The Insurer Investment Management Insights
Issue 2

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Executive summary

Last quarter was dominated by two main events with long term implications for the insurance industry: first, on the economic side, the FED confirmed its dovish stance consolidating the persistence of the low yield environment and second, on the regulatory side, EIOPA issued its opinion on the Solvency II review indicating the lines of the review of the framework.

In our second insurance management insights letter, we detail the implications of those two events on the insurance industry. We also analyse the various asset classes in the context of existing portfolio allocations. During this period of uncertainty, mitigating against downside risk through capital protections and diversification will be critical, considering the divergence in growth in different economies.

We believe that continued diversification in alternative investments can help with risk mitigation in the current environment. In our view, senior secured loans and investment grade continue to exhibit interesting profiles in terms of capital adjusted return in the context of the average allocation of the insurance industry in EMEA.

"During this period of uncertainty, mitigating against downside risk through capital protections and diversification will be critical"

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1. Macro outlook update

1. Disruption – both monetary and geopolitical

Monetary policy disruption
The Fed has taken an abrupt turn towards a more dovish stance for 2019, and we expect that to continue in 2020 as the Fed has indicated the bar is very high for any rate hikes. This abrupt change in policy raises the longer term risk that the Fed will not have enough 'dry powder' available for the next crisis. However, this creates a very supportive environment for risk assets in the coming year.

Geopolitical disruption
We have seen significant geopolitical disruption in recent months, and that is leading to structural fragmentation. Of course, the greatest geopolitical risk is the potential for full-blown trade wars, which remains a distinct possibility at this juncture, and which can place downward pressure on economic growth in a variety of ways.

Technological disruption
We expect innovation and the so-called Fourth Industrial Revolution or IR 4.0, as we like to call it, to maintain its trend-setting role across global and major national economies, with major implications for the distribution of global growth and the balance of power in the world. The potential for highly innovative firms to use technology to disrupt established businesses and business models is likely to continue – even if tech stocks come under further pressure as markets normalize and the regulation of private data and the political role of social media platform firms come under greater regulatory oversight and political scrutiny. IR 4.0 also feeds back into geopolitical disruption and international competition. US-China trade tensions are only partly about trade; the underlying issues are about investment and global economic and political influence – attaining and maintaining the technological frontier as reflected in US concerns about national security and the protection of intellectual property.

2. Debt overhang

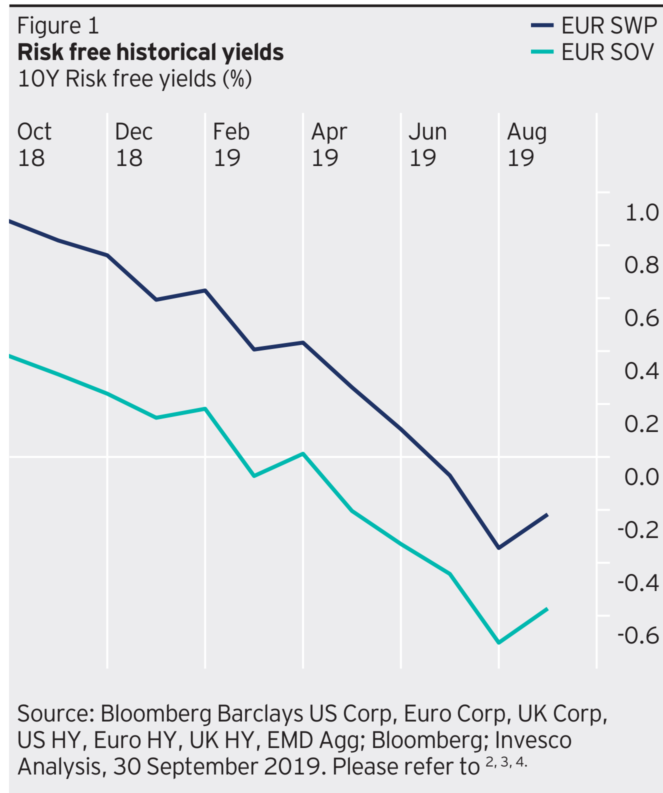
The world is becoming increasingly indebted. As monetary policy normalization continues and accelerates in coming years, this pressure is likely to increase. In addition to the short-term effects of debt pressure, there is a long-term effect as well: more money spent on servicing debt means less money able to be used for investment purposes, and that will impact longer-term economic growth.

3. Implications

In this environment, we believe exposure to risk assets is important for meeting long-term goals – especially given that an upward bias for stocks continues to exist, although it is weaker. Mitigating against downside risk will be critical, and that includes being well-diversified within equities and fixed income; that is also important given the divergence in growth in different economies. And, perhaps most important during this period of uncertainty, we believe that exposure to alternative investments can help with diversification and risk mitigation. That may include strategies such as market neutral portfolios and other lower-correlating asset classes, especially including those with income-producing potential such as real estate.

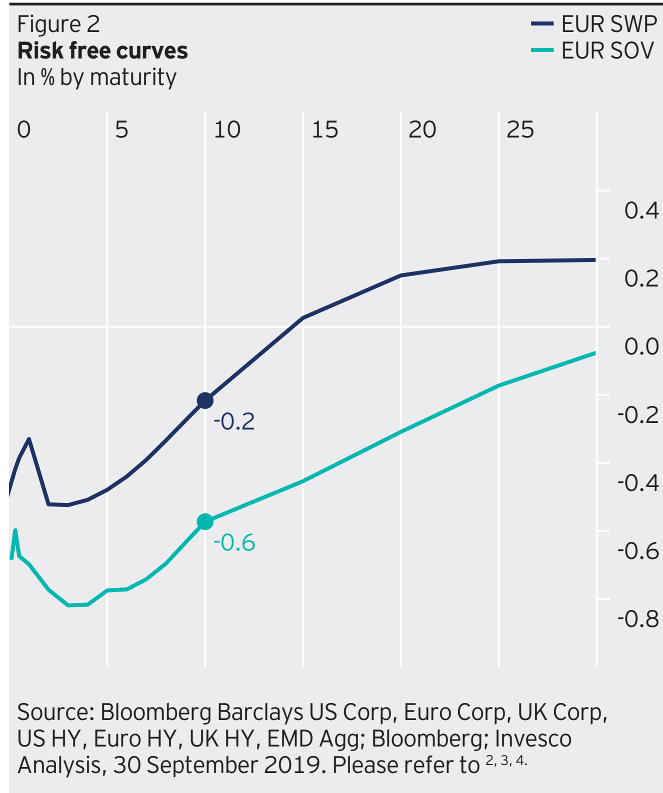
Continuous decrease of the risk free yields in Eurozone leading to very negative yields (-60 bps) for the 10Y benchmark sovereign bonds.

Figure 1
Risk free historical yields
10Y Risk free yields (%)



Source: Bloomberg Barclays US Corp, Euro Corp, UK Corp, US HY, Euro HY, UK HY, EMD Agg; Bloomberg; Invesco Analysis, 30 September 2019. Please refer to [2, 3, 4].

Figure 2
Risk free curves
In % by maturity



Source: Bloomberg Barclays US Corp, Euro Corp, UK Corp, US HY, Euro HY, UK HY, EMD Agg; Bloomberg; Invesco Analysis, 30 September 2019. Please refer to [2, 3, 4].

Hedging costs increased during the last quarter (-22 bps) for long duration hedges.

During the summer of 2019 corporate bond yields fell to very low levels by the end of September 2019. In this environment, the significant yield pick-ups on long term USD hedged bonds are very attractive to EUR based investors.

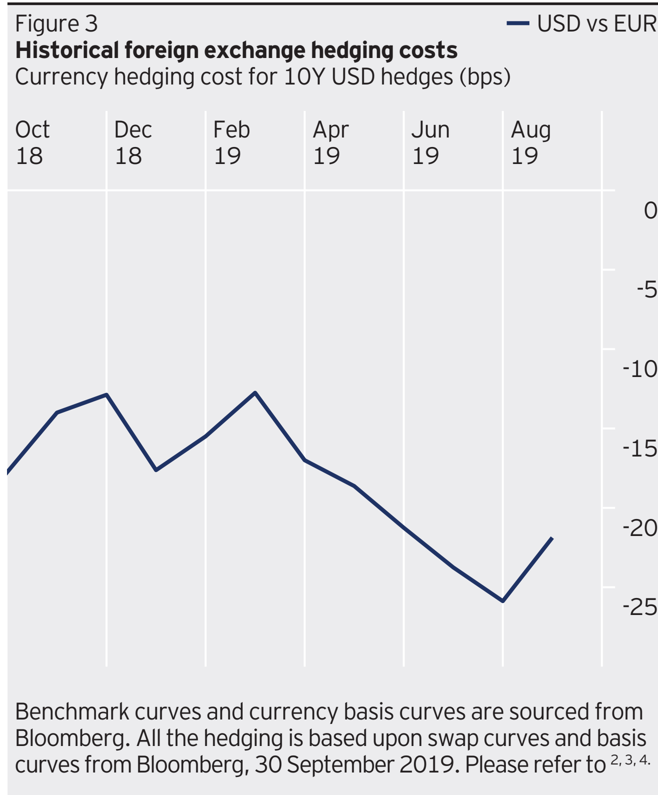


Figure 3
Historical foreign exchange hedging costs
Currency hedging cost for 10Y USD hedges (bps)

Benchmark curves and currency basis curves are sourced from Bloomberg. All the hedging is based upon swap curves and basis curves from Bloomberg, 30 September 2019. Please refer to [2, 3, 4].

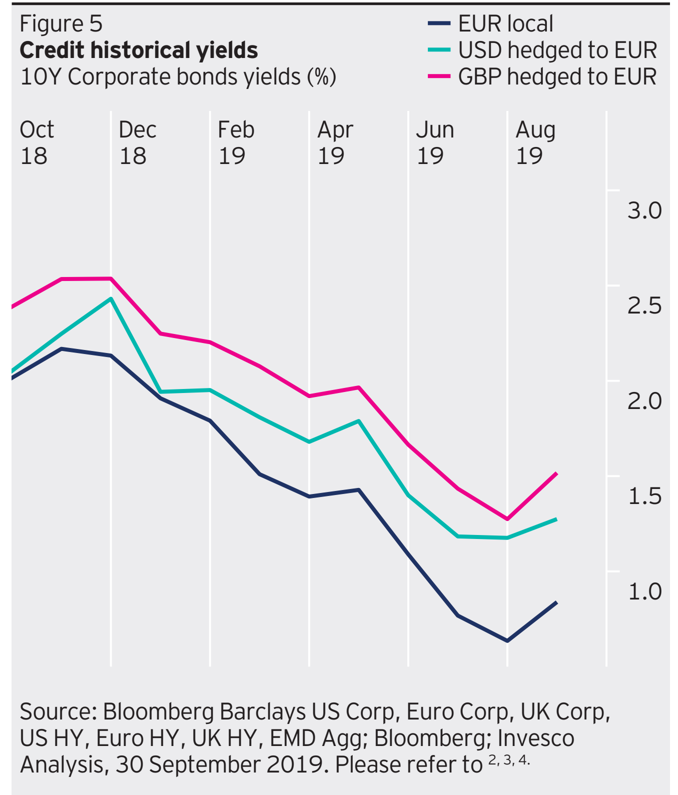


Figure 5
Credit historical yields
10Y Corporate bonds yields (%)

Source: Bloomberg Barclays US Corp, Euro Corp, UK Corp, US HY, Euro HY, UK HY, EMD Agg; Bloomberg; Invesco Analysis, 30 September 2019. Please refer to [2, 3, 4].

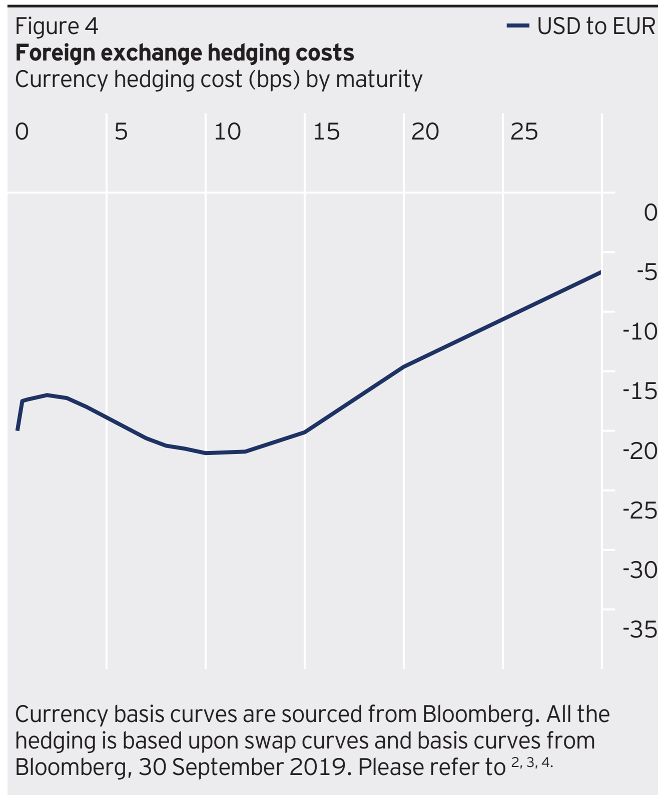


Figure 4
Foreign exchange hedging costs
Currency hedging cost (bps) by maturity

Currency basis curves are sourced from Bloomberg. All the hedging is based upon swap curves and basis curves from Bloomberg, 30 September 2019. Please refer to [2, 3, 4].

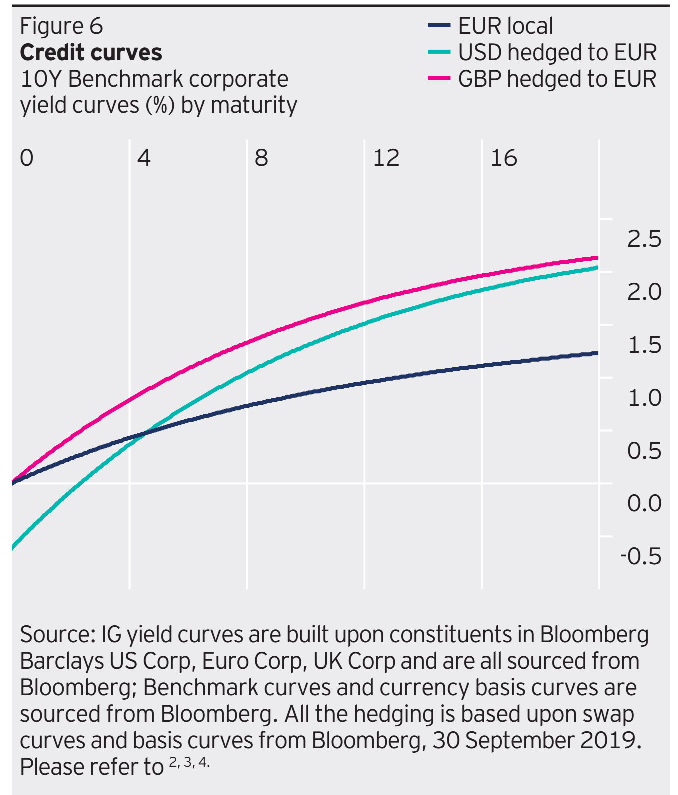


Figure 6
Credit curves
10Y Benchmark corporate yield curves (%) by maturity

Source: IG yield curves are built upon constituents in Bloomberg Barclays US Corp, Euro Corp, UK Corp and are all sourced from Bloomberg; Benchmark curves and currency basis curves are sourced from Bloomberg. All the hedging is based upon swap curves and basis curves from Bloomberg, 30 September 2019. Please refer to [2, 3, 4].

2. Regulatory strategic news

The Solvency II review kicks off in earnest

The biggest development in the second half of 2019 was the European Insurance and Occupational Pensions Authority (EIOPA) publication detailing its opinion on the Solvency II Review in October. This broad-ranging review covers everything from measure relating to long-term guarantees to the standard formula, reporting and disclosure, group supervision, freedom of services and macroprudential oversight.

Attention is likely to focus on the EIOPA's findings in relation to the package of measures relating to long-term guarantees and measures on equity risk, particularly given the political focus on deepening European capital markets to provide long-term financing within the real economy.

However, EIOPA has instead suggested a tightening of the regime. In its report, EIOPA expresses concerns that the current rules are leading to the underestimation of technical provisions, leading to misaligned risk management incentives and possible negative impacts for financial stability. In particular, EIOPA suggests changes to the calculation of the risk-free interest rate and the design of the Volatility Adjustment, which may reduce insurance undertakings Solvency Capital Ratio by up to 49% depending on the final option chosen.

EIOPA also recommends changes to the long-term and strategic equity investments risk sub-module, where they propose to phase out the duration-based equity sub-risk model, given the introduction of the long-term equity category. EIOPA also recommends the introduction of a new long-term bond and loan risk charge that would mirror the long-term equity risk charge introduced earlier this year (i.e. a lower risk charge due to longer holding period).

The insurance industry is likely to be disappointed that EIOPA has chosen not to address other issues that have been a thorn in their side, including the risk margin.

The stage is therefore set for a battle between EIOPA and the regulators on the one hand, who want a risk-based approach, and policymakers who may want to use the Solvency II regime to further broader political goals such as Capital Markets Union and sustainable finance. It's now in the hands of the European Commission to decide how to balance these competing goals as they move towards issuing a legislative proposal.

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Sustainable finance and climate risk is still a hot topic

Embedding sustainability considerations across the financial system continues to be a focus of regulators around the globe. In Europe, the European Commission published its Green Deal Strategy in December 2019, which sets out how the EU plans to achieve climate-neutrality by 2050. The plan includes dozens of initiatives to send a clear price signal to markets regarding climate risk. Regarding financial services and the insurance sector more specifically, the strategy includes proposals to define a European green label for financial products and a commitment to review capital requirements to incentivise green investments.

In preparation for this work, EIOPA has followed up on its earlier advice on sustainability risks under Pillar 2 with an opinion on the integration of sustainability and climate risk under Pillar 1.

While the Commission request hinted at possible regulatory incentives that could be introduced to promote investments in sustainable assets, the industry is likely to be disappointed with EIOPA's opinion, which finds that there is little evidence that sustainable investments are less risky and there is, therefore, no justification for lower capital requirements.

More broadly, EIOPA finds that Solvency II is neutral when it comes to sustainability, neither hindering nor incentivising firms to invest sustainably. However, a theme that EIOPA returns to again and again in its advice related to the paucity of reliable data on Environmental, social and corporate governance (ESG) and the need for firms to take a more forward-looking approach to issues such as climate change, including through the use of scenario analysis. EIOPA intends to undertake scenario analysis of climate risks in the 2020 stress tests using the 2° investing methodology.

At the international level, the International Association of Insurance Supervisors (IAIS) has published an issues paper on implementation of the recommendations by the Task Force on Climate-related Financial Disclosures (TCFD), which encourages insurance supervisors to promote the adoption of TCFD reporting by insurance firms. An Application Paper by the IAIS will follow.

National regulators are also turning their attention to the way insurance undertakings approach climate risks:

France

The French supervisor, the Autorité de contrôle prudentiel et de résolution (ACPR), recently published its own stocktake of the ways in which French insurers were addressing climate risk. The report finds that while there is a general recognition within the industry regarding the need to focus on climate risk, but the practice varies considerably. In general, the ACPR finds that there are still limited resources dedicated to climate risk within firms, but there is a small group of leaders, with the rest of the industry waiting for best practice to emerge.

United Kingdom
The Prudential Regulatory Authority (PRA) has asked insurance undertakings to provide information on climate scenarios. For this exercise, PRA has developed three hypothetical scenarios. On the liability side, the PRA has translated these scenarios into two natural catastrophe events: US Hurricane and UK weather, with the severity of the impact of the physical risks increasing under each scenario. For example, the PRA asks firms to model the impact ranging on a 5% increase in major hurricanes of 5% under a sudden transition, increasing to 60% under the scenario where there is a failure to transition. On the investment side, the PRA has translated these three scenarios into financial impacts to asset valuations, based on their interpretation of the scientific literature (such as the Intergovernmental Panel on Climate Change (IPCC)) for high-risk sectors. For example, the PRA asks insurance firms to model a 65% loss on coal-based power generation under a sudden transition, while power generation from renewables would raise asset values by 10%.

The Bank of England has also announced that it will undertake a biennial exploratory scenario for UK banks and insurers in the second half of 2020, with the results due in 2021

Germany
The German Federal Financial Supervisory Authority (BAFIN) has adopted new guidelines relating to ESG and climate risks. The guidelines underscore the need for financial services firms to have in place a strategy to address sustainability risks, including climate risks, and put in place the appropriate governance to address these risks. BAFIN also recommends firms establish "heat maps" to assess sustainability risks according to urgency and impact. BAFIN also recommends the use of scenario analysis for measuring sustainability risks.

The things that keep insurance regulators awake at night
In December, EIOPA published its semi-annual Financial Stability Report. Few will be surprised that the prospect of prolonger low-yield environment was top of their worry list. In particular, growing trade tensions and political uncertainty has led to a slowdown in the global economy, causing central banks to be more cautious on rolling back non-conventional monetary policy stimulus. This has made the risk of a prolonged low yield environment more prominent again, which in turn impacts of the ability of insurers and pension funds to meet their long-term liabilities and increasing search-for-yield behaviour. Stretched asset prices, and the risk of a sudden reassessment of risk premia remains high, could be exacerbated by an economic slowdown and lead to losses for life insurers and pension funds.

Emerging risks such as cyber risk and climate risks are increasingly garnering attention.

Turning to the bread and butter of insurance regulation, overall Solvency ratios of European insurers have slightly improved since 2018, standing at around 200%, but insurers in certain countries show a high degree of home bias in their investment portfolio and remain highly interconnected with the banking system, while exposures to real estate markets are also substantial. This could make insurers susceptible to spill over effects from sovereigns, the banking sector and/or a potential slowdown in real estate markets.

And finally, a look into the future
When the International Association of Insurance Supervisors (IAIS) published their strategic plan for the next five years, it provided a glimpse of the key issues that are likely to drive regulatory change for the insurance sector. In particular, IAIS identify 5 top trends that are likely to be in focus over the coming years:

1. **Technological Innovation:** FinTech presents significant opportunities for financial inclusion and policyholder value, but also poses operational and underwriting risks. The rapid expansion in alternative data sources and advanced analytics is of particular impact and has the potential to disrupt the insurance market.

2. **Cyber resilience:** insures are not only exposed to cyber risks but also active takers of cyber risk through cyber underwriting activities.

3. **Climate risk:** insurers are exposed to both transition risk as institutional investors and physical risk from natural disasters through their underwriting, but can be key agents in the mitigation and management of climate risk.

4. **Conduct and culture:** technological changes to the insurance business model present new conduct challenges, such as the supervision of advanced data analytics. A holistic approach to market conduct and prudential supervision is called for, recognising that conduct and culture issues could lead to financial soundness and stability concerns.

5. **Financial inclusion and sustainable economic development:** policyholder protection and contributing to financial stability are fundamental to ensuring the sustainable involvement of the insurance sector in closing the protection gap, including resilience to natural disasters and security in old age; supporting inclusive insurance markets; and promoting sustainable long-term investment.

Looking beyond the insurance sector, the European institutions are also going through a period of renewal, with a new European Commission taking office on 1 December. As part of this renewal, work is ongoing to define new priorities for financial services regulation for the next 5 years. Reinvigorating the Capital Markets Union is top of the agenda and a report by a group of experts, sponsored by the French, German and Dutch Ministers of Finance have identified 5 strategic priorities:

- **Generate more long-term savings and investment opportunities**
- **Massively develop equity markets**
- **Increase financial flow fluidity between EU financial market places**
- **Develop debt, credit and forex financing tools in a manger that increases the international funding currency role of the Euro**

While the recommendations span the entire financial services industry, some of the initiatives proposed would be of particular interest to the insurance industry. This includes a recommendation to modify Solvency II and IFRS 9 to make it easier for insurance companies to invest in equity and a proposal to develop a Sovereign Green Bond label. The European Commission is establishing a High-Level Expert Group that will be tasked with elaborating a new strategy for the Capital Markets Union in Europe, which will define the agenda for the next 5 years.

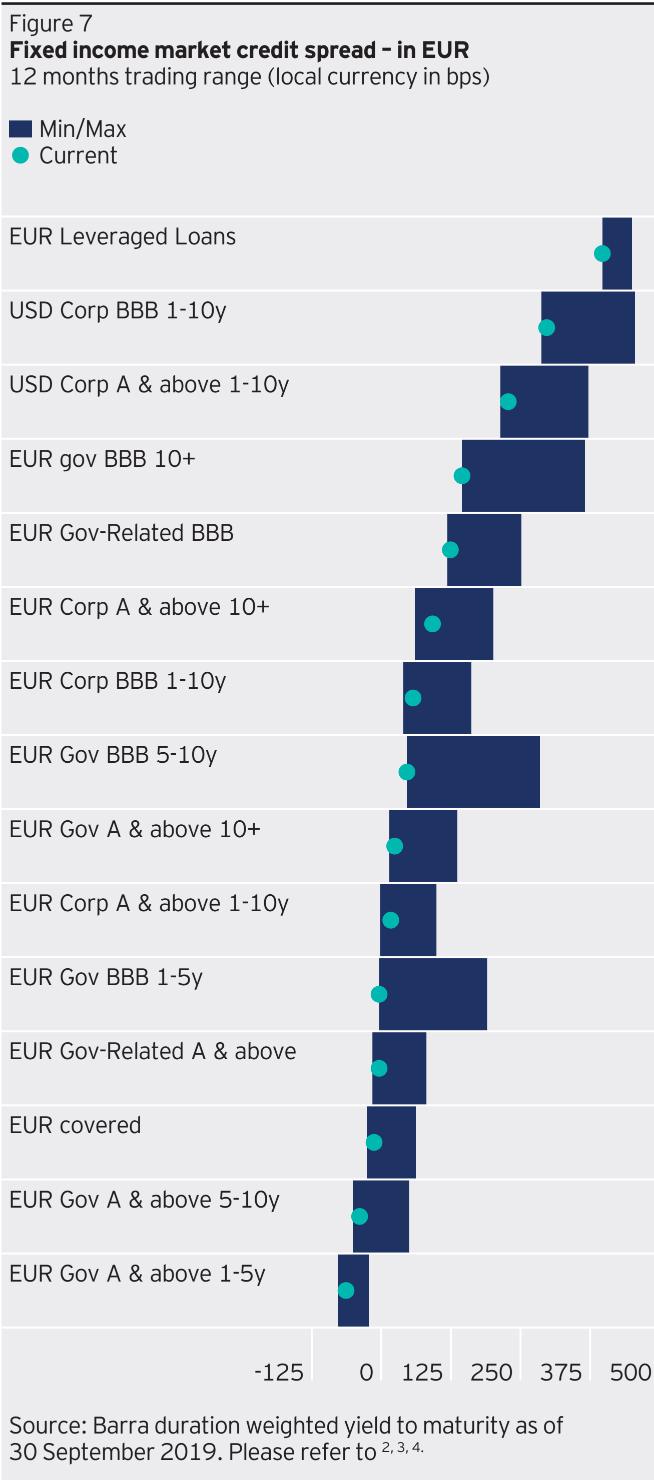
3. Insurance asset allocation benchmarks market updates

Spreads of the fixed income assets are in the low range compared to the last 12 months.

Based on spot market yields and our CMAs[1], EUR Private Equity, Infrastructure equity and Private lending are the most profitable asset classes compared the related capital requirements. EUR Corporate bond is the least profitable asset class in this framework.

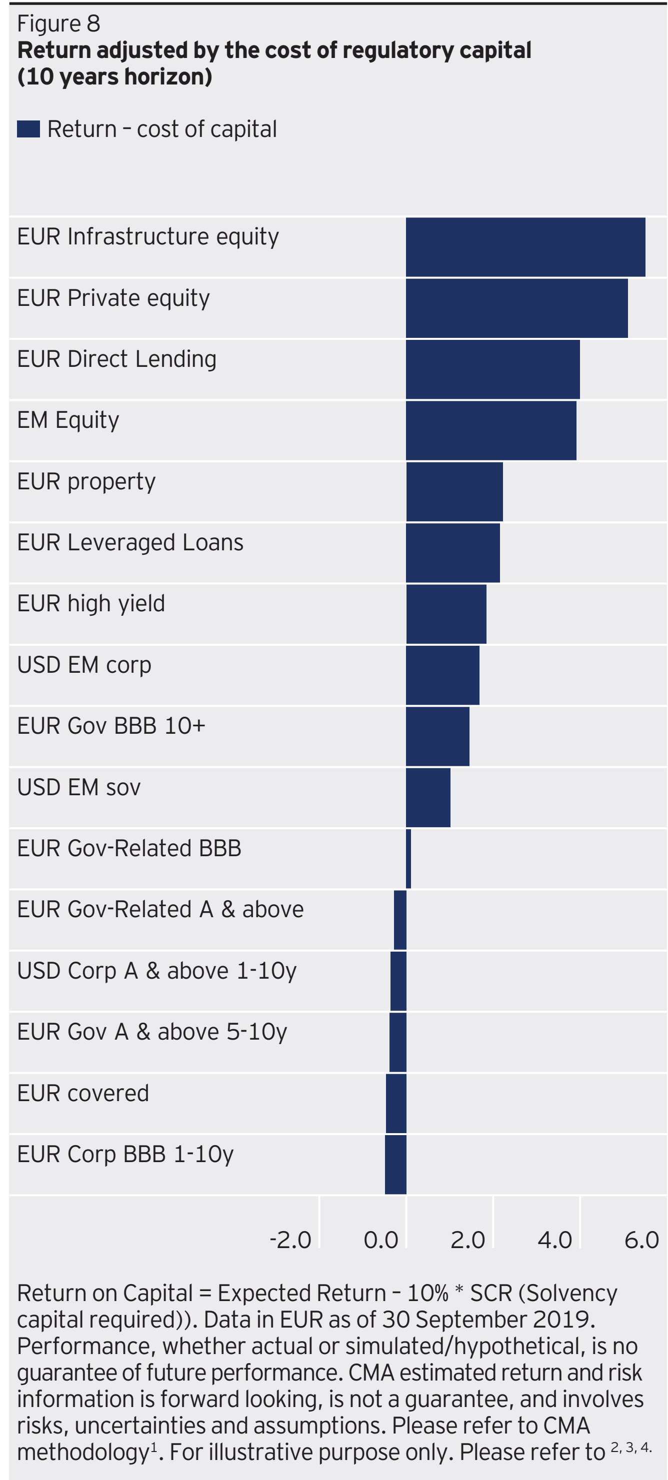
Note for figures 8 and 9: For fixed income assets, Barra's duration weighted yield to maturity is used as expected return. For other assets, Invesco CMAs[1] are used where available. Otherwise manual inputs from Invesco Solutions are used. Cost of capital is assumed to be 10%. EUR Direct Lending and USD CML (Consumer and Mortgage Loans) are assumed to be in private equity-style fund vehicles. All the hedging of fixed income assets is based upon swap curves and basis curves from Bloomberg; otherwise based upon Bloomberg Generic Govt 10Y Yield.

Figure 7
Fixed income market credit spread - in EUR
12 months trading range (local currency in bps)



Source: Barra duration weighted yield to maturity as of 30 September 2019. Please refer to [2, 3, 4].

Figure 8
Return adjusted by the cost of regulatory capital (10 years horizon)

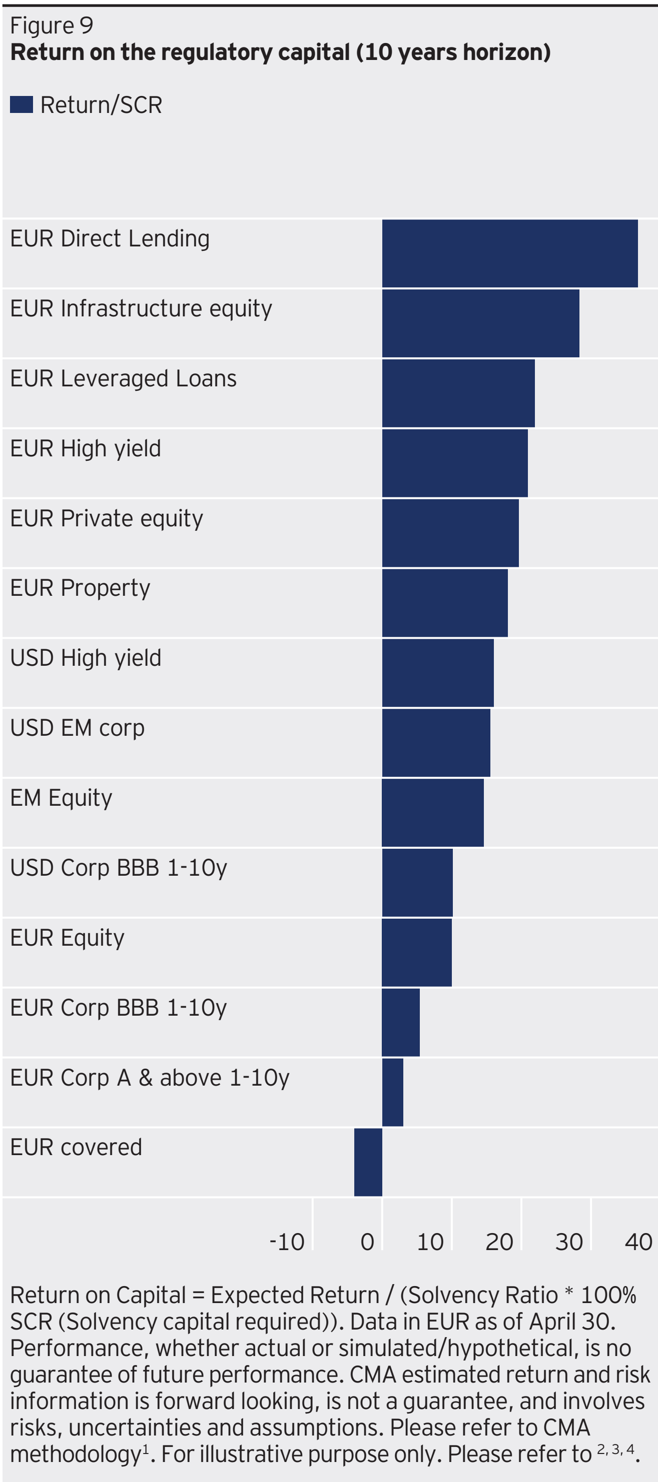


Return on Capital = Expected Return - 10% * SCR (Solvency capital required)). Data in EUR as of 30 September 2019. Performance, whether actual or simulated/hypothetical, is no guarantee of future performance. CMA estimated return and risk information is forward looking, is not a guarantee, and involves risks, uncertainties and assumptions. Please refer to CMA methodology[1]. For illustrative purpose only. Please refer to [2, 3, 4].

Methodology presentation
We analysed the impact of investing 1% of a typical EMEA portfolio in different asset classes. We were able to obtain this allocation by proportionally reducing all the existing allocations by 1% reallocating to most attractive asset classes (highlighted in figure 10). The typical EMEA insurance portfolio that we considered is allocated as follows : Euro Govt. 40%; Euro Corporates 40%; Euro High Yield 2%; EM Debt (USD) 3%; Equity ex UK 10%; Real Estate 5%. This portfolio would have 1.37% of return, 10.93% of SCR for a volatility of 3.86%.

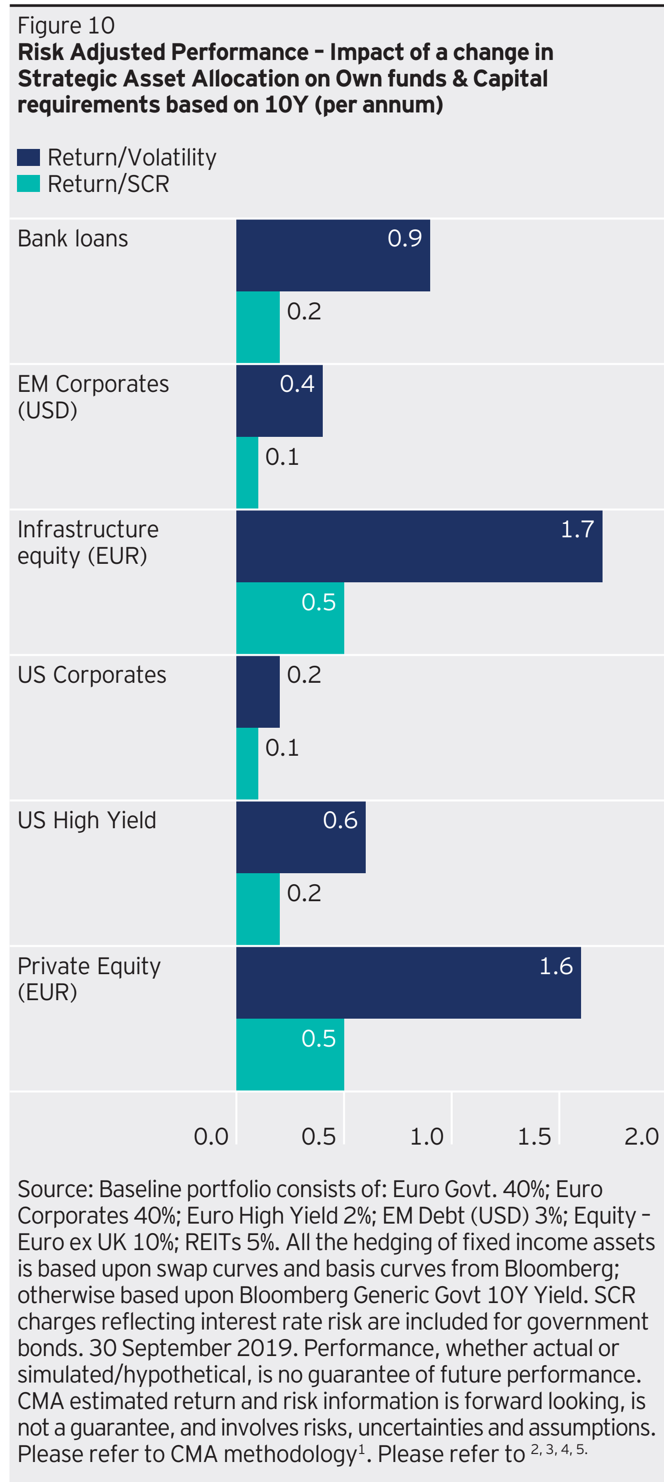
Adding 1% of Banks Loans (aka Senior secured loans) has the potential to improve the Return/SCR ratio by 20bps and the Return/Risk ratio by 90 bps making this asset class the most efficient asset class in the Solvency framework. Meanwhile in the total return asset class, adding 1% of Infrastructure Equity may improve the Return/SCR by 50bps and the Return/Risk ratio by 160 bps. This asset class is theoretically the most attractive in the solvency framework.

Figure 9
Return on the regulatory capital (10 years horizon)



Return on Capital = Expected Return / (Solvency Ratio * 100% SCR (Solvency capital required)). Data in EUR as of April 30. Performance, whether actual or simulated/hypothetical, is no guarantee of future performance. CMA estimated return and risk information is forward looking, is not a guarantee, and involves risks, uncertainties and assumptions. Please refer to CMA methodology[1]. For illustrative purpose only. Please refer to [2, 3, 4].

Figure 10
Risk Adjusted Performance – Impact of a change in Strategic Asset Allocation on Own funds & Capital requirements based on 10Y (per annum)

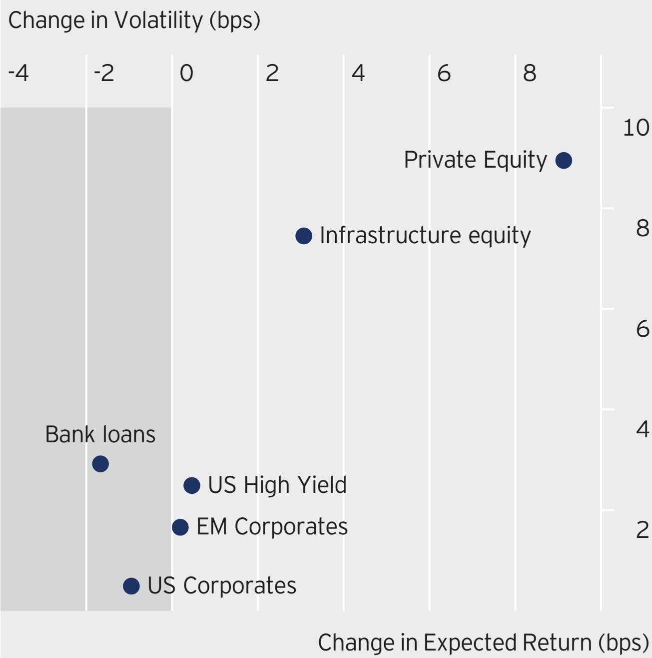


Source: Baseline portfolio consists of: Euro Govt. 40%; Euro Corporates 40%; Euro High Yield 2%; EM Debt (USD) 3%; Equity – Euro ex UK 10%; REITs 5%. All the hedging of fixed income assets is based upon swap curves and basis curves from Bloomberg; otherwise based upon Bloomberg Generic Govt 10Y Yield. SCR charges reflecting interest rate risk are included for government bonds. 30 September 2019. Performance, whether actual or simulated/hypothetical, is no guarantee of future performance. CMA estimated return and risk information is forward looking, is not a guarantee, and involves risks, uncertainties and assumptions. Please refer to CMA methodology[1]. Please refer to [2, 3, 4, 5.]

We think that senior secured loans continue to look as an attractive asset class for insurers, improving the return and diversifying the risk of the portfolio. Investment grade Emerging Market bonds and US corporates seem to be attractive options for the liability matching book after the FX hedging into EUR. On the return seeking assets, Infrastructure Equity is preferable to Private Equity in terms of risk adjusted returns.

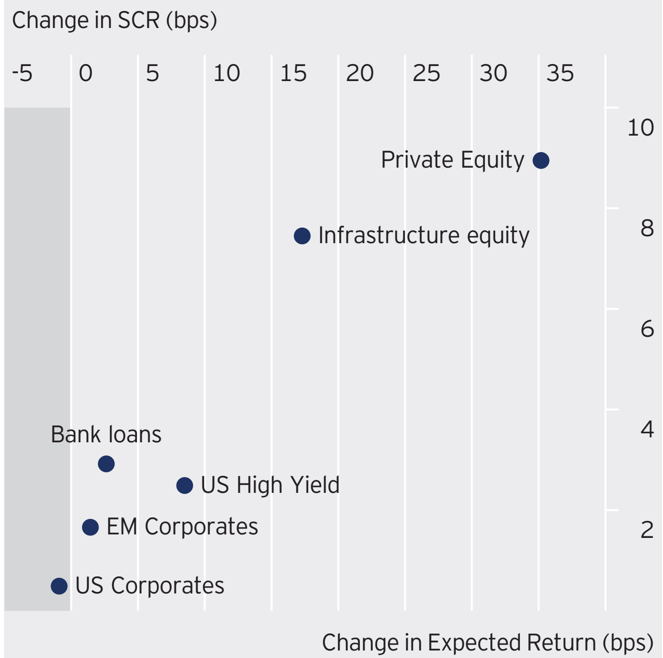
In an environment where yields fell to minimal levels compared to 12 months ago, insurers should amplify the diversification of their portfolios. We believe that diversification can be carried out efficiently by adding some diversifying assets which are more liquid than Private Equity and Infrastructure assets. This can be achieved by choosing the new assets based on insurers current holdings and liabilities, for instance Bank loans and Emerging market debt.

Figure 11
Allocating 1% of the portfolio to the asset class below. Impact on the economic profitability
Impact on Expected Return/Volatility



30 September 2019. Source: please refer to Figure 10.
Please refer to [2, 3, 4, 5].

Figure 12
Allocating 1% of the portfolio to the asset class below. Impact on the regulatory profitability
Impact on Expected Return/SCR



30 September 2019. Source: please refer to Figure 10.
Please refer to [2, 3, 4, 5].

"In an environment where yields fell to minimal levels compared to 12 months ago, insurers should amplify the diversification of their portfolios."

4. About Invesco Insurance Investments

The Invesco Insurance Investment Solutions team works closely with insurance Chief Investment Officers and their teams to achieve their business objectives.

Through deeper understanding of the insurance environment and experience in insurance investment management we are privileged to partner with our clients whilst seeking to provide a differentiated value-added outcome across the full investment cycle that could produce enhanced business results.

Meeting the evolving needs of our insurance clients
Focusing on specific clients' goals, our approach is designed to optimise investment return for both policyholder and shareholder under specific insurance constraints:

- Liabilities: duration, duration volatility, guaranties cost, estate protection, required liquidity, product design;
- Accounting Earnings: aiming to deliver steady, stable and sustainable outcome for shareholders and policyholders under local and international standards;
- Regulatory capital: seeking to preserve the solvency ratio, limit the volatility of the general account or improve the return on capital;
- Risk Management: financial risk sensitivities, concentration risk, liquidity risk, eligible instruments (prudent person).

Using advanced analytics in conjunction with the insurance specific regulatory & accounting constraints, our approach offers you the potential to:

- design liability matching portfolios and evaluate the performance and risk of insurance portfolios in conjunction with liabilities using our proprietary methods and compare it with regulatory requirements;
- enhance current portfolio outcome by assessing a broader range of asset classes and factor exposures;
- design innovative strategies allowing our clients to build high value add competitive products for their clients.

In developing customized solutions for clients, the team's approach includes liabilities, risk analytics and practical implementation challenges including current asset allocation and liquidity challenges:

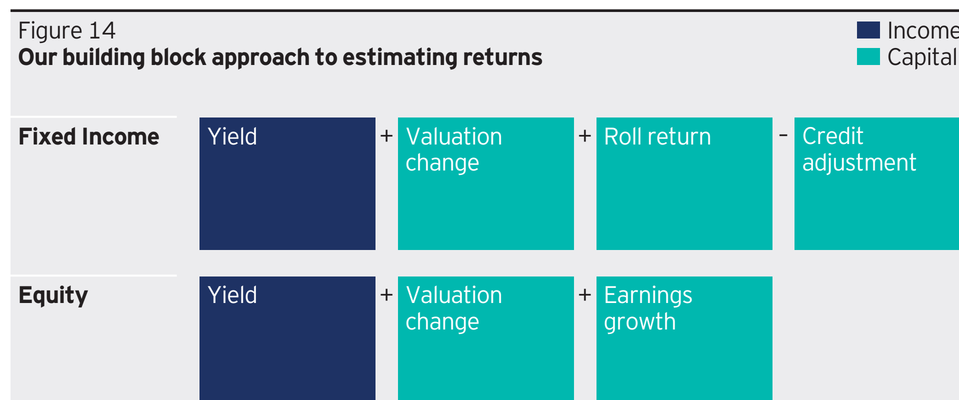
- assisting clients in North America, Europe and Asia, Invesco Investment Solutions Invesco's Global Solutions team consists of over 50 professionals, with 20+ years of experience across the leadership team;
- the team benefits from Invesco's on-the-ground presence in more than 20 countries worldwide[6], with over 150 professionals[6] to support investment selection and ongoing monitoring.

"Focusing on specific clients' goals, our approach is designed to optimise investment return for both policyholder and shareholder."

5. References

[1] **About our capital market assumptions methodology**
We employ a fundamentally based "building block" approach to estimating asset class returns. Estimates for income and capital gain components of returns for each asset class are informed by fundamental and historical data. Components are then combined to establish estimated returns (Figure 13). Here we provide a summary of key elements of the methodology used to produce our long-term (10-year) estimates. Five-year assumptions are also available upon request. Please see Invesco's capital market assumption methodology whitepaper for more detail.

Figure 14
Our building block approach to estimating returns



Fixed income returns are composed of:
- Average yield: The average of the starting (initial) yield and the expected yield for bonds.
- Valuation change (yield curve): Estimated changes in valuation given changes in the Treasury yield curve.
- Roll return: Reflects the impact on the price of bonds that are held over time. Given a positively sloped yield curve, a bond's price will be positively impacted as interest payments remain fixed but time to maturity decreases.
- Credit adjustment: Estimated potential impact on returns from credit rating downgrades and defaults.

Equity returns are composed of:
- Dividend yield: Dividend per share divided by price per share.
- Buyback yield: Percentage change in shares outstanding resulting from companies buying back or issuing shares.
- Valuation change: The expected change in value given the current Price/Earnings (P/E) ratio and the assumption of reversion to the long-term average P/E ratio.
- Long-term (LT) earnings growth: The estimated rate in the growth of earning based on the long-term average real GDP per capita and inflation.

Currency adjustments are based on the theory of Interest Rate Parity (IRP) which suggests a strong relationship between interest rates and the spot and forward exchange rates between two given currencies. Interest rate parity theory assumes that no arbitrage opportunities exist in foreign exchange markets. It is based on the notion that, over the long term, investors will be indifferent between varying rate of returns on deposits in different currencies because any excess return on deposits will be offset by changes in the relative value of currencies.

Volatility estimates for the different asset classes, we use rolling historical quarterly returns of various market benchmarks. Given that benchmarks have differing histories within and across asset classes, we normalise the volatility estimates of shorter-lived benchmarks to ensure that all series are measured over similar time periods.

Correlation estimates are calculated using trailing 20 years of monthly returns. Given that recent asset class correlations could have a more meaningful effect on future observations, we place greater weight on more recent observations by applying a 10-year half-life to the time series in our calculation.

Arithmetic versus geometric returns. Our building block methodology produces estimates of geometric (compound) asset class returns. However, standard mean-variance portfolio optimisation requires return inputs to be provided in arithmetic rather than in geometric terms. This is because the arithmetic mean of a weighted sum (e.g., a portfolio) is the weighted sum of the arithmetic means (of portfolio constituents). This does not hold for geometric returns. Accordingly, we translate geometric estimates into arithmetic terms. We provide both arithmetic returns and geometric returns given that the former informs the optimisation process regarding expected outcomes, while the latter informs the investor about the rate at which asset classes might be expected to grow wealth over the long run.

2 Market update proxies

Asset class	Asset Description
EUR Leveraged Loans	Credit Suisse Western European Leveraged Loan Index
Hedge funds	IVZ Hedge Fund US HFRI Equity Hedge
EUR Corp A & above 10+	Bloomberg Barclays Corporate sub-index (Stat EOM): A-AAA 10+ Year
EUR Corp BBB 10+	Bloomberg Barclays Corporate sub-index (Stat EOM): BBB 10+ Year
EUR Gov-Related A & above	Bloomberg Barclays Government-related sub-index (Stat EOM): A-AAA
EUR Gov A & above 1-5y	Bloomberg Barclays Treasury sub-index (Stat EOM): A-AAA 1-5 Year
EUR Gov A & above 10+	Bloomberg Barclays Treasury sub-index (Stat EOM): A-AAA 10+ Year
EUR Gov A & above 5-10y	Bloomberg Barclays Treasury sub-index (Stat EOM): A-AAA 5-10 Year
EUR Gov BBB 1-5y	Bloomberg Barclays Treasury sub-index (Stat EOM): BBB 1-5 Year
EUR gov BBB 10+	Bloomberg Barclays Treasury sub-index (Stat EOM): BBB 10+ Year
EUR Gov BBB 5-10y	Bloomberg Barclays Treasury sub-index (Stat EOM): BBB 5-10 Year
USD high yield	Bloomberg Barclays High-Yield Index (Stat EOM)
EM equity	MSCI EM (EMERGING MARKETS) IMI – Monthly
EUR equity	MSCI EUROPE ex UK IMI – Monthly
EUR Private equity	IVZ Private Equity Europe ex-UK All PE excl Mezz & Dist
EUR Direct Lending	IVZ Private Debt floating Europe ex-UK SME
USD CML	IVZ Private Debt fixed US Senior CRE
EUR Infrastructure equity	IVZ Infrastructure Equity Europe ex-UK Renewables
EUR property	IVZ Real Estate Europe ex-UK Property
EUR high yield	Bloomberg Barclays Euro HY
USD EM corp	Bloomberg Barclays EM USD Agg: Corporate
USD Corp A & above 10+	Bloomberg Barclays US Credit: A-AAA 10+ Year
USD Corp A & above 1-10y	Bloomberg Barclays US Credit: A-AAA 1-10 Year
EUR Corp A & above 1-10y	Bloomberg Barclays Euro Agg Corporate: A-AAA 1-10 Year
EUR Corp BBB 1-10y	Bloomberg Barclays Euro Agg Corporate: BBB 1-10 Year
USD Agency 10+	Bloomberg Barclays US Agency Long
USD EM sov	Bloomberg Barclays EM USD Agg: Sovereign
EUR Gov-Related BBB	Bloomberg Barclays Euro-Aggregate: Government-Related Baa
USD Corp BBB 10+	Bloomberg Barclays US Long Credit Baa
USD Corp BBB 1-10y	Bloomberg Barclays US Intermediate Credit Baa
USD agency 1-10y	Bloomberg Barclays US Agency Intermediate
USD agency MBS	Bloomberg Barclays U.S. MBS: Agency Fixed Rate MBS (Ret)
EUR covered	Bloomberg Barclays Euro-Aggregate Securitized – Covered (Ret)

3 Risk-Ret proxies

Asset class	Asset Description
Euro Govt.	Bloomberg Barclays Euro Agg: Government Related
Euro Corporates	Bloomberg Barclays Euro Agg: Corporate
Euro High Yield	Bloomberg Barclays Euro HY
EM Debt (USD)	Bloomberg Barclays Emerging Markets (U.S. Dollar) (Stat EOM)
Equity – Euro ex UK	MSCI EUROPE ex UK IMI – Monthly
REITs	FTSE EPRA/NAREIT Developed Europe REITS Index
Bank loans	Credit Suisse Western European Leveraged Loan Index
EM Corporates (USD)	Bloomberg Barclays EM USD Agg: Corporate
Infrastructure equity (EUR)	IVZ Infrastructure Equity Europe ex-UK Renewables
US Corporates	Bloomberg Barclays Corporate sub-index (Stat EOM)
US High Yield	Bloomberg Barclays High-Yield Index (Stat EOM)
Private Equity (EUR)	IVZ Private Equity Europe ex-UK All PE excl Mezz & Dist

4 For the benchmark (government and swap) curves, the Bloomberg tickers are:

YCGT0025 Index	USD SOV
YCGT0016 Index	EUR SOV
YCGT0022 Index	GBP SOV
YCSW0023 Index	USD SWP
YCSW0201 Index	EUR SWP
YCSW0222 Index	GBP SWP

Note that EUR SOV= Germany

5 The 1% re-allocation is sourced via a pro-rated reduction of baseline portfolio holdings. For fixed income assets, Barra's duration weighted yield to maturity is used as expected return. For other assets, Invesco CMAs[1] are used where available.

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6 Source: Invesco, 30 September 2019.

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