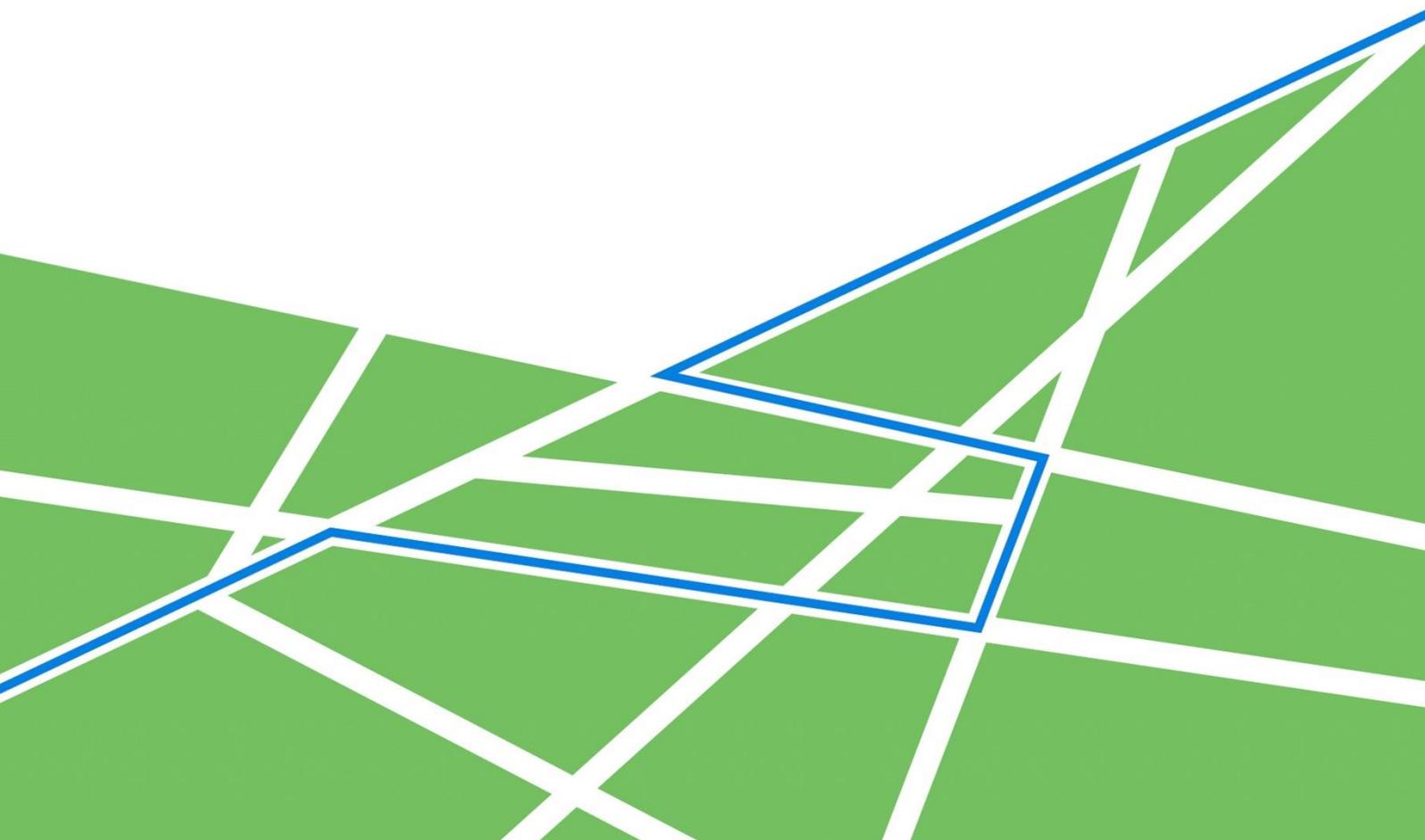


MILLIMAN REPORT

# Alternative assets for life insurers

Recent trends, risk quantification and  
regulatory developments

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## Introduction

In this paper, we discuss the use, by life insurers, of alternative assets considering developments and trends across a range of geographies. To do this, our first challenge is that the term “alternative assets” has no widely accepted definition and is open to different interpretations. Precise definitions are fraught with problems as there may be lots of marginal cases open for debate and so we have adopted a pragmatic approach of taking “alternative assets” to be those which are not available to be traded on public markets. This definition aligns broadly with the concept of these assets being more illiquid and indeed the term “illiquid assets” is a commonly used shorthand.

The universe of alternative assets is large and encompasses fixed income classes such as infrastructure debt or equity release mortgages and equity classes such as private equity – we provide an extended list of examples in Appendix 1.

So having, roughly, defined alternative assets the next question is why an insurer would seek exposure to them – why not just stick with public markets? The answer generally has many elements and the weight on each will vary between firms but in our discussions with insurers we have noted the following key drivers:

- To improve the risk-adjusted yield on investment – if alternative assets can offer more attractive compensation in relation to risk or offer compensation for risks an insurer can avoid (for example, liquidity risk in relation to some liability types) then this can be a powerful incentive and has proven to be so in particular as yields on public market assets such as government and traded corporate bonds have been falling for many years – until recently!
- To enhance portfolio diversification – accessing private markets in addition to public ones provides a greater range of investment opportunities that may then offer better portfolio diversification.
- Environmental, Social and Governance (ESG) considerations – while it is clearly possible to factor ESG considerations into an investment process that contemplates only public traded assets, use of alternative assets offers major investors like insurers an opportunity to differentiate themselves not only in terms of how they face their customers but also with asset providers – this latter aspect becomes increasingly important as demand grows for alternative assets in general and those with the most attractive green credentials in particular.
- To improve capital efficiency – related to the first point above, arguments can be made that many private assets offering high levels of collateralisation to mitigate credit risk can be capital efficient. However, standard frameworks (e.g. Solvency II Standard Formula, the Standard Model under the International Capital Standard, risk based capital regimes across Asia) often lack the granularity needed to fully capture the benefits. This means that optimizing the capital treatment of these assets can require the adoption of a (Partial) Internal Model (PIM). Implementing a PIM is a non-trivial undertaking which may be uneconomic unless the insurer anticipates a significant commitment to the assets covered.
- Better duration matching – some classes of alternative asset, such as ground rents, can offer relatively long durations. Thus, in geographies where there is a shortage of publicly traded long-dated fixed income assets alternative assets may offer scope to improve the duration matching of an insurer’s liabilities.
- Control over asset terms – where insurers invest directly in alternative assets (i.e. not via say a pooled fund arrangement) the terms of the alternative asset will be set via negotiation between the originator and the principal investors. This process can enable investors with significant market presence in a particular sectors(s) to tweak the terms in their favour.
- Inflation matching – an area that would perhaps have been of less interest pre-2022 is the ability to acquire inflation linked cash-flows. However, with inflation rates nudging double digits in a number of countries, assets that offer a degree of inflation protection are rightly of interest to help match an insurer’s expenses and any index-linked liabilities. Alternative assets like infrastructure debt can offer index-linked cash-flows as they are often underpinned by revenue streams that are directly linked to inflation and for which demand is expected to be price inelastic.

Having set the scene a little here, the remainder of the paper is structured as follows:

- Market Developments –
- Survey Results – the result of several surveys and interviews across the US, Europe, UK, and Hong Kong
- Risk Quantification –
- Regulatory Treatment / Developments –
- Conclusions

## Market Developments

There are many factors which may influence the supply of alternative assets and the corresponding demand for these by life insurers. In this section, we touch on a selection of factors we feel are influential at present.

### GREEN AGENDA

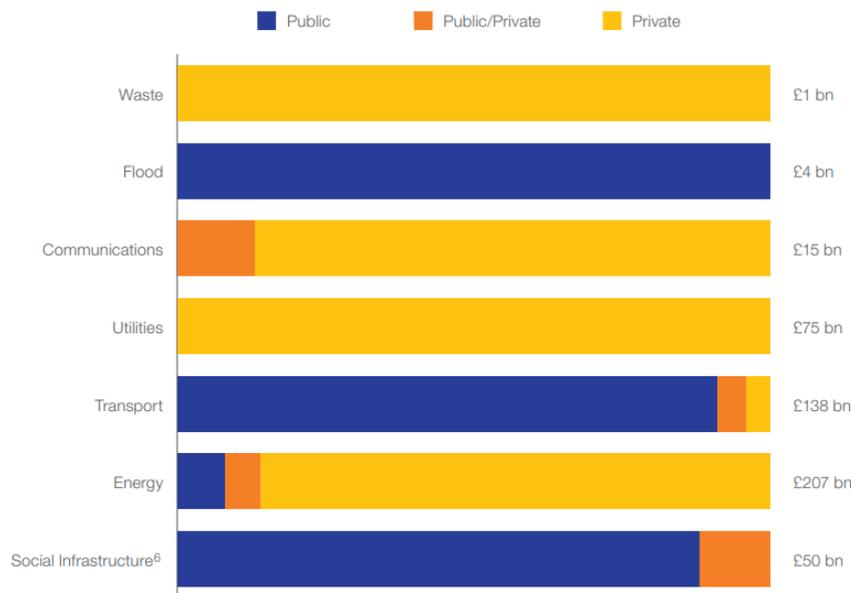
The drive to transition the global economy towards a low carbon future is expected to create a significant supply of alternative assets in the years ahead as private finance is sought to fund many projects and where the features of the projects and companies involved are likely to result in significant capital raising outside of public markets for example due to:

- Issuers being smaller making private markets more attractive from the perspective of costs and regulatory burden.
- Newer companies developing innovative technologies but unable to offer, as yet, stable streams of earnings attractive to many public market participants.
- Ability to deal with a small pool of investors and negotiate terms that can better reflect the particular objectives of both sides.

At the same time, many of these projects may appeal to life insurers as, once operational, they can offer long-dated often inflation-linked cash-flows that are suitable to match long-term insurance liabilities with principal often underpinned by significant collateralisation.

Taking the UK as an example, Figure 1, illustrates the key role that private finance is expected to play with the bulk of investment in the areas of energy, communications and utilities being from private sector sources rather than public funds. Inevitably, some of this private investment will be raised via public markets but we expect that a material portion will also be sourced via private placings.

**FIGURE 1: UK NATIONAL INFRASTRUCTURE DELIVERY PLAN – CHOICE OF FINANCE<sup>1</sup>**



### RICHNESS OF PUBLIC MARKETS

Figure 2, from the World Economic Forum, indicates that with the exception of the Asia Pacific region, the number of public traded companies is in decline and indeed the trend has been downwards in the US and Europe for some years. The same publication notes that:

*“The universe of U.S. publicly owned companies has been shrinking since the turn of the millennium. Fewer companies are choosing to list, and those that are listed have been issuing debt to finance share buybacks at unprecedented levels since the financial crisis.”*

<sup>1</sup> Source: <https://www.gov.uk/government/publications/national-infrastructure-delivery-plan-funding-and-finance-supplement>

The clear implication is that by considering only investments traded on public markets, insurers are constraining the opportunity set available to them and it appears that in many countries those constraints are increasing over time.

FIGURE 2: NUMBERS OF PUBLICLY TRADED COMPANIES BY REGION<sup>2</sup>

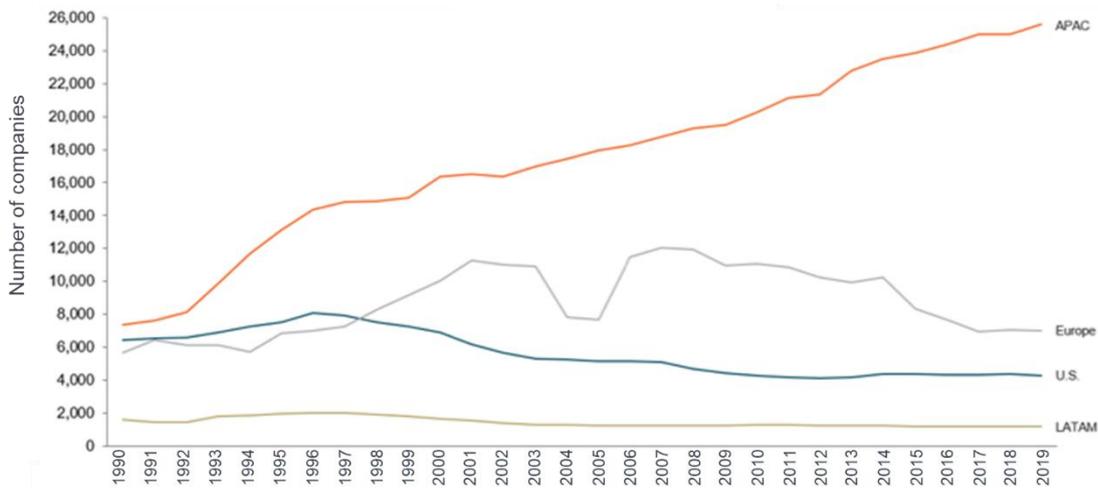
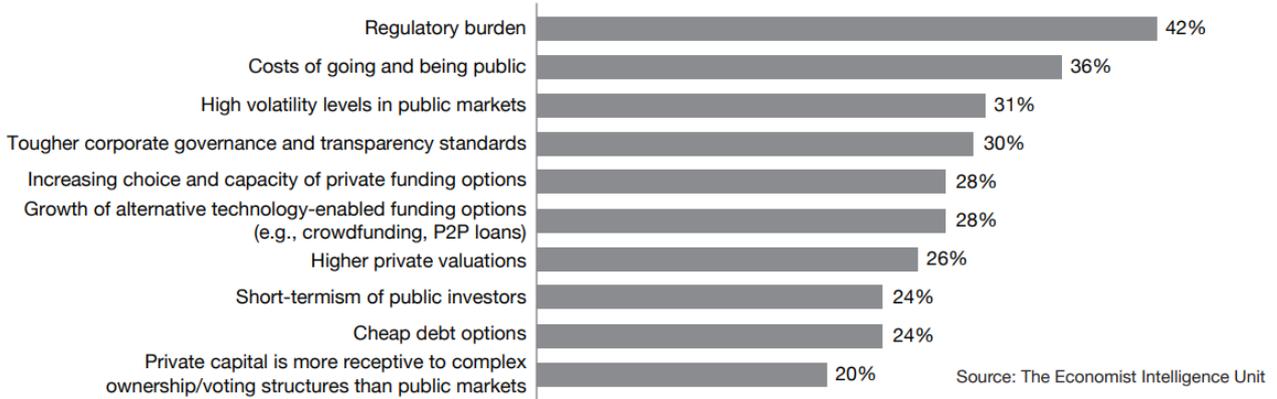


Figure 3 provides some insight into what may be driving the downward trend in the number of publicly listed companies with costs and regulatory burden, not surprisingly heading the list of perceived challenges.

FIGURE 3: POSSIBLE DRIVERS OF PUBLIC EQUITY MARKET DECLINE<sup>3</sup>



**LIQUIDITY OF PUBLIC MARKETS**

In the introduction to this paper, we noted that alternative assets are also sometimes referred to as illiquid assets. However, in reality, the distinction is not black and white but rather liquidity exists on a continuum. In discussions with our clients we have heard anecdotally of instances where the liquidity of a private asset has been found to be better than a similar amount of a publicly listed one. Thus, while we do not challenge the broad characterisation of alternative assets being less liquid, it is unwise to assume that a public listing automatically delivers high liquidity. Indeed the liquidity challenges faced by public markets are well known:

- World Economic Forum again – “Public markets have also been getting less liquid. Regulation, in the form of Basel III and the Dodd-Frank Act, has made it much more capital-intensive for investment bank broker dealers to “warehouse” securities on their balance sheets.”

<sup>2</sup> Source: <https://www.weforum.org/agenda/2021/09/six-issues-to-define-the-future-of-capital-markets/>

<sup>3</sup> Source: <https://www.pwc.com/gx/en/audit-services/capital-market/publications/capital-markets-2030.pdf>

- The Bank of England issued a working paper in November 2017 entitled “The leverage ratio and liquidity in the gilt and repo markets”. The following is an extract from that paper:

*“Market participants have argued that a significant unintended consequence of post-crisis regulatory leverage ratio requirements has been a reduction in the liquidity of fixed income markets. We assess this claim in the context of the gilt (UK government bond) and gilt repo markets. We find that gilt repo liquidity worsened during the period when UK leverage ratio policy was announced, and that gilt liquidity worsened conditional on factors such as funding costs and inventory risk. We also find evidence that gilt repo liquidity has become less resilient. However, evidence from heterogeneity in dealer behaviour is inconclusive regarding a causal link between leverage ratio requirements and the reduction in market liquidity<sup>4</sup>.”*

- Work by the UK Financial Conduct Authority (FCA) also in 2017 noted:

*“New data suggests there has been a decline in liquidity in the UK’s corporate bond market over the past two years. The analysis, which combines both traditional and non-traditional measures of liquidity, indicates trading conditions have generally become more difficult from 2014/2015 onward.”<sup>5</sup>*

- More recently, the liquidity of government bond markets has again been newsworthy as the UK gilt market demonstrated in September and October 2022. During this period, the Bank of England had to step in and purchase long-dated gilts to restore orderly market conditions following significant sales of gilts by UK defined benefit pension funds. These funds needed to raise cash collateral to fund margin calls on derivatives used to help manage the interest rate sensitivity of their scheme funding levels.

Indeed a report entitled “Liquidity in Core Government Bond Markets” issued by the Financial Stability Board (FSB) on 20 October 2022 notes:

*“Changes in core government bond markets over the past decade may have made these markets more prone to liquidity imbalances in times of stress. The growth in outstanding debt combined with the greater use of government bonds by some investors for trading and hedging strategies or liquidity management purposes may have increased sensitivity to shocks. Dealers have lower risk warehousing capacity to support intermediation compared with the size of trade flows especially in stress, while non-bank liquidity providers – such as principal trading firms (PTFs) – do not appear to sufficiently increase market-making in stress.”*

At this point we note that liquidity challenges in public markets<sup>6</sup> are likely to create a headwind for investment in alternative assets. The reason for this is that investors always require a degree of liquidity – even an illiquid liability such as a payout annuity has near term benefit payments to customers alongside expense outgo that must be met and potentially collateral payments on derivative based hedges that must be funded. So, when contemplating an allocation to alternative assets an insurer will typically rely on the liquidity of its publicly traded portfolio to deliver the required supply of liquidity with an appropriate safety margin. Increasing the allocation to alternative assets (making part of the asset portfolio more illiquid) is thus likely to require a counterweight to ensure overall portfolio liquidity remains within risk appetite.

For an insurer then contemplating an increase in its allocation to alternative assets, a key question will be – “is it worth it”? For example, if a commercial real estate (CRE) loan offers a yield premium of say 80bps over corporate bonds that may look attractive if the liquidity of public traded corporate bonds was fully robust. However, if ensuring adequate portfolio liquidity meant shifting some assets from corporate bonds to cash – because there are reservations about the liquidity of higher yielding assets such as corporate or even government bonds under stress - then the lost yield on those assets has to be taken into account in assessing the overall benefit of investing in the CRE loan.

<sup>4</sup> Source: Banking of England Staff Working Paper Number 690 “The-leverage-ratio-and-liquidity-in-the-gilt-and-repo-markets” available from: <https://www.bankofengland.co.uk/working-paper/2017/the-leverage-ratio-and-liquidity-in-the-gilt-and-repo-markets>

<sup>5</sup> Source: <https://www.fca.org.uk/insight/new-evidence-liquidity-uk-corporate-bond-market>

<sup>6</sup> While many of the examples come from the UK, we do not expect the challenges are limited to the UK market.

Milliman recently hosted a roundtable discussion with ALM practitioners from six major UK life insurers where the following point was noted:

*“The necessity of having some proportion of liquid assets in a portfolio (particularly an MA<sup>7</sup> portfolio) backing annuity liabilities is obvious, the debate is over exactly what proportion this should be. It was proposed that this proportion may have become higher given the events of the last 6 months or so<sup>8</sup>.”*

In summary then there are factors encouraging insurers to contemplate an increase in their alternative asset allocation but it is not a cloudless sky and approaches will inevitably vary between markets and also between individual firms. In the next section we add some colour to this.

## Survey results

To get a sense of how insurers across the world are currently viewing the opportunities and challenges presented by alternative assets, we sought to pull together information across a number of geographies using a combination of inputs (collation of information from several insurer surveys in some cases and Milliman experience in others). The areas covered were:

- Asia ex. Japan – specifically Hong Kong and Singapore
- Europe – specifically France and Spain
- Japan
- UK
- US

In the remainder of this section we set out the key features that struck us from the information we gathered. However, we note that our information is from late 2021 and early 2022 and so pre-dates the latest round of global interest rate increases and market volatility which may change the approach of some insurers, at least in the near-term.

### What types of alternative asset do you currently invest in / plan to invest in over the next 12 months?

While there was, unsurprisingly, some variation in the specific mix of alternative assets held across different markets, the overall appetite is notably broad across the markets considered and includes both fixed income (e.g. commercial real estate or infrastructure debt), and equity (e.g. private equity) type exposures. Furthermore, we observed no strong evidence that the range of alternative asset classes being considered is expanding in the near-term at least, though ground rents (both commercial and residential) appear of increasing interest to some firms in the UK and infrastructure debts are getting some traction in Singapore.

### What type of business do your alternative assets back?

Illiquid assets are used as part of the asset allocation to back a range of traditional lines of business (non-participating and participating), with a particularly wide application noted in Hong Kong and Singapore for long-term participating business (single premium and regular premium) with “less liquid” liabilities. In Hong Kong in particular, private equity has been a popular asset class for companies selling high savings participating whole life business with low guarantees but high potential long term return upside to customers through non-guaranteed terminal dividends.

In the UK, the most significant, area of activity in relation to the deployment by UK life insurers of alternative assets relates to payout annuity business. Payout annuity liabilities are highly illiquid and so offer scope to be matched in part with relatively illiquid assets. Under Solvency II the ability of insurers to pursue a long-term buy-and-hold investment strategy for such liabilities and thus to extract an illiquidity premium has been recognised via the matching adjustment. The Matching Adjustment (“MA”) has been widely adopted in the UK with substantial part of the market having approval to use the MA which typically ranges from around 50bps to around 150bps depending on the backing asset portfolio.

In continental Europe (e.g. Italy, France) the payout annuities are much less popular than in the UK and the exposures in alternative asset classes are also smaller. Nevertheless insurers have some limited exposures in alternative asset classes covering products with profit participation.

<sup>7</sup> MA – Matching Adjustment under Solvency II

<sup>8</sup> A summary of the roundtable discussion can be found here: <https://uk.milliman.com/en-gb/insight/roundtable-life-insurer-ALM-autumn-2022>

**What % of existing liabilities / target % of new business liabilities is backed by alternative assets?**

Across Japan, Spain and France indicated exposures were currently quite limited at below 10% of liabilities though a follow up question around planned changes noted a typical intention to increase exposures slightly over the coming year.

For Hong Kong and Singapore, current exposures are higher being generally in the range 10% - 30%.

In the UK, exposure will vary significantly by firm depending on business mix. However, considering annuity business specifically, most participants in a recent Milliman market survey aimed to increase their exposures to illiquid assets up to 50% or more via higher target allocations on new business.

In the United States, insurers continue to increase their holdings of less liquid assets. Many of these assets are classified by the National Association of Insurance Commissioners as “Schedule BA”, which means they have the highest risk-based capital charge of 30%. Despite this treatment, insurers held 14.7% more Schedule BA assets at year-end 2021 than year-end 2020. Additionally, ABS and other structured securities, which are often illiquid, increased 11% and 30%, respectively, year-over-year. As a consequence, the percent of general accounts invested in bonds declined from 70% year-end 2020 to 61% at year-end 2021.

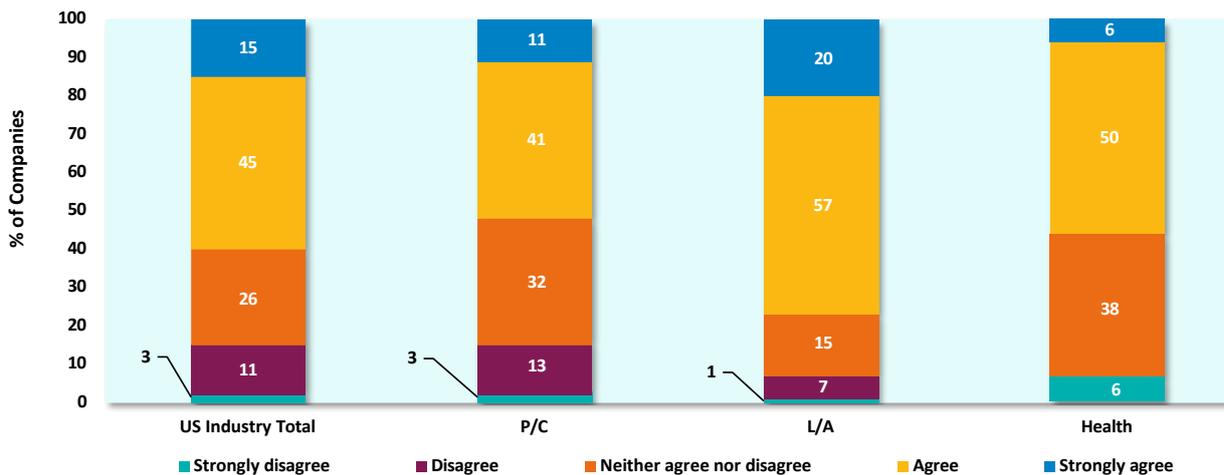
**What are the key business drivers for investing in alternative assets?**

As indicated earlier there are several reasons why insurers may seek exposure to alternative assets. Some themes we noted are:

1. Higher risk-adjusted yields and improved portfolio diversification are the principal drivers noted almost universally irrespective of market.
2. It is interesting that improved capital efficiency was mentioned frequently as a driver but responses to questions around the regulatory capital treatment of alternative assets indicated a general sense that current rules do not necessarily reflect well the features and risks of some of these assets and can result in an onerous treatment. It is possible though that participants anticipate a degree of positive change in the capital rules in future – we return to this topic a little later in the paper.
3. Environmental, Social and Governance (ESG) considerations are ranked highly in Europe and the UK and there has been a substantial change in attitudes towards ESG in the United States. Figure 4 illustrates US insurer responses to a survey by AM Best in 2021 on the relevance of ESG to investment decision-making:

**FIGURE 4: USE OF ESG FACTORS IN INVESTMENT DECISION MAKING**

**Prompt: ESG factors are explicitly considered in your investment decision-making process?**



We expect this trend to continue as ESG policies became more embedded and investors seek to differentiate themselves in this regard. Moreover climate risk becomes an important topic that will be covered within capital regimes. For example under the 2020 Solvency II review the companies will need to perform climate risk stress tests within the ORSA process which will clearly penalize portfolios which are less ESG focused.

### **What are the principal investment constraints (limits) that apply when investing in alternative assets?**

The most frequent constraint noted was in relation to the overall appetite of the firm for liquidity risk. This is no surprise as clearly the inclusion of more illiquid assets within the investment portfolio should be accompanied by appropriate modelling and analysis of the implications for a firm's ability to meet cash demands, in particular policyholder claims, as and when they fall due.

The next most widespread limit noted was in relation to quality of asset - if your investment process / expertise is fairly new/limited you may well look to limit exposures to any particular asset types i.e. diversification is more important here to manage risk.

Operational constraints - such as limited asset supply, limited transaction size, speed of transaction and ongoing administration challenges - are also typically seen as a key challenge, especially in markets with less mature investment teams where outsourcing solutions (e.g. pooled funds) can be used to mitigate the risk.

### **What are the key challenges when administering and risk monitoring alternative assets?**

A point frequently noted was the lack of available market data and benchmarks to assist pricing and risk and capital assessment. The consequence of this being a need to rely more heavily on expert judgement in setting parameters. We note that this need not be a significant handicap as insurers typically already have established processes to develop, validate and document expert judgements. However, this aspect can add to the resource intensity of alternative asset management and any additional costs should be considered as part of any business case to initiate or extend exposures. Reinforcing this point, was the common observation that it can be challenging to maintain sufficient in-house resources to manage alternative assets (origination, credit assessment, valuation, collateral, terms variation and work-outs where assets are in danger of becoming impaired). To mitigate this, some firms

We note here that many of the management functions required around alternative assets can be sourced from external specialist providers at least until such time that scale and experience make the establishment of an in-house team economic.

There now follows a series of questions related to the current capital treatment of alternative assets for insurers and below we cover these together:

- Do you feel that current Risk-Based Capital (RBC) frameworks allow insurers to give a fair and reasonable treatment to alternative assets?
- Where do you see the challenges arising regarding investment in alternative asset under current RBC frameworks?
- Which aspects of the regulation do you feel need to be reconsidered in order to support an increased allocation to alternative assets?

The consensus around the first question was that current standard RBC frameworks do not, as yet, allow insurers to fully reflect the features of alternative assets. The general sense was that, across the alternative assets sector as a whole, capital requirements were too high and insufficiently granular. A further point made was that gaining regulatory approval to better reflect the features and risks of alternative assets can often be time consuming and costly. Not surprisingly, responses to the last question focused on improved asset class differentiation, lower capital charges and simplified processes for regulatory approval of insurers' approaches.

We also asked respondents what they felt were the main incentives for regulators to review the rules. A common response was that allocation to alternative assets can improve asset diversification for insurers. There is a clear implication here that this should resonate with regulators seeking to improve risk management and resilience in the life insurance sector. In a similar vein was the scope for improved asset liability matching that alternative asset may facilitate – though we note that this aspect was not among the key reasons given for insurers themselves to invest in illiquid assets. There is an apparent inconsistency here that we intend to explore further outside the confines of this paper.

### How do you see alternative asset investment constraints being impacted by Environmental, Social and Governance (ESG) considerations?

Responses here were mixed, some felt that ESG considerations would not significantly alter their existing approach and asset allocation – perhaps because ESG factors are already well embedded into the investment framework. Others noted that some alternative assets in particular have very clear green credentials e.g. investment in wind farms and solar parks while others offer opportunities to actively improve the asset from an ESG perspective e.g. retro-fitting of energy efficiency measures to residential or commercial property.

Overall, we expect ESG considerations to increase in importance as new metrics are embedded into investment frameworks and as insurers seek to differentiate themselves in this area.

### What approaches do you use to gain access to alternative assets?

Approaches explored included direct origination of the assets by a related company (e.g. equity release mortgages), direct investment or via vehicles such as pooled funds or securitisations. In terms of the responses we noted a trend for the range of origination approaches used to increase with the level of allocation to alternative assets – not surprising as a higher allocation may well require an insurer to utilize a variety of access channels to meet its requirements.

Where investment in alternative assets is well established there was a greater tendency for origination activities to be managed predominately in-house, though still supplemented by specialist external providers where needed. In other cases, origination was largely outsourced to external asset managers with the main reason given being to get access to the necessary specialist expertise.

### What approach do you use to assess the credit quality of alternative assets?

A survey undertaken by Milliman in the UK in late 2021 noted that the vast majority of illiquid assets (c.90% across the survey total) were internally rated by insurers themselves with little variation in this picture across asset types.

Elsewhere, this tendency was less strong with greater reliance being placed on ratings provided by external asset managers or credit-rating agencies e.g. for securitisations or possibly where an asset includes the provision of a credit enhancement wrapper.

## Risk quantification

Typically alternative assets are traded in private markets and their valuations are not publicly quoted. Risk quantification of those assets is very challenging. Usually it is difficult to find suitable data for calibration. Even if there is data, the underlying instruments often suffer from illiquidity, leading e.g. to so-called “stale prices”, i.e. quotations based on last but not very recent transaction price which do not reflect the latest development in financial markets. Typical techniques to deal with such issues are unsmoothing techniques or using explanatory models. We highlighted those approaches in our previous paper, “Alternative asset classes: Why and what to model, and considerations for risk management”<sup>9</sup>.

In this note, we describe risk quantification challenges from a different angle. In particular, we focus on the data sources and the definition of appraisal-based valuations which in our view better reflects illiquidity the long-term nature of such investments. We focus our example on private equities, being a popular alternative investment.

By their nature, private equities or private equity funds have some similarities to traditional equity investments, however there are also important differences. Probably the most apparent difference is that investment in private equity is typically a long-term commitment, typically has predefined maturity of 10 years or longer to ensure sufficient time for the underlying companies to grow and develop. Usually the capital is partially distributed back to investors during the life-span of the duration of such contract, nevertheless the main capital draw down would typically occur at maturity. Private equities and the fund structures are specifically designed to reflect this long-term characteristic. These investments are not traded like liquid assets and it is practically impossible for investors to withdraw their funds before the maturity.

<sup>9</sup> <https://www.my-milliman.com/en-gb/insight/alternative-asset-classes-why-and-what-to-model-and-considerations-for-risk-management>

Private equity historical return data have limited holdings transparency and are based on subjective appraisal-based valuations rather than observable, transaction-based prices on a public exchange. There are different approaches to derive benchmarks for risk calculations. As an example, a simple approach is to use Listed Private Equity indices, based on the stock prices of exchange-listed private equity managers and fund investments. One of the most common index is the LPX 50 Total Return index based on stock prices of the 50 largest private equity firms. Interestingly, it is the index which was used for the calibration of the standard formula shock for Solvency II Type 2 equities by the European Insurance and Occupational Pensions Authority (EIOPA).

However, using such private equity index as benchmark also comes with challenges as such an index is unlikely to be a good representative of the return of a direct holding in a particular private equity investment. In particular:

- Typically private equities are structured as long term private vehicles which are meant to be held to maturity. In particular, when investing in private equities, insurance companies are typically looking for long term illiquid investments with a better long term upside return while managing the shorter term illiquidity risk via several management actions including making their liabilities more illiquid. As such, the performance of such private equity investments is not expected to be impacted materially by the short-term market sentiment of the equity markets, which should theoretically make the risk-return profile of private equity companies to behave differently from the risk return profile of the equity shares of the companies / funds included in the LPX 50 TR index.
- A significant proportion of the LPX 50 TR index is comprised of management company vehicles, with the revenue based on management fees, which may impact the risk return profile potentially significantly and will not make it comparable with the risk return profile of a direct investment in a private equity.
- The measures driven by the LPX 50 TR index like volatilities, correlations, etc. are driven mainly by the developments in the public market which often have a shorter-term nature.
- If the actual risk-return profile of private equities was indeed similar to the LPX50 TR index, then insurers would likely opt for much less problematic (and in fact cheaper) investments in equity shares available via the exchange-traded markets.

#### What are the alternatives then?

Given the long-term and illiquid nature of private equities, a more robust first-principle approach could be developed based on industry data to derive the evolution of the underlying Net Asset Value (NAV) based on cash-flows of similar investments. Such approach is typically called appraised-value indices. For example, a potential approach for the development of a private equity index is described in the paper by European Private Equity and Venture Capital Association (EVCA) "Calibration of Risk and Correlation in Private Equity, A proposal for a new approach for the development of a private equity index"<sup>10</sup>, in which the authors suggest defining returns of such an index between times  $t_1$  and  $t_2$  as follows:

$$R_{t_1}^{t_2} = \frac{NAV_{t_2} - NAV_{t_1} - \sum_{t_1}^{t_2} Call_t + \sum_{t_1}^{t_2} Distribution_t}{NAV_{t_1} + \sum_{t_1}^{t_2} \left( Call_t \cdot \left( 1 - \frac{t-t_1}{t_2-t_1} \right) \right) - \sum_{t_1}^{t_2} \left( Distribution_t \cdot \left( 1 - \frac{t-t_1}{t_2-t_1} \right) \right)},$$

where  $NAV_t$  is the net asset value of all private equity funds in the benchmark,  $Call_t$  the sum of capital calls from investors in one period (e.g. quarter) and  $Distribution_t$  is the sum of capital distributions to investors in one period. Such a benchmark could be calculated only from a dataset of real industry data which could be offered by providers like Prequin.

Working with such time series requires additional analysis because the data could be available in say only quarterly time intervals, so it might need for example, stochastic interpolation to obtain monthly data, dealing with autocorrelations or un-smoothing the data series. What is however notable is that the standard measures of risk (e.g. 1 in 200 quantile, volatility) calibrated with such data could be 40%-60% lower than analogous figures calibrated to the LPX 50 TR index, as shown in various papers such as the EVCA paper but also e.g. in the 2016 paper published by AssetMetrix: "Private equity indices: Approches, characteristics, implications"<sup>11</sup>. For example, the 99.5% quantiles calculated by EVCA were around 30% (with some deviations depending on the data source and methodologies applied). In contrast, according to EIOPA calibrations

<sup>10</sup> [https://www.investeurope.eu/media/1312/12-05-18\\_evca\\_researchpaper\\_pe\\_s2riskcalibration.pdf](https://www.investeurope.eu/media/1312/12-05-18_evca_researchpaper_pe_s2riskcalibration.pdf)

<sup>11</sup> [https://www.bvai.de/fileadmin/Themenschwerpunkte/Private\\_Equity/Leitfaeden\\_Whitepapers\\_Studien/Private\\_Equity\\_Indices\\_-\\_Approaches\\_\\_Characteristics\\_and\\_Implications.pdf](https://www.bvai.de/fileadmin/Themenschwerpunkte/Private_Equity/Leitfaeden_Whitepapers_Studien/Private_Equity_Indices_-_Approaches__Characteristics_and_Implications.pdf)

from the same time period the shock derived from LPX50 TR index was almost 70%. As a further contrast, recall that the stress applied to Type 2 equities (covering private equity) in the SII Standard Formula is 49% +/- the symmetric adjustment (in fact 49% is a result of weighted average of risk for private equities, commodities, hedge funds and equities for emerging markets<sup>12</sup>, with private equity calibrated to LPX50 TR being recognized as the most risky component in the mix).

We accept however that the number and range of appropriate benchmarks for these assets remains limited. Nevertheless, the methodology used (overall calibration philosophy is very similar to the one used to calibrate risks under Solvency II / RBC regimes) and the key conclusions set out in the analysis (lower level of risk) are useful inputs to the wider discussion on the potential risk return impact of private equity investments in the context of economic capital / RBC regimes. Overall, all these analyses based on alternative indices suggest that companies using the LPX50 TR index as a proxy might overestimate (potentially significantly) the real risk related to private equity holdings.

Of course, construction of appraisal based indices require access to industry data which is not available in the most popular market data sources (at least not to the extent necessary to construct such indices). However, there are a few specialized data providers who could give access to material databases. For example, the EVCA estimations were performed based on data from Prequin and Prevara, though these are not the only private equity data providers in the market.

From more readily accessible data, one could consider using LPX50 NAV index (opposed to LPX50 TR index), based on the evolutions of net asset values of the largest private equity companies. This index seems to overcome the most important shortcomings of the LPX50 TR index: the composition of LPX50 NAV index does not include pure fund management companies, and it is based on fundamental valuations based on NAV rather than the price of equity shares. In his 2012 paper "Listed vs Unlisted Private Equity"<sup>13</sup> Michel Degosciu reports the volatility of LPX50 NAV index to be also about 60% of the volatility of LPX50 TR index, and the correlation with appraisal-value indices to exceed 90%, this suggests that it could be a more easily available alternative to be used for risk calculations. Other proprietary-based benchmarks are also used in practice by insurance companies such as Cambridge Associates or 3i group private equity.

## Regulatory Treatment

In this section, we consider regulatory developments relevant to alternative assets for a number of different jurisdictions.

### SOLVENCY II

The Solvency Capital Requirement (SCR) under Pillar I of Solvency II can be calculated either with the standard formula or with full or partial internal model. The standard formula is a risk based capital formula in which different risks are organized in risk modules and sub-modules which are combined together with Variance-Covariance (aka correlation matrix) approach. A full or partial internal model are developed internally by companies under a strict supervisory review process.

In the standard formula, alternative asset classes are not necessarily addressed specifically in terms of their capital requirements. The asset classes like private equities, hedge funds, commodities are mapped as so called "Type 2 equities" with a capital charge of 49% adjusted with a so-called "symmetric adjustment" (SA) reflecting the current position in the economic cycle, which can be either positive or negative. This charge is somewhat higher than for listed equities for which the capital requirements amount to 39% +/- the same "symmetric adjustment". In reality, the three asset classes: private equities, hedge funds and commodities, have quite different profiles both in terms of risk and liquidity, nevertheless they are charged the same capital under the Solvency II standard formula.

Furthermore, for fixed income alternative asset classes under the standard formula companies might struggle to avoid high capital charges for counterparties without a credit rating provided by an External Credit Assessment Institution (ECAI). However, in such cases collateralization or providing an internal rating offers scope to reduce the capital requirements (see Figure 5 below).

Both for equities and fixed income there is one notable exception for the so-called "qualifying infrastructure investments" and "qualifying infrastructure corporate investments", for which capital requirements are somewhat lower. In order to qualify, such investments must be issued by a so-called 'infrastructure project entity' being in fact an entity whose function is to pursue qualifying infrastructure investments - strictly limited to owning, financing, developing or operating infrastructure assets. For qualifying infrastructure corporate investments, the entity function is limited by the "substantial

<sup>12</sup> [https://www.bafin.de/SharedDocs/Downloads/EN/Leitfaden/VA/dl\\_lf\\_solvency\\_annahmen\\_standardformel\\_scr\\_en.html](https://www.bafin.de/SharedDocs/Downloads/EN/Leitfaden/VA/dl_lf_solvency_annahmen_standardformel_scr_en.html)

<sup>13</sup> [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2081997](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2081997)

majority of revenues” being derived from infrastructure assets. Such investments have to meet strict criteria on investors’ security, for example additional requirements for due diligence and risk management are set out for insurers. Additionally, for fixed income investments, insurers have to commit to hold them until maturity and that their credit assessment (preferably based on a rating(s) of external agencies) should be equivalent to investment grade.

In Figure 5 below we compare capital charges for specific instruments qualified under equity risk and spread risk submodules of standard formula to give a flavor of how the capital requirements differ between those instruments.

**FIGURE 5: SII – ILLUSTRATIVE FIXED INCOME CAPITAL CHARGES**

INSTRUMENT	SF CLASSIFICATION	CAPITAL CHARGE	
<b>Equity</b>	Listed equity	Type 1 equity	39% + SA
	Private equity	Type 2 equity	49% + SA
	Qualifying infrastructure equity	Equity-QI	30% + 77% * SA
	Qualifying infrastructure corporate equity	Equity-QIC	36% + 92% * SA
<b>Fixed income (7 year modified duration)</b>	Vanilla bond (ECAI A-rated)	Spread	8.4%
	Vanilla bond (ECAI BBB-rated)	Spread	15.5%
	Vanilla bond (unrated, no qualifying collateral)	Spread	18.4%
	Vanilla bond (internally rated qualifying as equivalent of A-rating <sup>14</sup> )	Spread	8.4%
	Vanilla bond (internally rated qualifying as equivalent of BBB-rating)	Spread	15.5%
	Vanilla bond (unrated but where collateral satisfies condition <sup>15</sup> )	Spread	9.2% (= 0.5 * 18.4%)
	Vanilla bond (unrated but where collateral satisfies condition <sup>16</sup> )	Spread	14.2% (= 0.5 * (18.4% + 10%))
	Vanilla bond (A-rated, qualifying infrastructure Investment)	Spread – QI	6%
Vanilla bond (A-rated bond, qualifying infrastructure corporate Investment)	Spread - QIC	6.31%	

Another aspect of the treatment of alternative investments under Solvency II is liquidity risk. The standard formula does not require any capital provision for liquidity risk under Pillar I. However, as already mentioned in our previous paper, companies with significant exposures in alternative asset classes would be required to report liquidity risk as part of their ORSA.

Companies with partial or full internal models aim to calculate the 99.5% quantile of the change in own funds over a 1 year time horizon for the SCR, taking into account their best knowledge of the risks they face. The advantage of an internal model is that it allows companies to flexibly design the approach to better reflect the nature of their risks. Internal models are of course subject to very strict regulatory approval rules. Generally, developing internal models is a very expensive process, and typically small companies don’t decide to invest in an internal model, but they rather opt for the standard formula.

Internal model companies could have stronger incentives to invest in alternative asset classes as they can build and parametrize their own models which reflect risk and diversification in a way that reflects their own views.. As noted in the earlier section on risk quantification, the risk related to for example, private equities or private debt instruments which are typically held to maturity, are less exposed to volatile market value movements - the riskiness of those assets is much more related to counterparty default risk and liquidity risk than short term market volatility. Their illiquid nature makes such

<sup>14</sup> Where the internal rating satisfies the requirements of Article 176(a) of the SII Delegated Act.

<sup>15</sup> Where collateral posted satisfies the requirements of Article 214 of the SII Delegated Act and its risk adjusted value of the collateral is greater or equal to the market value of the bond.

<sup>16</sup> Where collateral posted satisfies the requirements of Article 214 of the SII Delegated Act and while its risk adjusted value is < the market value of the bond it is greater or equal to the bond’s market value following the spread stress (in this case  $\geq (1-18.4\%) * MV$ ). In our example, we assume that risk adjusted value of collateral is equal to the 90% of the market value of the bond i.e. there is a 10% uncollateralised exposure pre-stress.

investments most attractive when covering very illiquid insurance liabilities, e.g. payout annuities. In such cases, yields on alternative asset classes may be deemed to earn an illiquidity premium which could be considered in some sense risk-free. As such investments are held to maturity, full market value shocks essentially would not need to be taken into account when calculating the capital requirement.

The above might be considered against Solvency II rules, which recognize that assets are booked at market values and that SCR requirements should reflect any changes in the market values of assets. However, it is worth noting that the Solvency II 2020 Review recognized that under specific conditions the capital required for so-called long-term equities under the standard formula could be reduced to 22% compared with the standard 1-year calibrations. To justify the more favourable treatment, companies would need to ensure that:

- Long-Term Equities are managed in sub-portfolios in ring-fenced funds, covering liabilities with sufficiently long duration and a high level of illiquidity.
- Companies will have to demonstrate that the average holding period for such equities is longer than 5 years.
- Long Term Equity sub-portfolios should be sufficiently diversified and consist of listed or certain unlisted equity positions from EAA countries.

Of course Long-Term Equities (“LTE”) are not related to investments in alternative assets. Nevertheless, the concept of LTE is an important breach of Solvency II paradigms which relied on measuring the variation of Own Funds over a 1-year time horizon, where assets in own funds are recognized at market values. We believe that a similar rationale could be applied in an internal model for alternative asset classes, e.g. private equities, as the capital requirements could be potentially reduced by introducing cash-flow based measurement which would to a lesser extent take into account short-term market sentiment, provided of course that certain liquidity constraints are closely monitored. We included an example of such approach in the risk quantification section.

The second important issue in the Solvency II 2020 Review that might trigger interest in alternative investments is a revised treatment of the Volatility Adjustment (“VA”), which will be much more aligned with an insurer’s actual investment portfolio and illiquidity of liabilities. Currently the VA depends only on an abstract reference portfolio and does not differ between types of liabilities. After the Solvency II 2020 Review the VA is expected to be much closer to the current Matching Adjustment and is likely to be more alternative assets-friendly by reducing the volatility of own funds.

To be clear though, at this moment comments in relation to the potential LTE and VA changes should be considered a little bit speculative as the revised SII regulations are still to be confirmed and are not expected to come in force sooner than in 2025.

## ASIA

Most of the Solvency regimes in Asia have moved or are moving towards a risk-based capital regime. For example, Singapore RBC 2 was formally introduced with effect from 31 March 2020 while Hong Kong RBC is expected to become live in 2024 (although some companies have already early adopted). Japan is also planning to introduce a framework largely similar to the Insurance Capital Standard (ICS) from the end of the financial year 2025.

Under Hong Kong RBC and Singapore RBC2, private equity has the same treatment as other equities while private debt and infrastructure are looked through with a credit spread capital requirement based on their ratings. No allowance is made for alternative assets in the matching adjustment.

In line with the latest ICS data collection exercise, the Japan Financial Services Agency is currently collecting data from the industry on specific alternative assets with an objective to potentially review the risk charges applicable to infrastructure investments and strategic equities to reflect the better risk profile than similar non-infrastructure and non-strategic equities.

## USA

There have been multiple ongoing or implemented developments around alternative asset classes. At the end of 2021, the NAIC revised their capital charges for bonds, in effect making the charges more granular than was previously the case. Instead of bucketing bonds into 6 risk charge categories under the previous methodology, the new approach makes use of 20 categories. The estimated impact of this on insurer capital levels was expected to be neutral to slightly negative, but it did remove the incentive to invest in the lowest-rated bonds within each of the original groupings.

With the rise in alternative investments, insurers have been looking at structures that will receive bond treatment and are filing exempt (that is, they have an external rating by a qualified credit rating agency). This has raised concerns about regulatory arbitrage.

To reduce arbitrage risk, the NAIC's Valuation of Securities Task Force (VOSTF) updated their policies and procedures guidance to remove one type of structured asset, principal protected securities, from the file-exempt category, which no grandfathering of previously exempt PPS.

Furthermore, so-called 'bespoke securities', defined as "financial instruments typically constructed by or for a small group of investors, which, due to their private nature, are not subject to or constrained by market forces and competition. As such, their visible characteristics may substantially underrepresent actual risks." Effective January 1, 2022, the NAIC required insurers to provide the NAIC's Securities Valuation Office with a private letter rationale report for any investment security with a private letter rating. This is required at acquisition and annually.

Finally, the NAIC recently updated its guidance for Statutory Accounting Principle 43R – Loan-Backed and Structured Securities, to remove a practice adopted during the Financial Crisis that allowed insurers to acquire a higher rating for their Loan-Backed and Structured Securities if they adjusted the carry value of those assets to reflect expected losses. Insurers utilized this to adjust the carrying value to an amount such that there were no longer any expected losses under all model scenarios, thereby allowing the insurer to designate the security as NAIC 1, which had the lowest capital charge. The revised guidance keeps this approach for legacy assets (pre-January 1, 2013), but now requires all non-legacy Loan-Backed and Structured Securities to use the rating assigned by the NAIC Securities Valuation Office (SVO).

This gives the SVO more flexibility in rating the risk of a security, although it is going to be more closely aligned with the rating by the NRSROs. The SVO's guidelines include the following for loan-backed and structured securities: The security's "rating should reflect the current risk of loss in the portfolio of loans. The rating should seamlessly transition from a Moody's rating of Aaa or Aa1 to a Moody's rating of C or Caa1 without any rating discontinuities." The "current risk of loss in the portfolio of loans should be based on the portfolio's current credit performance. The current credit performance of the portfolio is the most relevant assessment of the current risk of loss since it reflects both current credit conditions as well as the credit quality of the portfolio as a whole."

## Conclusions

In summary, there are clear reasons why alternative assets can be attractive investments for insurers with long-term and relatively illiquid liabilities. Consistent with this, the responses from our collection of survey results indicate growing interest in this area across a wide spread of geographies. Indeed, taking a bigger picture perspective, we also recognise that some alternative assets provide a mechanism for insurers to provide long-term productive finance to the real economy and also support significant societal objectives such as the transition away from carbon based energy. Nevertheless, investing in alternative assets poses challenges for insurers from both operational and risk management perspectives, while current risk-based capital regimes are often insufficiently granular to enable the specific features of some assets to be properly captured, though as we note earlier the direction of travel here is generally positive.



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## Appendix

Illustrative list of alternative asset classes:

- Private equity
- Hedge funds
- Infrastructure debt  
(construction phase / operational phase)
- Commercial real estate loans
- Secured financing e.g. export credit
- Social housing loans
- Student accommodation loans
- Ground rents (commercial / residential)