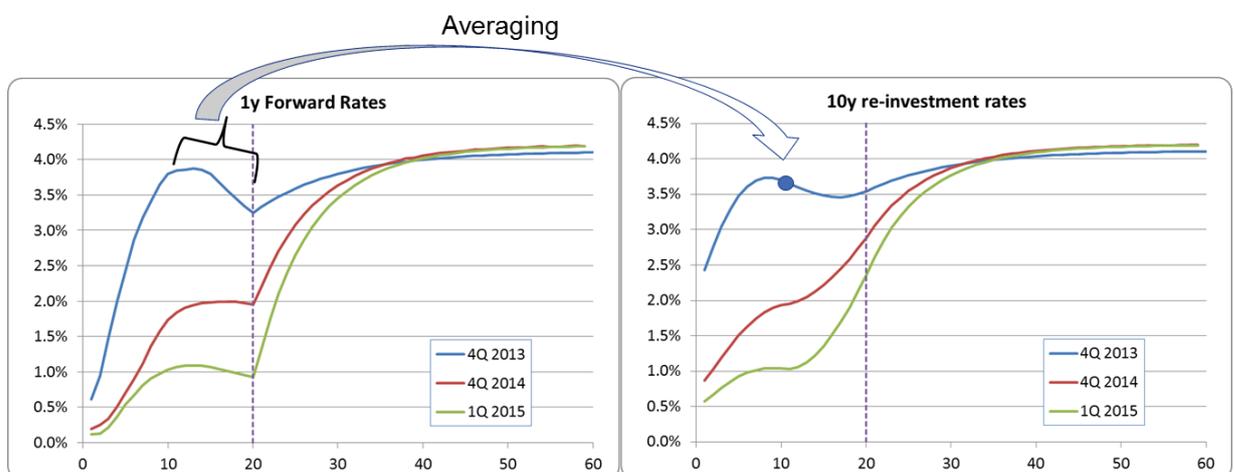
Two relevant regimes can be distinguished:

- In the liquid range (up to the last liquid point at 20y), forwards can be implied from valuation rates.
- In the illiquid range, forward rates are anchored towards an UFR of 4.2%. This level is reached at year 60.



Forward, or re-investment, rates for a certain tenor are moving averages of 1y forward rates. As the latter approaches the UFR quickly in the extrapolation range, forwards over longer tenors show a stronger convergence towards the UFR and higher values than valuation rates.

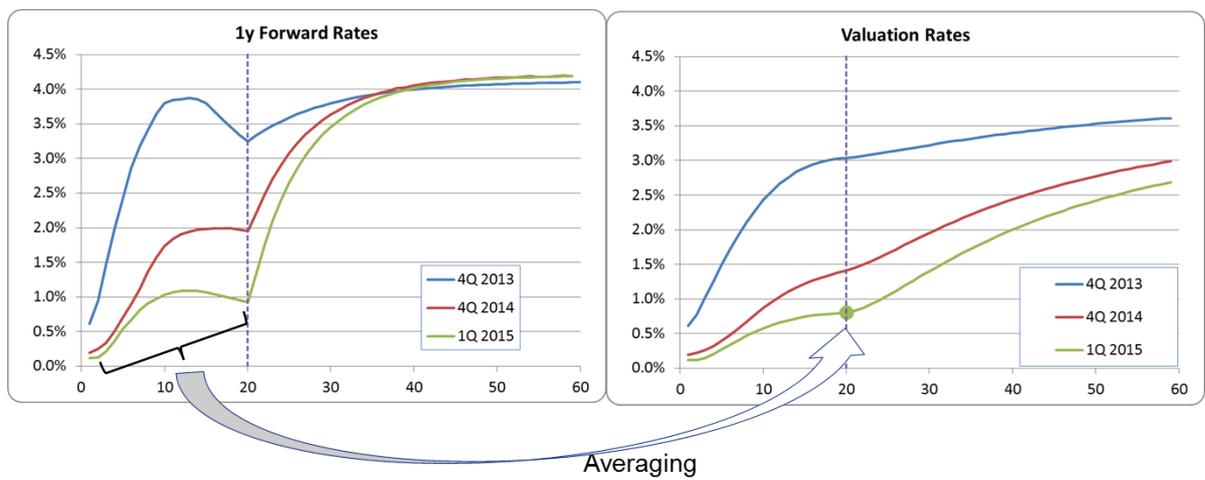
The consequence of this method would be a steepening of the yield curve in the long end.



It is important to point out that only the forward rate is anchored, but not the spot rate, which is calculated only as a function of the forward rate. By that the spot rate in year 60 is significantly below the UFR and there are still material shocks on the spot rate.

The 60y valuation rate in 4Q 2104 was 3.4 % and declined to 2.7% in 1Q 2015.

Valuation, or spot zero, rates can be recovered as averages of the 1y forward rates. These averages are to be calculated up to the maturity of the valuation rate in question, starting at time zero. The long term valuation rate is below the anchor level.



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