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Global Insurance Themes

Low Interest Rates are Credit Negative for Insurers Globally, but Risks Vary by Country

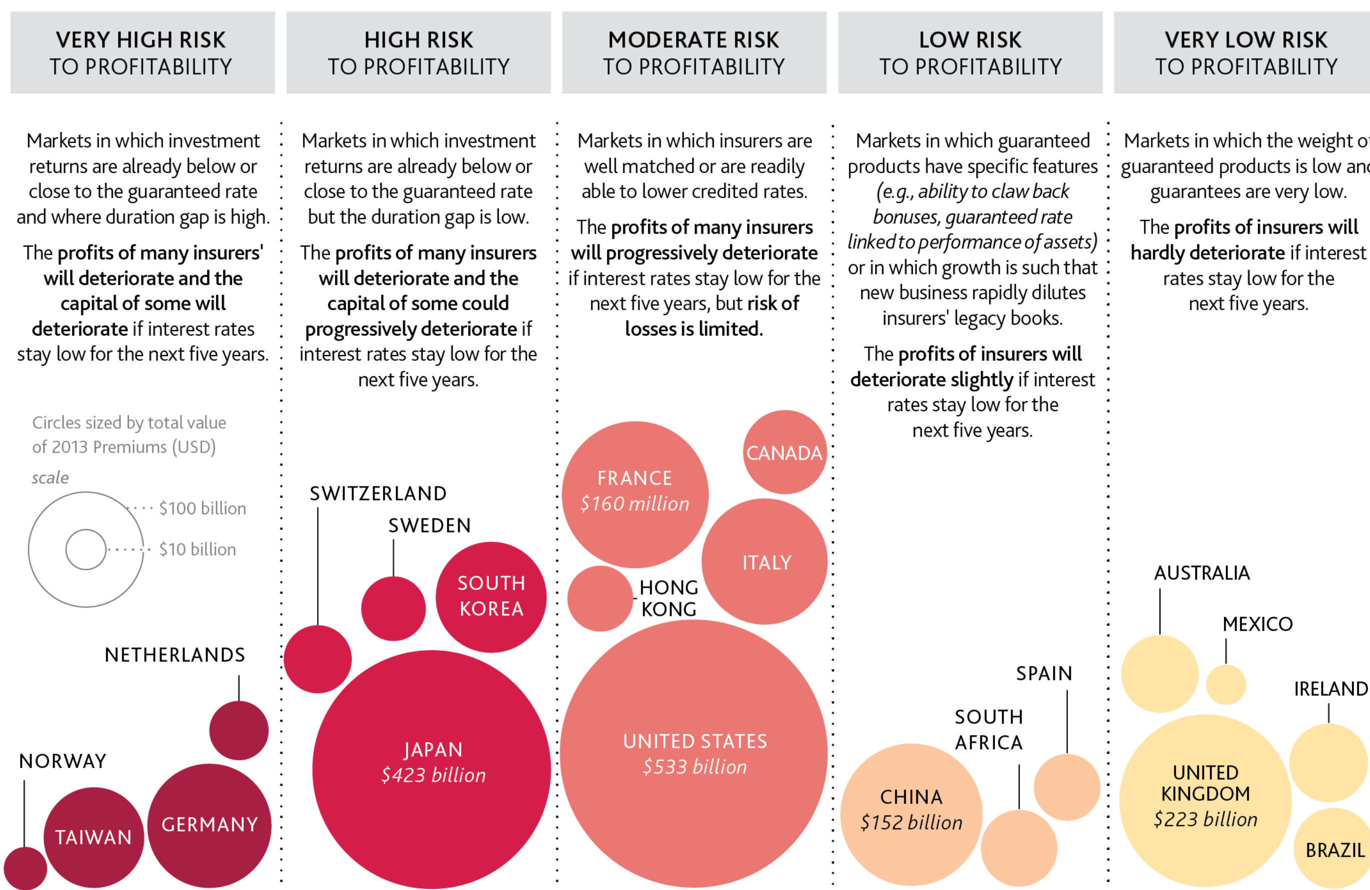
This report is the first in a series ("Global Insurance Themes") covering topics affecting insurance companies globally. Other Global Insurance Themes reports will be published through the rest of the year.

Low interest rates are credit negative for insurers, notably life insurers – We expect interest rates to stay low in most of the world's economies. As a consequence, insurers' investment returns will continue to decline. For life insurers that typically offer a guaranteed rate to policyholders, this increases the risk that, in some countries, investment returns will fall below the guaranteed rate, leading to losses and declines in capital. In many jurisdictions, the effects of low rates are not yet fully visible in insurers' accounts, but losses will be reported progressively. For property and casualty (P&C) insurers, low interest rates will reduce profits, but are unlikely to hit their capital. The focus of this report is therefore on life insurers.

Risks vary by country – The effects of a prolonged low interest rate environment will vary significantly by insurer. To assess these effects we look at (1) the insurer's business mix, (2) the level of guarantees offered in guaranteed products, (3) the insurer's ability to "share" the impact of declining interest rates with policyholders, which is driven by the spread between investment returns and the guaranteed rate as well as by the features of the products, and (4) the gap between the duration (the average time to maturity) of the insurer's assets and the duration of its liabilities. These four factors, and the resulting level of risk in a low interest rate environment, vary significantly by insurer. Nonetheless, similarities exist among insurers operating in the same market. We reviewed 21 large life insurance markets and have classified these countries into five different categories (buckets), depending on their exposure to low interest rate risk, as summarised in Exhibit 1, below. We believe Germany, the Netherlands, Norway and Taiwan (which collectively account for 9% of worldwide life insurance premiums) are the most exposed markets, while Australia, Brazil, Ireland, Mexico and the UK (14%) are least exposed. Not all insurers in each country face the same level of risk. We provide more information on each market in Appendix 1.

Insurers are responding to the challenge, and their actions will have mixed credit implications - Insurers are acting to counter the effects of low interest rates, particularly by lowering credited rates on in-force policies and reducing guarantees on new business. They are also changing their business mix by diversifying into health, protection, unit-linked products or asset management, and modifying their asset allocation. Some of them have also used interest rate derivatives to shorten their duration gap. In this report, we summarise the short- and long-term credit implications of these measures, which insurers are in varied stages of implementing. We intend to comment further on these topics in future reports. Our ratings already reflect the benefits of mitigation for insurers that have efficiently managed to reduce their vulnerability to low interest rates. Insurers that have only recently started to implement these strategies will reap the benefits more gradually.

Exhibit 1
Moody's assessment of the level of risk that major life insurance markets face in a prolonged period of low interest rates



This assessment is made at the country level and mostly focuses on the direct impact of low interest rates on profitability generated by in-force policies. However, not all insurers in each country face the same level of risk. Moody's insurance financial strength ratings reflect the specificities of each individual insurer. Please refer to moodys.com for research on Moody's-rated insurers.

Source: Moody's Investors Service

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

1) Low interest rates are credit negative for insurers, especially life insurers

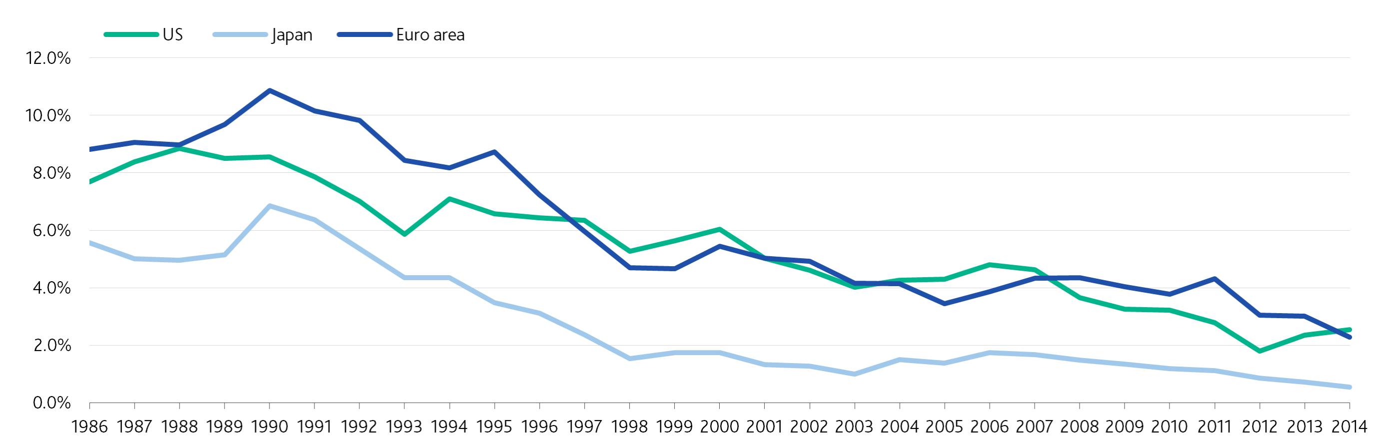
We expect interest rates to remain low in most economies

In most advanced economies, interest rates have declined to historically low levels (Exhibit 2). Although we do expect interest rates to begin to rise in some regions, such as the US and UK, over the near term, rates will remain very low in North America, in Europe and in many large Asian economies.

In our central scenario, we expect the 10-year US Treasury rate to rise to 2.3% at year-end 2015 and to return to the pre-2008 level of 4.8% only in 2019. In the euro area, the quantitative easing policy announced by the European Central Bank in January 2015 will likely keep interest rates at a depressed level for a prolonged period. We also expect interest rates in Japan to remain very low. On 28 February, the People's Bank of China, the Chinese central bank, also decided to lower its benchmark one-year lending rate to 5.35% from 5.60%, making this the second round of rate cuts since November 2014.

Exhibit 2

10-year bond yields have reached historically low levels in most major economies



Sources: Moody's Investors Service, data from US Board of Governors of the Federal Reserve System, Bank of Japan, International Monetary Fund and European Central Bank

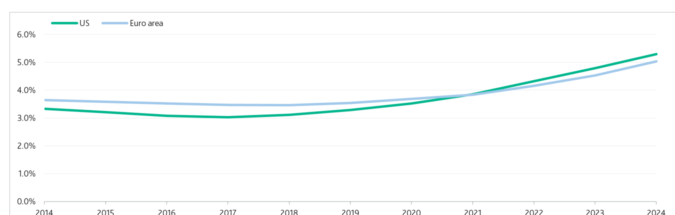
Insurers' investment returns will decline

Insurers invest predominantly in fixed income securities, and consequently their investment returns correlate strongly to interest rates. Because interest rates will remain low by historical standards, including in economies where we expect interest rates to rise, new money and maturing assets will be reinvested at yields that will be lower than current portfolio yields. As a result, insurers' investment returns will continue to decline for many years.

Exhibits 3 and 4 illustrate how the portfolio yield of an insurer investing only in 10-year government bonds and reinvesting 10% of its assets every year would evolve over the next 10 years in two scenarios.[1] If we assume, optimistically, an increase in interest rates of 50 bps every year from 2014 levels (Exhibit 3), the insurer's portfolio yield would continue to decline for the next three years in the US, and for the next four years in the euro area, before starting to rise again. If we assume unchanging interest rates after year-end 2014 (Exhibit 4), the insurer's portfolio yield would decline for the next seven years in the US and the next 10 years in Europe, before stabilising at the year-end 2014 level of interest rates.

Exhibit 3

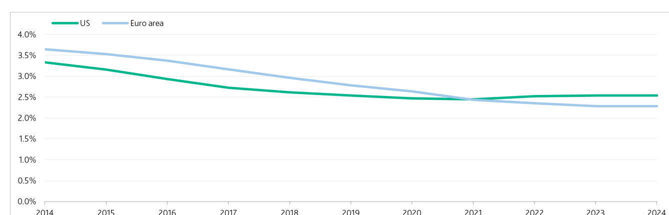
10-year moving average of 10-year government bond yields (assumes a yearly 50 bps increase after 2014)



Sources: Moody's Investors Service, data from US Board of Governors of the Federal Reserve System and European Central Bank

Exhibit 4

10-year moving average of 10-year government bond yields (assumes stagnation at 2014 levels)



Sources: Moody's Investors Service, data from US Board of Governors of the Federal Reserve System and European Central Bank

Low interest rates expose life insurers to a risk of losses and therefore the risk of a decline in capital

A decline in investment returns typically translates into lower profits for insurance companies.

Life insurers can offset the impact on profits of reduced investment returns by distributing less to policyholders. Indeed, many life insurance products are "participating products", in which life insurers distribute benefits according to the level of their investment returns. When investment returns decline, they can share the pain with policyholders.

Nonetheless, life companies also typically grant long-term guaranteed rates to policyholders for some of their products and they cannot give less than these guaranteed rates. The decrease in investment returns owing to low interest rates raises the risk that insurers' overall returns will be lower than the level of guarantee promised to policyholders, leading to negative financial results. Absent other sources of profits sufficient to offset these losses, insurers would report net losses and therefore a decline in capital.

The full impact of low interest rates is not always immediately visible in insurers' accounts

The risks life insurers face in a low interest rate environment are usually not immediately visible in their accounts or solvency ratios. Paradoxically, a decline in interest rates can appear to have positive effects on insurers' accounts. Indeed, in many jurisdictions, insurance liabilities are accounted for at amortised cost with a fixed interest rate, and their valuation is not sensitive to changes in market rates. However, assets could be accounted for at fair value, such that the value of fixed income securities increases when interest rates decrease. In these cases, even as the risk of future losses increases, reported shareholders' equity also increases.

The effects of low interest rates will be revealed only progressively in insurers' accounts, through a progressive decline in financial results (owing to lower investment returns[2]), as well as through potential and progressive intangible asset write-downs[3] or ad hoc reserve increases.[4]

In some jurisdictions, however, the accounts or the regulatory solvency ratios more accurately reflect the impact of a decline in interest rates because insurance liabilities are valued on a market-consistent basis, as is the case in the Netherlands or Canada for example. Solvency II ratios, which European companies will start reporting in 2016 will also better reflect interest rate risk, as will solvency ratios reported under the new China Risk Oriented Solvency System.

We believe that economic or market-consistent frameworks better illustrate the risks to insurance companies during a prolonged period of low interest rates. In our ratings, we give more weight to these metrics than to traditional ones when we assess insurers' ability to weather through such a period.

Low interest rates have less of an effect on P&C insurers

The effects of low interest rates are more pronounced for life insurers than for P&C insurers, largely because of differences in product offerings. The bulk of life insurance premiums pertain to savings business or long-duration liabilities. In many life savings products, the main value proposition is investment yield to the customer and spread income to the insurer. Low interest rates directly challenge the value proposition.

P&C insurers, however, focus almost entirely on products that protect against adverse events such as lost or damaged property or financial claims on the insured by other parties. P&C insurers seek a combination of underwriting and investment income, but the heart of a P&C product is protection, not an investment return promised to the customer.

Therefore, when facing low interest rates and declining investment income, P&C insurers can often raise premium rates to boost underwriting income. Most P&C policies re-price every year, which helps insurers adapt to changing market conditions. The P&C sector also benefits from the mandatory nature of its largest product lines, such as motor insurance (required for customers to register their cars) and home insurance (required for customers to secure home financing).

P&C insurers face their own unique risks, most importantly natural and man-made catastrophes, and adverse development of loss reserves, particularly on long-tail casualty lines. While a P&C policy period typically runs for a year (or less), the resulting claims can take many years to develop and settle. Accordingly, P&C insurers are exposed to claims inflation and fluctuating yields on invested premiums. But P&C insurers' exposure to low interest rates is tempered by their ability to raise prices, subject to competitive pressures in their chosen markets.

The rest of this report focuses on life insurers.

2) Low interest rates are a global issue, but risk varies by country

We use four main factors to assess vulnerability to low interest rates

Although low interest rates are a global issue, the risk varies significantly by insurer. We use four main factors to assess an insurer's exposure to low interest rates:

› **The proportion of guaranteed products and other interest rate sensitive products in the business mix**

The insurers most vulnerable to a low interest rate environment are those with large portfolios of either insurance savings products that promise long-term guaranteed rates or other long-term products, such as long-term care products or annuities, which are priced assuming a certain level of long-term interest rates.

Conversely, insurers with large portfolios of savings products with no guarantees or of short-term health and protection products will be the least vulnerable to low interest rates.

› **The average guaranteed rate on in-force policies**

Generally, the higher the guaranteed rate promised to policyholders, the higher the risk that an insurer's investment returns will fall below the guaranteed rate.

› **The spread between investment returns and the guaranteed rate, as well as the features of the products (which give companies the ability to reduce credited rates)**

As a rule, the lower the spread between an insurer's investment returns and the guaranteed rate, the higher the risk that the investment returns will fall below the guaranteed rate.

However, we also take into account the features of the products in our analysis.

In some markets, life savings products are "participating" products, meaning that policyholders receive a share of the investment returns or other results, in addition to the guaranteed rate. When interest rates decline and investment returns decline, insurers can therefore lower their distributions to policyholders (as long as they distribute at least the guaranteed rate), and the impact of the decline in rates is partly borne by policyholders. When insurance products are not of this type, the insurance company bears the full impact of the decline in rates.

In addition, we differentiate between yearly guarantees and guarantees given only at policy maturity. We consider guarantees at maturity to be less risky than yearly guarantees because the former usually gives insurers more flexibility in terms of asset liability management and makes them less dependent on interest rate-driven performance.

Lastly, we factor into our analysis the mechanisms of distribution of credited rates. In some markets (such as South Africa), insurers can claw back bonuses distributed in previous years. Theoretically, life insurers could use these funds to offset a large decline in investment returns.

› **The gap between the duration of the insurer's assets and the duration of its liabilities**

When the duration of a life insurer's assets is shorter than that of its liabilities (meaning that, on average, its assets will mature before its insurance obligations do), the insurer will have to reinvest a part of the portfolio before its policies mature. If insurers promise a high guaranteed rate to policyholders and interest rates subsequently fall, they could be forced to reinvest at a yield that will prevent them from paying the guaranteed rate.

Conversely, when the duration of assets is the same as that of liabilities, an insurer faces less reinvestment risk or less risk of not being able to meet its obligations,[5] provided that the guaranteed rate it promised to policyholders was not higher than the asset yield available in the market when it sold the policies.

Similarity of risks within a single country

These four factors and the resulting level of risk in a low interest rate environment vary significantly by insurer. Nonetheless, similarities exist among insurers operating in the same market.

The level of guaranteed rate, for instance, is very similar for all life insurers in one country, reflecting local market practices and sometimes regulatory constraints.

The duration gap (between assets and liabilities) varies more significantly between two insurers operating in the same country, but even then there are some commonalities. The duration gap partly reflects the nature of the products sold: in countries where policies have a very long duration, duration gaps tend to be wider because very long duration assets are not always available. However, the gap also reflects regulatory and accounting practices: in countries where duration gaps are penalised through specific reserve requirements, or through market-consistent basis valuations of the balance sheet, duration gaps tend to be narrower.

Exposure of main life insurance markets to low interest rates risk (Moody's assessment)

We have assessed each of these four factors for 21 large life insurance markets, which allows us to assess the overall level of risks that life insurers would face in the event of a prolonged low interest rate period in each of these markets. The results of this analysis are summarised in Exhibit 5 below. We provide more details on each market in Appendix 1.

We found that life insurance markets could be classified into five different buckets:

» The "very high risk to profitability" bucket includes markets in which investment returns are already below or close to the guaranteed rate and where the duration gap is wide on average. The results of many insurers in these markets are likely to deteriorate and the capital of some of the insurers in these markets will deteriorate if interest rates stay low over the next five years. Germany, the Netherlands and Taiwan are in this bucket. Norway is also in this bucket, although potential declines in capital may take longer to emerge because interest rates are currently higher in Norway than in the European Union or Taiwan.

» The "high risk to profitability" bucket includes markets in which investment returns are already below or close to the guaranteed rate but the duration gap is narrow on average. The financial results of many insurers in these markets are likely to deteriorate and the capital of some could progressively deteriorate if interest rates stay low over the next five years. Japan, South Korea and Switzerland are included in this bucket. However, in these countries insurers also usually benefit from sizeable technical results which partly offset pressure on investment results. Still, the capital of less diversified insurers could progressively deteriorate. Sweden is also included in this bucket, despite a wide reported duration mismatch, because Swedish insurers mostly provide

guarantees at maturity only and, in our view, are in a position to narrow their duration gap if they replace their equity exposure with fixed income securities.

» The "moderate risk to profitability" bucket includes markets in which insurers have a very narrow duration gap (e.g., Canada, Italy, the US) or a relatively high ability to lower credited rates (e.g., France, Hong Kong). In these markets, investment returns remain above the guaranteed rate. The profits of many insurers will progressively deteriorate if interest rates stay low over the next five years. Their investment returns will decline and the reduction in credited rates will not fully offset this decline. However, the risk of losses is limited. We also expect interest rates to rise in Canada and in the US, which will alleviate pressures on insurers' investment returns in these markets.

» The "low risk to profitability" bucket includes markets in which guaranteed products have specific features that limit the overall risk for insurers. South Africa, where insurers have the ability to claw back bonuses, and Spain, where insurers mostly offer products with durations and guaranteed rates that correspond to the duration and yield of the assets backing the liability, are in this bucket. We also include China in this bucket because the market is growing so quickly that new business is rapidly diluting in-force policies and the risk of not being able to meet past guarantees can be offset by increasing margins on new business.

» The "very low risk to profitability" bucket includes markets in which the weight of guaranteed products is low and the guarantees themselves are very low. As a consequence, the risk of a decline in the profitability of insurers in these markets is very low if interest rates stay low. Australia, Brazil, Ireland, Mexico and the UK are in this bucket.

These assessments are based mostly on the direct impact of low interest rates on insurers' profitability generated by in-force policies. However, low interest rates will also hurt insurers' sales or new business margins indirectly, which will also affect insurers' profitability. We discuss some of these impacts briefly in the next section.

In addition, some insurers operating in the most vulnerable countries could have much lower exposure to low interest rates than indicated in our assessment above. Conversely, some insurers operating in the least vulnerable countries could have much higher exposure to low interest rates than our results suggest. Please refer to Appendix 1 for more details on each market, including comments on the heterogeneity of each market.

Exhibit 5

Moody's assessment of the level of risk that major life insurance markets face in a prolonged period of low interest rates

	COUNTRY	REGION	WEIGHT	2013 PREMIUMS (USD MILLIONS)	GUARANTEED PRODUCTS *as % reserves*	AVERAGE GUARANTEED RATE	ABILITY TO REDUCE CREDITED RATES	DURATION GAP
VERY HIGH RISK TO PROFITABILITY	GERMANY	Europe	4%	$114,349	> 80%	3-3.5%	low to medium	> 10 yrs
	NETHERLANDS	Europe	1%	$26,005	60-80%	3.5-4%	low	5-8 yrs
	NORWAY	Europe	1%	$13,909	60-80%	3-3.5%	medium	> 10 yrs
	TAIWAN	Asia	3%	$75,013	> 80%	4-5%	low	5-8 yrs
HIGH RISK TO PROFITABILITY	JAPAN	Asia	16%	$422,733	60-80%	2-3%	low to medium	2-5 yrs
	SOUTH KOREA	Asia	3%	$91,204	> 80%	5-6%	low to medium	0-2 yrs
	SWEDEN	Europe	1%	$30,865	40-60%	3-3.5%*	low to medium	> 10 yrs
	SWITZERLAND	Europe	1%	$34,227	> 80%	1.5-2.5%	low	0-2 yrs
MODERATE RISK TO PROFITABILITY	CANADA	N. America	2%	$52,334	60-80%	2-4%	medium	1-3 yrs
	FRANCE	Europe	6%	$160,156	> 80%	0-1%	medium to high	2-5 yrs
	HONG KONG	Asia	1%	$32,059	60-80%	2.5-3.5%	medium	N/A
	ITALY	Europe	5%	$117,978	60-80%	2-3%	medium	0-2 yrs
	US	N. America	20%	$532,858	60-80%	2-4%	low to medium	< 1 yrs
LOW RISK TO PROFITABILITY	CHINA	Asia	6%	$152,121	> 80%	2-3%	high	N/A
	SOUTH AFRICA	Africa	2%	$44,556	60-80%	N/A	high	N/A
	SPAIN	Europe	1%	$33,862	> 80%	3.5-4%	low	0-2 yrs
VERY LOW RISK TO PROFITABILITY	AUSTRALIA	Pacific	2%	$45,641	< 20%	0-1%	high	N/A
	BRAZIL	LatAm	2%	$49,417	< 20%	N/A	N/A	N/A
	IRELAND	Europe	2%	$46,929	< 20%	1-2%	high	< 0 yrs
	MEXICO	LatAm	0%	$12,470	< 20%	N/A	N/A	N/A
	UK	Europe	9%	$222,893	20-40%	0-1%	high	< 0 yrs

This assessment is made at the country level and mostly focuses on the direct impact of low interest rates on profitability generated by in-force policies. However, not all insurers in each country face the same level of risk. Moody's insurance financial strength ratings reflect the specificities of each individual insurer. Please refer to moodys.com for research on Moody's-rated insurers.

Additional notes:
- "Weight" refers to the weight of the market in the worldwide life insurance market in 2013 (total life insurance premiums: USD2.6 trillion)
- "Guaranteed products" also include long-term non-savings products with interest-rate assumptions embedded in their pricing; some data are Moody's estimates
- "Average guaranteed rate": an asterisk (*) means that guarantees are mostly at policy maturity; some data are Moody's estimates
- "Duration gap": a positive number means assets are shorter than liabilities; the higher the duration gap, the higher the reinvestment risk and the higher the risk in a prolonged period of low interest rates; some data are Moody's estimates

Sources: Moody's Investors Service; please refer to Appendix 2 for more details on sources of information

3) Insurers are responding to the challenge, and their actions will have mixed credit implications

All insurers facing the negative impacts of low interest rates are acting in order to protect their profitability and capital. Exhibit 6 below summarises the main actions taken by insurers and their expected credit implications. We intend to comment further on some of these topics in future reports.

Exhibit 6

Life insurers' primary measures to cope with low interest rates and credit implications

Action	Positive Credit Implication	Negative Credit Implication
Lowering credited rates on in-force policies	Offsets the risk to insurers' profitability of declining investment returns	Makes savings products less attractive to policyholders (which could decrease sales and increase surrenders)
Offering lower guaranteed rates on new business	Helps reduce the average guaranteed rate over time, but does not immediately have a significant impact on the balance sheet	Makes savings products less attractive (which could lead to a decline in sales)
Diversifying into health/protection	Lessens insurers' reliance on investment results and therefore their exposure to low interest rate risk	Could expose insurers' balance sheets to long-term (and difficult to estimate) risks (e.g., longevity risk); also increases exposure to political risks owing to the strong involvement of governments in health and retirement fields
Diversifying into unit-linked/asset management business	Lessens insurers' reliance on investment results and increases fee-based profits; therefore lessens their exposure to low interest rate risk	Brings insurance products closer to asset management products and increases the field of competitors for insurers (which could lead to a decline in margins)
Changing asset allocation	Could increase investment returns	Decreases insurers' balance sheet liquidity (as insurers invest more in illiquid asset classes) and could increase asset risk
Implementing hedging strategies, e.g. through the use of interest rate derivatives to lengthen the duration of assets	Shortens the duration gap and hence minimizes interest rate risk	Reduces profitability owing to the high costs of such strategy if implemented when interest rates are already low; also increases liquidity risks due to cash calls for collateralization purposes when interest rates increase

Source: Moody's Investors Service

These strategies have already been implemented for a long time in some countries. Hence, in Japan, where interest rates have been very low for a long time, insurers have lowered credited rates and guarantees on new business, and have diversified into health/ protection with relative success in many cases (see Appendix 1 for more details on the Japanese life insurance market). Similarly, some Dutch insurers, and to a lesser extent some German insurers, have implemented long-term hedging strategies in the mid-2000s, before interest rates started to decrease rapidly (see Appendix 1 for more details on the Dutch and the German life insurance markets), hence significantly reducing their vulnerability to a prolonged period of low interest rates. Our ratings on those insurers already reflect their reduced risk. Insurers that have only recently started to implement these measures will benefit more gradually.

Appendix 1: Additional Information on Risk for Major Life Insurance Markets Stemming from Persistently Low Interest Rates

Please refer to Appendix 2 for details on the sources of information provided below.

Countries in the "Very High Risk to Profitability" Bucket

Germany

» 2013 Life Gross Premiums Written = USD114 billion (4% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 90%

» Average guaranteed rate ~ 3.1%-3.2% (Moody's estimate)

» 10-year moving average of long-term government bonds = 2.8%

» Assets duration ~ 10 years / Liabilities duration ~ 20 years / Duration gap ~ 11 years

German life insurers provided guarantees to their policyholders at over 3% per annum until 2003. Although the guaranteed rate on policies underwritten since 2004 has fallen progressively and is now limited to 1.25% (since 1 January 2015), the average guaranteed rate on the in-force business (i.e., policies that have not yet matured) remains above 3%. Furthermore, German life liabilities have a very long duration (and typically only achieve total run-off over more than 60 years), while the duration of German life insurers' assets is significantly shorter. The duration gap between assets and liabilities is more than 10 years, one of the largest in Europe. Because of this substantial reinvestment risk, Germany is one of the most exposed markets in Europe and globally to a prolonged low interest rate environment.

Life insurers' investment yields remain higher than the guaranteed rate, and the participating nature of German life insurance products (according to which insurers distribute to policyholders a large portion of investment and technical results on top of the guarantee) have offered some flexibility to insurers to limit the impact of low yields on their accounts so far. However, the ability to lower credited rates is declining rapidly as yields get closer to the guaranteed rate. Moreover, German life insurers' regulatory solvency has declined in the last five years partly because insurers are using a portion of their capital buffer to continue to credit high rates to policyholders. The government and regulator have taken several measures in the last five years to strengthen the sector, including forcing insurers to set aside specific reserves (*Zinszusatzreserve*) and to lower guarantees on new business. In spite of these reforms, we believe that the industry as a whole will incur losses if interest rates stay low.

Nonetheless, not all German insurers face the same level of risk. We believe that the German life insurers that we rate, including Allianz Lebensversicherungs-AG (Aa2 insurance financial strength, stable), AXA Lebensversicherung AG (Aa3 insurance financial strength, stable), ERGO Lebensversicherung AG (Aa3 insurance financial strength, stable), the life subsidiaries of Generali Deutschland (rated A3 for insurance financial strength, stable) and Zurich Deutscher Herold Lebensversicherung AG (A1 insurance financial strength, stable), have better risk profiles than the sector average thanks to lower duration gap than the average of the sector, a higher proportion of unit-linked policies or higher profits generated from risk and protection policies.

The Netherlands

» 2013 Life Gross Premiums Written = USD26 billion (1% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 60%

» Average guaranteed rate ~ between 3.5% and 4.0% (Moody's estimate)

» 10-year moving average of long-term government bonds = 3.1%

» Assets duration ~ 9 years / Liabilities duration ~ 15 years / Duration gap ~ 5 years

The highly competitive environment in the Dutch market has forced life insurers to maintain high minimum guaranteed rates on life products (between 3% and 4%) for a long period. As a result, the average guaranteed rate on guaranteed products in the Netherlands is one of the highest in Europe, above 3.5%, and some life companies are reporting investment yields lower than their guaranteed rate. In addition, although unit-linked products constitute around 40% of insurers' liabilities, these products also carry some guarantees in the Netherlands.

Dutch life insurance products have historically been sold in conjunction with mortgages or for pension purposes and have therefore very long durations, which poses a challenge when it comes to asset-liability management. However, the Dutch regulatory regime relies on a market-consistent approach to value insurance liabilities, which has created incentives for life insurers to minimize their duration gaps (to lower volatility in their regulatory solvency ratios). This explains why the duration gap is on average narrower than in countries such as Germany, although it remains high.

Some of the largest Dutch life companies that we rate, including Aegon N.V. (A3 senior, stable) and NN Group N.V. (Baa2 senior, stable), have had a disciplined asset-liability management policy for years and the sensitivity of their solvency ratios to changes in interest rates is relatively low. These companies should be able to withstand a prolonged low interest rate environment. However, other companies, including SRLEV (Baa3 insurance financial strength, under review with direction uncertain), have experienced significant declines in capitalisation owing to the significant gap between their asset and liability durations.

Norway

» 2013 Life Gross Premiums Written = USD14 billion (1% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 75% (private pension only, Moody's estimate)

» Average guaranteed rate ~ between 3% and 3.5% (Moody's estimate)

» 10-year moving average of long-term government bonds = 3.5%

» Assets duration ~ 6 years / Liabilities duration above 20 years / Duration gap above 14 years (Moody's estimate)

Norwegian private pension sector's largest product (44% of industry's private pensions liabilities as of September 2014) are "paid-up" policies for which the guarantee is set for the duration of the policy. We estimate that the average guaranteed rate on these products was around 3%-3.5% at year-end 2014.

Norwegian life insurers' investment returns are currently above the average guaranteed rate. However, we expect that, as government bond yields continue to decline (the 10-year government bond yield was 1.60% at March 2015), investment returns will decrease faster than the average guaranteed rate, because Norwegian life insurers operate with a significant duration mismatch. We estimate that the Norwegian private insurers' average duration in investments backing guaranteed policies is around six years, which is considerably shorter than the duration of their liabilities, which often extends beyond 20 years.

Besides paid-up policies, Norwegian life insurers' balance sheets include other guaranteed products (constituting 31% of Norwegian private pensions liabilities), but for which insurers are able to change their pricing every year, as well as unit-linked products (25% of liabilities). These products do not expose insurers to interest rate risk.

Nevertheless, we believe life insurers with a significant number of paid-up policies remain vulnerable to a sustained low interest rate environment owing to the significant duration mismatch. In December 2014, we downgraded the Baa1 insurance financial strength rating (stable) on Storebrand Livsforsikring by one notch owing to these concerns. We also affirmed the A2 insurance financial strength rating (negative) on Kommunal Landspensjonskasse in light of the group's lower risk liability profile, which is oriented toward public pension schemes and allows for annual re-pricing of guarantees.

Taiwan

- 2013 Life Gross Premiums Written = USD75 billion (3% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 90% (Moody's estimate)
- Average guaranteed rate ~ between 4% and 5% (Moody's estimate)
- 10-year moving average of long-term government bonds = 1.7%
- Duration gap ~ between 5 and 8 years (Moody's estimate)

Taiwanese insurers sold products with high guaranteed rates (over 6%) until the early 2000s. Given the current low interest rate environment, policyholders of this legacy business are likely to hold on to their policies, which typically have long maturity periods. Furthermore, given the lack of long-dated high-quality fixed-income instruments in the local market, there is a general duration mismatch between assets and liabilities, exposing insurers to a significant reinvestment risk.

Taiwanese insurers have adopted rather aggressive investment strategies, with sizeable exposures to real estate and overseas investments, in an effort to mitigate negative spread through higher asset yields. Some of the largest life insurers, such as Cathay Life Insurance Co., Ltd (Baa2 positive) and Fubon Life Insurance Co Ltd (A3 stable), have recently achieved asset yields that are marginally higher than the average guaranteed rate. However, the ongoing profitability pressure from legacy business and the aggressive investment strategies are key factors constraining the credit profile of several life insurers in Taiwan.

Countries in the "High Risk to Profitability" Bucket

Japan

- 2013 Life Gross Premiums Written = USD423 billion (16% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 75% (Moody's estimate)
- Average guaranteed rate ~ between 2% and 3% (Moody's estimate)
- 10-year moving average of long-term government bonds = 1.3%
- Duration gap ~ between 2 and 3 years

The weight of policies with guaranteed rates account for around 75% of total insurance reserves in Japanese life insurers' balance sheets. Although the average guaranteed rate has declined thanks to the expiration or maturity of old policies with high guaranteed rates and insurers' efforts to increase reserves for such policies, it remains high, at around 2.5%, considering the current 1.1% yield of 20-year Japanese Government Bonds (JGBs) and many players have regularly reported investment yields lower than the guaranteed rate in the last decade. Furthermore, at the current, extremely low interest rates, even new sales of savings type policies are likely to incur negative spread.

Japanese life insurers are also exposed to reinvestment risk. Japanese life insurers have narrowed their duration mismatch in the last five years by increasing purchases of long-term JGBs, resulting in a significant reduction in embedded value sensitivity to changes in domestic yields. However, given the current ultra-low JGB yields, the cost of further improvement has risen, and we expect insurers to slow purchases of long-term domestic bonds.

We have not taken any rating actions recently on Japanese life insurers because of the extremely low interest rate environment. We believe that most life insurers are well positioned to maintain their current credit profiles, thanks to favorable underwriting results which continue to benefit from high mortality/morbidity gains and greater underwriting discipline, given that many insurers have

introduced an economic value-based approach as a management tool. Insurers have also benefited from the good performance of foreign investments as the yen weakened. Nonetheless, a higher allocation to non-yen assets also introduces new and unfamiliar risks.

South Korea

- 2013 Life Gross Premiums Written = USD91 billion (3% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 80% (Moody's estimate)
- Average guaranteed rate ~ between 5% and 6% (Moody's estimate)
- 10-year moving average of long-term government bonds = 4.5%
- Duration gap ~ between 0 and 2 years (Moody's estimate)

South Korean life insurers sold products with high guaranteed yields (over 6%) until the early 2000s. Although interest rates have been higher than in other European or Asian economies in the last 10 years, the general decline in interest rates has resulted in the life industry's facing significant negative spreads, which has constrained the industry's overall profitability. Many players still have negative spreads, i.e. an investment yield that is lower than the average guaranteed rate.

Furthermore, 10-year Korean government bond yields are now significantly lower than their long term average, and the risk of decline in insurers' investment returns is therefore very high. However, the country's risk-based capital regime encourages South Korean insurers to minimize asset-liability duration mismatch and hence minimize their exposure to interest rate risk. The duration mismatch is therefore relatively low, although some reinvestment risk exists.

To mitigate profitability pressures from legacy business, South Korean life insurers have shifted their product mix from fixed rate guaranteed products into floating rate and protection products, which are subject to less interest rate risk. Although it will take years for the legacy business to run off, floating rate and protection products help diversify sources of earnings and improve the quality of earnings.

Sweden

- 2013 Life Gross Premiums Written = USD31 billion (1% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ slightly below 60%
- Average guaranteed rate ~ 3.0% to 3.5% (at maturity, Moody's estimate)
- 10-year moving average of long-term government bonds = 2.9%
- Assets duration ~ 4 years / Liabilities duration ~ 15 years / Duration gap ~ 10 years (excluding non-fixed-income assets)

Swedish life insurance companies have high average guaranteed rates, at an estimated 3.0-3.5%. Although the guarantee on new business has declined significantly over the years to 2% and below, the average guarantee remains higher owing to the long duration of policies sold in the past. Nevertheless, many Swedish life insurers offer guarantees at maturity only, as opposed to annual guarantees, which are less onerous to provide for, with significant participating features.

Although the country's regulatory regime requires that life insurers discount liabilities at market-consistent rates, which should in theory encourage asset-liability duration matching, the Swedish life insurers' duration mismatch is significant. However, this also reflects a very high exposure to equities (39% of investments at year-end 2013). The risk arising from short-term equity volatility is partially mitigated by the predominant limitation of guarantees at policy maturity and by the significant profit-sharing element.

We believe that the introduction of Solvency II in January 2016 will likely lead to a decline in equities exposure and an increase in allocation to longer-duration fixed-income securities. The reported solvency of the Swedish life insurers already reflects the impact of low interest rates given that their liabilities are already discounted on a market-consistent basis.

The Swedish life insurers that we rate have relatively low exposures to interest rate risk. Storebrand Livsforsikring AS (Baa1 insurance financial strength, stable) owns a Swedish life subsidiary, SPP, whose duration gap is small. Skandia Insurance Company (A2 insurance financial strength, stable) is a unit-linked company owned by Skandia Liv (unrated).

Switzerland

- 2013 Life Gross Premiums Written = USD34 billion (1% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 90%
- Average guaranteed rate ~ between 2% and 3% (individual life, Moody's estimate)
- 10-year moving average of long-term government bonds = 1.8%
- Duration gap ~ between 0 and 2 years (Moody's estimate)

The weight of guaranteed products on Swiss life insurers' balance sheets is high, at around 90%. However, guaranteed products include two main types of products with different levels of exposure to interest rate risk. Group life products offer a guaranteed rate that is fixed by the government. This guaranteed rate is reviewed every year, and any change in the guaranteed rate applies not just to new business but also to in-force policies. Therefore, the interest rate risk associated with life products is relatively low, as long as the government's decisions take into account changes in market interest rates, which has been the case the last decade. Individual life insurance products, however, have a fixed guaranteed rate set for the entire duration of the policy. In this portfolio, the average guaranteed rate is between 2% and 3%, which is high given the very low interest rate environment that has prevailed in Switzerland for many years.

The introduction in 2006 of the Swiss Solvency Test (SST), a risk-based regulatory regime relying on a market-consistent approach has also given life insurers an incentive to maintain a small duration gap between their assets and liabilities. Swiss life insurers also benefit from high technical results (mortality/morbidity gains) that offset pressures on investment income.

As a result, insurers that we rate in Switzerland, such as AXA Versicherungen AG (Aa3 insurance financial strength stable), which owns AXA Leben AG, the leading Swiss life insurer, have managed to report strong results in a low interest rate environment and face low solvency risk over the short to medium term. However, prolongation of the low interest rate environment would increase the risk of losses over the long-term. Furthermore, Swiss authorities are envisaging raising the share of investment results that need to be shared with policyholders (from 90% to 92%), which could place further pressure on Swiss insurers' margins.

Countries in "Moderate Risk to Profitability" Bucket

Canada

- 2013 Life Gross Premiums Written = USD52 billion (2% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ between 60% and 80% (Moody's estimate)
- Average guaranteed rate ~ between 2% and 4% (Moody's estimate)
- 10-year moving average of long-term government bonds = 3.2%
- Duration gap ~ between 1 and 3 years (Moody's estimate)

The Canadian life insurers are sensitive to interest rate fluctuations, and their profitability weakens when investment returns approach minimum crediting rates or are insufficient relative to the interest rate assumptions embedded in guaranteed premium rates and other guarantees.

C-IFRS (Canadian International Financial Reporting Standards) requires that the industry recognize losses arising from declining rates immediately. This situation is very different from that of US-based life insurers for whom the accounting tends to delay the recognition of the impact of persistently low interest rates. We expect interest rates in Canada to rise in 2015, but if rates do remain very low, earnings pressure resulting from spread compression, lower investment income and the attendant increased cost of hedging against low interest rates will remain a drag on earnings.

France

- 2013 Life Gross Premiums Written = USD160 billion (6% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 85%
- Average guaranteed rate ~ 1% (Moody's estimate)
- 10-year moving average of long-term government bonds = 3.2%
- Assets duration ~ 8 years / Liabilities duration ~ 12 years / Duration gap ~ 5 years

French life insurers' balance sheets are dominated by traditional guaranteed products, whereby insurers offer a guaranteed rate (yearly guarantee set for the entire duration of the policy) and distribute to policyholders a high portion of investment results generated in addition to the guaranteed rate. Insurers can also provide a short-term guaranteed return on some of their products (typically for one year only, and this return has to be decided at the beginning of the year).

Although French insurers report a relatively large duration gap, the risk in a low interest rate environment is relatively limited thanks to a very low average long-term guaranteed rate. Most life products have offered only a 0% guaranteed rate for the last 10 to 20 years. Given the duration of insurers' assets (around eight years), life insurers' investment yields will not bump into the average guaranteed rate for many years.

The low average guaranteed rate and the participating features of French life policies also allow insurers to lower credited rates as their investment yields decline, which protects their profitability. Nonetheless, competition and a willingness to maintain the attractiveness of their main product tend to constrain this ability, hence our belief that all French life insurers are exposed to the risk of a progressive decline in profitability in a prolonged low interest rate environment.

Hong Kong

- 2013 Life Gross Premiums Written = USD32 billion (1% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 75% (Moody's estimate)
- Average guaranteed rate ~ between 2.5% and 3.5% (Moody's estimate)
- 10-year moving average of long-term government bonds = 2.7%

Unlike other North Asian economies such as Taiwan and Korea, there is no prescribed rate for product pricing in Hong Kong. Participating products contributed to about 60% of net liabilities as of year-end 2013, with non-participating contributing 15% and unit-linked 25%.

Given the profit sharing nature of participating business, a reduction in investment returns can be partly shared with policyholders through a dividend adjustment mechanism. The majority of the unit-linked business written does not provide financial guarantees, making the industry more resilient to a prolonged low interest rate environment.

However, given the lack of depth and breadth of the local market for longer term bonds, investing in USD fixed-income securities to shorten duration gaps, while bearing foreign exchange risk, is not uncommon.

Italy

» 2013 Life Gross Premiums Written = USD118 billion (5% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 80%

» Average guaranteed rate ~ between 2% and 3% (Moody's estimate)

» 10-year moving average of long-term government bonds = 4.3%

» Assets duration ~ 8 years / Liabilities duration ~ 7 years / Duration gap ~ 1 year

Although interest rates have been declining for many years in Europe, the Italian insurance sector benefited from high spreads and therefore high yields on Italian government bonds between 2011 and 2013. These high spreads allowed insurers to report high investment returns. However, spreads on Italian government bonds declined significantly in 2014, and Italian insurers must now also contend with the challenge of low interest rates, which will progressively reduce their investment income.

The risk that their investment income will fall below the rate guaranteed to policyholders is low, given the average guaranteed rate on in-force business of between 2% and 3%. Furthermore, the gap between the duration of Italian insurers' assets and that of their liabilities is limited on average, which also limits the vulnerability of Italian insurers to the low interest rate environment. Italian insurers' asset liability management is facilitated by low-duration liabilities of around seven years, one of the shortest durations in Europe.

The participating features of Italian life products limit the impact of declining investment returns on insurers' profitability in the short-term. As an example, Generali Italia S.p.A. (Baa1 insurance financial strength, stable) typically sold policies whereby when investment returns exceed a certain rate, all profits exceeding this rate are distributed to policyholders. In these policies, the decrease in investment returns is fully borne by policyholders as long as investment returns remain above the specified rate. Nonetheless, the spread between investment returns and the specified rate will progressively decline. In addition, competition on guaranteed rate could hurt insurers' profitability.

US

» 2013 Life Gross Premiums Written = USD533 billion (20% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ between 60% and 80% (Moody's estimate)

» Average guaranteed rate ~ between 2% and 4% (Moody's estimate)

» 10-year moving average of long-term government bonds = 3.3%

» Duration gap ~ less than 1 year on average (Moody's estimate)

US life insurers have a very diversified product mix. The products that are the most sensitive to interest rate risk are fixed annuities (deferred and payout), long-term care, long-term disability, variable annuities with guaranteed lifetime benefits and universal life with secondary guarantees. We estimate that these products account for 60% to 80% of industry reserves on a statutory basis. Conversely, primarily participating whole life, term life, group life and non-guaranteed pension products, variable life and annuities without living

benefits, and short-term accident and health policies, which account for approximately 20% to 40% of industry reserves, are less sensitive to interest rate risk.

On average, the difference between portfolio yields and average crediting rates is greater than 1%, with the average US life insurance company portfolio yield below 5% and average crediting rate around 3%. However, such averages are misleading because a substantial number of companies – more and more each year - are crediting guaranteed contractual minimum crediting rates on significant blocks of business, and the ability to further reduce crediting rates is therefore deteriorating. Nonetheless, reinvestment risk remains limited. In general, companies' maximum tolerance level of duration mismatch is one year, although public disclosure of duration mismatch in the US is scant. This one-year target might be harder for insurers to manage to if maintaining yield becomes more challenging and duration matching targets take secondary importance to investment earnings.

In the United States, financial reporting rules do not require immediate recognition of the impact of changes in interest rates in reserves. However, each successive year of low interest rates widens the gap between earned rates and pricing /reserving assumptions and increases the likelihood that companies will need to add reserves or write down related intangible assets in significant numbers at some future date.

We have taken no rating actions solely because of low interest rates in the US; however, in 2014 some long term care writers, such as Genworth Holdings, Inc. (Ba1 senior, negative) and UNUM Group (Baa2 senior, stable), took large reserve charges. Several others reported declines in their active life reserve margins owing to peristently low interest rates, as well as worse than expected claims experience. At the same time, the earnings of many companies in the US benefited from the strong equity markets, which helped offset the drag from low interest rates. We expect interest rates to rise sooner in the US than in other economies, which should also limit interest rate risk for US life insurers.

Countries in "Low Risk to Profitability" Bucket

China

- 2013 Life Gross Premiums Written = USD152 billion (6% of worldwide life premiums)
- 10 year moving average of long-term government bonds = 3.7%

Most of the products sold by Chinese life insurers are participating products, where the prescribed pricing interest rate was at least 5% before it was cut to 2.5% in 1999. The average guaranteed rate of this legacy business is likely to be over 6%. Long standing life insurers such as China Life Insurance (Group) (unrated) have sizeable exposures to this legacy business, given the long-term nature of these policies.

However, since the early 2000s, China's life insurance industry has grown nearly 20% annually (life premium income was CNY100 billion in 2000, CNY1.3 trillion in 2014), which helps dilute the adverse impact of the legacy business.

The Chinese regulator is relaxing pricing rules and as a result we expect more price competition on new business. Nonetheless, we expect Chinese life insurers to maintain rational pricing and underwriting thanks to the new solvency system, China Risk Oriented Solvency System (C-ROSS). Since February 2015, the China Insurance Regulatory Commission announced the final rules for C-ROSS and the commencement of a transition period towards the new regime. While the current capital regime will remain the basis for supervision during the transition period, insurers are now required to begin adopting C-ROSS principles and standards.

Under Pillar 1 (quantitative capital requirement) of C-ROSS, insurers will be charged higher reserving requirements for offering excessively high guarantees. Projected future policyholder dividends for participating products will also be subject to policyholders' reasonable expectations, which means aggressively high policyholder dividend distributions should lead to higher reserves. Also, insurers will be required to hold an additional reserve for the time value of options and guarantees (TVOG). The TVOG reserve requirement will increase with underlying guaranteed rates, and will apply to both participating and universal life products, according to the latest quantitative impact study.

South Africa

- 2013 Life Gross Premiums Written = USD45 billion (2% of worldwide life premiums)
- 10-year moving average of long-term government bonds = 8.3%

South African life insurers' existing blocks of business consist of large volumes of traditional profit-sharing products, although unit-linked policies have been growing significantly in recent years. The average guaranteed rate is usually high in comparison with other countries, but the level of interest rate is also much higher, and the spread between investment returns and guaranteed rates remains high.

In addition, a significant part of the traditional profit sharing policies allows for an annual declaration of bonus based on expectations of smoothed investment returns. A declaration of bonus can be either vested or non-vested. Non-vested bonuses can be clawed back in adverse circumstances, which allows insurers such as Old Mutual Life Assur. Co. (South Africa) Ltd (Baa1 insurance financial strength, stable) to make negative bonus declarations. In our view, these features are significant mitigating factors against interest rate risk, through reductions in credited rates to policyholders.

Spain

- 2013 Life Gross Premiums Written = USD34 billion (1% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 90%
- Average guaranteed rate ~ between 3.5% and 4% (Moody's estimate)
- 10-year moving average of long-term government bonds = 4.3%
- Assets duration ~ 8 years / Liabilities duration ~ 9 years / Duration gap ~ 1 year

The main product sold by Spanish life insurers is one whose guaranteed rate and duration align with the yield and the duration of the assets covering the policy. The reinvestment risk is therefore very limited, and for these products, the vulnerability of the Spanish life insurers to a prolonged low interest rate environment is very low. In addition, new business policies sold in recent years have variable guarantees that can be changed semi-annually, mitigating low interest rates.

Nonetheless, Spanish insurers also sold participating products that expose them to profitability risk, although to a limited extent thanks to the insurers' ability to lower credited rates when investment returns decline. In addition, as in many other countries, the low interest rate environment makes guaranteed products less attractive for consumers and the flattening of the interest rate curve minimizes the differentiation between long-term insurance products and shorter savings products provided by banks or other financial providers. As a result, demand for guaranteed insurance products is lower, which also reduces Spanish insurers' reported earnings.

Countries in "Very Low Risk to Profitability" Bucket

Australia

- 2013 Life Gross Premiums Written = USD46 billion (2% of worldwide life premiums)
- Weight of guaranteed products on balance sheet ~ 15% (Moody's estimate)
- 10-year moving average of long-term government bonds = 4.9%

Guaranteed products constitute only a small portion of the Australian life insurance market. Unit-linked products are predominant in the balance sheet of Australian life insurers and constitute around 75% of the industry's policy liabilities. The vast majority of unit-linked products in Australia do not offer any guaranteed returns.

Insurers have exposures to capital guaranteed products, which constitute around 65% of their non-unit-linked business, that is to say around 15% of their total liabilities, according to our estimates. The non-unit-linked business has discretionary participating features. Considering the discretionary nature of the bonuses, and the low level of guarantees, Australian life insurers' ability to lower credited rates is very high.

Overall, the Australian life insurers' exposure to low interest rate risk is very low.

Brazil

» 2013 Life Gross Premiums Written = USD49 billion (2% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 5% (Moody's estimate)

» 10-year moving average of long-term government bonds = 6.4% (inflation-indexed)

The Brazilian life insurers have generally very low exposures to interest rate risk, because main product lines are retirement annuities, especially the VGBL (*Vida Gerador de Beneficio Livre*) and PGBL (*Plano Gerador de Beneficio Livre*) products, whose participants remain mainly in the accumulation period, during which there are no guaranteed rates. Based on data reported by the market's largest players, including Itau Vida (Baa1 insurance financial strength rating, under review for possible downgrade), we estimate that non-guaranteed products constitute around 95% of Brazilian life insurers' liabilities.

As for the products with guaranteed rates such as FGB (*Fundo Gerador de Beneficio*), and other liabilities with guaranteed rates, guarantees are typically indexed to inflation, plus 0%-6%. However, interest rate risk exposure is typically limited by sound asset-liability management practices and by the availability of assets – mainly Brazilian inflation-linked government bonds – that in most cases allow insurers to match rates and duration, although we estimate that the duration of Brazilian life insurers' assets is shorter than that of their liabilities.

Ireland

» 2013 Life Gross Premiums Written = USD47 billion (2% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 15% (Moody's estimate)

» Average guaranteed rate ~ between 1% and 2% (Moody's estimate)

» 10-year moving average of long-term government bonds = 4.9%

» Duration gap ~ -1 year

The Irish market is predominantly a unit-linked market. The non-unit linked business is made of legacy with profits policies, with a low guaranteed rate. In addition, life insurers can easily lower credited rates. Moreover, the duration gap of the Irish life insurers is very narrow (on average, assets of a longer duration than liabilities), which further limits reinvestment risk.

Overall, a prolonged period of low interest rates would have a very limited impact on the Irish life insurers' in-force portfolio.

Irish life insurers also sell protection products whose new business margins decline when interest rates are low, although the overall impact on insurers' profitability would remain limited given the shorter duration of these products.

Mexico

» 2013 Life Gross Premiums Written = USD12 billion (0% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 20% (Moody's estimate)

» 10-year moving average of long-term government bonds = 7.3%

Mexican life insurance companies have relatively modest exposures to low interest rate risk, because of the relatively modest scale of the pension products managed by the country's insurers and their product profile. Premiums for total life insurance products accounted for just 1.2% of GDP in 2013, and annuity/pension-related premiums accounted for just 6% of total insurance industry premiums.

Private pension funds, in the accumulation phase, are managed by specialized asset managers (called *afores*) which are not classified as insurers and are by law restricted from guaranteeing minimum returns. Conversely, *pensiones* companies (which are insurers) exclusively handle the pay-outs for private pensions and could provide minimum guarantees to their policyholders, but these insurers accounted for just over 20% of insurance industry assets at year-end 2013, and, owing to very strict investment guidelines, are restricted from investing in high-risk instruments to fund their policy liabilities.

By contrast, the most common forms of life insurance – which, along with individual and group life, and accident and health products, accounted for about 50% of industry premiums – offer traditional insurance protection and are mostly term products with short liability durations. Long-term insurance products combined with savings (e.g., universal life) are relatively new in Mexico, although bank affiliated insurers typically offer their private bank clients long-term life-saving insurance products combined with mutual funds savings, to take advantage of tax benefits. However, these products, with limited distribution, do not guarantee any return.

UK

» 2013 Life Gross Premiums Written = USD223 billion (9% of worldwide life premiums)

» Weight of guaranteed products on balance sheet ~ 40% (Moody's estimate)

» Average guaranteed rate ~ 0% (Moody's estimate)

» 10-year moving average of long-term government bonds = 3.6%

» Assets duration ~ 12 years / Liabilities duration ~ 11 years / Duration gap ~ -1 year

More than 60% of the UK life industry's reserves are unit-linked with no interest guarantees. The remaining business consists of with-profit policies and annuities.

In with-profit policies, insurers credit a low annual bonus and grant an additional discretionary final bonus which is contingent on actual investment performance over the life of the policy. The annual bonus is conservatively decided every year based on long-term expected future investment returns. The flexibility in the declaration of annual bonus and the discretionary nature of the final bonus helps insurers adapt to changing market conditions and minimizes their vulnerability to low interest rates. Furthermore, UK life insurers have operated under an economic regulatory framework for many years, which encourages dynamic management of the embedded guarantees in with-profit policies and discounts the liability on a market-consistent basis.

UK annuity writers are somewhat vulnerable to interest rate risk because annuities are long-term products with interest-rate assumptions embedded in their pricing. Therefore, investment yields that prove to be lower than initially assumed in the pricing will hurt insurers' investment results. Nonetheless, UK insurers have a long tradition of matching assets and liabilities for these contracts. Hence, on average, UK life groups report a longer asset than liability duration.

Nevertheless, as in other countries, the UK life insurers' profitability will likely decline as expected returns decrease and the demand for guaranteed retail annuities diminishes.

Appendix 2: Sources of Information

Sources for 2013 gross premiums written:

- Swiss Re Sigma No3/2014, World Insurance in 2013: Steering Towards Recovery

Sources for weight of guaranteed products:

- Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV), Bafin (Germany)
- Insurance Europe, Statistics N°49: The European Life Insurance Market in 2012, 31 Mar 2014 (The Netherlands, Switzerland, France, Italy, Spain)
- Moody's estimates based on data reported by largest private pension providers (Norway)
- Moody's estimates based on data reported by largest players and Finansinspektionen (Sweden)
- Moody's estimates based on data reported by largest players (Taiwan, Japan, South Korea, Canada, Hong Kong, China, South Africa, Australia, Brazil, Ireland, Mexico, UK)
- SNL Financial LC (contains copyrighted and trade secret materials distributed under license from SNL, for recipient's use only) and Moody's estimates (US)

Sources for average guaranteed rate:

- Moody's estimates based on data reported by largest players, Bafin and Bundesbank (Germany)
- Moody's estimates based on data reported by largest players, De Nederlandse Bank (The Netherlands)
- Moody's estimates based on data reported by largest private pension providers (Norway)
- Moody's estimates based on data reported by largest players, International Monetary Fund Financial Sector Assessment (Sweden)
- Moody's estimates based on data reported by largest players (Taiwan, Japan, South Korea, Switzerland, Canada, France, Hong Kong, Italy, US, China, Spain, Australia, Ireland, UK)

Sources for 10-year moving average of long-term yields:

- Organisation for Economic Co-operation and Development (Germany, The Netherlands, Norway, Japan, South Korea, Sweden, Switzerland, Canada, France, Italy, US, South Africa, Spain, Australia, Ireland, UK)
- Central Bank of China, Taiwan (Taiwan)
- Central Bank of Brazil (Brazil)
- Hong Kong Monetary Authority (Hong Kong)
- Bank of Mexico (Mexico)
- Bloomberg (China)
- Moody's Investors Service calculations

Sources for insurers' ability to reduce credited rates:

- Moody's assessment based on (1) the difference between average guaranteed rate and the 10-year moving average of long-term yields (used as a proxy for a lower boundary of insurers' investment returns), (2) the difference between average guaranteed rate and insurers' investment returns (estimated based on data reported by largest players in each market) and (3) product features

Sources for duration of assets, duration of liabilities and duration gap:

- European Insurance and Occupational Pensions Authority, EIOPA Insurance stress test 2014, November 2014 (Germany, The Netherlands, Sweden, France, Italy, Spain, Ireland, UK)
- Moody's estimates based on data reported by largest private pension providers (Norway)
- Moody's estimates based on data reported by largest players (Taiwan, South Korea, Canada, US, Switzerland)
- Bank of Japan (Japan)

Moody's Related Research

Special Reports:

- Storebrand: Storebrand likely to remain vulnerable to low interest rates, March 2015 (1002291)
- European Insurers Face Credit-Negative Quantitative Easing Program, January 2015 (178815)
- European Insurance Stress Test Results Improve Transparency Around Sector's Capitalisation and Sensitivity to Shocks, December 2014 (178212)
- European Insurance: Key Credit Risks for 2015, December 2014 (178211)
- Dutch Life Insurance Market Remains Challenging, December 2014 (178215)
- Asian Insurance Companies: Credit Trends and a Changing Industry Landscape (presentation), October 2014(176440)
- Rated Japanese Insurers Eliminate Negative Spread, July 2014 (171985)
- Norwegian Rules to Convert Guaranteed Paid-Up Policies Are Credit Positive for Life Insurers, July 2014 (172707)
- US Life Insurers Marginally Increasing Investment Risk, May 2014 (170054)
- European Insurance CFOs optimistic about increasing profitability; Low interest rates remain key concern, February 2014 (163463)
- Continued low interest rates have driven US life insurers' statutory reserves higher, November 2013 (160158)
- German Life Insurance Industry Faces Losses If Interest Rates Stay Low, October 2013 (159357)
- China's liberalization on the pricing of traditional life insurance policies will help steer industry towards protection products, August 2013 (157488)
- European Insurance: Low Rates and New Regulations Will Drive Increase in Illiquid Investments, July 2013 (156338)
- P&C Insurance Interest Rate Challenges: Capital Volatility If Rates Keep Moving Up, Lackluster Returns If Rates Stay Low, July 2013 (155919)
- Interest Rates Low, Low, Low: Are US Life Insurers Concerned Enough?. December 2012 (147199)

Industry Outlooks:

- 2015 Outlook - Global Life Insurance: Economic Recovery, Rising Asset Prices and Product Mix Offset Low Interest Rates, December 2014 (1001797)
- US Life Insurance Industry: Outlook Remains Stable, November 2014 (1000486)
- Industry Outlook: Japan Life Insurance, October 2013 (158907)
- UK Life Insurance Industry: Increasing Regulatory and Political Headwinds Prompt Negative Outlook, June 2014 (171412)
- French Insurance: P&C Starts to Feel the Pressure; Life Stabilises but Constraints Remain, April 2014 (167396)
- Chinese Life Insurance, June 2014 (171683)

- » Italian Insurance: P&C remains stable; Life back to stable but multiple challenges remain, December 2014 (1001403)
- » German Insurance: Life outlook remains negative as low interest rates weaken the sector; P&C stable, February 2015 (1002213)
- » Canadian Life Insurance Industry Outlook Remains Stable: Continued Economic Recovery Supports Credit Profile, December 2014 (1001597)
- » Outlook Remains Stable for Brazilian Insurance, August 2014 (174134)
- » Dutch Insurance: Adverse Economy and Margin Pressures Underlie Negative Outlook, March 2013 (151884)
- » Mexican Insurance – Outlook: Steady Economic Growth and Strengthened Regulations Support a Stable Outlook, February 2015 (1001847)

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

Endnotes

1 For this virtual insurer, the portfolio yield would correspond to the 10-year moving average of 10-year government bonds.

2 Partially offset by a reduction in credited rates.

3 In most accounting regimes (e.g., IFRS, US GAAP), insurers value their intangible assets (e.g., goodwill, DAC, VOBA) by making assumptions about future profits and interest rates. When interest rates decline, insurers have to review their assumptions. Hence, many insurers have reported write-downs of intangible assets in the last five years. However, assumptions can differ from market observations. Therefore, most insurers continue to value these assets by assuming increases in interest rates. If interest rates do not increase to the levels assumed by insurers, further write-downs will take place.

4 In some jurisdictions, regulators require that insurers set aside a specific reserve when interest rates decrease (e.g. *Zinszusatzreserve* in Germany). Under IFRS, the Liability Adequacy Test would also translate into an increase in reserves for insurers with significant reinvestment risk. Similarly, US life insurers with significant reinvestment risk would need to boost statutory reserves as a result of cash flow testing deficiencies in the event of a decline in interest rates, which is part of the annual asset adequacy testing of the sufficiency of assets to fund liabilities.

5 Matching the duration of assets and liabilities is not sufficient to eliminate reinvestment risk. Indeed, the duration of assets (respectively of liabilities) represents the first order sensitivity of an insurer's assets (respectively liabilities) to a change in interest rates. Second order sensitivity (also known as convexity) may differ even when durations are equal. In such a case, after a change in interest rates, the duration of assets will be different from that of liabilities, potentially exposing the insurer to reinvestment risk.

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