Capital and risk implications of mortgage investments for insurers

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The continued low interest rate environment creates significant challenges for insurers who depend on long-term yields to generate value for customers. In particular, it is increasingly difficult to manufacture guaranteed life assurance products such as annuities or traditional non-linked saving and investment products, that offer sufficiently attractive returns to consumers. In attempting to address this challenge, insurers are increasingly turning to a wider range of assets to seek yield, and in this paper we consider the risk and capital implications for European insurers investing in one such alternative – portfolios of mortgage loans.

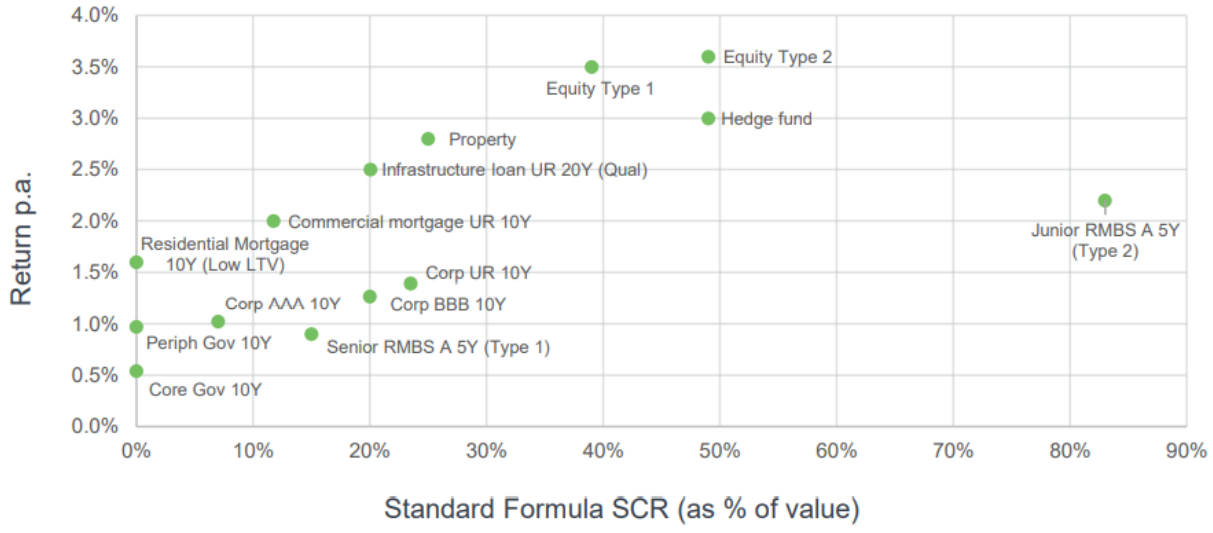
Introduction

In 2018 we produced a research paper looking at insurer investment strategies under Solvency II. The relatively new regulatory regime had given insurers greater flexibility in terms of the range of investments that they could hold, compared with the previous European regulatory regime. In addition, the new regime also linked the capital requirements for holding those investments much more closely to the underlying risks.

One key element of our 2018 paper was an assessment of the expected returns for a range of asset types, including mortgages, plotted against the Solvency II standard formula capital requirements for holding those assets. This graph is replicated below[1] (Figure 4).

For most asset types, there is a strong correlation between the potential return that can be achieved and the level of capital that must be held – consistent with a view that "safer" assets typically generate lower expected returns, and typically generate lower capital requirements. While the correlation of returns and capital requirements is an interesting, if unsurprising, observation from a graph like this, perhaps the most interesting takeaway relates to the exceptions – the outliers which show a break in the "normal" capital and return trade-off.

FIGURE 4: EXPECTED RETURNS COMPARED TO STANDARD FORMULA SCR FOR A RANGE OF ASSETS



[1] Note that this graph is taken directly from the 2018 paper and the analysis has not been updated

Following the publication of this paper, we received a number of follow up queries relating directly to mortgage assets. As an asset group both residential and commercial mortgages appear to show the potential for stronger yields than the capital requirements would suggest. The key questions that arise are typically along the lines of:

- Is this too good to be true – can mortgage assets generate meaningful returns for lower capital requirements?
- Do the capital requirements adequately reflect the risks?
- Are insurers taking advantage of these asset classes?

The purpose of this briefing note is to drill a little more into the Solvency II treatment of this asset class to try to surface the answers to these key questions. In assessing these questions, we also identified the greater prevalence of mortgage assets in the US market. We therefore also assess the potential for European insurers to invest in this, perhaps more established US asset class, highlighting some of the key issues that are likely to arise.

In terms of the structure of the remainder of this paper, we start with some analysis on the prevalence of investment in mortgages by insurers, before discussing the Solvency II capital requirements for residential mortgages and commercial mortgages separately. We then revisit the questions posed above in some detail, before offering some concluding remarks.

This briefing note is based on publicly available information on the use of mortgage assets by life insurers, and reflects our understanding of the treatment of these assets under Solvency II. It is not intended to be investment advice, and no individual or insurer should take action based on this briefing note alone.

Prevalence

Mortgage assets are not a material component of the investment portfolios of many European insurers. An analysis prepared by EIOPA based on year-end submissions from insurers for end 2019 showed that mortgage assets comprised just 2.8% of investment portfolios[2] (largely unchanged from the end 2018 position). Note that the percentages related to non-linked assets held by insurers and do not consider assets held to match unit-linked policyholder liabilities.

Asset class	% held
Government bonds	28.0
Corporate bonds	26.2
Equities	12.5
Investment Funds	19.9
Structured notes	1.1
Collateralised securities	0.6
Cash and Deposits	4.3
Mortgages	2.8
Other Loans	2.5
Property	2.0
Other Assets	0.2

While it is possible that some of the investment fund holdings held by insurers could also have exposure to mortgage assets, it appears that mortgage assets are still a relatively niche investment type for European insurers.

Drilling into the underlying data a little further allows a more detailed assessment. While the overall percentage held is relatively low at 2.8%, this increases significantly when focusing solely on life insurers where 4.9% of non-linked assets are invested in mortgages.

By contrast, looking at the asset allocations of US insurers paints quite a different picture. A special report[3] published by the National Association of Insurance Commissioners (NAIC) based on end 2020 data showed that mortgage loans made up over 8% of insurers' total cash and investible assets. For US life insurers, the special report showed over 12% of investible assets allocated to mortgages (equating to around $601 billion in total at end 2020).

Capital requirements

The key capital measure under Solvency II is the Solvency Capital Requirement ('**SCR**'). Insurers can apply to calculate the SCR using an internal model, specific to the insurer itself. However, the majority of insurers use a standard formula, which has a structure and parameters prescribed in regulation. The SCR is built up using a modular approach which determines a capital component in respect of each risk that the insurer faces. The capital components are aggregated together, with an appropriate allowance for diversification, into an overall capital requirement – the SCR.

[2] Source: "European Insurance Overview 2020" available at www.eiopa.europe.eu.

[3] https://content.naic.org/sites/default/files/capital-markets-asset-mix-ye-2020-final.pdf

The SCR impact of investing in mortgage assets is a little complicated, and depends primarily on the type of mortgages held. In simple terms, commercial mortgages are treated as investments, and the primary risk that they give rise to is market risk. Within market risk there are a number of sub-risks, and the most relevant ones for mortgage investments will be interest rate risk and spread risk.

By contrast, residential mortgages – which meet certain criteria defined in the Solvency II regulations – are treated as counterparty exposures, and do not give rise to spread risk under the standard formula. Instead these contribute to the counterparty default risk component.

Any differences between the currency of an insurer's assets and liabilities can give rise to a currency risk exposure in the SCR. For the purpose of this paper we assume that no such currency risk arises in respect of mortgage assets. However, given the potential availability of US$ denominated mortgage assets, it should be noted that these are likely to generate a currency risk capital charge for European insurers. However, it is likely that currency hedging could be put in place to mitigate this risk, and we consider this point in more detail later in the paper.

Given the materially different treatment of residential and commercial mortgages, we consider these asset types separately.

Commercial mortgages

Under Solvency II, commercial mortgages give rise to interest rate and spread risk (as well as currency risk where relevant).

The interest rate risk arising from an investment in commercial mortgages needs to consider not just the asset position but also the liability position. The interest rate component is determined by the impact of a prescribed change in interest rates on the net asset value of the insurer, and depending on the insurer's asset and liability exposures, this can be driven by either an increase or a decrease in interest rates.

In broad terms, commercial mortgages may not give rise to a materially different interest rate exposure to equivalent corporate bonds. Given commercial mortgages are typically considered as a potential alternative investment to corporate bonds, we therefore focus in this section on the spread risk capital component for commercial mortgages. However, there can be some differences between the interest rate risk considerations for mortgage loans and we address this further later in the paper.

Typically commercial mortgage loans will be to counterparties who do not have a credit rating, and as such the key determinant of the capital requirement will be the duration of the loan, with capital requirements increasing for higher durations. In addition, the capital requirement will be influenced by the level of collateralisation.

The level of collateralisation determines the shock that must be applied to the loan asset under the spread risk module. Where the risk-adjusted value of the collateral asset (in this case the underlying property against which the mortgage loan is secured) is higher than the loan amount, then the capital requirement is typically half the requirement of an equivalent unrated corporate bond of similar duration. In this context the risk-adjusted value of the collateral is typically of the order of 75% of the collateral asset value, though it will depend on the specific circumstances of the insurer and the nature of the collateral arrangements. On this basis, commercial mortgages with Loan to Value ('**LTV**') ratios of 75% or lower will typically have considerably lower capital requirements compared with equivalent duration corporate bonds.

However, where the risk adjusted value of the collateral is lower than the loan amount, the capital requirement ranges from 50%-100% of the level of an equivalent unrated corporate bond of similar duration. The exact level depends on the LTV ratio, with higher LTV ratios broadly giving a higher capital requirement.

The table below summarises the spread risk capital component (as a percentage of the asset value) for a selection of corporate bonds and an unrated commercial mortgage (meeting the LTV requirement noted above), of differing durations.

Asset	5 years	10 years	15 years
Unrated corporate bond	15.0%	23.5%	29.5%
A-rated corporate bond	7.0%	10.5%	13.0%
BBB-rated corporate bond	12.5%	20.0%	25.0%
Commercial mortgage meeting LTV criteria	7.5%	11.8%	14.8%

The capital requirement level may depend on the circumstances of the insurer, but for a mortgage loan with a 5 year duration, the capital requirement will be 7.5% for LTVs below c. 75%, increasing incrementally from 7.5% to 15% for LTVs between c. 75% and c. 88%. Above this level of LTV the capital requirement remains at 15% i.e. the same level as that for an unrated corporate bond of equivalent duration.

Residential mortgages

As discussed earlier, mortgage loans form a considerably larger proportion of the investible assets of US life insurers compared with their EU counterparts. Looking at the US mortgage loan assets in more detail, an NAIC special report[4] on this asset class, based on end 2019 data, showed that commercial mortgage loans dominate, making up 89% of the loan types held, with residential mortgages comprising just 5% of loans (the remainder being a mix of farm and mezzanine mortgages).

By contrast, the EU experience shows that, while overall investment in mortgage loans lags US insurers, the relative importance of residential mortgages is much higher. Analysis of EIOPA data for end 2019 suggests that residential mortgages made up 55% of the non-linked mortgage investments held by EU life insurers. The EU experience is heavily influenced by the Dutch market where mortgage assets are a far more material component of life insurer balance sheets than other EU countries. We consider this point further later in the paper.

The higher proportion of mortgage assets invested in residential mortgages in an EU context may be explained by the favourable capital treatment. To avail of the favourable capital treatment, there are a series of criteria that residential mortgages must meet, which allow them to fall into the counterparty default risk module (instead of the spread risk module). These include:

- The properties must be residential, either lived in or let by the owner
- The exposure must be to an individual or small to medium enterprise
- The maximum exposure to an individual is €1million
- The risk to the lender is not materially dependent on the value of the underlying property, but rather on the ability of the borrower to repay – typically lenders should have appropriate loan to income and loan to value requirements.
- There are requirements relating to the regularity of valuations and the legal enforceability of the charge on the assets.

Assuming all conditions are met, the capital charge is driven by an assessment of a loss in the event of a default by the borrower (referred to as a Loss Given Default or '**LGD**') and a probability of default, set at 15% for exposures of this type.

In simple terms, the LGD[5] is defined as the difference between the loan amount and 80% of the risk adjusted value of the property. The risk adjusted value of the property can depend a little on the other assets that an insurer holds, but will be at least 75% of the value of the property, so the LGD will be at most the difference between the loan amount and 60% of the property value (i.e. 80% of 75% of the property value).

As a result, residential mortgage loans meeting the criteria set out in the regulations, and with LTV ratios below 60% will typically have a zero LGD, and hence a zero counterparty default capital risk component.

Where LTVs are high enough to give rise to a positive LGD, then a counterparty default SCR component will arise. The table below sets out a simplified calculation of the counterparty default risk capital component for a portfolio of residential mortgage loans, based on the LTV of the portfolio. Note that the actual default risk component could be lower depending on the circumstances of the individual insurer. The figures below to do not reflect other sources of risk (e.g. currency risk) which could arise.

LTV	Counterparty Default risk capital requirement as % of loan value.
60% or lower	0%
70%	2.1%
80%	3.8%
90%	5.0%
100%	6.0%

In addition, it should be noted that counterparty default risk is not typically one of the most material components of a life insurer's SCR (relative to underwriting risk and market risk), and this can generate a material diversification benefit. The result of the diversification benefit is that the impact of the residential mortgages on the overall SCR is typically materially lower than counterparty default risk capital requirements set out in the table above.

Note that residential mortgages which do not meet the criteria set out in the Solvency II regulations will fall into the market risk capital requirements rather than the counterparty default risk capital requirements, and the considerations will be similar to the commercial mortgages described above.

Key Questions Arising

We began this paper by setting out the common questions that arose when insurers started to look at mortgage loans as potential investment assets:

4 https://www.naic.org/capital_markets_archive/special_report_200630.pdf (note that the paper is not currently available on the NAIC website)

5 Calculations assume the mortgage loan has no guarantor that would repay some of the loan in the event of default. Such a guarantor would reduce the LGD and hence the capital requirement.

- Is this too good to be true – can mortgage assets generate meaningful returns for lower capital requirements?
- Do the capital requirements adequately reflect the risks?
- Are insurers taking advantage of these asset classes?

Having set out the basis for calculating the capital requirements for these assets under Solvency II, it is now time to look to tackle some of these questions.

Potential returns

Clearly, for suitable LTV levels, the capital treatment of both commercial and residential mortgages can be favourable when compared with equivalent corporate bonds. Given the relatively low volumes of mortgage assets available for insurers to invest in, in a European context, we have looked to the more established US market to get an understanding of potential yields.

Information provided by a leading provider of commercial mortgage loans in the US suggests quite a bit of variability in potential yields depending on the risk characteristics of the underlying loans (including LTV ratios, duration and type of underlying tenant). Their analysis suggests that lower risk commercial mortgage loan portfolios can generate spreads of c. 1.25% to 2% over equivalent duration treasury bills. By contrast, they shared details of a portfolio of commercial mortgage loans with an average LTV of 67%, and internally assessed credit rating of BBB. It generated an average spread of over 330 basis points compared with US treasury bills and 235 basis points relative to comparable corporate bonds.

Insurers will need to assess the mortgage loan offerings of any providers to assess the available yields. However, if the key source of investible mortgage assets originate in the US market, then insurers will need to carefully manage any currency exposure arising. A currency hedging programme may facilitate a mitigation of any currency risk arising, but the costs of the programme are likely to also generate a drag on expected returns.

Notwithstanding the potential drag on returns of a currency hedging programme for US$ investments, it appears that mortgage assets have the potential to generate relatively strong returns, while generating relatively attractive capital requirements. In addition, while mortgage assets are not as material a feature of EU insurer balance sheets, clearly there are sources of EU mortgage loans which EU insurers could access without the associated currency risk challenges of US assets. This may be a particular opportunity for insurers who are part of a banking group, and this excellent paper by our Dutch colleagues gives further detail of the capital considerations when comparing mortgages held on an insurer balance sheet with those held on a bank balance sheet: ”Mind the gap between insurers and banks: How different perspectives on risk and return can lead to possible investment opportunities”.

Risks

However, a key question for insurers will be whether the capital requirements adequately reflect the underlying risks. Insurers investing in mortgage loans will be exposed to different risks than would arise for other asset classes. In particular, “delinquency rates” (percentage of loans for which payments from the borrower are overdue) will be a concern. However, the risk will be heavily mitigated by the collateral arrangements in place, and the capital requirements reflect this through the importance of the LTV ratio. Insurers investing in mortgage loan assets will need to assess the risk characteristics of the loan portfolios to assess if any concentrations of risk arise, and to understand its exposure to wider macroeconomic challenges. The current COVID-19 global pandemic may have far-reaching macro-economic implications which could have a knock-on impact on property prices, LTVs and ability of borrowers to finance loans for example.

Liquidity risk is a material additional consideration for mortgage loans. Mortgage loan portfolios are not as liquid as equivalent corporate bonds. While the yield pick-up typically available on these assets may justify the additional liquidity risk, insurers investing in mortgage loans should consider them as longer term “buy and hold” investments, and they may not be suitable for all insurers. There is a secondary market for mortgage loans, which can typically be robust in strong economic conditions. However, insurers cannot rely on the robustness of the secondary market in a challenging economic environment.

A further risk is prepayment risk, which materialises when loans are repaid by borrowers early. Typically, mortgage holders have a unilateral right to do so, meaning it is difficult for an insurer investing in mortgage assets to control the risk. This risk is not captured in the standard formula and it does not result in a loss to the insurer as such but can make the effective duration of a mortgage portfolio shorter than expected and mean less yield is earned over time. Prepayments can of course be reinvested by an insurer in further mortgage assets but this brings some additional complexity. It is also possible to mitigate prepayment risk somewhat by accessing mortgage assets through a securitisation rather than directly.

A further risk consideration in the context of mortgage loans relates to interest rate risk. As mentioned earlier in the paper, mortgage loans should broadly mirror corporate bonds from an interest rate risk perspective, but there can be subtleties that impact insurer capital requirements over the short term. Over the medium to long term yields on mortgage loans will typically move broadly in line with

movements in the risk-free curve (all other things being equal); however, in the short term this is not always the case. Mortgage interest rates can be somewhat stickier than underlying risk-free rates – mortgage rates do not typically move directly in line with underlying interest rates. In addition, the stickiness may not be symmetric, with anecdotal evidence suggesting that mortgage rates can be slower to reduce when underlying interest rates fall. For insurers using mortgages to back longer-term non-linked liabilities, this can give rise to more volatility to changes in interest rates than might apply for comparable corporate bonds.

The extent to which this is a material issue will depend on the approach taken to value mortgage assets. While a valuation discount rate based on risk free plus a risk premium would eliminate this additional interest rate risk consideration, we understand that a number of local European regulators require mortgage assets to be valued by discounting at the mortgage interest rate (meaning that the discount rate may not move directly with changes in the risk-free rate).

An insurer with a material exposure to mortgage assets, and particularly where the insurer determined that the standard formula SCR requirement arising from those assets did not adequately capture the risks arising, may be required by its local regulator to implement a full or partial internal model. Even without an internal model, an insurer in this position would need to assess the impact of the exposure to these risks in its ORSA, and. In addition, the ORSA allows a projection of the SCR under different scenarios and could allow the insurer to assess the impact of changes in a loan portfolio. For example, a fall in property values would impact LTVs which would in turn impact the level of capital an insurer would need to hold under the standard formula.

Are insurers taking advantage?

With respect to the question of whether European insurers are taking advantage of this asset class, at present, it appears not. However, an examination of EIOPA data by country points to a number of interesting exceptions, in particular the Netherlands.

The table below summarises the proportion of life insurer non-linked assets invested in mortgage loans for a selection of EU countries at end 2019 (including the UK which was part of the EU at that time). In addition, the proportion of those investible assets held in commercial loans is shown.

Country	Mortgage loans as a % of life insurer investments	Of which, commercial mortgage loans
Austria	1.0%	100%
Belgium	12.6%	9%
France	0.1%	100%
Germany	6.3%	30%
Ireland	0.4%	100%
Italy	0.0%	98%
Luxembourg	0.1%	100%
Netherlands	17.8%	37%
Spain	0.0%	0%
United Kingdom	7.5%	71%
EU total	4.9%	45%
Total excluding Netherlands	3.7%	48%

The analysis suggests quite a variation in the prevalence of mortgage assets within EU life insurer investment portfolios. The high prevalence in the Netherlands may reflect in part a strong local view on the security of this asset class, given historically low default and delinquency rates for Dutch mortgages. In addition, figures published by the European Mortgage Federation show that Dutch mortgages have typically higher interest rates than most comparable Eurozone countries[6], perhaps increasing the attractiveness of Dutch mortgages as an asset class. In any case, it is clear that Dutch insurers are leading the way from a European perspective in relation to mortgage investment.

Conclusion

Mortgage loans, both commercial and residential, have the potential to form a valuable component of life insurer investment portfolios. The additional yield pick-up available can provide attractive returns relative to the resulting capital requirements. The prevalence of mortgage loans as strong components of insurer investment portfolios in some EU member states underlines this potential, but the variation in exposures points to a clear opportunity in other territories. The high level of investment in commercial mortgage loans

[6] https://hypo.org/app/uploads/sites/2/2020/12/HYPOSTAT-2020-FINAL.pdf

among US insurers suggests an additional source of mortgage loan investment opportunities for EU insurers to consider.

However, investments in mortgage loans can bring additional risks which insurers will need to consider and assess. With suitable diversification and allowance for liquidity, and with appropriate risk management safeguards in place, mortgage assets could form an important component of European insurers' general account assets.

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