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Non-traditional investments – key considerations for insurers

by the Non-traditional Investments Working Party

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The working party

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Abstract

Life insurers have historically relied upon investment markets as a key source of profit and crucially have been able to do this whilst embarking on relatively 'vanilla' investment strategies. In the current low yield environment, broadening their investment horizons is critical to maintaining profitability.

This paper summarises some relevant external literature and the working party's own research in understanding the potential benefits and pitfalls for insurers seeking to invest in non-traditional assets.

The objective of this paper is to help educate and promote understanding by all (the many) relevant parties. In doing so, we hope to help organisations to achieve some further economic success for the ultimate benefit of society.

Whilst this paper has primarily been written from the perspective of a life insurer, we hope it will be of interest to a much wider audience. Many of the asset classes considered here are relevant to general insurers, pension funds and the wider capital markets.

It is very important to note that the paper does not contain investment advice and the analysis represents the views of the individuals and the working party and not the companies which they represent or the Profession. The paper does not make any comment as to the suitability (or otherwise) of specific investments for particular investors.

Keywords

Non-traditional assets, alternative assets, investments, ALM, loans, infrastructure, PPP, PFI, social housing, real estate, residential mortgage, commercial mortgage, ground rent, student accommodation, asset backed securities, ABS, RMBS, CMBS, aircraft lease, emerging markets debt, high yield, private placement, private equity, hedge fund, insurance linked security, ILS.

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1. Introduction

Life insurers have historically relied upon investment markets as a key source of profit and crucially have been able to do this whilst embarking on relatively 'vanilla' investment strategies. In the current low yield environment, broadening their investment horizons is critical to maintaining profitability.

Insurers are critical to the infrastructure of the investment society, representing the largest collective long term lenders to the market with over £1.8tn of assets under management in the UK and €8.4tn in Europe[1]. The form of this investment is both in "originating" lending i.e. lending directly to the retail or institutional market as well as (more normally) providing secondary investment in these important markets.

Fortunately there are a range of economic and political initiatives driving demand for institutional lending; in addition to this, traditional lenders (mainly banks) are more reluctant than ever to tie up liquidity by lending for long durations. Insurers are subject to less pressure on liquidity than banks which may allow them to fill the void in the long-term debt market.

Throughout this paper, we have provided explanatory text within the body of the report, through footnotes or through specific glossaries as appropriate. Other financial terms are well defined in the Association of Corporate Treasurers glossary - http://www.treasurers.org/glossary.

The Working Party (WP) considered five subgroups of investments which insurers either currently utilise or which the WP expect will grow in significance over the coming years. These investments are biased towards assets backing annuities, which have seen the most material move towards non-traditional assets over recent years. These subgroups are:

1. Infrastructure debt – covering infrastructure financing and social housing financing.

2. Real estate backed debt – covering residential mortgage loans, commercial real estate financing, equity release mortgage loans, ground rents and student accommodation.

3. Other asset backed debt – covering Asset Backed Securities (ABS); specifically residential mortgage backed securities (RMBS) & commercial mortgage backed securities (CMBS), collateralised loan obligations (CLO) and aircraft financing (as an example of real asset backed debt).

4. Unsecured debt – covering private placements, high yield bonds and emerging market bonds.

5. Other assets – covering Private Equity (PE), Hedge Funds (HF) and Insurance Linked Securities (ILS).

This paper is structured around each of these subgroups as follows:

- A high level summary of the key features of sample assets within each subgroup is covered in table 1.1

- Section 2 covers general considerations for all non-traditional assets and seeks to draw comparisons between subgroups and within subgroups.

- A detailed consideration of each asset subgroup is covered within Section 3.

The availability and format of data is very varied across the different asset classes and so the working party has necessarily made use of whatever data is available without necessarily seeking to standardise it.

Whilst we note that some of the features in Table 1.1 are subjective, we attempt to illustrate some notional terms for the benefit of the reader. The Red / Amber / Green ("RAG") ranking contained within Table 1.1 is particularly subjective and was itself a source of significant debate for the working party; it should be noted that the rankings are relative to other assets within the paper (rather than broader market instruments). However, we believe that the rankings are useful to highlight some of the critical

[1] http://www.insuranceeurope.eu/uploads/Modules/Publications/european-insurance-in-figures-2.pdf

areas of difficulty with each investment. The rationale behind the ranking is covered in Section 3, which explores each cell in the table in detail.

We considered the following items within Table 1.1:

- Pricing transparency – whether the investments have a market price or have to be marked to model. The presence of indices or other relevant market data may also be useful.

- Cashflow certainty – whether the cash flows are predictable. Early repayments and other probabilistic decrements can reduce certainty for some fixed income investments whereas equity like investments inherently exhibit low certainty.

- Duration – we have attempted to determine a modified duration for each investment and this is the "duration" definition that we have used throughout the paper. This varies significantly within each of the sectors but we have identified the common durations for investments.

- Security – we have considered the presence of tangible security collateralising the bond or loan. We have considered the presence of security to be a favourable feature.

- "Clip size" – we have attempted to set out what a typical insurance investment "unit" might be in each asset. Investments in funds which are backed by non-traditional assets may be available at smaller clip sizes.

- Format – either bond, loan or equity. We have assumed that loans are more difficult to manage than bonds or equity.

- Liquidity – depends on the presence of a secondary market and the ability to quickly sell at the "market prevailing" price.

- Ability to source – due diligence is required before purchasing assets but bonds and equities tend to be relatively easy to source, whereas loans require specific conduits into the market.

- Complexity of ongoing operational management – this captures a range of considerations which are elaborated upon later in the report. However, this captures the scale of the ongoing commitment to the management of the assets.

Return and capital characteristics are covered in Section 2 (and then in more detail in Section 3). We have not attempted to tabulate the return and capital characteristics here.

Table 1.1 – overview of certain investments

Asset category	Infrastructure	Real estate backed		Other asset backed	Other unsecured		Other	
Sub asset class	Infrastructure loan	Equity release mortgage	Commercial real estate loan	RMBS / CMBS	Emerging markets debt	Private placement loan	Insurance linked security	Hedge Fund / Private Equity
Pricing transparency	Low	Low	Low	High	High	Medium	Medium	Low
Cashflow certainty	High	Medium	Medium	Medium	High	High	Medium	Low
Typical duration	>10 years	>10 years	5-7 years	<5 years	6-7 years	5-12 years	1-3 years	Open ended
Security	Semi-secured	Secured	Secured	Secured	Unsecured	Unsecured	Unsecured	Unsecured
Clip size	>£50m	>£50m	>£10m	£2m	>$10m	>$30m	£2m	>$250k HF/>$1m PE
Format	Loan	Loan	Loan	Bond	Bond	Bond or loan	Bond	Units/equity
Liquidity	Low	Low	Low	High	High	Medium	Medium	Medium
Ability to source	Difficult	Difficult	Medium	Easy	Easy	Medium	Medium	Easy
Complexity of ongoing operational management	High	High	High	Low	Low	Medium	Medium	Low[2]

[2] Low if we assume that the hedge fund or private equity fund will manage the assets on the insurers' behalf. This would be high if significant oversight was required by the insurer.

2. General considerations for non-traditional investments

2.1 Format of investment

Investments considered within this paper can be made in a number of ways. Typical considerations are whether the investment is made in bond, loan or equity format. Insurers can generally access the investments directly or through specific vehicles. Alternatives to direct investment, which are possible for many of the investments covered in Section 3 within this paper, include:

- Pooled fund investment – in this case, insurers invest with other investors into a fund which buys the investments. Typically, this would be offered by a specialist investment manager which would manage the assets on behalf of all investors. The insurer would generally have no discretion over the investments made within the fund. Note that investors can access the fund in many different forms including: UCITS compliant, jurisdiction specific funds, closed or open-ended, via debt, equity or loan consideration. This type of investment may be difficult for certain insurers (e.g. UK annuity writers) which will need to demonstrate their own control over the investment.

- Segregated mandate or "fund of one" – in this case, the insurer would invest in the instruments through an asset manager. A segregated mandate may be such that investments are made directly on the insurer's balance sheet but are managed by the asset manager on behalf of the insurer. The insurer may retain some control over the investments (they may have a "right of veto" for assets which they do not wish to purchase) or the mandate may allow the asset manager full freedom to invest on the insurer's behalf, subject to meeting certain criteria. The investment objectives and constraints are usually specified in the mandate's Statement of Investment Principles (SIP). As above, the exposure to the fund can vary significantly.

- Syndicated loans or "club deals" – insurers may participate in larger investments either with other investors directly (as part of a "club") or with other investors and arranged through an underwriter (usually a bank) via a syndicated loan. In this case, the insurer can access the investments directly, but in smaller chunks.

- Securitisations – these are considered specifically in Section 3.3 as part of "other asset backed securities", but securitisations are mechanisms for insurers to take structured forms of direct investments. This may be important or beneficial where the "clip size" is too low for the insurer to participate otherwise. This is particularly the case for small and medium sized enterprise (SME) loans.

Insurers may also access alternative investments through a variety of mechanisms i.e. through direct origination of the assets, through purchase in the secondary market (i.e. purchasing existing investments from a third party) or through participation in a structured investment where relevant characteristics of the underlying investment have been isolated on behalf of the insurer.

2.2 Typical returns

As noted above, high risk-adjusted investment returns are critical to insurers' profitability.

A high level summary to illustrate the typical returns obtainable on some of the asset classes within each of the 'debt-like instrument' subgroups is covered in graph 2.1, a detailed consideration of the return and risk characteristics of each asset subgroup is covered within the specific sections later in the paper.

The following points describe the methodology used and necessary caveats:

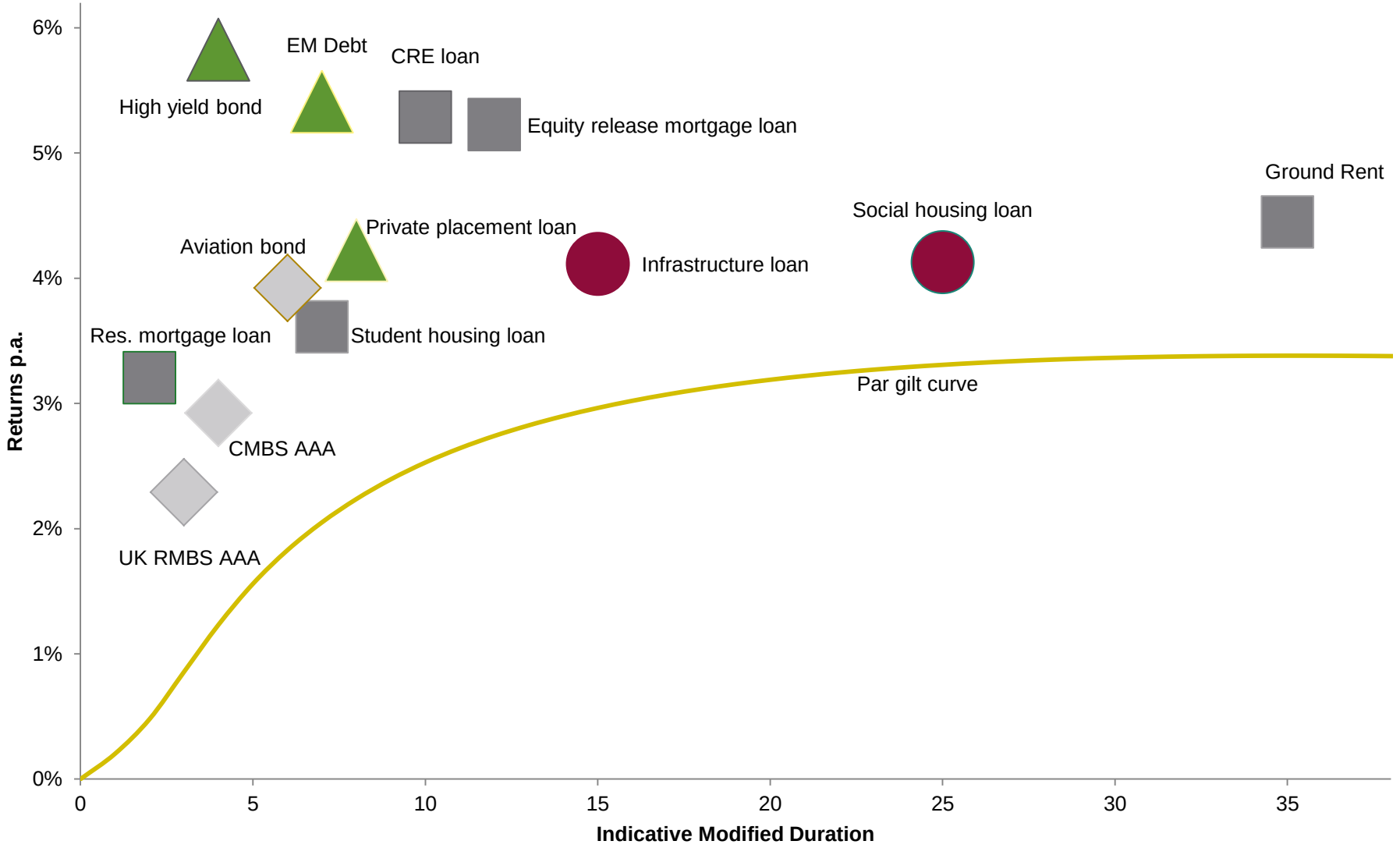
- In order to facilitate ease of comparison, all of the instruments were swapped into fixed sterling by adding the relevant spreads to the UK yield curve.
- Given that these instruments are heterogeneous and have different features (for example, fixed versus floating payments, issuer options, different amortisation periods, etc.), comparability between them is necessarily approximate.
- Following on from the above, the quality of available data is highly variable (for example, for emerging market and high yield debt, indices were used and there were relevant market prices, whereas for equity release mortgages the data was anecdotal as there is no active market).
- A degree of subjectivity was used to estimate typical durations for the subclasses.
- The data used in this sample was as of 31 March 2014. Over the course of the economic and credit cycles, both the gilt rates and the spreads will fluctuate in absolute terms and relative to each other.
- Returns for the equity-like classes (e.g. private equity, hedge funds, ILS) have not been plotted on this chart. The data for these as well as the finer details for each of the subgroups are covered within the specific sections later in the paper.

Graph 2.1 plots these typical returns against a typical duration. The data points are deliberately large to illustrate the fact that this is a highly subjective exercise, particularly for the non-traded assets. The key is as follows:

- Circles – infrastructure loans
- Squares – real estate backed loans
- Diamonds – other asset backed securities
- Triangles – other unsecured assets

The data points and return considerations for each subgroup of assets are presented in Section 3. However, the data is non-public in most cases and so the working party has also drawn on proprietary information or anecdotal evidence where possible.

Graph 2.1 – illustration of returns for certain investments

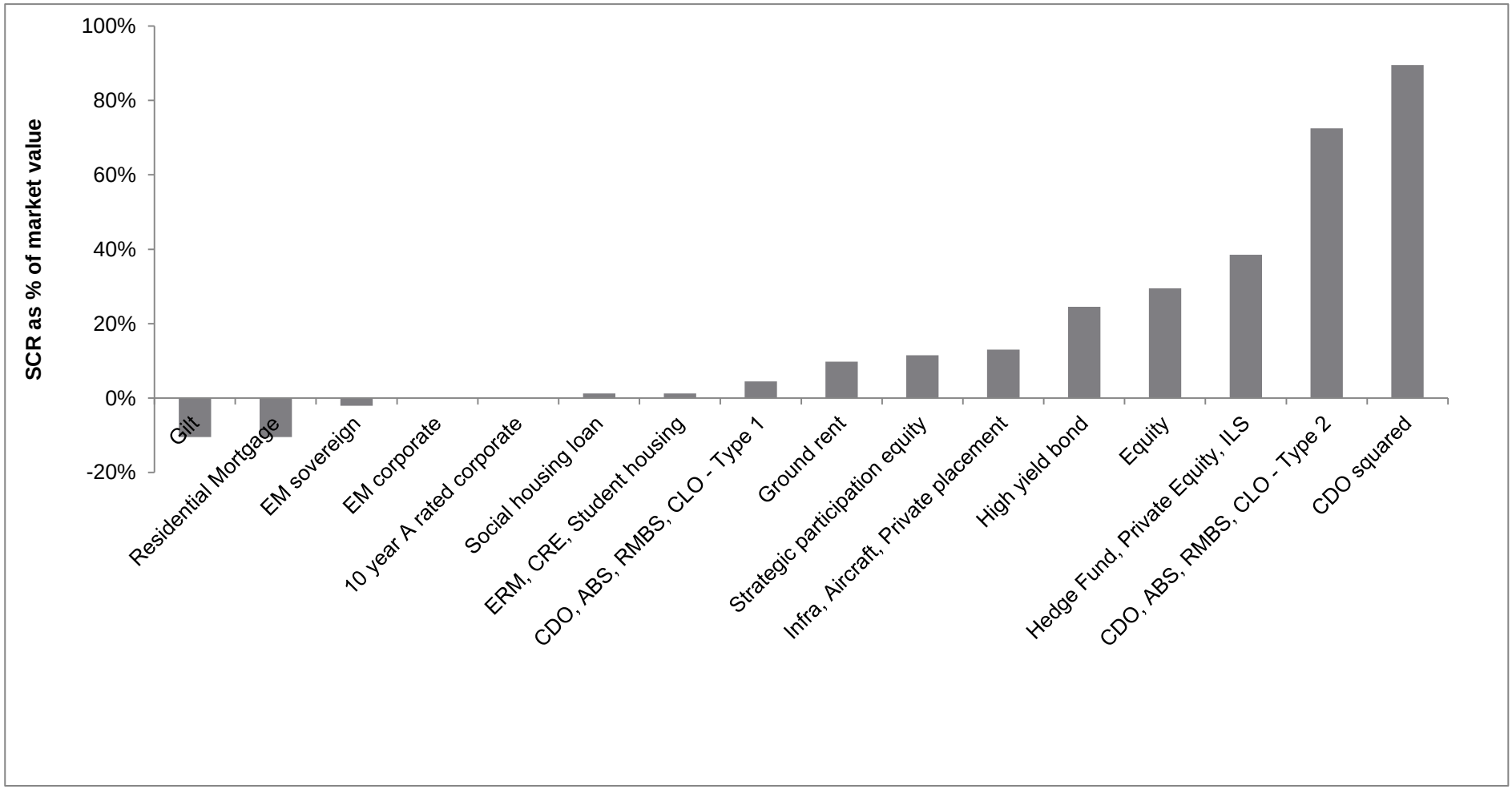


2.3 Standard formula capital considerations

The following graph and table covers the key capital considerations for standard formula firms when assessing the non-traditional assets in this paper. The Standard Formula Solvency Capital Requirement (SCR) is as at 9th November 2014 i.e. the source of the figures below is based on the Working Party's interpretation of the Delegated Acts published in October 2014. The Solvency II SCR calculated is undiversified and gross of any loss absorbing effects.

Graph 2.2 compares the undiversified Standard Formula SCR against a 10 year A rated corporate bond, which has an SCR of 10.5%, with bars below the line showing lower capital requirements, and above the line being higher capital requirements.

Graph 2.2 – SCR for certain investments compared to 10 year A rated corporation bond



The following table sets out the SCR, with comments, for each of the non-traditional assets within this paper as well as comparisons with the traditional assets. It also considers qualitatively the position of internal model firms by identifying the underlying risks (both default risk and spread widening risk as appropriate) and considering whether the standard formula capital charge is likely to be a suitable proxy for the real capital at risk. The source of the internal model information is proprietary information and knowledge of individuals within the working party. These factors are explored further within Section 3.

Table 2.3 – SCR treatment for selected investments

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
"Traditional" Assets (for comparison purposes)				
Gilt	10 year duration	0.00%	Spread risk module for EEA government bonds. EEA government bonds require zero capital for spread risk stress (assuming that the debt is raised in the sovereign's own currency).	Arguably some EEA government bonds ought to carry spread risk. Some companies' internal models do hold capital against EEA government bonds but typically not UK gilts.
Corporate bond	A-rated, 10 year duration	10.5%	Spread risk module for standard A rated corporate bonds.	The standard formula attempts to capture a range of risks (spread risk, default risk and downgrade risk), whereas internal model firms tend to model these risks separately. Internal model firms tend to assess the spread risk to be higher than that assigned by the standard formula whereas the standard formula would (by design) tend to provide a capital charge higher than the downgrade and default risk alone.
Equity	OECD listed equity	22% - 39% + symmetric adjustment[3]	Transitional measures mean that the capital charge for equities will be 22% on 1/1/16 for equities purchased in advance of this date, rising to 39% over 7 years. 39% represents the equity risk OECD equity module.	Internal models tend to relatively closely match the ultimate (39%) standard formula calibration.
Equity	Non- OECD or unlisted	49% + symmetric	Equity risk non-OECD equity module.	The standard formula is a somewhat blunt instrument for this asset class as there are significant differences between unlisted

[3] The symmetric adjustment for the equity risk sub module varies, depending on the level of the market compared to a rolling average. At 31/12/12, EIOPA calculated this as +7.5%.

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
		adjustment		equity, certain overseas equity markets and other assets which are captured by this module.
Strategic Participation Equity	OECD equity where there is a strategic participation (15%-50% holding)	22.00%	Strategic participation equity module.	Internal models may model the underlying participation directly and the underlying risks could be significantly different from that assumed by the standard formula.
Infrastructure				
Social Housing Loan (SHL)	Unrated, 10 year duration, 45% LTV	11.75%	We have applied the spread risk module. We have assumed that social housing loans are unrated and that the "collateral" meets the definition required to offset the spread risk. For an unrated, secured bond, its underlying collateral may be used to offset some of the capital requirement, if the collateral meets a series of tests set out in the Solvency II Delegated Acts (Article 219). In particular, one of the tests is that the collateral cannot be correlated to the underlying debt. This is particularly challenging; however, it could be argued that the value of the social housing properties does not affect the value of the loan, which is more a feature of supply and demand. The underlying collateral for SHL is the actual underlying property although there have not yet been any events where a	Social housing loans are illiquid and hence the spread risk may be expected to be more material than an equivalent corporate bond. For companies not holding the asset to maturity, this might suggest that the standard formula may not adequately capture the volatility of the spread. On the contrary, there are two elements which make the standard formula potentially very penal for SHLs: • Social housing bonds, which ought to be a good proxy for similar loans, tend to be rated at the higher end of A / AA ratings and so the inability of standard formula firms to apply their own internal ratings may be penal. • For companies holding the assets to maturity, the expected loss for SHLs is extremely low (there has never been a recorded loss for a SHL owner).

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
			foreclosure has materialised. However, the LTVs are ultimately very low and a 50% offset would be expected in the standard formula.	
Infra-structure (infra) loan	Unrated, 10 year duration, in the operational phase. Debt is assumed to be 90% of the financing for the SPV.	23.5%	We have applied the spread risk module. Infrastructure is usually unrated and unsecured (formally). In the event of default, the debt holder can take control of the infrastructure project but not the underlying physical assets and hence is unlikely to meet the definition required for the collateral offset.	As for social housing, the illiquid nature of infrastructure loans may make the spread risk charge insufficient to capture the volatility. Most infrastructure bonds are rated around the BBB level and so the spread risk charge is not obviously penal by forcing a standard formula firm not to use an internal rating (given that the BBB and unrated charges are relatively similar). On the contrary, infrastructure loans (particularly PFI and PPP) have tended to experience much lower numbers of defaults and the recovery rates on default have tended to be much higher than corporate bonds. As such, for holders to maturity, the standard formula may be relatively penal.
Real estate backed loans				
Standard Residential Mortgage	10 year duration, 75% LTV 10 year duration, 85% LTV	0.00% *1.76%*	We have applied the counterparty risk module for type 2 counterparties. Note that residential mortgages incur capital from the counterparty risk module and not spread risk. As the counterparty module provides more formally for collateral offset with no limit, the charges are much lower than for assets within the spread risk module. .	The standard formula is unlikely to be a particularly good proxy for companies not holding mortgages to redemption as the spread risk of mortgages is more consistent with corporate bonds. For holders to maturity, the capital charge is more consistent with the way an internal model might be expected to model the risk and so can be considered a more appropriate proxy for the real risk than (say) for SHLs or CRE.
Equity Release Mortgage (ERM)	Unrated, 10 year duration 35% current LTV	11.75% - 23.5%	Equity release mortgages tend not to meet the criteria under Solvency II for residential mortgages and so we have assumed that they fall into the spread risk module.	Whilst the spread on equity release mortgages has historically not been as volatile as corporate bonds, the standard formula may not be a suitable proxy for potential future volatility as the asset is highly illiquid.

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
			The tests for collateral are as set out above for SHLs. In this case, the value of the equity release mortgage is more closely correlated to the underlying property. However, a case can still be made for collateral offset to be applied (and thus obtain a 11.75% charge).	For holders to maturity, an internal model treatment would be much more consistent with a standard residential mortgage, using direct modelling of the underlying risk factors. The risks for equity release mortgages may be higher due to the provision of a "no negative equity guarantee", but the standard formula is likely to be penal. This is largely as the 50% restriction on the collateral offset bites given the low LTVs at outset for equity release mortgages; if the collateral offset is not permitted the treatment may be particularly penal.
Commercial real estate (CRE) loan	Unrated, 10 year duration, 65% LTV	11.75% - 23.5%	Our calculation is as per SHLs and equity release mortgages and we have applied the spread risk module. The tests for collateral are as set out above for SHLs. In this case, the value of the commercial real estate loan is more closely correlated to the underlying property. However, a case can still be made for collateral offset to be applied (and thus obtain a 11.75% charge).	Internal model considerations for CRE loans are similar to that for social housing loans. CRE loans are illiquid and hence the spread risk may be expected to be more material than an equivalent corporate bond. For companies not holding the asset to maturity, this might suggest that the standard formula may not adequately capture the volatility of the spread. On the contrary, there are two elements which make the standard formula potentially penal for CRE loans: • Many CRE loans entered into by insurance companies are expected to be investment grade and so the classification as unrated may be penal. • For companies holding the assets to maturity, the expected loss for CRE loans might be expected to be lower than equivalent corporate bonds. Whilst default rates tend to be higher, the loss upon default tends to be lower given the security of the building; if the collateral offset is not permitted the treatment may be particularly penal.
Ground rent	Unrated, 30 year duration, <20% LTV.	20.25%	There are two possible treatments for ground rents. We have assumed that they are entered into as long term secured debt, where the debt is secured on the freehold	The standard formula is very penal for this asset class. The expected loss for holders to maturity (or others on a mark to market basis) is very low given the security of the payment stream.

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
			property. We have therefore applied the spread risk module. The value of the ground rent is not materially correlated to the value of the underlying property and so the 50% collateral offset is likely to be possible, though the collateral may be considered illiquid. In some cases, the ground rent may simply be the ownership of the freehold property and so attract the property shock of 25% (potentially with risk mitigation, given that the leasehold has been sold).	Internal models tend to model the default risk for ground rents close to supra-national or government security.
Student housing loan	Unrated, 10 year duration	11.75% - 23.5%	We have applied the spread risk module. This is very similar to SHL, may be treated as an unrated, secured corporate bond.	Internal model considerations for student housing loans are similar to that for social housing loans. Student housing loans are illiquid and hence the spread risk may be expected to be more material than an equivalent corporate bond. For companies not holding the asset to maturity, this might suggest that the standard formula may not adequately capture the volatility of the spread. On the contrary, there are two elements which make the standard formula potentially penal for student housing loans: • Many student housing loans entered into by insurance companies are expected to be investment grade and so the classification as unrated may be penal. • For companies holding the assets to maturity, the expected loss for student housing loans might be expected to be lower than equivalent corporate bonds, given the security of the buildings.
Other asset backed securities				

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
Aircraft	Unrated, 10 year duration.	0% (if government backed) or 23.50%	0% can be potentially applied for government backed aircraft assets (e.g. ECA loans). For other assets, we have applied the spread risk module for unrated assets, as aircraft are likely to be one of the most difficult assets to meet the collateral requirements of Article 214 given that they are highly illiquid.	ECA loans obtaining a 0% capital charge is likely to be inadequate as internal model firms would be likely to capture the idiosyncratic risk of aircraft. For other non-ECA loans, the illiquid nature of aircraft loans may make the spread risk charge insufficient in terms of spread risk. Holders to maturity are likely to find the standard formula penal given that there is explicit security, which would be taken into account under an internal model but not given credit under the standard formula. Certain aircraft securities are rated; this is likely to reduce the disparity between internal model and standard formula.
CDO/ RMBS / CLO - Type 1	A rated, 5 year duration	15.0%	Type 1 securitisation module. Note that CMBS are unlikely to meet the definition of Type 1 so we have assumed they do not fall within this category.	Considerations for type 1 securitisations are similar to those above: The spread risk on securitised exposure is much higher than an equivalent corporate bond. This is reflected now within the standard formula (the capital charge is 50% higher than that of an equivalent corporate bond). However, on holding to maturity, the losses on these assets ought to be much lower than implied by the standard formula and thus it may be considered to be penal.
CDO/CMBS/ RMBS/CLO - Type 2	A rated, 5 year duration	83.0%	Type 2 securitisation module.	It is widely documented that the standard formula is very penal for type 2 securitisations both in terms of spread risk and default risk.
CDO^2	A rated, 5 year duration	100.0%	Resecuritisation module.	It is widely documented that the standard formula is very penal for resecuritisations both in terms of spread risk and default risk.
Other unsecured assets				
Emerging	A rated, non-	8.4%	Spread risk module, non-EEA government	We believe internal model result should closely mirror the

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
markets debt	EU sovereign debt, 10 year duration		debt. We have assumed that currency risk is hedged.	standard formula. Whilst one might argue that certain emerging markets countries are more stable than certain EEA countries, there is undoubtedly more volatility on average within the emerging markets.
Emerging markets debt	A rated corporate emerging market debt, 10 year duration	10.5%	We have applied the spread risk module, consistent with A rated UK corporate bond. We have assumed that currency risk is hedged.	The standard formula could be considered to inadequately capture the additional volatility expected in the emerging markets. However, this would normally be reflected in the rating.
Private placement	Unrated, 10 year duration	23.5%	Spread risk module, treated as an unrated standard corporate bond.	The illiquid nature of private placement loans may mean that the spread risk charge does not adequately capture the volatility. On the contrary, the standard formula does not reflect the higher recovery expected on loan assets.
High yield bond	BB rated, 10 year duration	35.0%	Spread risk module for standard BB rated corporate bonds.	Considerations are similar to those for standard corporate bonds. The standard formula is calibrated relatively benignly for spread risk but tends to overstate the real “default” risk. Internal model benefits tend to come through modelling default risk explicitly.
Other assets				
Hedge fund	Unlisted equity	39% - 49% + symmetric adjustment	Hedge funds are generally included in the other equity risk module and so obtain a 49% capital requirement unless they are closed-ended and unleveraged alternative investment funds, qualifying venture capital funds or qualifying social entrepreneurship funds, in which case they attract a 39% capital charge.	Hedge funds are a very diverse asset class and the standard formula treatment for this asset class is a very blunt instrument. Hedge funds tend to attempt to reduce volatility and thus an internal model treatment would be expected to be more favourable than the standard formula. However, there may be issues calibrating models given limited data available.

Asset Class	Details	Solvency II SCR	Comments and assumptions	Standard Formula vs. Internal Model
Private equity	Unlisted equity	39% or 49% + symmetric adjustment	These are included in the other equity risk module in most cases, though some may now meet the widened criteria for Type 1 equity.	The appropriateness of the standard formula for private equity has been well articulated by the BVCA and EVCA[4] and rebutted by EIOPA[5]. Certain private equity investments may have more volatility than implied by the standard formula whereas others may be considered to be more akin to the strategic participations. As such, internal models may have very different capital charges than the standard formula.
Insurance linked security	Unlisted equity	49% + symmetric adjustment[6]	These are included in the other equity risk module, unless look through to the underlying investments is possible. If look through is possible, Cat bonds are treated as normal corporate bonds with specific allowance for catastrophe risk in addition. We have not attempted to quantify the charge if this treatment is possible given the diverse nature of catastrophe bond holdings.	"Other equity" covers a very diverse asset class and the standard formula treatment for this asset class is a very blunt instrument. If look through is possible, the standard formula may be a materially good approximation to the real underlying risks which may include mortality, longevity and general insurance risks. In the absence of look through, internal models are expected to diverge materially from the standard formula.

The table identifies a small number of areas where the standard formula is unlikely to be a suitable proxy for the underlying risks of these assets, which is unsurprising given the esoteric nature of the assets. This is particularly in respect of:

- Highly illiquid assets where the expected spread risk is higher than that for liquid assets.
- Assets with underlying security, where either the underlying security does not meet the requirements of Article 219 or where the security benefit is capped at 50%.
- Assets with a default history, which is significantly more benign than an equivalently rated corporate bond.

[4] BVCA – British Venture Capital Association; EVCA – European Venture Capital Association. Both are trade bodies representing venture capital and private equity companies. The EIOPA response to this paper can be found here: https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/reports/EIOPA_Technical_Report_on_Standard_Formula_Design_and_Calibration_for_certain_Long-Term_Investments__2_.pdf

[5] The European Insurance and Occupational Pensions Authority, which is an independent advisory body to the European parliament - https://eiopa.europa.eu/

[6] The symmetric adjustment for the equity risk sub module varies, depending on the level of the market compared to a rolling average. At 31/12/12, EIOPA calculated this as +7.5%.

► Assets where the Standard Formula bucket is particularly heterogeneous (e.g. assets classified as “other equity”).

It should be noted that companies may wish to consider the appropriateness of the standard formula in accurately reflecting the underlying risks whether or not the company is applying for an internal model.

2.4 Currency Hedging

Broadening insurers' investment horizons naturally takes insurers outside of investments denominated in local currency and into assets denominated in foreign currency to broaden the asset universe. This section sets out the overall considerations for any asset (traditional or non-traditional) denominated in another currency.

At first glance, an investment into assets denominated in a foreign currency creates a foreign exchange (FX) risk over and above the assets' intrinsic risk. The intrinsic risk will drive the market value of the assets in the foreign currency but their value in the domestic currency also depends on the prevailing spot exchange rate.

Whilst this is broadly correct for equity like investments, in the case of fixed income assets the reality is less straightforward, in particular for insurers who will invest for income and yield rather than for capital appreciation. Complexity arises because:

(i) the market value of the fixed income asset in the domestic currency of the investor depends on:

- credit spreads,
- foreign interest rates (e.g. swaps)
- the foreign exchange rate

(ii) the individual market impact of such risk factors is difficult to fully isolate.

As a result, in practice, the range of hedging strategies employed by investors purchasing assets denominated in a foreign currency differs significantly between companies and among investments (whether investments are static, buy-and-hold or are dynamic portfolios with reinvestments).

When considering a preferable hedge, an insurer typically needs to determine whether:

- it is primarily interested in hedging mark to market movements (in which case a rolling strategy may be appropriate)
- fully fixed GBP cashflows are required (for example, as the matching adjustment rules require in the Solvency II Directive Article 77b "*the cash flows of the assigned portfolio of assets are fixed"*), in which case a "full hedge" is needed.

Both strategies are considered further below, along with considerations if hedges are not included.

2.4.1 No hedge

At one extreme, an insurer can choose not to hedge foreign currency exposure. In such a scenario, the foreign fixed income assets will

- provide no duration in the domestic currency[7] as there is no direct sensitivity to movements in the domestic interest rates, e.g. a USD denominated bond does not have a duration in GBP as movements in sterling rates do not change USD rates and
- be fully exposed to the volatility of the exchange rate, in comparison with domestic fixed income assets.

[7] Duration, which is expressed in years, is a measure of the price sensitivity of a fixed income asset to changes in the interest rates. For example a bond with a duration of 10 years will fall by 10% (10* 1%) in case of a 1% fall in interest rates.

2.4.2 Full hedge

At the other extreme, an insurer can choose to enter into a cross currency swap where the cash flows from the foreign denominated assets are converted into a pre-defined schedule of cash flows in the domestic currency. In such a scenario, the combined exposure will:

- provide duration in the domestic currency and
- eliminate cashflow exposure to the currency (or FX) risks

However, the hedge will introduce new exposures:

- An exposure to “currency basis”

  In theory the cross currency swaps are priced based on the interest rate differential offered by the two currencies. This is contrary to what is observed in the market, where participants also pay or receive a cross currency spread (or basis), which means that one currency trades at a premium over the other currency. Such cross currency spread/basis can be volatile over time and therefore can impact the valuation of the cross-currency swaps.

  When hedging with a cross currency swap, the currency basis is locked at the level prevailing at the time of hedging for the remaining term of the swap. Therefore the exposure to currency basis will (i) create a new source of mark-to-market volatility and (ii) brings an additional cost (if spread is paid) or yield (if spread is received).

  In summary, this currency basis exposure brings about market value volatility as a cost of fully fixing the cashflows in GBP.

- A contingent exposure upon default of the foreign denominated asset

  A vanilla cross-currency swap, which hedges for example a foreign denominated bond, is independent of the credit performance of the bond. Hence if the bond defaults, the swap will continue to exist. This means that in such situations the insurer will have (i) a windfall profit if the cross currency swap has a positive mark-to-market or (ii) an unexpected loss if the cross currency swap has a negative mark-to-market.

2.4.3 Alternative hedges

In between these two approaches there are other ways in which the hedge can be implemented.

<u>Simple overlay with rolling short-term FX forwards</u>

An alternative approach, which is widely used in fund management, is to use an overlay of rolling 3-month FX forwards to manage the volatility in the market value of the domestic currency of foreign denominated fixed income assets.

Such an approach is simple to implement and avoids the lock-in of the currency basis for the long-term (i.e. only 3 months). However, the approach does not provide any duration in the domestic currency and does not provide fixed cashflows in GBP.

<u>Enhanced overlay with interest rate swaps and rolling short-term FX forwards</u>

The simple overlay with rolling short-term FX forwards can be enhanced by translating the foreign currency duration into domestic currency duration or mitigating the risk of underperformance of the portfolio relative to its associated insurance liabilities.

The translation of the foreign currency duration into domestic currency duration can be achieved by:

- entering into an interest rate swap in the foreign currency where the insurer receives floating rate (plus spread) and pays fixed rate (equivalent to the coupon income) on a notional equal to the notional of the bond

- entering into an interest rate swap in the domestic currency where the insurer receives a fixed rate and pays a floating rate (e.g. GBP Libor flat) on a notional equal to the notional of the FX forward hedge and the notional of the bond.

Further considerations need to be given if:

- the investment portfolio is not static (i.e. if there are reinvestments and embedded calls) and therefore the foreign currency duration is expected to change

- the investment portfolio has a large credit component and therefore the foreign currency duration may be adjusted as credit spreads move

- the domestic currency duration is not directly linked to the foreign currency duration and therefore the domestic currency duration may be adjusted independently

For such situations, a flexible overlay approach would need to be considered where the FX forward notional would not necessarily match the domestic / foreign interest rate swap notional.

Either of these alternative strategies avoids the cross currency basis exposure and thus is expected to result in lower mark to market volatility. However, they do not provide fixed cashflows in GBP terms, which may be particularly problematic for annuity insurers seeking a matching adjustment approval.

2.5 Transforming cashflow certainty

Cashflow certainty is a topic which is receiving increasing focus, particularly for annuity writers which place a high value on fixed cash flows in order to make assets eligible for the matching adjustment.

Many of the investments set out in this paper have features which create uncertainty over the payment term. Cashflow certainty considerations for specific assets are considered within the Section 3 of this paper whereas this section deals with the general issues for financial assets. Clearly, no financial asset has complete certainty of cash flows so, in this section, any reference to cashflow certainty refers strictly to the definition of 'fixed cash flows' required to comply with matching adjustment rules. The PRA has provided a number of key criteria setting out the way it expects insurers to fix cash flows[8]. These points are further elaborated upon in Paul Fisher's letter of 15th October 2014[9]. Both papers make requirements on the insurer to demonstrate full cashflow certainty (not just "highly predictable") and suggest that any cashflow transformation solutions need to transfer real risk. Any new risks introduced by the transformation also need to be fully considered.

In the process of examining potential options for creating the required cashflow certainty it is useful to differentiate between the various types of 'uncertainty' present in financial asset cash flows. Briefly, these can be characterised as:

1. Structural/contractual uncertainty (cash flows are not fixed in local currency by virtue of the nature of the cashflow terms themselves), e.g.:
   - ► Foreign currency denominated bonds
   - ► Floating rate instruments
   - ► Index-linked bonds (outside the matching adjustment allowance on inflation-linked liabilities)
2. Performance uncertainty (cash flows vary depending on the performance of an underlying business or non-financial variable), e.g.:
   - ► Amortisation schedules which depend on underlying cash flows
   - ► Equity release mortgages (where final payment timing and amounts depend on longevity, mortality and voluntary early repayments)
3. Borrower optionality, e.g.:
   - ► Mortgage pre-payment risk
   - ► Callable bonds
   - ► Optional/mandatory deferral clauses

There are a number of options available to insurers which may wish to transform investments in order to make them more favourable for the insurer.

In weighing such options, an insurer needs to consider:

- ► The impact on the annuity insurer i.e. does the solution provide fixed cash flows for the solo annuity entity.

[8] http://www.bankofengland.co.uk/pra/Documents/solvency2/matchingadjustmentasseteligibilityjune2014.pdf

[9] http://www.bankofengland.co.uk/pra/Documents/solvency2/matchingadjustmentletteroct2014.pdf

- The impact on the insurance group (i.e. does the solution still provide capital relief when the annuity insurer is consolidated into the group).

- The impact on the counterparty (i.e. is the counterparty a suitable holder of the risks and what will be its capital treatment).

In the longer term, it would clearly be preferable for the insurer if it were able to influence the terms on which it invests. There is some precedent for this in the UK market, for example certain social housing loan contracts in 2012 and 2013 were amended to ensure fixed cash flows.

The differences in the commercial real estate market between short term loans, which are written with less economic early repayment penalties and long term loans, which are written with economic early repayment penalties has arguably been influenced by the presence of insurers in the long term market which has helped to define the 'market standard' for such loans.

By contrast, we understand that anecdotally, the infrastructure market is one which insurers have had mixed experience in demanding protection against prepayment, with some insurers finding it difficult to change the market standard which tends to allow prepayment. This situation may improve over time.

2.5.1 Derivative overlays

2.5.1.1 Standard derivative overlays

In the case of assets with 'structural uncertainty' (item 1 in the list at the start of Section 2.5), it is generally possible to convert variable cash flows into a fixed cashflow. For example, a floating rate asset can generally be converted into fixed cash flows through the purchase of a swap converting floating cash flows to fixed cash flows. Equally, cash flows made in a foreign currency can be hedged back to the insurer's domestic currency through currency derivatives (the hedging of foreign currency assets is covered more fully in Section 2.4).

In many cases, the derivative solution required to give the requisite level of 'certainty' for matching adjustment, as well as to sufficiently remove any basis risk, may entail additional costs relative to the simpler (but potentially less robust) solutions, such as internal guarantees, which might otherwise be used to deal with these assets. This additional cost would then need to be factored in to the overall investment case. Any additional liquidity costs or risks resulting from the requirement to post collateral on long-dated derivative overlays would also need to be considered.

2.5.1.2 Structured complex derivative (or reinsurance) overlays

In principal, it might be possible to structure more complex derivatives (or reinsurance) to remove performance uncertainty (item 2 in the list at the start of Section 2.5). For example, longevity derivatives/reinsurance would be one element of any solution structured to make the cash flows from equity release mortgages more certain. To the extent that the amortisation profile of an asset is dependent on underlying financing and economic variables, it may also be possible to structure hedges. For example, the pre-payment risk on a pool of residential mortgages (which is likely to be highly correlated to interest rates). However, the key issue here is likely to be cost and/or basis risk, with the likely outcome being that a third-party solution which gave sufficient certainty to meet matching adjustment rules could create costs which would outweigh any increase in investment yield. A more practical solution in these situations could be to write such a derivative/reinsurance contract intra-group.

In general it will likely be difficult to find third-parties willing to write contracts to indemnify against borrower optionality (item 3 in the list at the start of Section 2.5), except in the limited context mentioned above for a mortgage pool. Extension risk associated with callable bonds is another situation for which it may be possible to find third parties willing to offer protection if it is determined that this is required by the rules.

2.5.2 Block reinsurance

Annuity liabilities could be reinsured to a (re-)insurance company which could be willing to accept the ineligible assets as a reinsurance premium. Should the reinsurer be a natural holder of these assets, then in theory it may be willing to price the reinsurance contract in such a way that it is equivalent or similar to the impact of valuing the liabilities using a matching adjustment.

There is already a market for bulk annuity reinsurance/transfers in the UK and, whilst (re-)insurers are understandably reluctant to pass a material proportion of future investment profits to cedants as a reduced premium, in many cases pricing reflects a reasonable premium above 'risk-free'. This would be expected to be the case on an ongoing basis as long as the risk adjusted asset returns exceed the cost of longevity cover.

Furthermore, if the premium were to be paid in specie using assets which were difficult to use for the matching adjustment, then this would likely require a reinsurer domiciled outside the EEA (whether that jurisdiction is deemed equivalent or not) and hence not fully subject to Solvency II rules in order for them to give credit for any 'liquidity premium' embedded in the assets.

Whilst this solution is potentially cleaner than others, it is likely to be considered as an option only for insurers wishing to ameliorate the impact on capital of legacy blocks of annuities in run-off: if writing new annuity business were important strategically then the resulting loss of control over pricing which this option entails would most likely be unattractive.

2.5.3 Special purpose vehicles

A special purpose vehicle (SPV) could be used to formally bifurcate the fixed and the non-fixed cash flows. In this case, the ineligible assets would be held by the SPV which would issue a note to the annuity insurer reflecting the fixed cash flows. An equity or subordinated tranche would be created and held by another part of the group (or externally) covering the non-fixed cash flows.

One problem with this approach is the level of tranching which would be required in order to create the requisite fixed cash flows on the senior tranche. Generally speaking this form of solution would necessitate a (potentially material) reduction in the yield associated with the senior tranche, and could also potentially reduce the term. In the context of a structure in which the junior tranches were to remain within the group, the absence of direct capital markets constraints could enable more yield to be channelled to the senior tranche.

A further potential issue with this form of solution is the likelihood that for firms calculating capital requirements using the standard formula, such a structure could fall into the securitisations category, and hence attract a high capital charge. For internal model firms, insurers could argue that the senior tranche should not carry a charge higher than the combined asset (senior + junior tranches), whose treatment under the company's internal model is likely to be known. However, given the relatively strict segregation of assets in the matching pool envisaged by the rules, this could prove a difficult argument to put to regulators.

2.5.4 Intra-group transactions

Where an annuity insurer is part of an insurance group, it may wish to hold the ineligible assets elsewhere within the group with the fixed cash flows passed to the annuity writer, and any cashflow variability met elsewhere in the group. Alternatively, and equivalently, the asset could be held within the matching asset pool, together with an overlay written by another part of the group to cancel out any cashflow variability.

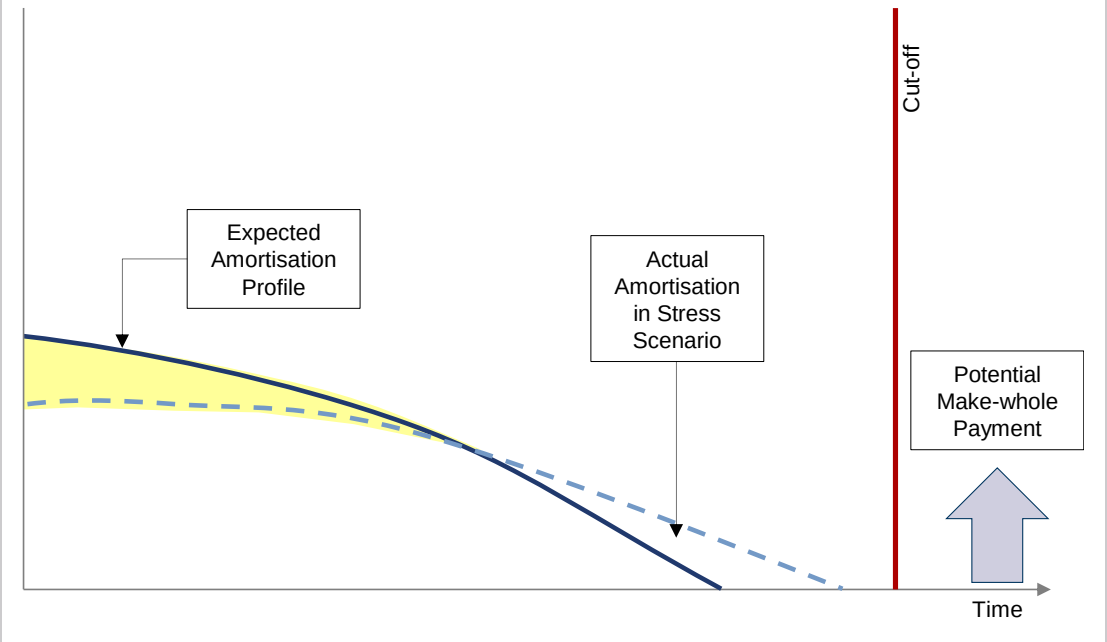
Whilst we note that these solutions are inherently attractive and sometimes less complex than an alternative solution, there are a number of potential constraints to their uptake. This is most notably due to the uncertainty that they provide sufficient real risk transfer to be deemed an appropriate solution for cashflow fixing. There are additional concerns over the

preservation of the fixed cashflows once the annuity company and the internal transaction is consolidated at group level due to the issues presented by Article 342 of the Delegated Acts: *"The aggregated group eligible own funds shall be adjusted to eliminate the impact of an intra-group transaction where the impact of the intra-group transaction affects the best estimates of the insurance and reinsurance undertakings in such way that the amount … is different depending on whether the intra-group transaction is eliminated in the calculation of that amount or not."*

An example of how such an arrangement could function is illustrated below which is effectively an actual-expected swap. The annuity writer pays the actual amortisation profile of the asset, and in return receives the pre-agreed expected amortisation profile. The cut-off feature, along with a potential 'make-whole' payment, is necessary in order that the annuity writer retains full exposure to the performance of the asset, and has a hedge against the uncertainty. The swap is required to be on a "full indemnity" basis i.e. it will need to take all cashflow uncertainty risks out of the asset, but the swap or the overall package will be considered to have defaulted in the event that the overall structure no longer provides fixed cashflows.

This feature effectively makes the swap a pure intra-group lending arrangement (e.g., in the diagram the shaded area represents lending from the group to the annuity writer), which could be priced appropriately.

Figure 2.4 – sample intra group transaction



A similar structure could be envisaged in which the group holds the asset and lends to the annuity writer directly. In both cases the full exposure to the credit risk of the asset (or a significant majority of this exposure) would need to be passed to the annuity writer in order to justify the asset held by the matching portfolio paying a material spread.

We note that this type of structure may provide a benefit for the annuity company but this benefit may not remain when the annuity company is consolidated at group level if intra-group transactions are required to be consolidated out.

2.5.5 Conclusions and comparison of options

The table below compares the various features of the potential solutions discussed above. As a general rule, the simpler the nature of the cashflow uncertainty, the greater will be the availability and cost-effectiveness of third-party solutions. For more complex situations, it is more likely that internal solutions will be preferable. The table below considers relative

benefits and issues with different solutions with two ticks being most certain to be favourable and two crosses being most certain to be unfavourable.

Table 2.5 – illustration of different options for cashflow certainty

	Likelihood of approval	Complexity	Availability/ cost	Capital release/ dissynergies	Comments
Derivative overlays (using standard instruments)	✓✓	✓	✓	×	Preferred option for 'Simple' structural variability (e.g. Fx, Floating rate notes)
Structured third party derivative / reinsurance	✓	××	××	××	
Block reinsurance	✓✓	✓	×	×	May be strategically unattractive – cedes pricing flexibility
SPV	✓	××	–	×	Cost not assumed to be too expensive if not rated.
Intra-group Transactions	×	××	–	✓	May result in complex structure.

There remain two further 'solutions' to this issue which we have not discussed – specifically these are more drastic options for avoiding or deferring the issue entirely: an insurer could either seek to employ transitional measures as a temporary fix, or could elect to not apply the matching adjustment. These options are discussed below.

2.5.6 Utilising transitional measures

One possibility to deal with problematic annuity blocks could be to seek approval to use the transitional measures set out in the Solvency II rules to limit the impact on technical provisions over the medium term. Applying transitional measures will be subject to regulatory approval. However, in the context of a run-off block this might be a viable option to manage the capital position.

2.5.7 Is the matching adjustment necessary?

As described above, in many cases it should be possible to engineer the assets described in this paper such that an annuity writer could in some form utilise them within its matching adjustment-eligible asset pool. However, it is also clear that there are potentially high costs of complying with matching adjustment rules. These could include both direct costs (such as administrative and operational complexity, higher costs for hedging and derivative overlays, and potentially ceding a proportion of investment yield to third parties), and opportunity costs (through lost investment flexibility and a potentially reduced universe of accessible investments). In addition, there may be capital dis-synergies introduced by the constraints on the management of the matching adjustment portfolio. These constraints could either be capital constraints (i.e. diversification may not be granted between the matching adjustment portfolio "ring fenced fund") or they could be real constraints (i.e. opportunity costs of not being able to invest more freely).

From a risk-management perspective, the use of a matching adjustment removes one of the key advantages of a mark-to-market approach, namely that it allows full flexibility to manage risk dynamically. The sale of assets which have fallen in value is now discouraged both by the rules themselves, but also by the resulting impact on liabilities when higher spread assets are replaced by lower-risk, lower-spread assets. This constrains the ability of insurers to de-risk in adverse scenarios (in fact, this was and remains a key criticism of the application of the current UK Pillar 1 rules for annuities). The rules also appear to explicitly disallow the sale of assets in order to exploit more attractive investment opportunities, or to manage asset risk

more actively through the cycle (with the exception of ‘maintaining the replication of expected cash flows’).

Doubtless for most annuity writers the matching adjustment will prove to be a necessity. However, it is plausible that for insurers with only limited annuity liabilities in the context of the group, the costs of applying the matching adjustment may well outweigh the benefits. There are also a small number of annuity insurers where the ineligible assets are sufficiently small that they can be left outside of the ring fenced fund (either within the assets backing risk margin, SCR or surplus) or simply not counted.

2.6 Operational challenges for loans

When an insurance company holds a corporate bond, it generally holds it to maturity (or certainly with an intention to "buy and maintain" i.e. it will buy and hold unless an issue with the holding emerges and an appropriate replacement will be found. It will probably continue to assess the credit rating, either through an internal assessment or through tracking any external credit rating(s). It will certainly continue to monitor the change in market value (and thus the change in spread). As such, it will intervene if and only if there are some obvious market factors which lead to a change in the bond.

A loan is different. For a loan, there is no available market value and generally there is no credit rating. As such, the management of loans is more challenging than the management of a corporate bond portfolio.

There are a number of operational challenges for insurance companies managing loans, such as those considered within Sections 3.1 – 3.3 and 3.4.2 of this paper. The main operational challenges are:

1. Calculating a market value for an illiquid asset
2. Credit assessment of the asset
3. Changes in borrower circumstances
4. Borrower optionality
5. Variations (or changes to loan terms)

2.6.1 Valuation

As there are no market values for the asset, a modelled value must be created. This modelled value is likely to have to meet IFRS standards and so the parameters should be market observable, where possible. The modelled value is likely to be close to the transaction price soon after purchase but market conditions may change, leading to a requirement to update parameters. Companies can put in place certain measures to manage the valuation of the asset; the fact that the valuation is modelled rather than marked to market may be a particular benefit for certain insurers given that this creates less accounting volatility. Care needs to be taken to ensure that a robust valuation framework is in place even for modelled values.

2.6.1.1 Proxy valuation

When considering the valuation, it is helpful to consider traded assets which are similar to loans. In particular, there are bonds covering:

- Social housing
- Infrastructure
- Universities and higher education
- Commercial real estate

A relationship can be determined between the bonds and similar loans which, at the very least, give a reasonable view of the market's view of the sector. However, changes in the situation of an individual borrower and contract specific terms, for example borrower optionality are not captured.

A relationship can be determined between bonds and loans in general. The most liquid market to be able to determine this relationship is generally the private placement market (covered in Section 3.4.2) and equivalent corporate bonds. The historic relationship between

loans and bonds has been such that loans had a negative spread to bonds (e.g. pre Global Financial Crisis) but, more recently, this has become a significant premium.

Individual issuers will carry different credit risk to the sector. As such, an idiosyncratic[10] spread will be required to bridge from the sectoral view to the individual asset. This idiosyncratic spread is likely to require a link to the credit rating.

Decomposing the spread on the loans into a spread on an equivalent bond, a loan to bond premium and the idiosyncratic spread of the bond allows insurers to more accurately monitor and assess the spread on the loan. This ensures that the valuation of the asset is easier to explain.

2.6.1.2 Hard valuation

For assets with real assets backing the loans, the underlying collateral needs to be valued on an ongoing basis. For certain assets (e.g. property, aircraft, infrastructure), this can be both costly and time consuming. This is likely to be an important consideration for insurers relying on the value of the underlying collateral to support the valuation or risk measurement of the loan.

2.6.2 Credit rating

The credit rating of loan assets tends to depend on both the loan characteristics and the underlying borrower. The credit assessment of the loan will generally be complex and will likely require consideration of both quantitative factors (e.g. financial position of the borrower, covenants within the loan) and qualitative factors (e.g. outlook for the sector). At the time of loan purchase, the assets will undergo full due diligence so that these factors will be considered in detail. Once the loan has been purchased, an insurance company needs to have the ability to monitor and update the credit rating factors to feed into the valuation of the asset, but also to understand whether any action needs to be taken on the asset.

2.6.3 Changes in borrower circumstances

Depending on the outcome of the sectoral analysis described above and the credit analysis, the borrower may be determined to be higher risk than at the time of lending. These changes are likely to factor into the cashflow projections as well as the valuation of the asset.

The borrower's circumstances also need to be taken into account in both the valuation of the borrower options and the variation requests.

2.6.4 Borrower optionality

Borrowers tend to have many options within the contracts, as set out in the cashflow certainty section above. Specific options which may be available to borrowers within loan contracts include:

- Full or partial prepayment
- Extension of all or part of the contract
- Fixed rate or floating rate linkage
- Linkage to certain underlying risk free curves

The options may either be contractual so that the lender is mandated to accept the option or the lender may have the choice to either deny the option or to price the change in contract. In either case, the value of the options is challenging to calculate. The existence of the options also makes the cash flows uncertain, which presents a challenge for insurers seeking the use of the matching adjustment.

[10] Defined as being where compensation is required for specific features of an underlying security

2.6.5 Variations

A loan contract is different from a bond in that the borrower and lender typically have closer relationships. If something goes wrong, the borrower is likely to phone up the lender and see what can happen to resolve the issue. This is generally to the benefit of both sides as default type events may be mitigated or stopped.

However, the existence of this relationship does make a loan contract more complex to manage. In the case of retail loans, this generally requires the insurance company to have a call centre to manage borrower requests. For commercial loans, the variations may still be complex to assess.

Variations are always accepted only at the discretion of the lender. A lender reserves the right to reject all variations; however, this may not always be in its best interest. Further, it may generate negative reputation in the market should the lender wish to write further loans.

An insurance company would therefore need to be able to assess whether the variation proposed is reasonable. If so, it would need to determine what the cost of the change should be and whether any contractual changes are required. The impact on the cash flows (and any potential impact on matching adjustment) needs to be considered. The impact on the credit rating of the borrower with or without the variation is also important.

It is important for insurance investors to ensure that information is provided on a regular basis in order to be able to make decisions on the variations. Industry examples of poor decisions made by investors often include asymmetry of information.

The most complex and common example is for infrastructure loans, and so we have considered a case study here of some variations within infrastructure contracts.

For an infrastructure loan, there are several parties involved, i.e.

- Soft services, e.g., portering and cleaning
- Hard services, e.g., repairing of assets
- Long term services, e.g., boilers, freezers

The cost of these services is estimated at outset and may need resetting over time. Changes to the estimates made at outset require a change to the contract, i.e. a variation.

Any change to the contract will generally change the risk profile and this change will need to be formally consulted upon by both the bond (or loan) holders and the equity investors. As the risk appetite of the bond and equity investors tends to be different, the decision making may not be aligned. However, bondholders have entrenched rights and so have the ability to block variations, which they would generally do in the event of an increase to the risk profile.

Variations are usually accompanied by a change to the financial model underpinning the loan, which the investors should review. In some cases, the equity investors may accept a variation with inadequate consideration or consultation with the debt investors. In this instance, the debt investors have the ability to withhold dividends to be paid to equity investors.

Where an infrastructure project is performing poorly (through poor service quality), the debt investors have the right to be able to enforce changes to the running of the project in order to ensure that significant penalty points do not accrue against the contract and cause the trust to shut the project down (with loss to the debt holder).

The ability for insurers to be able to access this information depends on the vintage of the loan (rights are enhanced on newer deals) and the level of control over the project.

2.6.6 Summary

Loan investment requires caution on the part of the insurance company. Management of the above issues needs to be overseen by the insurance company, but some of the expertise can be outsourced. Insurance companies generally need to follow one of the following models:

- Hire expertise in house. The insurer may need general loan management, credit management and specialist sectoral expertise. Insurers which lend significant amounts of money to certain sectors tend to have in house specialists covering that sector.

- Utilise investment management expertise. Investment managers tend to have further resources dedicated to management and monitoring of individual assets as well as sectors. The management of the investments needs to be agreed between the insurer and the investment manager, i.e., whether the investment manager has discretion to amend the contracts on behalf of the insurer or whether recommendations are made.

- Loan insurance (“wrapping”) may also be utilised to provide some of these services offered by a specialist investment manager.

- Outsource all management. Insurers could outsource all decision making to an investment manager such that the performance of the assets is placed completely in the hands of the investment manager. The investment manager will therefore take responsibility for management of all of the above, with information reported to the insurer.

3. Asset class specific considerations

3.1 Infrastructure

The definition of infrastructure can be very broad. In this context we include roads, railways, airports, power generation and transmission, ports, communications, water and waste, and social infrastructure such as hospitals, schools, and housing (social housing and student accommodation). We include in our definition of infrastructure both:

- Corporate entities, such as utility companies, toll road operators and airport/port companies – whose revenues are either 'economic' or regulated; and
- Concession[11] structures or other project financings for single (or multiple related) assets, such as PFI/PPP[12].

Infrastructure assets typically have some or all of the following characteristics:

- Require a large initial capital outlay, or have material ongoing capital expenditure needs
- Involve long duration contracts that are often complex
- Yield stable and predictable long-term (up to 35 years or more) cash flows that can support significant leverage and are often partially inflation-linked
- The cash flows are often influenced by a regulatory regime set by a government, or sponsored/subsidised by a governmental or quasi-governmental body
- Return should, with some exceptions (e.g. toll roads), be relatively uncorrelated to the business cycle
- Are frequently monopolistic or quasi-monopolistic

The main difference between project financing and financing for corporate entities is that corporate entities:

- Tend to be less levered
- Debt would be typically more liquid (due to a larger debt issuance in the market)

As such, the long-term predictability and relative security of the cash flows make investment in infrastructure assets appealing for insurers, in particular those with long-term liabilities (e.g., individual and bulk annuity funds).

At the highest level, there are two options available for investors wishing to invest in infrastructure:

Debt investment

Debt investors have the first call on the cash flows generated by an infrastructure corporate or project (after the payment of operating costs, which would typically include any swaps, SPV expenses and fees). Debt is usually secured (with limitations in some cases) on physical assets and / or contracts, as such, the cash flows are generally stable and secure. Debt will typically make up 80-90% of a project's capital requirement; somewhat less for an

11 Concession: In the case of a public service concession, a private company enters into an agreement with a public sector entity to have the exclusive right to operate, maintain and carry out investment in a public facility for a given number of years.

12 PFI / PPP: The Private Finance Initiative ("PFI") is a procurement method to create Public Private Partnerships ("PPP" or "P3"), using private money to finance public sector infrastructure or services.

"infrastructure corporate"(a listed company which is responsible for delivering one or more infrastructure project or a company wholly or partly owned by an infrastructure fund).

Equity investment

Equity investors receive the free cash flows from projects after deducting operating costs and income used to service debt investors. Hence, equity investors have a leveraged exposure and are subject to more volatile cash flows and asset valuations. Equity will typically make up 10-20% of a project's capital requirement; somewhat more for an infrastructure corporate.

Figure 3.1 – a typical (simplified) infrastructure project

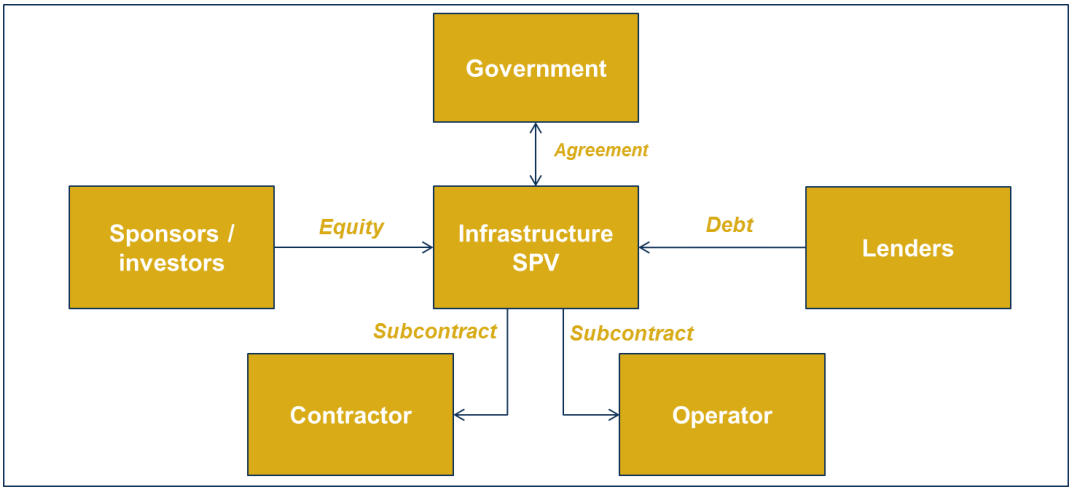


Table 3.2 – summary of infrastructure key characteristics

	Infrastructure financing – equity	Infrastructure financing - debt
Pricing transparency	- Generally unlisted - Not rated - Limited supply of publicly available comparison benchmarks - IRR can be derived on certain transactions (mainly those with a contractual fixed equity return)	- Typically listed security rated in the range of BBB- to A - Some debt securities and most bank loans are unrated; typical equivalent in the range of BB to BBB- - Adequate supply of market data on comparable benchmarks - Pricing generally publicly available
Cash flow certainty	- Relatively stable, robust cash flows - Risk level of stability dependent upon a matrix of key criteria - construction risk/no construction risk and demand/availability revenue stream - Risk of dividend "lock-up" if project underperforms by a relatively small amount - Regulatory / government influences - A mix of fixed rate and index linked opportunities	- Relatively stable, robust cash flows - Risk level of stability dependent upon a matrix of key criteria - construction risk/no construction risk and demand/availability revenue stream - Typically fixed rate, with loans needing to be swapped out to a floating rate
Typical duration	- Long dated (maturity up to 35 years, average life 15-20 years).	- Long dated (maturity up to 35 years, average life 15-20 years).
Typical clip size	- Project sizes vary significantly (from £50m to £500m in the UK) - Equity typically 10-20% of a project's funding needs (depending on the sector)	- Project sizes vary significantly (from £50m to £500m in the UK) - Debt typically 80-90% of a projects funding needs (depending on the sector)
Typical return	- IRR for primary assets typically in the range of 10-15%, depending on cash flow certainty, being lower for secondary assets or operational assets	- In the range of G+150-250 bps for a BBB rated project
Risk / return	- Risk/return profile will depend on the positioning in the risk matrix described previously of construction/no construction and demand/availability	- Risk / return profile will depend on the positioning in the risk matrix described previously of construction/no construction and demand/availability

Format		- Frequently traded in loan format. - Some listed bonds.
Liquidity	- Active secondary market available for buyers and sellers - Typically there are restrictions on equity sales during a construction period	- Debt instruments are fairly illiquid given the bespoke nature and relative complexity of the asset as well as being very long dated - However, debt instruments with an outstanding issue size of >£250m are significantly more liquid compared to their smaller peers.
Ability to source	- Difficult to source directly, most investments via a fund	- Limited supply (right now) - Ability to source most debt instruments requires either a market partner involved in origination, or requires an in-house origination team
Complexity of ongoing management	- Highly complex; need a fund manager or experienced in-house team	- High complex; need either a "super-trustee", a credit enhancer acting as controlling creditor (or partial controlling creditor), or an in-house team

3.1.1 Pricing transparency (availability of data/benchmarks/ratings)

Equity

Equity in concession/project companies is not generally listed nor rated and, as such, there is limited supply of publicly available benchmarks for comparison. It is possible to derive the IRR for certain transactions with a contractual fixed equity return. While absolute return is the predominant benchmark approach, others approaches can include inflation plus margin, or a combination of listed and unlisted equity infrastructure indices. Examples of unlisted infrastructure funds include Macquarie Infrastructure Partners Fund III, Terra Firma Infrastructure Fund for Global Renewable Energy and UBS International Infrastructure Fund II. Some funds that invest in infrastructure assets are listed, such as HICL Infrastructure Company Limited or Brookfield Global Listed Infrastructure Fund Inc.

Infrastructure corporates are sometimes listed (e.g., Eurotunnel).Economic and Regulated equity is often listed, and as such is not discussed further in the infrastructure section.

Debt

The larger infrastructure debt issues are more likely to be financed in the capital markets, as opposed to bank debt which is not usually listed. Bond instruments are typically listed and attract investment-grade ratings in the range of BBB- to A. Some debt securities and most loans are unrated, though typical internal ratings would be in the range of BB to BBB-. Ratings, where given, are normally obtained at the construction phase of an infrastructure project, where the financing is required. This rating is usually maintained during the life of the debt.

Pricing for listed debt (e.g., UK Regulated Utilities) is more readily available than unlisted or bank debt and there is adequate supply of other market data through comparable benchmarks, including bond indices (e.g., Bank of America Merrill Lynch Euro Single A Utilities Index).

Data on historical ratings migrations and defaults is generally stronger than for many other asset classes given ratings agency reports. In particular, Moodys publishes a report[13] on unrated project finance loan experience, which contains data of 4,425 loans (as at end 2012) made by banks from 1983 – 2012 and estimates that the report covers 54.2% of all loans in that period. The data also subdivides PFI / PPP loans from the broader project finance universe as well as a subdivision between construction phase and operational phase loans.

[13] https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_165655

The default experience of projects in the operational phase (particularly after a year or two of operation) is generally consistent with that of a higher rated asset; this is reflected within the default experience in the Moody's report.

3.1.2 Cash flow certainty

Debt cash flows are stable and robust, with the risk level dependent upon a matrix of key criteria: whether 'greenfield' or 'brownfield', whether investment made at 'operational' or 'construction' phase and additionally whether the revenues are subject to 'availability' of the asset(s), to 'demand' risk from users or are 'regulated'.

Table 3.3 – summary of different types of infrastructure projects

'Greenfield' investments	In the context of infrastructure, the greenfield/brownfield distinction is not rural vs. urban. Rather, greenfield projects involve the construction of new facilities where none existed previously, e.g. a new motorway / city bypass, or a new hospital (even if it replaces an older hospital on the same site).
'Brownfield' investments	Brownfield projects are either already existing and/or involve the expansion or transformation of an existing asset, e.g. widening/improving an existing motorway, expansion of an existing airport.
Construction phase investments	Investments made at the pre-operational or construction phase, before most revenue is being generated (construction phase projects may receive some concession payments during the build). Higher risk is associated with construction phase projects due to the presence of completion risk (construction delays, cost overruns) and usage risk (insufficient demand for the service/facility once provided).
Operational phase investments	Investing at the operational stage of a project. Lower risk due to the asset having been completed and usage levels having been established; the risk also diminishes over time as the project is proved to be revenue generating.
'Availability'	Availability based investments are typically the lowest risk investments, where some governmental entity agrees to pay a pre-agreed amount in return for the use of the asset (e.g., a hospital).
'Demand'	Demand based projects vary widely in risk profile, and tend to be subject to economic risks (e.g., tolls collected from toll roads, the sale of power from a power plant).
'Regulated Revenues'	In these instances the source of revenue is prima-facie demand based, but in practice the industry is so heavily regulated with an effective captive consumer base that the risk profile more closely matches that of Availability based risks as demand is, to an extent, inelastic (e.g., UK Water Companies).

Note that many infrastructure corporates, such as airports and energy transmission companies, have ongoing (often substantial) capital expenditure programmes that can result in the introduction of construction risk for new assets alongside existing operational facilities.

Many infrastructure corporates generate revenues that are broadly linked to inflation. These may be financed by a combination of fixed rate and/or index-linked debt, depending on the corporate's approach to managing inflation risk, which may also involve swaps. The cash flows on the debt may be a contractual entitlement or may be subject to business, economic or regulatory risks. Equity cash flows typically have a link to inflation.

Some concession structures also provide for index-linked cash flows, which can be financed by index-linked bonds, although in bank-financed structures the debt is usually swapped to floating rate. In some projects, a portion (only) of the revenue is index-linked, and is designed to meet operating costs, whereas the portion of revenue that is designed to meet financing costs (both equity and debt) is fixed rate.

Equity risk and return will be consistent with the senior payment ranking of the debt.

Equity cash flows are at risk of dividend 'Lock-up' if the project underperforms by a relatively small amount due to reduced revenues and/or increased costs.

Such 'Lock-up' scenarios usually include cash flow coverage tests, but often these are further project-specific measurements, e.g., a Demand risk toll road could be based on traffic flows,

but an Availability based project could be measured on direct availability (i.e., all lanes being open on a road) or a combination of availability and service (i.e., a Hospital not being cleaned to the required standards – and thus that 'unclean' area being deemed unavailable). Such 'Lock-ups' can be triggered based on a points system, where contractual breaches accrue points, with the 'Lock-up' occurring after a set level of such points having been accrued. At a more serious level of underperformance, accrued points can also result in the termination of the Concession, and thus a project company default (with termination payments based on contractual provisions, which could result in losses for the bondholders, and almost certainly for the equity). Typically it would be the debt holders, rather than the concession grantor who would control whether or not to lock up the payments to the equity.

There is a mix of fixed rate and index-linked equity opportunities, where absent the aforementioned 'lock-up' scenario, equity cash flows for Availability based projects can be almost debt like in their certainty and timing given the relative certainty in the overall project cash flows.

Bond instruments may include protections against prepayment risk, via a 'Spens[14] clause' or other make-whole clauses; note that in project financings, the protection will typically not apply if the project defaults or there is a force majeure event. However, most infrastructure loans do not have significant prepayment protection and, in fact, have a number of other borrower options as described in Section 2.6. At present, infrastructure loan cash flows are unlikely to be sufficiently certain for matching adjustment purposes given the range of borrower options and the ability of borrowers to prepay.

For loans purchased in the secondary market, there may be loans where the prepayment option is very unlikely to be activated due to the preferential rates at which the loans were originated pre Global Financial Crisis[15]. In these cases, it would be very difficult for projects to refinance at rates close to those at arrangement and thus prepayment is very unlikely.

3.1.3 Security/Recourse to assets

Debt is typically secured on physical assets and / or contracts (i.e., Concessions). Equity investors are the ultimate beneficial owner of such physical assets or contracts as long as the contractual promises to debtholders are fully serviced and fees, expenses and swap costs are paid. Concession structures relating to public assets/facilities (e.g., PFI) typically do not provide for security over the assets/facilities (though there may in some instances be a negative pledge associated with the assets), in this instance, the debt holder is relying on the future revenue generated from the Concession to service the debt. Such Concessions typically expire shortly after the final maturity of the debt (though it should be noted that the Concessions associated with some UK-Regulated Utilities often can be terminated with a notice period that can be less than the final maturity of such UK-Regulate Utilities debt). In instances where debt secured by Concessions in the UK (e.g., Metronet, Eurotunnel) have defaulted, recoveries for the debtholders have been based on the value of the Concession (as determined commercially by sale, or by the grantor of the Concession).

Debt may be issued either by the infrastructure corporate (or project company) itself, or by a dedicated finance company that raises finance from banks and/or bondholders and on-lends the proceeds to the operating company, with the benefit of the relevant security package. Such on-lending structures are typically set up to avoid the debt defaulting, even if the underlying asset / Concession does itself default.

[14] Spens - potentially strong form of protection for lenders/investors in securities, designed to mitigate the adverse effects of call risk for investors. Under a Spens clause the borrower/issuer has to value the cash flows beyond the date of the call/redemption at the government bond yield, or some other low rate. The consequence of a Spens clause for the investor is that they can re-invest the redemption monies in government stock, thus preserving their originally expected cash inflows at lower risk. [Source - http://www.treasurers.org/glossary/S]

[15] The Global Financial Crisis of 2007–2008 is considered by many economists to be the worst financial crisis since the Great Depression of the 1930s. It resulted in the threat of total collapse of large financial institutions, the bailout of banks by national governments, and downturns in stock markets around the world.

3.1.4 Typical debt duration

Infrastructure projects are long-dated with maturities up to 35 years, which is equivalent to a modified duration of 15 to 20 years or more. By nature, infrastructure projects often seek to finance projects which take a long time to build and are expected (or hoped) to be operational for a long period of time thereafter. Debt typically amortises over the fixed life of the asset (often in real rather than nominal terms in the early years if the debt is inflation linked).

Infrastructure corporates have a broader spectrum of maturities, including shorter maturities, and debts are more likely to be a mix of bullet (with the associated refinancing risk) and amortising. Debt investors get comfortable with “bullet maturities” on the basis that the corporate has an ongoing revenue-generating life, unlike a fixed length concession typical to an infrastructure project.

3.1.5 Typical clip size

Large infrastructure project sizes can vary significantly (from £50m to £500m in the UK, with several jumbo projects being even larger, and some corporates having large volumes of debt in the market, albeit with lower levels of leverage). Equity will typically make up 10%-20% of a project’s funding requirement (depending on the sector), with the remaining 80%-90% being provided through debt issuance. There are also smaller project opportunities available in certain sectors (e.g., renewable energy, schools, community and medical centres).

3.1.6 Typical return (as of Q1 2014)

Infrastructure project equity investors will typically invest to achieve a projected IRR in the range of 8%-15% (anecdotally). The target IRR will depend on the relative security and predictability of the cash flows, i.e., a fixed cash flow, government-based or heavily regulated exposure might target an IRR at the low end of the range due to lower expected volatility whereas investors in a waste project or toll road with volume risk may look for an IRR at the higher end of the range.

Debt investors in Concessions may expect to achieve in the range of Gilts + 150-250bps currently for low investment grade ratings, though higher returns may be available in certain sectors and if investing in smaller ticket sizes. Pricing expectations for Concessions will vary over time in line with comparables such as the trading value of UK-Regulated Utility bonds which are large and liquid.

Such UK-Regulated Utilities would typically trade inside of the wider universe of Concessions, and economic assets (e.g., ports) would typically trade wider than Concessions as a whole, given the same debt rating.

3.1.7 Format

Opportunities for insurers to invest in infrastructure projects are most likely to be in loan format; however, bond and equity formats are possible. Due to the lack of a significant number of bond issuances in the infrastructure market, loans are sometimes rated and “wrapped” by a credit insurer which reduces the credit risk of the loan and the complexity of the investment.

3.1.8 Liquidity

There is an active secondary market available for buyers and sellers of infrastructure equity, though in Concession structures there are typically restrictions on selling equity holdings during the construction period of a project.

In general, infrastructure debt instruments are fairly illiquid given their bespoke nature and relative complexity combined with them being very long-dated. This is particularly the case for infrastructure loans, which are less liquid than bond instruments.

However, bond instruments with an outstanding issue size of >£250m are significantly more liquid compared to their smaller peers, as many funds are only permitted to invest in debt

that is included in the Markit iBoxx GBP Benchmark Index. Such an index only includes debt instruments with at least £250m outstanding (£100m if the first settlement date was before 31 December 2010). Note that as a bond matures, it may become less liquid if it falls below £250m (or £100m if applicable).

Hence, many infrastructure corporates (e.g. UK-Regulated Utilities) are more liquid as they are generally larger issuers of debt, and their constant issuance results in ongoing marketing of such debt, and thus a more diverse, current and informed investor base for such debt than exists for non-Corporate Concessions, which typically only issue once into the market.

3.1.9 Ability to source

Infrastructure investments can be difficult to source directly without an in-house origination team and investments are often made via a fund or through a market partner. Currently, the supply of project finance debt is relatively limited given the affordability constraints of many European governments. Further, a small number of large players often make bids for entire projects, making it hard for smaller investors to make independent bids for portions of infrastructure project debt. The largest bond issuances are marketed via investor road-shows.

Anecdotally, it has been noted that as 2014 has progressed, there has been a marked increase in bank participation in, and thus competition for, smaller infrastructure transactions given the relative decline in supply of new assets.

Economic and UK-Regulated Utility debt is typically easier to source, particularly for the larger, more frequent issuers.

Given the current competitiveness of the infrastructure market, insurers have an additional hurdle to jump as they need to convince the broader market that they are credible investors in this space. This will evolve over time, but does make origination of loans more difficult than might otherwise be the case.

3.1.10 Complexity of ongoing management

Infrastructure investments can be highly complex to manage. An investment in infrastructure equity would require either a fund manager or in-house team to oversee assets.

When investing in debt linked to Concessions (excepting Concessions linked to Regulated debt), debtholders may need to appoint either a ‘super-trustee’, a credit enhancer acting as controlling creditor (or partial controlling creditor), or an in-house team. Given the relatively high leverage, creditors are typically entitled to exercise a high degree of control over the project company’s actions. Bondholders (or some creditor representative) can expect to deal with a range of issues on a fairly regular basis, including the possibility of quite major changes to the project. Preserving the original risk profile can take time and effort. The level of information flow that is available to investors may depend on the debt format: e.g. information is more easily provided under loan structures than publicly listed bond issues. The amount and accessibility of available information will need to be a consideration for the investor.

Economic and Regulated debt is easier to manage as gearing levels are lower, thus the management have greater latitude (and thus need to come to the debt holders less often for consent than in the case of such aforementioned Concessions). However, there can, for certain issues, still be more interaction with debt holders than would be the case with simpler corporate bond issues.

3.1.11 Solvency II capital charges

Infrastructure is usually unrated and unsecured (formally). In the event of default, the debt holder can take control of the infrastructure project but not the underlying physical assets and hence is unlikely to meet the definition required for the collateral offset. The capital charge for infrastructure debt is therefore likely to be equivalent to an unrated corporate bond of equivalent rating.

The illiquid nature of infrastructure loans may mean that the spread risk is not adequately captured by the standard formula capital charge. Most infrastructure bonds are around BBB level and so the spread risk charge is not obviously penal by forcing a standard formula firm not to use an internal rating (given that the BBB and unrated charges are relatively similar).

On the contrary, infrastructure loans (particularly PFI and PPP) have tended to experience much lower numbers of default and the recovery rates on default have tended to be much higher than corporate bonds. As such, for holders to maturity, the standard formula may be relatively penal.

Matching adjustment considerations

The latest draft of the matching adjustment rules does not permit assets with prepayment optionality, unless there is an appropriate surrender penalty. Infrastructure loans tend to have prepayment optionality (and often many other options) which would be likely to disqualify them from the matching adjustment in the absence of a solution to fix the cash flows.

3.1.12 Selected UK infrastructure transactions

Table 3.4 - Selected UK closed transactions

Date	Deal	Type	Size (£)	Coupon	Amortisation	Rating at Issuance
Mar-14	MerseyLink PLC	Availability-based Bridge, senior secured fixed-rate bonds due 2043	257,000,000	3.842%	Fully amortising	Aa1
Mar-14	Solutions for North Tyneside	Social housing PFI, senior secured fixed-rate bonds due 2041	77,000,000	5.259%	Fully amortising	S&P AA, Moody's A2
Feb-14	M8, Scot Roads Partnership Finance	Availability-based Roads, senior secured fixed-rate bonds due 2045	175,000,000	5.591%	Fully amortising	S&P A-
Dec-13	TRFC 2013-1	Renewable Energy, secured RPI-linked notes due 2036	66,000,000	2.928%	Fully amortising	Unrated
Dec-13	S4B (Issuer) PLC Dec 13	Social housing PFI, senior secured fixed-rate bonds due 2038	73,525,000	4.926%	Fully amortising	S&P AA, Moody's A2
Nov-13	GREATER GABBARD OFTO PLC	Offshore electricity transmission, Secured Bonds due November 2032	305,140,000	4.137%	Fully amortising	A3 by Moody's
Oct-13	Associated British Ports	Economic infrastructure, senior secured notes due 2042	50,000,000	5.250%	Bullet	Baa2 (Moody's), BBB+ (Fitch)
Jul-13	Holyrood Student Accommodation PLC	Student Accommodation, senior secured fixed-rate tranche and senior secured RPI-linked tranche of bonds, both due 2048	63,000,000	Fix 5.533% IL 1.971%	Fully amortising	S&P AA, Moody's A2
Jul-13	Sustainable Communities for Leeds Finance PLC	Social housing PFI, senior secured fixed-rate bonds due 2032	102,000,000	5.069%	Fully amortising	S&P AA, Moody's A2
May-13	Malina Financing 2013-1	Renewable Energy, senior secured RPI-linked notes due 2036	60,000,000	2.598%	Fully amortising	Unrated

May-13	Uliving Consortium, Herts Accommodation	Student Accommodation, senior secured RPI-linked notes due 2054	143,500,000	2.057%	Fully amortising	S&P A-
Nov-12	Solar Financing 2012-1	Renewable Energy, senior secured RPI-linked notes due 2036	40,000,000	3.610%	Fully amortising	Unrated

Note that the transactions listed above that achieved AA ratings were all guaranteed, (in the case of MerseyLink, by the UK government) with underlying credit ratings in the BBB/Baa category.

3.1.13 Selected insurer transactions and news

Friends Life announces new £500m infrastructure mandate

http://www.friendslife.com/media/news/13-November-2013-Friends-Life-announces-new-500m-infrastructure-mandate.jsp

Drax agrees a £75m amortising loan facility maturing in June 2018 with Friends Life

http://www.drax.com/media/press_releases/?id=202763

PIC buys first ever UK solar bond

https://www.pensioncorporation.com/sites/default/files/press/pic_invests_ps40m_in_solar_plant_.pdf

Wragge & Co completes UK's largest solar bond deal

http://www.wragge.com/wragge_news_10010.asp#.UpNum8RcVbE

Legal and General chief pledges to invest more in infrastructure

http://www.cityam.com/article/legal-general-chief-pledges-invest-more-infrastructure

£74m wrapped bond will finance a UK PFI social housing project in central Manchester

http://assuredguaranty.newshq.businesswire.com/press-release/assured-guaranty-europe-guarantee-third-wrapped-uk-infrastructure-bond-2013

EIB credit enhancement lures UK insurers to project bond

http://www.risk.net/insurance-risk/news/2318549/eib-credit-enhancement-lures-uk-insurers-to-project-bond

L&G – Investing in infrastructure

http://www.legalandgeneralgroupcsr.com/ourpurpose/oureconomicinfluence/investingininfrastructure.html?cat=m

Legal and General makes first major care home and hospital investment

http://www.legalandgeneralgroup.com/media-centre/press-releases/2013/group-news-release-1208.html

Aviva investments in infrastructure

http://www.avivainvestors.co.uk/media-centre/2014Archive_a/AVIVA11G_027143.html

http://www.aviva.co.uk/commercialfinance/news/wolverhampton-bsf.html

http://www.aviva.co.uk/media-centre/story/17250/aviva-commits-500-million-to-invest-in-uk-infrastr/

UK infrastructure plan

https://www.gov.uk/government/publications/the-uk-insurance-growth-action-plan

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http://llewellyn-consulting.com/resources/UK+Infrastructure+Investment+-+White+Paper+July+-+2013.pdf

Infrastructure investment for insurance companies under Solvency II

http://uk.milliman.com/uploadedFiles/insight/2013/infrastructure-investment-solvency-ii.pdf

Insurers' Investment in Infrastructure: Overview and Treatment under Solvency II

http://www.vwrm.rw.fau.de/Infrastructure_2013-11-06_WP.pdf

3.2 Real estate backed loans

In this section we consider loans where the investor (i.e., the lender) has recourse to some form of real estate asset(s) in the event that the borrower defaults on their obligations. These real estate assets may relate to either residential properties (e.g. houses) or commercial properties (e.g. offices).

Due to the prevalence of industry specific terminology, a specific real estate glossary is provided at the end of this section.

Because of the recourse to real estate property, a common measure of 'security' for these loans is the so-called loan to value ratio (or LTV), i.e. the ratio of the value of the loan to the value of the underlying real estate assets – the lower this ratio, the greater the security for the lender.

Despite the additional security offered on these assets, the indicative returns (as set out below) also appear to be higher than equivalently rated corporate bonds. The relative attractiveness of this asset class is also heightened for insurers, which often understand property risk through their direct holdings.

The ability for the security to reduce the capital charge on most of these assets under the standard formula depends largely on the interpretation of the following wording within Article 214 of the delegated acts: *"there is no material positive correlation between the credit quality of the counterparty and the value of the collateral".* This is particularly important for this asset subgroup given that the security provided under the structure ought to be beneficial in the event of a default but there are certainly assets where the collateral is linked to the counterparty and thus the credit quality. Further, given the illiquid nature of real estate assets, other requirements of Article 214 i.e. *"the insurance or reinsurance undertaking transferring the risk shall have the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event of the counterparty;" and "is of sufficient liquidity"* may be particularly difficult to demonstrate. The specific considerations for each asset class are covered in the subsections below.

The key barriers to entry within these asset classes are generally:

- Illiquidity – of all the assets considered within this paper, the real estate backed assets are often the most illiquid, with very few assets sold in the secondary market.
- Complexity of ongoing management – whether dealing with retail customers (through equity release, residential mortgage loans and residential ground rents) or institutional borrowers (where lumpy change requests can be forthcoming), the ongoing management can be complex.
- Permissions – it is not clear that insurance companies are allowed to lend money to the retail market. Insurance companies have historically set up lending arms in order to do this, which adds to the ongoing complexity of the investment.
- Prepayment risk – most of the real estate backed loans offer the borrower the ability to prepay, which would make them ineligible for the matching adjustment under Solvency II (as currently drafted). Insurers will therefore need to negotiate appropriate make whole loan clauses for new loans, or otherwise develop suitable structuring solutions to mitigate the prepayment risk.

Table 3.5 - key characteristics for five types of real estate backed loans:

	Residential mortgage loans	Equity release	Commercial real estate loans	Ground rents	Student housing loans
Pricing transparency	No published indices Available	No published indices Available	No published indices Indicative	No published indices Real estate services providers, such as	No published indices Indicative

	Residential mortgage loans	Equity release	Commercial real estate loans	Ground rents	Student housing loans
	information includes mortgage interest rates, historical house price data, mortgage affordability, repossessions and mortgage arrears	information includes historical house price data	historical financial terms are collated by independent bodies such as De Montford University There are also a number of bonds issued by REITs or property companies Default information challenging to obtain	CBRE, provide some commentary on underlying asset yields	historical financial terms are collated by independent bodies such as De Montfort University Default information challenging to obtain
Cash flow certainty	Ability to prepay without penalty at end of fixed period	Cash flows depend on longevity, house prices and prepayment	Prepayment risk (modified SPENS more common for longer term, fixed rate deals)	Prepayment risk very small for residential; Typically none for commercial (but will depend on lease terms)	Prepayment risk (modified SPENS common for insurance-backed deals)
Security/Recourse to assets	First ranking legal mortgage of the property				
	LTV ratios in range 65%-90%	LTV ratios are typically <35% at outset but grow	LTV ratios in range 50%-70%	Very low LTV (<10%) for residential; 10%-40% for commercial	LTV ratios in range 50%-65%
Typical duration	Short, due to ability to prepay. Legal maturity c.25 years but actual duration <5 years	Similar to annuities for new business, c. 10-15 years	Maturities typically 3-7 years (though insurers invest >10 years)	30+ years	Maturities typically 5-10 years
Typical clip size	£140k-£160k for individual loans	Up to £50m	£30m-£500m	Very small up to £10m+ for individual assets	£5m-£100m+ (£30m+ typical)
Current typical return	BoE base rate + 175-350bps	Libor + 200-300bps	3mth Libor + 160-400bps	Gilts + 125-400bps	Swaps/Gilts + 150-350bps
	These returns are point in time estimates (at the time of writing) and exclude any upfront arrangement fees which would need to be paid by the borrower				
Format	Loan				
Liquidity	Very limited. No open secondary market and so need to privately transact or securitise				
Ability to source	Difficult without forming a joint venture with a bank	Can (and insurers have) set up own lending business	Open primary market	Challenging due to limited supply	In isolation; possible. Easier as part of a CRE mandate

	Residential mortgage loans	Equity release	Commercial real estate loans	Ground rents	Student housing loans
Complexity of ongoing management	Need origination and servicing platforms				
Solvency II capital requirements per standard formula	Counterparty risk module (so low capital)	At time of writing, treated like bonds and loans within the spread risk sub-module	Treated like bonds and loans within the spread risk sub-module		
Solvency II matching adjustment	Ability to prepay at end of fixed period without penalty makes the loans ineligible for the matching adjustment	Cash flows are not known due to dependence on longevity, house prices and prepayment Structuring solutions should allow the loans to qualify for the matching adjustment	Prepayment optionality can be managed through appropriate 'make whole' provisions, although these are not market standard at the time of writing	Prepayment risk, although small, provides a barrier to matching adjustment eligibility	Prepayment optionality can be managed through appropriate 'make whole' provisions Many deals done by insurers to date would be eligible for the matching adjustment

3.2.1 Residential mortgage loans

Residential mortgage loans are debt instruments, secured against residential properties. The borrower is required to pay back the loan with an agreed set of payments.

Residential mortgages are used by individuals to make home purchases without having to pay the entire value of the property up front. The borrower repays the loan, plus interest, over a number of years until he/she owns the property outright. If the borrower stops paying the mortgage, the bank can foreclose.

In the UK, most loans are floating or 'variable' rate. There is typically an initial period of between 2-5 years where the borrower pays a fixed rate of interest (rates vary over time depending on the funding costs of the lending institution) before switching to the mortgage provider's variable rate, which is often linked to the Bank of England base rate (typically base + x bps but with a floor of say 200bps).

Another feature of the UK market is the ability of the borrower to prepay the loan without penalty at the expiration of the fixed period and switch to another provider. So whilst loans typically have 20-30 year maturities, in practice the effective duration end up being much shorter. This may suit the lender as the maturity transformation is much reduced, but it will not suit insurers (as investors) looking for assets to match long-dated liabilities.

Prior to 2007, it was not uncommon for some lenders to offer loans for 100% (or more) of the purchase price of the property. (In this case the mortgage loan is said to have a loan to value (LTV) of 100%, i.e., the mortgage loan represents 100% of the value of the property.)

Market conditions started to take a turn for the worse in 2007, however, and in 2008 we witnessed the bankruptcy of Lehman Brothers and the collapse of financial markets across the globe. As house prices fell, lenders saw the value of their collateral fall also,

Post the Global Financial Crisis, however, lending criteria are much tighter. Most lenders will not provide a loan for 100% of the purchase price of the property. It is not uncommon for lenders to require that the borrower contribute, say, 25% of the purchase price of the property. In other words, a typical LTV is of the order 75%.

The LTV is seen as an important measure of the riskiness of the loan. The higher the LTV, the greater the risk that the value of the property (i.e., the lender's collateral) will be insufficient to pay back the loan in the case of default of the borrower.

Lenders are typically banks and building societies. Their underwriting process will include assessment of credit check scores, debt to income ratios, employment history and available assets. They will also arrange for an independent assessment of the value of the residential property.

In 2009, the Financial Conduct Authority (FCA[16]) began a comprehensive review of the mortgage market. The aim of the Mortgage Market Review (MMR) was to introduce a new set of rules which would prevent the problems of the past, where people were sometimes offered mortgage loans that they could not necessarily afford.

New rules were introduced in April 2014. Lenders are now fully responsible for assessing whether the borrower can afford the loan, which includes testing their ability to keep up repayments when interest rates rise. Lenders are now also fully responsible for verifying the borrower's income.

3.2.1.1 Pricing transparency (availability of data/benchmarks/ratings)

There is no published index to track the performance of, for example, a representative portfolio of Sterling denominated UK residential mortgage loans.

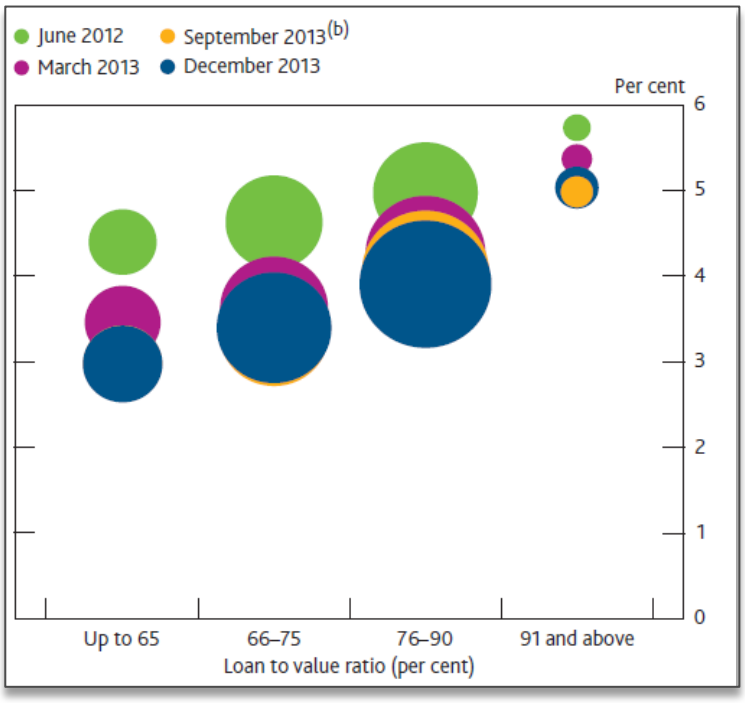
However studies and reports are published reasonably frequently to keep track of the interest rates offered in the market by the various banks and building societies.

For example, the Bank of England produces a quarterly publication called 'Trends in Lending' which tracks the fixed rates available on UK mortgages for a variety of different loan to value (LTV) ratios. See the example chart below from the January 2014 edition.[17]

Table 3.6 – whole market interest rates on fixed rate mortgages

[16] The FCA regulates the financial services industry in the UK. Their stated aim is to protect consumers, ensure industry remains stable and promote healthy competition between financial services providers

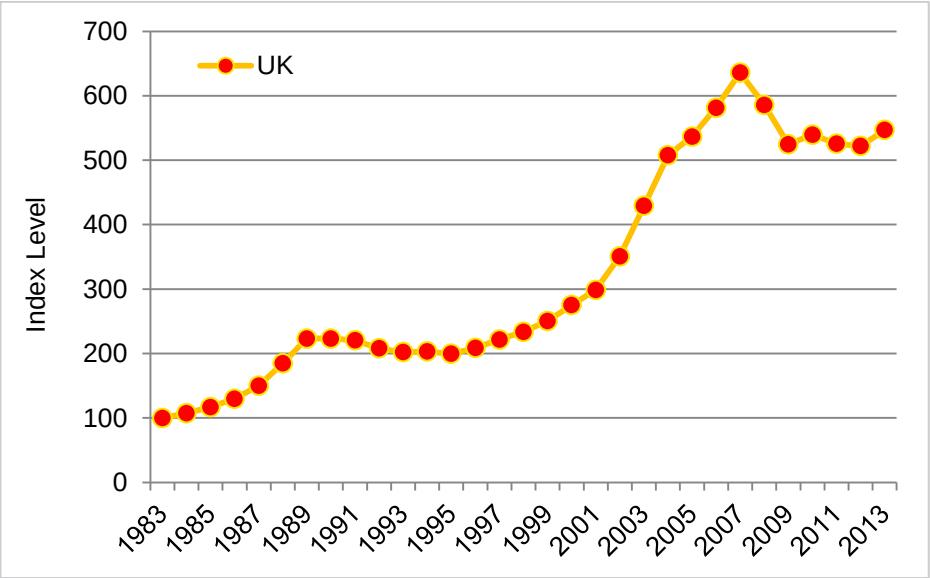
[17] http://www.bankofengland.co.uk/publications/Documents/other/monetary/trendsjanuary14.pdf.



House price indices are also available, e.g. the Halifax and Nationwide House Price indices.

The Halifax House Price Index is the UK's longest running house price series, with data going back to January 1983 (where the index is set to 100). The Graph 3.7 (Source: Halifax) shows historical price data for the UK as a whole, but data is also available for different regions of the UK (e.g. Greater London, East Midlands, Wales) as well as different property types (e.g. terraced, semi-detached, bungalow).[18]

Graph 3.7 – UK HPI index



The Halifax series of indices also provide information on housing and mortgage affordability, split by region. For example, the definition of housing affordability is given by:

[18] http://www.lloydsbankinggroup.com/media/economic-insight/halifax-house-price-index/

- The house price earnings ratio is calculated by dividing the Halifax seasonally adjusted standardised average house price by average earnings.
- The earnings data is a calculation based on the average earnings for Male Full Time employees from the ASHE survey at April each year.

Over the period Q2 1983 – Q2 2014, the house price earnings ratio for the UK as a whole has averaged 4.11, with a minimum of 3.09 and a maximum of 5.86.

3.2.1.2 Cash flow certainty

There are a number of aspects for the investor to consider before committing funds:

Table 3.8 – key characteristics in residential mortgage loans

Fixed vs. floating	The rate paid by the borrower is typically what is known as the Standard Variable Rate (SVR), which is a floating rate, often linked to the Bank of England base rate. However, there is typically an initial 2-5 year period where the borrower pays a fixed rate. This means that the insurer (as investor) would receive fixed cash flows for 2-5 years, followed by floating rate cash flows thereafter. This would not suit insurers (as investors) looking for fixed rate assets to match fixed liabilities.
Ability to prepay	The borrower's right to prepay, without penalty, at the expiration of any fixed period often leads to refinancing shortly afterwards. This means that the insurer (as investor) does not have certainty as to the maturity of its investments. Prepayment is significantly influenced by interest rates. Ignoring charges, the financial incentive for the borrower to prepay can be measured as the difference between the fixed interest rate currently being paid and alternative interest rates available in the market. This differential, and hence the incentive to prepay, will increase as interest rates fall.
Defaults	For residential mortgage loans it is important to distinguish between: ► Repossession – where banks take homes into their own ownership; and ► Mortgage arrears – where individuals fall behind in their mortgage payments, but not necessarily leading to repossession. In the case of repossession, the insurer (as investor) will get a recovery value on the loan equal to the amount for which the property can be sold (net of costs). For 2013, the Council of Mortgage Lenders (CML) reported the number of repossessions to be 0.26% of outstanding mortgages (vs. the most recent peak of 0.43% in 2009).[19] The fall in repossessions since 2009 has been aided by low interest rates. In the case of mortgage arrears, the insurer (as investor) will stop receiving its regular cash flows (or coupons or income stream) for a period of time. These regular cash flows are effectively deferred until such time as the end borrower can make them or the home is taken into ownership. The CML reported a drop in mortgage arrears in 2013. At the end of the year, 1.29% of all mortgages were in arrears to the value of at least 2.5% of the loan balance (vs. a peak of 1.88% in Q2 2009).

3.2.1.3 Security/Recourse to assets

Residential mortgage loans are loans secured on residential property.

Table 3.9 – key types of residential mortgage loans

Prime	Loans to creditworthy owner occupiers. These make up a large proportion of the market.
Buy-to-let	These mortgages are secured on rented properties.
Non-conforming	Loans to less creditworthy owner occupiers, e.g., individuals with impaired credit

[19] http://www.cml.org.uk/cml/media/press/3817.

histories.

A common measure of security for a residential mortgage loan is the LTV – the ratio of the size of the mortgage loan to the value of the property against which the loan is secured.

The LTV will vary according to the vintage of the mortgage. For example, mortgages sold over the years leading up to the Global Financial Crisis typically have higher LTVs than those sold more recently. (Indeed we have seen mortgage lenders strengthen their underwriting criteria post Global Financial Crisis).

The CML reported the average LTV for February 2013 – February2014 to be ~80% for first time buyers and ~70% for home movers.[20]

To put this in context, the 1 in 200 year stress for property values in the current draft of the Solvency II rules for the standard formula Solvency Capital Requirement (SCR) is 25% (i.e. a decrease in property values of 25%).

This property shock was calibrated using UK data extracted from the Investment Property Databank (IPD) indices. In particular, the calibration was based on monthly IPD total return indices for the UK market covering the period 1987 to 2008.[21]

3.2.1.4 Typical duration

Loans typically have an original maturity of between 20 and 30 years.

With a 'capital repayment' mortgage, the borrower gradually pays off the amount borrowed over the term of the loan, together with interest.

The resulting amortising profile of the loan means that the duration is far shorter than the original maturity.

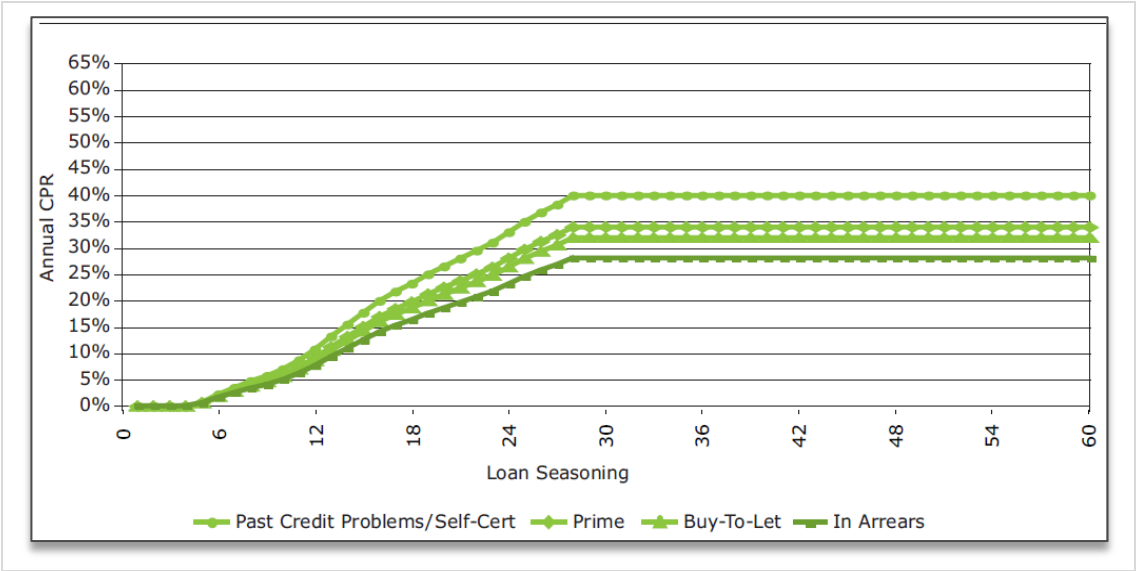
This is exacerbated by the ability of the borrower to prepay at the expiration of the fixed period, reducing the effective duration further.

The DBRS study on UK residential mortgage loan analysis criteria from November 2007[22] (see Figure 3.4) provides some helpful analysis on prepayment levels. (Note that this analysis was performed to estimate behaviour for UK RMBS transactions.)

We see that for prime loans on Standard Variable Rate, the Conditional Prepayment Rate (CPR), i.e. the proportion of the pool of mortgages that will be paid off, reaches 35% between 24 and 30 months after the loans have been taken out.

Graph 3.10 – Prepayment rates on different types of mortgages

[20] http://www.cml.org.uk/cml/media/press/3874.
[21] https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/technical_specifications/EIOPA-14-322_Underlying_Assumptions.pdf
[22] http://www.dbrs.com/research/216303/u-k-residential-mortgage-loan-analysis-criteria-credit-prepayment-and-loan-aggregation-archived.pdf



Mortgages may also be 'interest only', where the borrower only pays back the mortgage interest during its term. This gives a bullet structure, similar to that for standard corporate bond investments.

Lenders are still allowed to grant interest only loans by the MMR, however they are required to ensure there is a credible strategy in place for repaying the capital.

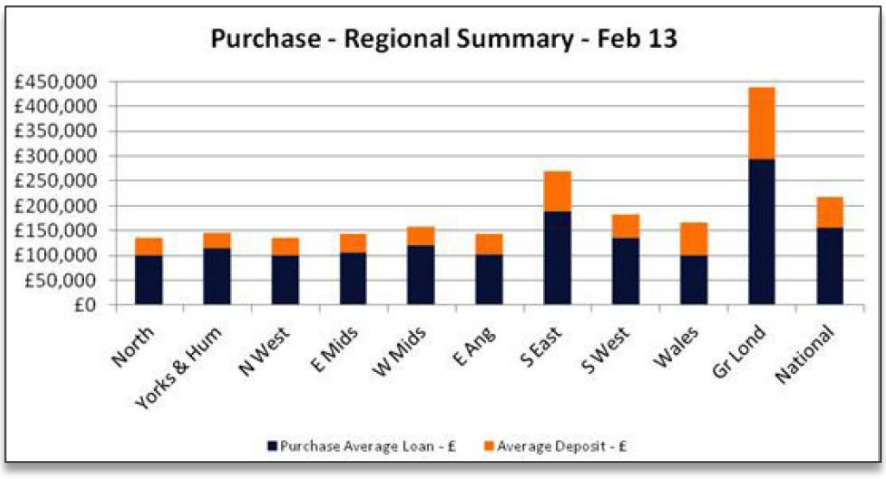
3.2.1.5 Typical clip size

The CML reported that the average mortgage loan in February 2014 was between £140k-£160k.[23] However, a meaningful amount of these loans would need to be originated to be a viable proposition for an insurer. Coinvestment with a bank or setting up its own loan origination platform would be likely to be required, and this would require a sizeable investment (probably >£100m) in order to justify the economics of setting up a platform.

Statistics provided by the Mortgage Advice Bureau show that average mortgage loan sizes can vary significantly by region. [24]

[23] http://www.cml.org.uk/cml/media/press/3874.
[24] http://www.mortgageadvicebureau.com/nmi/feb_2013.pdf.

Graph 3.11 – property price by region



3.2.1.6 Typical return

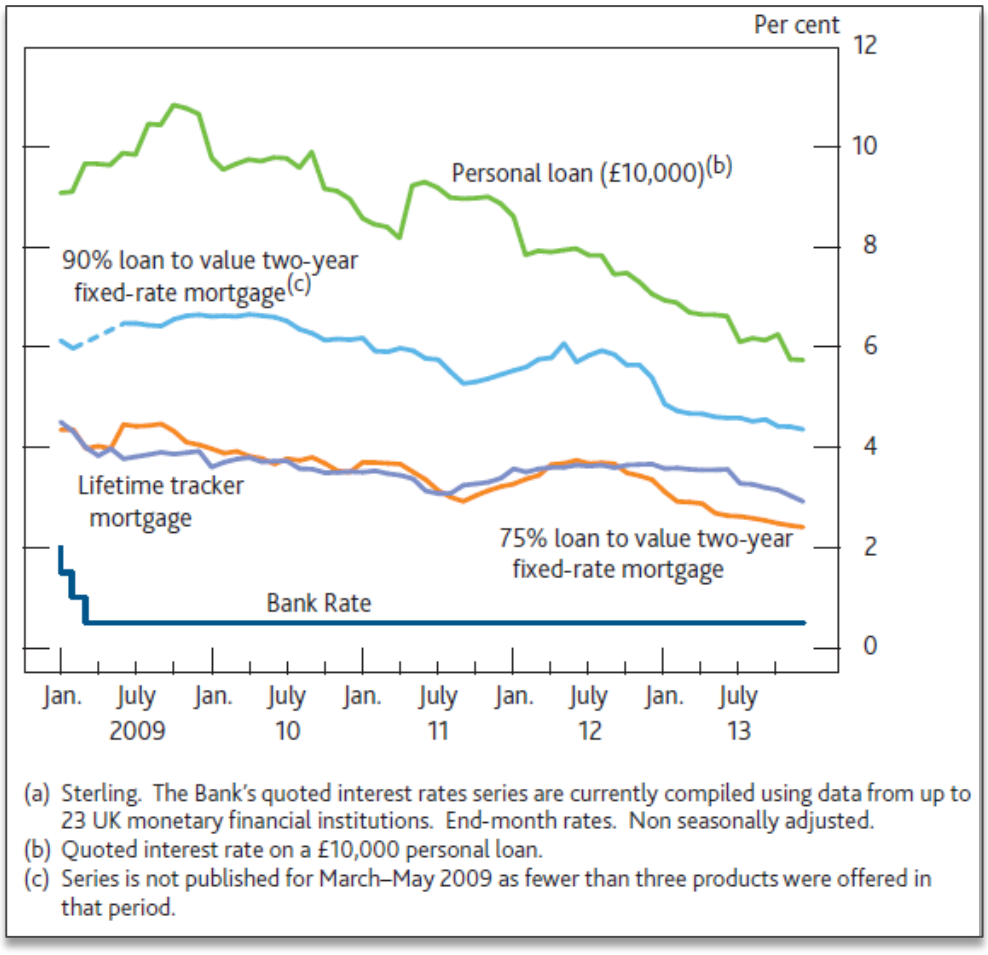
The rate paid by the underlying borrower is typically what is known as the Standard Variable Rate (SVR), which is a floating rate, often linked to the Bank of England base rate.

For a two year fixed rate mortgage loan, example pricing is shown in the Bank of England's January 2014 'Trends in lending' [25] (see chart below) and is in the region of:

- 75% LTV: BoE base rate + 175bps
- 90% LTV: BoE base rate + 350bps

[25] http://www.bankofengland.co.uk/publications/Documents/other/monetary/trendsjanuary14.pdf.

Graph 3.12 – typical returns on household lending



Since the Global Financial Crisis, we have seen spreads widen, as illustrated in the chart below.[26]

Graph 3.13 - Standard variable rates for mortgages

[26] http://www.hindecapital.com/blog/uk-mortgage-rates-the-slow-drift-higher-and-the-impending-danger-for-uk-house-prices/.

3.2.1.7 Format

There are three possible formats for insurance investment in residential mortgage loans:

Table 3.14 – types of loan investment

Whole loan	The insurer holds the specific residential mortgage loan(s) directly on its balance sheet. (The loans may either have been originated by the insurer itself or acquired from a third party – a so-called 'back-book' acquisition.)
Joint venture	The insurer enters an arrangement with, for example, a bank or building society. Such a joint venture will allow the insurer to access the origination and servicing capabilities of the bank or building society. The insurer may fund 100% or a defined proportion of each loan.
Fund	The insurer invests in a pooled structure to gain access to a portfolio of residential mortgage loans. The number of units held by the insurer in the fund will define the proportion of each underlying mortgage loan to which the insurer has exposure. Fund investments may make sense for smaller insurers and also where firms want to diversify their residential mortgage exposure across a number of loans.

3.2.1.8 Liquidity

Liquidity should be assumed to be very limited. Portfolio sales are likely to be complex and time consuming.

3.2.1.9 Ability to source

Mortgage volumes

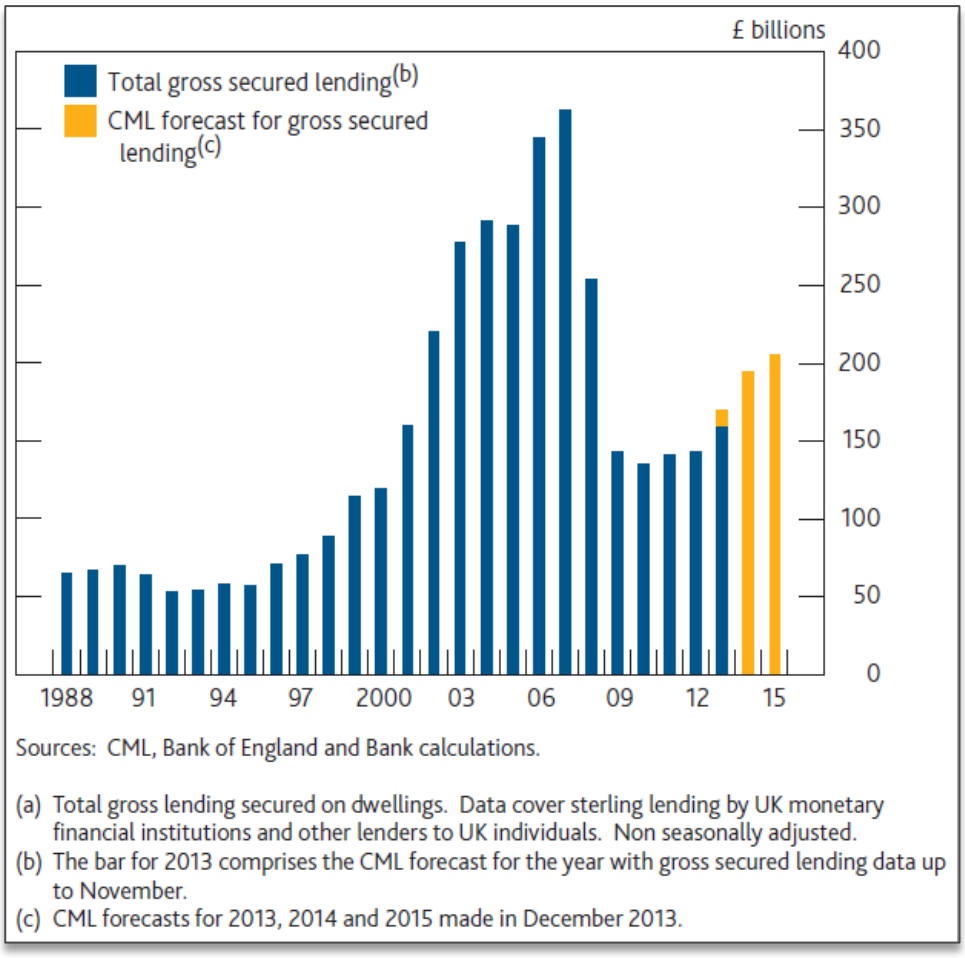
Mortgage volumes have dropped materially compared to before the Global Financial Crisis, however they are still comfortably in excess of £100bn per annum (see Bank of England chart below[27]).

According to the CML, the Bank of England has reported that gross UK mortgage lending was £14.8bn in February 2014, an 8% fall compared to January, but 40% higher in value than February 2013.[28]

This equates to nearly 100,000 new loans in February 2014 if we crudely assume each loan was for £150k.

[27] http://www.bankofengland.co.uk/publications/Documents/other/monetary/trendsjanuary14.pdf.
[28] http://www.cml.org.uk/cml/media/press/3874.

Graph 3.15 – gross lending secured on dwellings



Secondary markets

At present, traditional providers (i.e. banks and building societies), are less able/willing to commit funds for long maturities due to forthcoming regulatory changes in Basel III pushing up capital and liquidity requirements and making the traditional maturity transformation model of these institutions far more challenging.

This may provide some opportunities for insurers to access portfolios that banks and building societies are looking to remove from their balance sheets. However, at the date of this report, we are not aware of any transactions that have taken place with UK insurers,

Many of these portfolios may be too large for individual insurers (although it may be possible to acquire a portion of the book).

Origination

For an insurer to originate new business, it will be necessary to establish an origination platform. The costs of doing so are likely to be significant. Holding and servicing loans also requires regulatory authorisation (although it may be possible to appoint third party servicers).

Note also that the insurer would be in direct competition with banks and building societies. However, it may be possible for them to capture that segment of the market where there is demand for a long fixed rate period (e.g., maturities of 10 years and greater). This segment may only represent a small proportion of the overall market (UK borrowers like having the flexibility to switch deals), but the volumes may be meaningful in the context of the size of UK annuity books, for example.

The complexity of ongoing management (as set out in Section 2.6 above) would increase significantly if loans were originated directly.

Alternative structures

Alternative structures which could be explored include:

- Fund structures, where assets are managed by a third party; and
- Co-investment arrangements with banks and building societies, making use of their established origination and servicing platforms.

3.2.1.10 Complexity of ongoing management

Unless partnering with a bank or building society, the insurer will have to set up origination and administration platforms.

Holding and servicing loans will require regulatory authorisation.

For the provider, mortgages carry a risk of negative publicity, e.g., foreclosures. Therefore reputational risk is something the insurer needs to bear in mind if considering originating loans.

3.2.1.11 Solvency II capital requirements

SCR standard formula – Criteria

Residential mortgage loans that satisfy a number of criteria fall under the counterparty default risk module of the Solvency II SCR standard formula.

These criteria are:

- *The exposure shall be either to a natural person or persons or to a small or medium sized enterprise.*
- *The exposure shall be one of a significant number of exposures with similar characteristics such that the risks associated with such lending are substantially reduced.*
- *The total amount owed to the insurance or reinsurance undertaking and, where relevant, to all related undertakings … including any exposure in default, by the counterparty or other connected third party, shall not, to the knowledge of the insurance or reinsurance undertaking, exceed EUR 1 million. The insurance or reinsurance undertaking shall take reasonable steps to acquire this knowledge.*
- *The residential property is or shall be occupied or let by the owner.*
- *The value of the property does not materially depend upon the credit quality of the borrower.*
- *The risk of the borrower does not materially depend upon the performance of the underlying property, but on the underlying capacity of the borrower to repay the debt from other sources, and as a consequence, the repayment of the facility does not materially depend on any cash flow generated by the underlying property serving as collateral. For those other sources, the insurance or reinsurance undertaking shall determine maximum loan-to-income ratio as part of their lending policy and obtain suitable evidence of the relevant income when granting the loan.*
- *The following requirements on legal certainty shall be met:*

(a) a mortgage or charge is enforceable in all jurisdictions which are relevant at the time of the conclusion of the credit agreement and shall be properly filed on a timely basis;

(b) all legal requirements for establishing the pledge have been fulfilled;

(c) the protection agreement and the legal process underpinning it enable the insurance or reinsurance undertaking to realise the value of the protection within a reasonable timeframe.

- *The following requirements on the monitoring of property values and on property valuation shall be met:*

(a) the insurance or reinsurance undertaking monitors the value of the property on a frequent basis and at a minimum once every three years. The insurance or reinsurance undertaking carries out more frequent monitoring where the market is subject to significant changes in conditions;

(b) the property valuation is reviewed when information available to the insurance or reinsurance undertaking indicates that the value of the property may have declined materially relative to general market prices and that review is external and independent and carried out by a valuer who possesses the necessary qualifications, ability and experience to execute a valuation and who is independent from the credit decision process.

- *For the purposes of the paragraph above, insurance or reinsurance undertakings may use statistical methods to monitor the value of the property and to identify property that needs revaluation.*

- *The insurance or reinsurance undertaking shall clearly document the types of residential property they accept as collateral and their lending policies in this regard. The insurance or reinsurance undertaking shall require the independent valuer of the market value of the property … to document that market value in a transparent and clear manner.*

- *The insurance or reinsurance undertaking shall have in place procedures to monitor that the property taken as credit protection is adequately insured against the risk of damage.*

- *The insurance or reinsurance undertaking shall report the following data on losses stemming from mortgage loans to the supervisory authority:*

(a) losses up to 80 % of the market value or 80 % of the mortgage lending value in any given year;

(b) overall losses in any given year.

If the loans do not meet these criteria then they fall under the spread risk module of the Solvency II SCR standard formula and are treated in the same way as corporate bonds and unsecured loans.

SCR standard formula – Capital requirement

The SCR capital requirement for residential mortgage loans is favourable, relative to other asset classes, largely because it makes explicit allowance for the (stressed) value of the underlying collateral.

$$SCR = 15\% \times max\{value\ of\ loan - [1 - 25\% \times (1 - z\%)] \times market\ value\ of\ property, 0\}$$

where:

- 25% = prescribed instantaneous shock to property assets; and

- z% = diversification benefit from adding property to the portfolio

When there are no diversification benefits from bringing further property into the insurer's investment portfolio, this means that the standard formula capital charge is zero if the LTV is 75% or lower.

If diversification benefits were 33%, say, then the standard formula capital charge is zero if the LTV is 83% or lower. For an asset with 85% LTV, the capital charge would be 1.76%.

This compares to a standard formula capital charge for a single A rated corporate bond with a 10 year duration of 10.5%.

Matching adjustment considerations

The rate paid by the underlying borrower is typically the SVR, which is a floating rate, often linked to the Bank of England base rate. Some form of derivative would be needed to convert this to a fixed rate to satisfy the matching adjustment rules.

The latest draft of the matching adjustment rules also does not permit assets with prepayment optionality, unless there is an appropriate surrender penalty.

Whilst there is typically a prepayment penalty during any initial fixed rate period of a residential mortgage loan, this is unlikely to be sufficient for matching adjustment purposes. And in any case, after the end of the initial fixed rate period, the borrower is often able to prepay fully without penalty.

Therefore standard UK residential mortgage loans do not qualify for the matching adjustment, at least in the absence of any structuring.

3.2.2 Equity release

Equity release products allow customers to take out a loan secured against the value of their home (a lifetime mortgage), or sell part of it whilst remaining living there (referred to as reversion policies). Typically the product has a lifetime term, with the debt only being repaid on death (single life or last survivor basis) using the sale proceeds of the house. Early prepayment options exist for customers, but since interest rates are usually fixed there is typically some form of penalty to protect providers against rates having fallen.

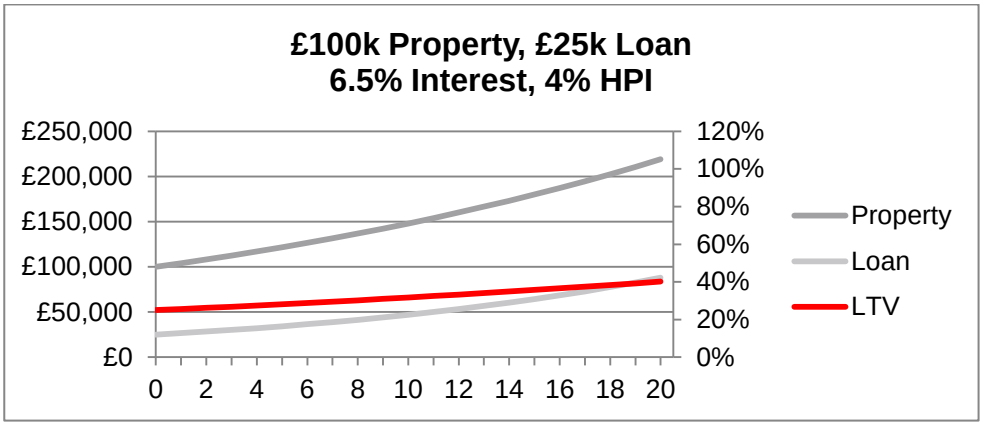
Products today come with no-negative equity guarantees (NNEG); so that there is no liability above the value of the property should the outstanding loan exceed it. In the past this feature was not so common, leading to problems and poor press for the whole product type. The presence of the NNEG introduces complexity into the product as the asset is a loan rolling up with interest but with a guarantee which typically becomes more valuable over time. The presence of the guarantee also means that the value of the property has a specific effect on the value of the loan given that falls in the value of the property or increases in the volatility of property prices make it more likely for the guarantee to bite.

In most cases the interest payable on the loan rolls-up rather than being paid each year. Even in the case of interest-paying policies there is often an option to switch into roll-up at the customers option. In order to mitigate the NNEG risk providers limit loans to low loan-to-value ratios at outset so that significant market falls are needed before the guarantee is likely to bite.

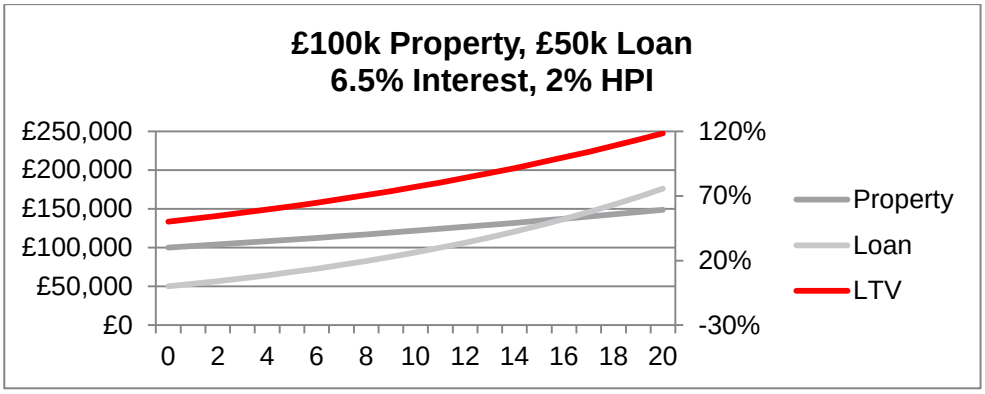
The following charts 3.17 and 3.18 show examples of this. The former shows a typical LTV of 25% with interest rolling-up at 6.5% per annum and 4% p.a. house price growth, and after 20 years the LTV is still at a low level of 40%.

The second example shows a higher initial LTV of 50%; the same interest payments, and house price growth of 2% p.a. In this the loan exceeds the property value after 16 years. This is by no means an extreme example; indeed it has positive property growth throughout, so demonstrates how a higher LTV can hugely increase the risk of the NNEG biting.

Graph 3.17 – loan to value illustration (1)



Graph 3.18 – loan to value illustration (2)



The Institute has a separate working party focussed purely on Equity Release which has recently performed some more research on the specific issue for equity release mortgages. This will provide further detail to the overview provided here.

3.2.2.1 Pricing transparency (availability of data/benchmarks/ratings)

No index or similar exists for equity release as a whole. In order to value a book of business, assumptions will be needed for policyholder longevity and potential exits due to prepayments, house price inflation and volatility, expense inflation of administering the business and the current value of a property. Of these the current property value is the most troublesome as properties with Equity Release mortgages on them may be subject to high levels of dilapidation than the wider market, especially if the loan is approaching the value of the property and there is no or little incentive for owners to spend money maintaining or improving the structure.

Various indices for residential property exist, the most well-known probably being the Halifax House Price Index (HHPI), the Nationwide Index and that produced by the Office of the Deputy Prime Minister. The HHPI has the longest history and also some granularity in terms of overall region, but is based on transactions only rather than the whole housing stock.

Proxy models exist for the effect on value of specific features, such as numbers of bedrooms, but in order to maintain any level of accuracy periodic individual valuations of the properties themselves will likely be required. This is possible at new business stage but valuing a portfolio of existing policies can be difficult.

3.2.2.2 Cash flow certainty

Cash flows are not fixed, but providers with a sizeable, diversified book and a track record of experience on customer behaviour, prepayment rates and longevity may feel their ability to predict and model cash flows is fairly accurate.

Some risks are at least partially hedgeable, for example:

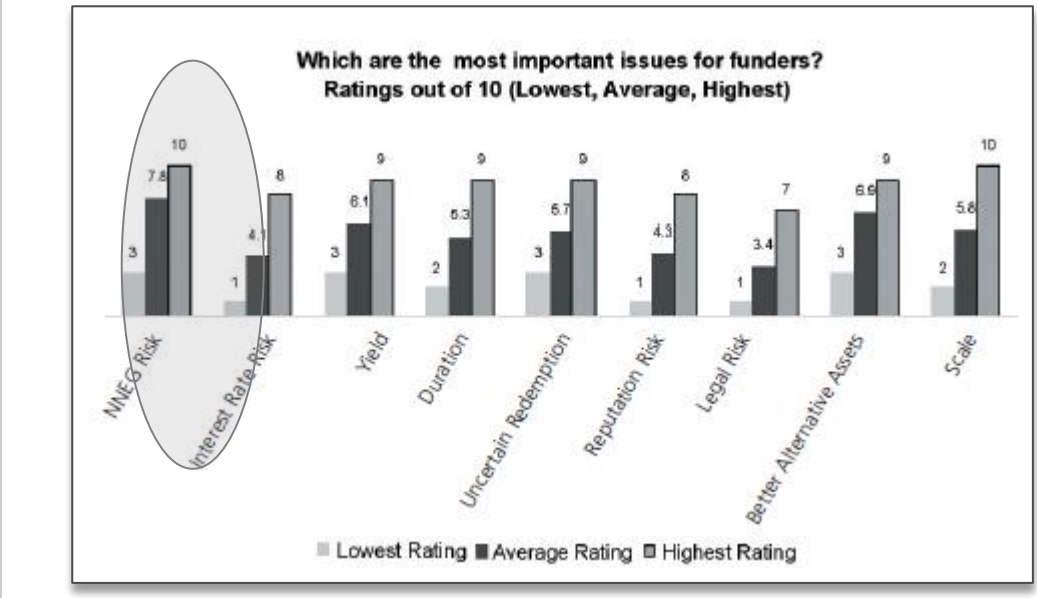
- no negative equity guarantee ("NNEG"), where the insurer guarantees that the loan will never exceed the value of the house. House price inflation instruments are not liquid and so proxy inflation hedges are possible to manage the house price deflation risks.

- redemption penalties (if they exist at all) being insufficient to pay the costs which would be incurred upon early termination of the loan (these costs often relate to the interest rate swaps which are used to manage the interest rate risk to the insurer writing equity release mortgage loans).

However other risks cannot be hedged, for example where customer behaviour and optionality is the driver.

In 2009, a paper by the Equity Release Council showed the NNEG risk as the largest issue for potential funders of ER business.[29]

Chart 3.18 – most important issues for funders



Whether returns are fixed in a monetary sense or dependent on the value of an asset depends on the nature of the product. A loan will offer fixed returns, ignoring any effect of the NNEG, whereas a reversion will return a proportion of the value of the property on death so is linked to house price inflation.

Should the NNEG have bitten on the lifetime mortgage then the returns will be capped at the value of the property.

3.2.2.3 Security/Recourse to assets

Whilst the cash flows do not have total certainty even if the NNEG doesn't bite due to unknown dates of death and property values, the security is strong due to the underlying property itself and the typically low LTV rates. The ability to allow interest payments to roll-up, even if they are technically due, means repossessions are extremely rare so the risk is timing of return more than likelihood.

[29] http://www.equityreleasecouncil.com/document-library/ship-facing-the-future-discussion-paper.

3.2.2.4 Typical duration

New business durations are on a par with annuities i.e. around 10-15 years, so can be attractive from an economic and risk perspective to insurers and pensions funds.

If purchasing an existing book, the duration will clearly depend upon the mix of business and the maturity of the written business. Newer style products with more customer flexibility will have a lower duration which may lead to them becoming more popular again with banks. Features which will drive this include for example options to remortgage or switch lenders, familiar to banks from standard mortgages but less attractive to insurers due to shorter durations.

3.2.2.5 Typical clip size

There are two ways to source business.

The first of these is via purchasing a block business of existing portfolios. For this route, trade sizes of £50m and above will be typical, although there are some smaller transactions.

The second option is for an insurer or pension fund to provide funding to an originator writing new equity release mortgages. For this an agreement to fund a certain level over a period is typical – for example £100m-£200m per annum for 2 years. Typically this is done on a partnership approach where each originator works with one funder and they jointly agree the economic terms and shape of the products.

Scale is needed for pooling of risk and to ensure that the amount of resource dedicated to implementing the strategy proves efficient. Commission payments up front are typical when sourcing business directly and there will be an annual management charge on an ongoing basis for administration.

3.2.2.6 Typical return

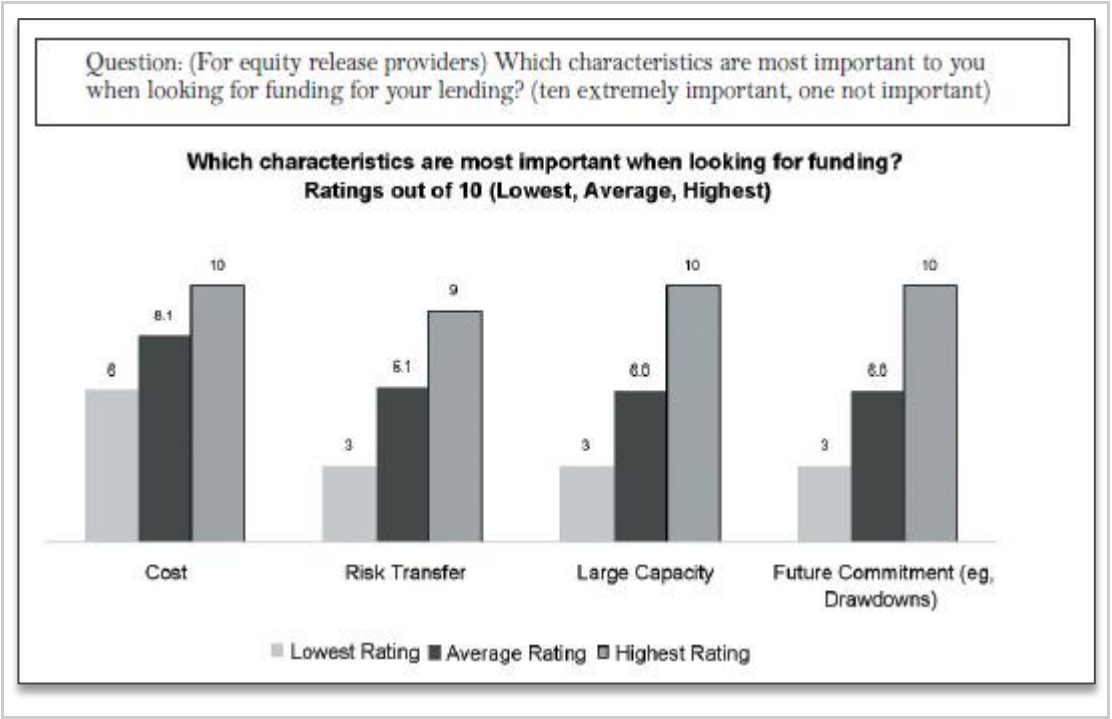
As a broad indication, when expressed in floating format, an expected return of 200-300 bps above Libor can be achievable. This has varied significantly over time and across different portfolios, predominantly due to changes in supply and the attractiveness to lenders of long-term property secured lending. It also assumes loans are held to maturity as sales values can be depressed in the secondary market.

The business became less attractive during the Global Financial Crisis as returns on other assets such as corporate bonds and standard mortgages increased. This, together with the funding challenges on their own balance sheets, decreased the supply of funding from banks and building societies, in particular. We are now back close to pre-Global Financial Crisis levels, driven by supply increasing again from traditional sources as well as further insurers and pension funds new to the market looking at entry strategies.

Unsurprisingly, the most important feature for providers of equity release looking for potential funding is the costs they will incur.[30]

[30] http://www.equityreleasecouncil.com/document-library/ship-facing-the-future-discussion-paper

Chart 3.19 – most important funding characteristics



3.2.2.7 Format

Most commonly, loans have been held directly on the funding provider's own balance sheet. For insurers, this is expected to become less desirable with the introduction of Solvency II as the assets will not qualify for the matching adjustment due to their uncertain cash flows. Restructuring activities can be expected both for existing and new business.

Some providers, notably Aviva, have securitised tranches of equity release business with the proceeds held both in their own funds as well as sold to third party investors.

Insurers seem comfortable with the risks that equity release style products bring, but the introduction of the Solvency II rules in 2016 brings some challenges. In order to meet the requirements of eligibility for matching adjustment treatment cash flows must be fixed, not just predictable, and therefore Equity Release mortgages held directly are not expected to qualify. Insurers wishing to maintain exposure have some options to restructure the loans, for example placing inside an off balance sheet special purpose vehicle which is funded by a mixture of equity and debt, the latter of which may be eligible. Alternatively they could look at removing the uncertainty via guaranteed liquidity facilities and pre-payment hedges with a bank, either on or off balance sheet.

Any structuring solution will bring extra costs and complexity to insurers, at least in the implementation phase and most likely for ongoing new business as well.

There are also question marks about insurers' ability to lend directly to retail customers and so insurers will generally have to set up a lending platform (separate company) to do this.

3.2.2.8 Liquidity

Deals in the secondary market are bespoke and private so it is hard to generalise about terms offered. Forced sellers, perhaps for example during the Global Financial Crisis, will be in a much weaker position than other traders.

Should a future event occur which makes the asset class less attractive for a particular group – possibly even Solvency II for insurers – there is a clear risk that values realised for books of business may be significantly depressed if investor demand is weak.

3.2.2.9 Ability to source

The secondary market is limited, and initial funding tends to be on a tied or partnership basis so potentially difficult for new entrants to access.

New entrants can either take advantage of bulk sales when they occur, or attempt to partner with a distributor of new products. Some can set up their own equity release provider or acquire one of the existing providers in order to guarantee distribution.

Owning the provider, either through setting up a new company or acquiring one, provides benefits in guaranteed distribution, greater control over the nature of loans sought (geographic spread, product types, product features) and means any profit coming from the distribution of the loans will also be captured. On the other side there is a cost involved in any set-up or acquisition and more management time will be required to oversee the entity. Some degree of scale may be required before the cost/benefit balance moves into the positive.

3.2.2.10 Complexity of ongoing management

Policies need to be individually managed, for example ensuring upkeep of properties is necessary to retain their value and saleability. Many policies include policyholder optionality in areas such as early repayment, switching from interest paying to roll-up and the taking of further drawdowns. An ongoing cost of management would be of the order of 0.1% per annum.

Customers are free to repay the loans at any time, albeit they are likely to be subject to a redemption fee if interest rates have fallen. Early books have experienced repayment rates of the order of 5% per annum, but rates have dropped as more recent business has had higher redemption penalties. Although the penalties are often linked to some proxy of long term interest rates (for example, a long gilt yield), they are not perfect matches to the loss incurred by the funder. An example, taken from a product currently (August 2014) on market, is an early redemption penalty calculated as:

(Change in 20-year gilt rate from policy start to repayment date)

multiplied by (proportion of the early repayment charge period remaining)

multiplied by (balance of the mortgage)

subject to a cap of 25% of the initial amount loaned

This is another reason why the assets are treated unfavourably under the latest draft of the Solvency II rules – the early repayment charge received is not an exact match for the lost value of the loan.

The NNEG needs careful management, both by care around what loans are made at the origination stage and then ongoing monitoring of the portfolio. The LTV ratios are set at a low level to try and minimise the chance of the NNEG biting. However there will be strong correlation across the book, so if the NNEG is close to biting for one policy there is a likelihood that it is close to biting on other policies.

3.2.2.11 Solvency II capital requirements

SCR standard formula

There is a disparity between equity release mortgage loans and residential mortgage loans at present as equity release mortgages appear to fail to meet the tests set out within the Solvency II level 2 text for residential mortgages. If they were deemed to meet the requirements of residential mortgages, the capital charge would be 0% for most equity release mortgages given the very low loan to value at outset. Given that they are unlikely to

meet these tests, an equity release mortgage loan is likely to be treated within the spread risk module as an unrated asset. For a 10 year duration loan, the charge is 23.5%.

The ability for the low loan to value to be used as an advantage and dampen the spread risk shock depends on the interpretation of the value of the property influencing the credit quality of the mortgagee as well as the ability to liquidate the collateral in a timely manner. If this is deemed to be immaterial, the collateral against the loan can be used to dampen the capital charge, such that the charge would be reduced to 11.75%.

Matching adjustment considerations

PRA has recently clarified within its letter of 15th October 2014 that equity release mortgages when unstructured are *"…very unlikely to be compatible with the eligibility criteria in Article 77b."*[31] The various structuring solutions that are currently under consideration are discussed in section 2.4.

3.2.2.12 Other relevant information

The market is currently growing, which should increase the opportunities for new entrants to the market.

There is currently pressure for a new generation of products offering more flexibility, likely to be attractive to younger retirees who don't want to lock into a 'for-life' product. These new products will be less attractive to insurers and pension funds due to the shorter terms, and are more a banking product. They will likely be more expensive to the end consumer, due to the flexibility provided.

3.2.3 Commercial real estate loans

Commercial Real Estate (CRE) senior secured lending provides funding for properties purchased by other investors. The loans are secured by a first ranking legal mortgage on the underlying property, providing an attractive risk adjusted return for lenders that can afford a degree of illiquidity.

Commercial Real Estate Lending (CREL) is undergoing structural change. banks are withdrawing from or curtailing their real estate lending activities both in the UK and across Continental Europe (as a result of the additional capital they are now required to hold for illiquid long term lending and the need to strengthen their balance sheets).

This has created an emerging and potentially large funding gap with demand for lending outstripping supply, resulting in loan spreads increasing significantly and with the potential for attractive risk-adjusted returns from this asset class. In response to this, a number of UK and European insurers (e.g. Friends Life and Standard Life) have already entered the CREL market alongside a number of other non-bank lenders (e.g. investment managers, such as AgFe, launching funds).

3.2.3.1 Pricing transparency (availability of data/benchmarks/ratings)

CREL is an illiquid asset class and as such no published index exists to track the performance of loans in the UK. However, indicative historical financial terms are collated by independent bodies such as De Montford University[32].

There are also a number of bonds issued by REITs or property companies, where the performance of these bonds may be expected to be closely linked to CRE loans of similar type, duration and rating (for example constituents within the Merrill Lynch Sterling Corporate Real Estate index)

[31] http://www.bankofengland.co.uk/pra/documents/solvency2/matchingadjustmentletteroct2014.pdf
[32] The UK Commercial Property Lending Report (http://www.dmu.ac.uk/about-dmu/schools-and-departments/leicester-business-school/the-uk-commercial-property-lending-report.aspx)

Further information can be found in studies and reports published by the Bank of England and rating agencies. Information on Commercial mortgage backed securities (CMBS) may also be used for proxies given they have similar key risk drivers, however factors such as the different structure of CMBS should be taken into account if this data is being used (for example ratings agencies views on CMBS changed significantly over 2008-2011, resulting in rerating of CMBS, that impacted indices and transition rates).

Pricing will vary by type of lending institution (such as banks, insurers and asset managers) which will be driven by differences in their risk appetites and capital requirements. This will also influence the terms they are willing to lend on and the area of the market they may target.

Relationship management and established presence in the market is required to help gather market pricing data of recent/current transactions to provide an indication of prevailing market spreads of potentially similar transactions.

As each loan is unique (e.g. property type/location, covenant quality, tenant profile), loans often have to be considered on a case-by-case basis.

The ongoing valuation of loans will be influenced by key factors such as:

- The state of the loan, for example performing or distressed;
- Prevailing market spreads for similar transactions (or estimated cost of refinancing the loan); and
- Realistic expected cash flows from the loans.

3.2.3.2 Cash flow certainty

Loans are secured by a first ranking legal mortgage of the underlying property. The cash flows servicing the deal typically result from rental incomes arising from the property.

Therefore the strength and reliability of these cash flows is essential for the borrower to service the loan. These factors include:

- Initial rental income cover – As the income from the property is used to service the debt obligations, therefore the high level of rental income in excess of the interest payments reduces the risk of the borrower being unable to service the loan,
- Number and credit worthiness of tenants – Material exposures to an individual tenant increases the risk of cashflow disruptions for the borrower and therefore its ability to service the loan.
- Lease structures (including break clauses) – the lease expiry profile could result in cashflow disruptions over the term of the loan if leases expire and are not renewed before the maturity of the loan.
- Vacancy rates and volatility – higher vacancy rates and/or volatility in rates can impact the stability of the borrower's income stream. The ability of the borrower/property to attract new tenants is important.

These will also be influenced by the economic environment, geographical location and property type.

CRE loans may include little or no amortisation, and if the borrower is relying on refinancing the property in order to pay some or all of the outstanding balance, this introduces refinance risk. This can lead to a significant increase in default risk and may be more pronounced with deals that have a high loan to value (LTV). Therefore the lender should consider the exit-strategy of the borrower as part of the underwriting process.

Borrowers are able to repay loans earlier than the contractual maturity date, introducing cashflow uncertainty. Loans will generally incorporate early prepayment penalties to protect the lender; however different approaches are adopted by lenders driven by their appetite for reinvestment risk:

- Bank lenders may apply a penalty charge (on a reducing scale by term for the first few years) to the amount repaid early. However this may not offer sufficient protection to cover the reinvestment risk.

- Insurance company backed lenders seek modified 'make whole' provisions or SPENS clauses to mitigate reinvestment risk, which are more onerous than the penalty charges applied by banks. This requirement is driven by insurers capitalising a proportion of the future spread when valuing its liabilities, but is becoming more significant to ensure that loans are eligible for Solvency II matching adjustment.

These different approaches will impact insurers' ability to be competitive in the market, creating areas which are more or less attractive. Provisions required by insurers are more common in longer term fixed rate deals, where insurers have a greater established presence and banks have less appetite to lend.

3.2.3.3 Security/Recourse to assets

Loans are secured by a first ranking legal mortgage of the underlying property, and the legal protections in the security documents provide the lender with rights to reduce the risk that their capital is not returned by the borrower.

Financial covenants seek to ensure that the borrower is able to meet payment obligations under the loan, and act as an early warning signal. The primary covenants are:

- Income cover ratio, to ensure the net operating income of the underlying property can cover the interest payments on the debt. This seeks to provide an income cushion providing some protection from tenancy voids; and

- Loan to value ratio, which is currently in the region of 55-75% for senior secured loans but mostly in the 60-70% range. This provides a capital buffer to protect the lender in the event of declining property values.

The legal protections may entail:

- Right to call for cure or waive breach. For example, requiring the borrower to partially repay the loan to get the LTV back within covenant;

- Control of cash waterfall, where if the interest cover ratio falls below a specified amount, income from the property is passed directly to the lender (i.e. control of rental account);

- Power of sale in security documents (enabling the lender to sell the underlying property if the borrower defaults); and

- Could also enforce security and control property, managing it on an ongoing basis if the borrower defaults. Depending on the circumstances, such as market conditions at the point of default, this may be a preferred alternative to an immediate sale

- Borrowers may also be required to hold an additional cash balance to protect from loss of tenants.

In the event of borrower default, there are a number of courses of action that could be taken by the lender, such as restructuring the loan. Ultimately, however, the lender should be prepared to hold the underlying properties directly, with consideration as to whether this could be managed from an operational perspective or through a managed sale.

Given the terms of the loans are negotiated directly between the borrower and lender(s); it may be possible to negotiate with the borrower additional security (fixed/floating charges).

3.2.3.4 Typical duration

Loans are typically for 3-25 years, although the market is predominantly 3-7 years given that banks have traditionally been the predominant lenders in this market. Insurers typically participate in the market for loans > 7 years given the length of liabilities. We understand anecdotally that this is currently c. 10% of the market by size.

Amortisation differs on a loan by loan basis, but will reduce duration. It also acts as a risk management tool, reducing the amount of outstanding loan over time and therefore the exposure to future property markets and loss given default. However this also reduces the running yield of the loan.

3.2.3.5 Typical clip size

CRE loans are generally £30m-£500m. Given the nature of this asset class, there is often considerable demand for loans greater than £100m.

There may be limited appetite from lenders to issue individual loans over £100m, therefore large loans often require syndicates. However, borrowers may be willing to pay a premium to deal with a single lender which has an appetite for loans of this size.

The size of individual loans means that building a diversified portfolio may be challenging, particularly if allocation to this asset class is not material.

3.2.3.6 Typical return

With the security of the underlying property, the asset class can offer an attractive risk-adjusted return, given the spreads that may be achieved and the potential loss given default as a result of the security provided by the underlying property.

Loans are predominantly floating rate (vs. 3 month Libor) given that banks have been the predominant lenders. However, borrowers may be more willing to fix for longer term loans (greater than 10 years).

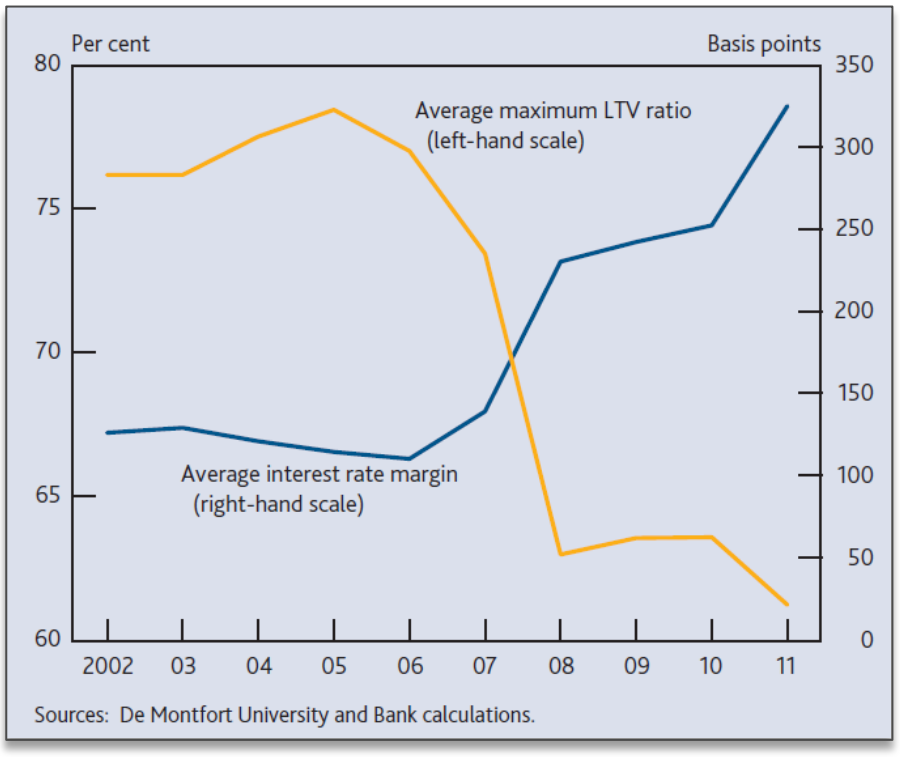
Returns vary by the nature of loan (key factors being LTV, sector, location, collateral etc.), with spreads in excess of 3 month Libor ranging from 1.4% for prime London offices to 4% for regional industrial sectors.

The lender also benefits from an upfront arrangement fee which is in the region of 1%, improving the internal rate of return.

There are different views on the outlook for the asset class, in particular regarding whether the current attractiveness for lenders is temporary or sustainable:

- Due to the size of the funding gap, with the participation of banks decreasing and the volumes of refinancing due over the next 5 years, this asset class should continue to provide an attractive risk-adjusted return; and
- Competition from new market entrants (such as German and Japanese banks as well as insurance companies) could lead to future spread compression and less beneficial loan terms (e.g. higher LTV ratios), reducing the risk-adjusted return.

Chart 3.20 – interest rates compared to LTV ratios



(Source: http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb1301.pdf)

3.2.3.7 Format

CRE loans can be directly originated by insurers, but this requires specialist expertise in origination, loan serving, property management, etc. Some aspects could also be outsourced (such as loan servicing).

Direct lending could be in the form of:

- Bilateral: Direct between single borrower and lender, which can provide a number of benefits given that it minimises the number of parties involved (such as reduced time to negotiate terms that meet both the borrower and lenders requirements); and
- Syndicate/club deal: Provides an ability to finance much larger assets (and/or achieve greater diversification overall) as a number of lenders are involved on each deal. This may increase negotiation times and possibly the need to compromise if lenders are not like-minded.

Co-investment arrangements could also be considered, whereby insurers may partner with existing investors (such as banks) and co-invest, making use of their established origination and servicing capabilities.

Indirect investment is another potential route to accessing this asset class via investment in a fund or a segregated account through an established investment manager. The minimum investments required vary by provider, with segregated accounts typically requiring larger commitments.

3.2.3.8 Liquidity

Liquidity is very limited. Insurers should expect to hold the loan until it is repaid.

There should also be consideration of the refinancing risk of the borrower at maturity (and the associated risk of loan extension), as discussed in Section 3.2.3.2.

If investing via a fund as opposed to directly, it is important to bear in mind that the majority of CRE debt funds are closed ended and feature lock-ups and early redemption penalties.

3.2.3.9 Ability to source

There are significant barriers to entry and ongoing challenges to source investments, with relationship management and speed of execution key.

Lenders generally source directly from borrowers. Some larger lenders may choose to do deals on a bilateral basis (for execution speed and negotiation power) and then sell a proportion of the loan to other interested lenders.

The market is becoming increasingly competitive as new entrants are attracted to a sector where banks have previously lent significant amounts.

Lead-in times for both direct and indirect investments should also be considered. This could be in the region of 12-18 months for placing investment allocation. This can be influenced by:

- When borrowers are seeking to have loans financed. For example, borrowers may be seeking to refinance an existing loan and have sought to negotiate arrangements in advance of the existing loan maturing.
- The time taken from the start of the bid process, undertaking due diligence of the borrower and underlying property, negotiation and structuring of the loan including legal documentation.
- The investment mandate, which will determine whether there are existing opportunities in the market the lender is able to pursue.
- The existing investment pipeline of the lender or asset manager and the amount of capital waiting to be deployed

3.2.3.10 Complexity of ongoing management

The origination of CRE loans can be complex, requiring specific expertise for managing each aspect of lending, including:

Table 3.21 – common issues within loans

Origination	This could include developing the right relationships, as well as understanding the market and its competitors in order to gain sight of the appropriate opportunities. The ability to carry out robust asset and borrower due-diligence may require a wide range of skills, such as accounting, legal, tax, valuation, environment surveyors and structural engineers.
Maintenance and servicing	This includes loan monitoring and reporting, cash flow management, property valuations and loan valuations.
Loan default and work-out	Whilst a good relationship and communication with the borrower is crucial, the ability to negotiate to achieve the optimal outcome as the lender is important. Ultimately, the lender should be able to manage the future liability risk (e.g., using power of sale on the property and selling for below market value could result in subsequent legal action from borrower).

3.2.3.11 Solvency II capital requirements

Commercial real estate loans fall within the spread risk module of the standard formula. Most loans are unrated and for a 10 year duration unrated loan, the capital charge is 23.5% in the absence of an offset for collateral. If commercial real estate loans are deemed to meet the collateral requirements under Article 214 as discussed above, this would tend to fall to 11.5% for newly originated loans (or performing mature loans) which have a LTV of less than 75%.

The capital requirement depends on the key characteristics of each loan, such as LTV, sector, location, quality of the underlying property and term- these will be considered in detail within an internal model.

Lack of market data (spread, default and recovery rates) means that determining capital methodology and calibration is more challenging than for other forms of debt (e.g., corporate bonds). However, some data exists for aggregate default rates and proxy data (e.g. CMBS) exists which may help with calibration.

Matching adjustment considerations

The matching adjustment, as currently drafted, does not permit assets with prepayment optionality. However, this could be managed through 'make whole' provisions, although these are not a standard feature in the existing market, particularly at the shorter end. Loans of > 10 years duration have historically been the target for insurers and prepayment protection is a more standard feature at this end of the market.

Table 3.22 - Other relevant information

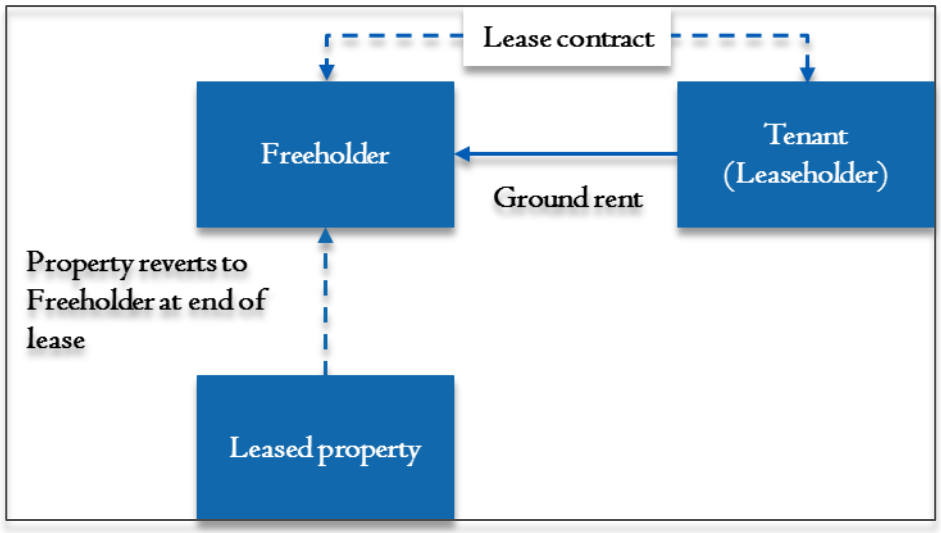
Refinancing risk	Borrower may need to refinance the loan in order to repay the loan principle at maturity. Therefore market conditions at maturity will influence the borrower's ability to repay. (Non-repayment would be treated as a default.)
Property market and prices	These will impact the value of the collateral.
Interest rates	Interest rates will impact the ability to pay and prepayment levels. Interest rate hedging is often part of the loan agreement to manage this risk.
Economic environment	Ability to service the loan and the value of the underlying property will be impacted by the underlying tenants and the ability to re-let.

3.2.4 Freehold property assets – Ground rents

Freehold property assets are the most secure form of property ownership in the UK as the freeholder has ultimate legal title over the land and buildings in perpetuity and ranks senior to any claim on the leasehold property from a mortgage lender.

A freehold 'ground rent' is created when a freehold piece of land or building is sold on a long lease. Ground rents constitute the regular payments under the lease payable by the tenant (or leaseholder) to the freeholder of the property. Lease terms are typically 99 to 999 years when issued. In practice, the leaseholder can extend the lease as the lease term decreases for a premium.

Diagram 3.23 – illustration of ground rent structure

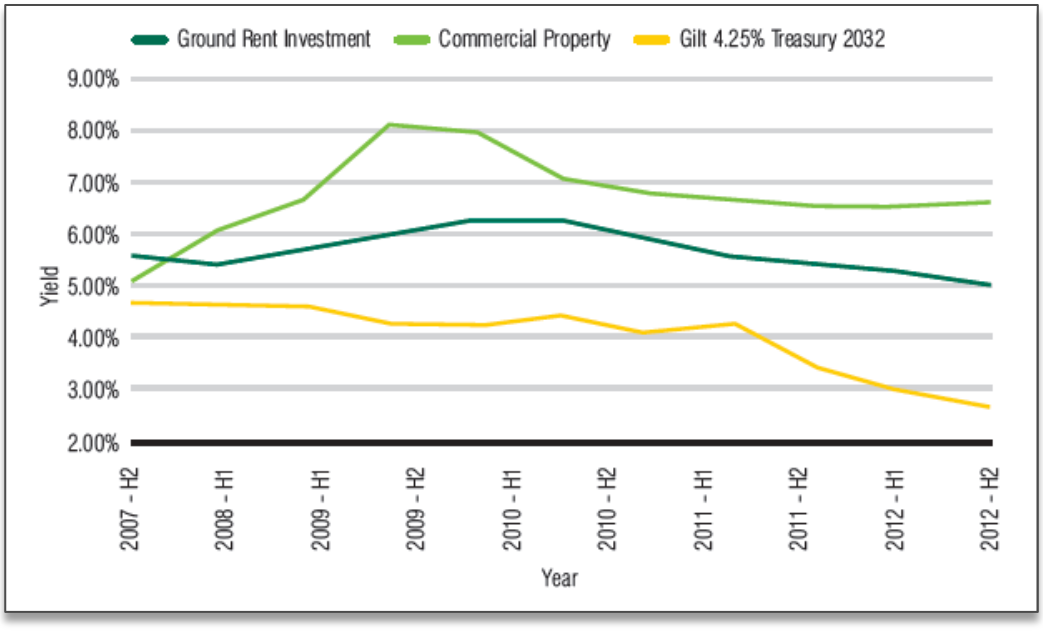


3.2.4.1 Pricing transparency (availability of data/benchmarks/ratings)

There is no published index to track the performance of ground rents. There are some funds (e.g., Freehold Income Authorised Fund) that publish regular net asset values, but a lack of granular data prevents meaningful pricing analysis.

Real estate services providers, such as CBRE, provide some commentary on underlying asset yields. For example, see below chart[33] for residential ground rents.

Graph 3.24 – illustration of ground rent yields



3.2.4.2 Cash flow certainty

The cash flows produced by a freehold 'ground rent' will depend on whether the lease relates to a residential or a commercial property and the specifics of the underlying lease.

[33] Sourced from CBRE.

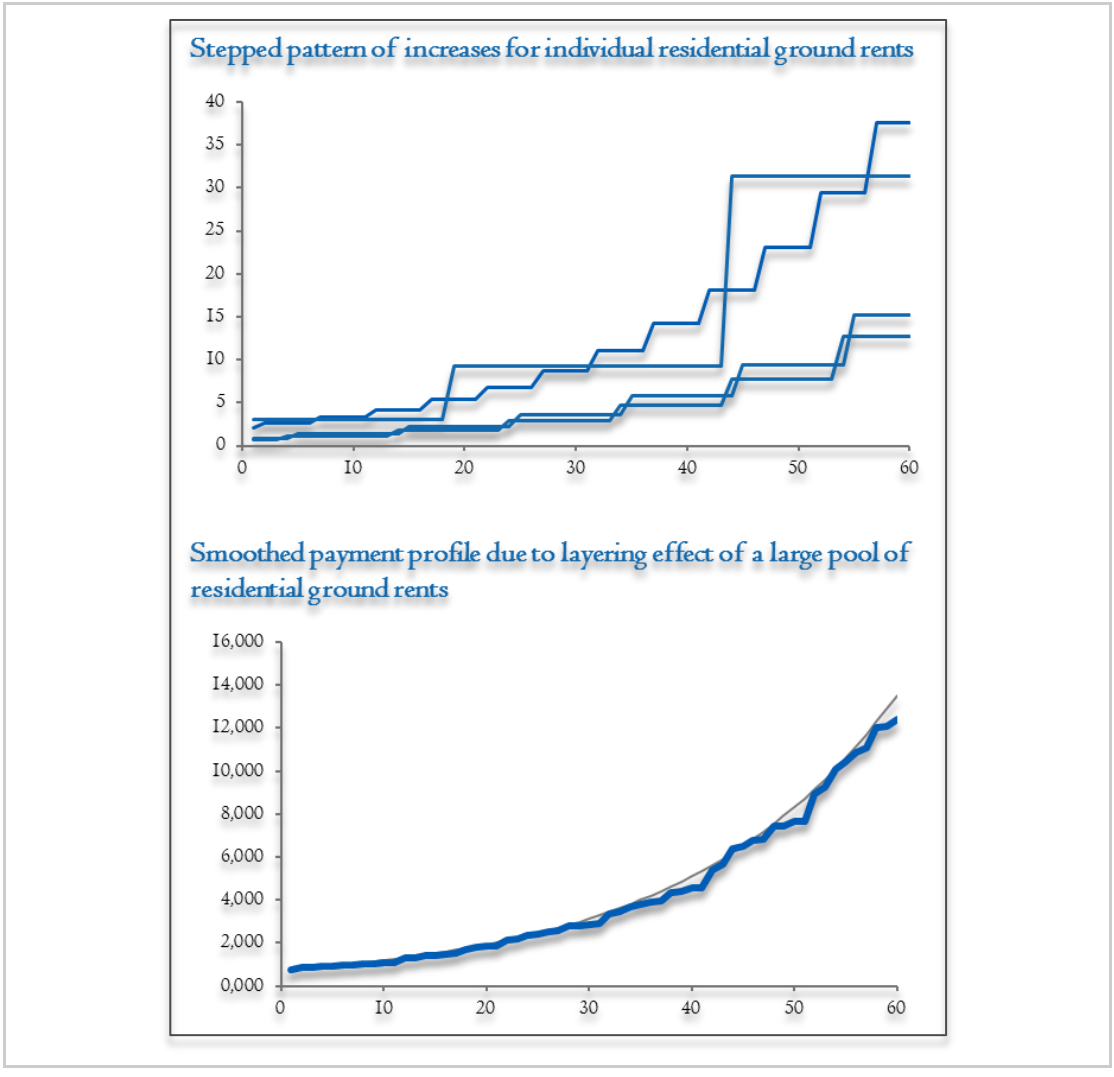
Ground rent

Ground rent income is the regular amount paid by the leaseholder to the freeholder under the terms of the lease. It is a contractual, super-senior, long-term income stream. Typically, ground rent is subject to periodic upward only review. Review types include:

- Fixed increases, e.g., doubling every 25 years;
- Inflation-linked, e.g., increasing every five years in line with the increase in published RPI;
- Increases linked to property value increases, e.g., indexed to HPI; and
- Other types, e.g. uplifts linked to the Public Sector Average Earnings Index (PSAEI).

Fixed and RPI-linked are likely to be most attractive for annuity funds with matching liabilities. The charts below[34] show the stepped payment pattern of increases for typical individual residential ground rents alongside the smoothed escalating annuity-like payment profile due to the layering effect of a large pool of residential ground rents assets.

Graph 3.25 – illustration of ground rent cashflow pattern for individual and groups



[34] Sourced from Alpha Real Capital

Other income – Residential ground rents

There are other 'ancillary' sources of income associated with residential ground rents:

Table 3.26 – other income associated with residential ground rents

Insurance commissions	Paid by insurers to the freeholder in return for capturing bulk purchase buildings insurance business for the underlying properties.
Admin fees	Fees for responding to lease enquiries, collecting payment arrears, administering the notification of lease assignment or the mortgage lender's interest.
Consent fees	Charges to alter lease terms, e.g., for building alterations, sub-letting or selling the leasehold.
Ground rent sales	Income resulting from a leaseholder (or group of leaseholders) purchasing the lease from the freeholder (enfranchisement). This is a form of prepayment.
Lease extension premia	Amounts paid by leaseholders to extend their leases. (Leaseholders are inclined to extend their lease as the lease length approaches 80 years in length due to mortgage lender requirements and legislation governing the fair value of lease extension payments.) This can also be a form of prepayment.

Other income – Commercial ground rents

Commercial ground leases are often full repairing and insuring (FRI,) also termed 'triple net' – that is, the leaseholder is responsible for all expenses (taxes, insurance and maintenance) associated with owning the property – and the only source of cash flow is the ground rent itself.

As such, all cash flows are contractual in that they are known by amount and timing.

Ability to prepay

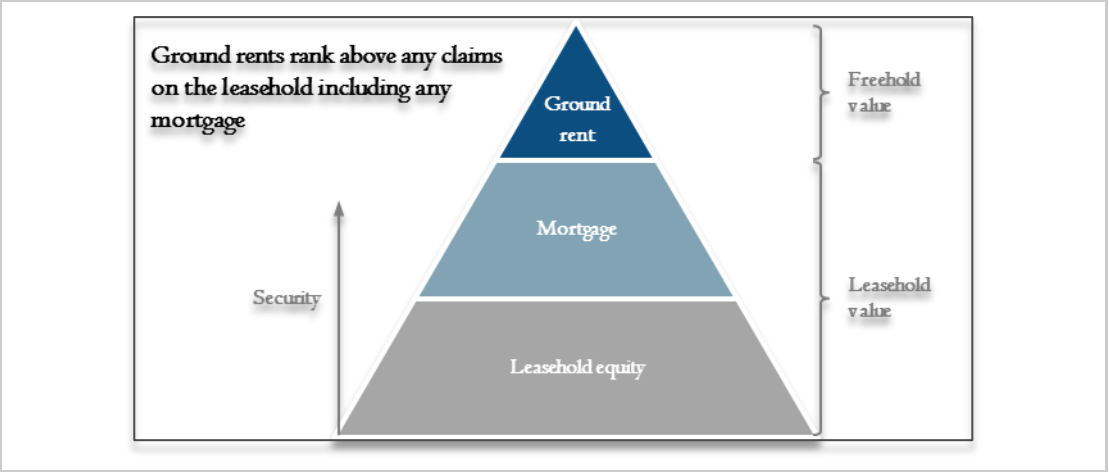
For residential ground rents, legislation gives leaseholders the right to purchase back the freehold (either individually in relation to leasehold houses or collectively for a block of flats) or to seek a lease extension (which if undertaken within the bounds of the legislation results in the loss of ongoing ground rent in exchange for a capital sum). This, in theory, represents a prepayment risk. For long leases, enfranchisement and lease extensions are rare and can be managed at a portfolio level.

For commercial ground rents, the ability to prepay by buying back the lease will depend on the terms of the lease. For example, the terms of a lease may grant the leaseholder an option to purchase the freehold land for a nominal sum, say £1, in *x* years' time. In this case, it can reasonably be assumed that the leaseholder will purchase back the freehold at that time and hence the freeholder effectively owns an *x*-year income strip.

3.2.4.3 Security/Recourse to assets

The legal structure of a ground rent means that the freeholder has the most senior security over the underlying property, ranking above any claim over the leasehold by a mortgage lender. For this reason, the often small contractual ground rent payments under the lease are ultimately over-collateralised by the value of the underlying property.

Chart 3.27 – security profile of mortgages



In the event the leaseholder fails to pay ground rent, the freeholder can terminate the lease[35], in which case the property reverts back to the freeholder. The freeholder can then issue a new lease to a new tenant.

For residential ground rents, given an average house price in England and Wales of £167,000[36], compared to a typical ground rent of, say, £250 per annum, reissuing a lease would represent a substantial windfall gain for the freeholder. In reality, this is extremely rare.

For commercial ground rents, the effective LTV depends on the 'gearing' of the ground rent to the passing rent or estimated market rental value (ERV). Commercial ground rents are typically geared in the range of 5%-15% of ERV, corresponding to an effective LTV of between 10 and 30%.

Example[37]

A leaseholder owns a leasehold commercial property that generates £1 million per annum of passing rent from occupational tenants. Under the terms of the lease, the leaseholder pays ground rent of £100,000 per annum to the freehold owner of the land. Hence, the ground rent is geared to 10% of passing rent, equivalent to 10x income cover.

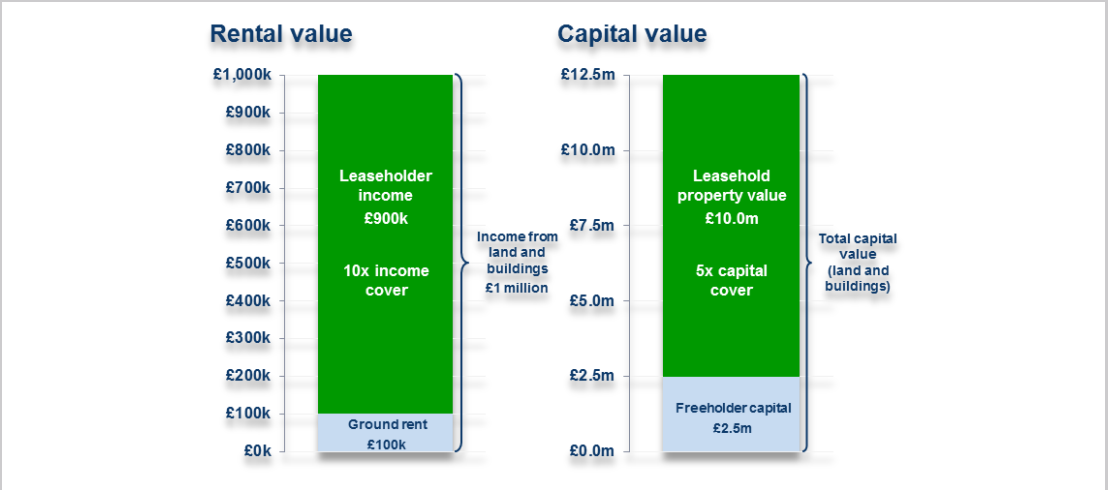
The (secure) ground rent is capitalised at 4% valuing the freehold asset at £2.5 million.

The leaseholder's net income is capitalised at the higher rate of 9%, recognising that this income is less secure due to the potential for void periods / non-payment by one or more of the property's tenants. This values the leasehold property at £10 million.

Hence, in the event of non-payment of ground rent by the leaseholder, the freeholder could foreclose on the property leaving the freeholder with assets totalling £12.5 million. Hence, the ground rent is comparable to a 20% LTV loan secured against the land and buildings.

[35] After certain statutory thresholds have been breached in the case of residential property.
[36] http://www.landregistry.gov.uk/__data/assets/pdf_file/0020/71192/HPIReport20140122.pdf.
[37] Sourced from Alpha Real Capital

Chart 3.28 – example interest and value coverage ratios



3.2.4.4 Typical duration

Ground rents are very long dated (with terms typically between 99 and 999 years) when the lease is created.

Alternatively, an insurer could gain exposure to ground rents by investing in a loan or bond secured against one or more ground rent assets (see section 3.2.4.7). As such, fully-amortising debt secured against a portfolio of ground rents could have a maturity of 60+ years with an average life (or duration) of 30+ years.

3.2.4.5 Typical clip size

Individual residential assets can be very small (a few thousand pounds). Larger residential developments could cost from a few hundreds of thousands of pounds up to, say, £2m for blocks of 200-300 flats.

Individual commercial ground rents can be larger, e.g., tens of millions of pounds.

Anecdotal evidence suggests that large portfolios of £100m+ of ground rents do change hands but these deals do not tended to be publicised.

In February 2012[38], Wallace Estates Limited issued £145m of loan notes made up of £45.6m RPI-linked notes due 2063 at an interest rate of 1.55%, £47.5m fixed rate notes due 2054 at 4.94%, and £52.0m of fixed rate notes due 2063 at 4.94%. The loans are secured against the ground rent assets of the company and its subsidiaries.

Anecdotally, we understand that assets backing annuity liabilities have been invested in residential ground rents by way of similarly long-dated secured loans in clip sizes of > £30m.

3.2.4.6 Typical return

The return from investing in ground rents will depend on the form of investment.

A previous trade[39] and recent anecdotal evidence would suggest that a 50-year fully amortising bond/loan secured on a sizeable portfolio of residential ground rents might be expected to attract bids of 125-175bps over gilts given the low credit risk (seniority in the capital stack and consequently very low effective LTV and loss-given-default).

[38] Wallace Estates Limited Annual Accounts 2012
[39] In February 2012, Wallace Estates Limited issued £45.6mn of RPI-linked Notes due 2063 at an interest rate of 1.55% at a time when the over 15yr gilt index was yielding -3bps; source: Wallace Estates Limited Annual Accounts 2012; FT Markets

This should be attractive for those with very long-dated matching liabilities (e.g. bulk annuity providers with deferred pensioner liabilities and general insurers with liabilities arising from Periodic Payment Orders – PPOs).

Inflation-linked commercial opportunities typically have a net initial yield[40] of between 3% and 4.5% real (increasing with inflation), depending on the property, location, industry, effective LTV etc.

In fixed income terms, this equates to a real yield of 2.2%-4.1%, assuming that the purchase cost is fully amortised over 60 years (see example below).

Example

An investor acquires a freehold subject to a 125-year lease for £3.3m (including costs), i.e. at a 3% net initial yield. Under the terms of the lease, the investor receives £100k per annum increasing annually with RPI.

The investor wishes to account for only the first 60 years of cash flows and so amortises the value of the asset to zero over 60 years. This reduces the gross redemption yield on the asset from 3% real to 2.2% real as part of the ground rent is diverted to pay down the £3.3m of principal.

3.2.4.7 Format

There are three possible formats for investing in ground rents:

Table 3.29 – ground rent formats

Direct	The insurer holds individual ground rent assets directly on balance sheet.
Fund	The insurer invests in a pooled fund structure to gain access to a portfolio of ground rents. The number of units held in the fund will define the proportion of each underlying asset to which the insurer has exposure.
Secured bond/loan	Buying a secured bond or entering into a secured loan backed by a pool of underlying ground rents.

3.2.4.8 Liquidity

Liquidity is very limited. Portfolio sales are complex and time consuming.

3.2.4.9 Ability to source

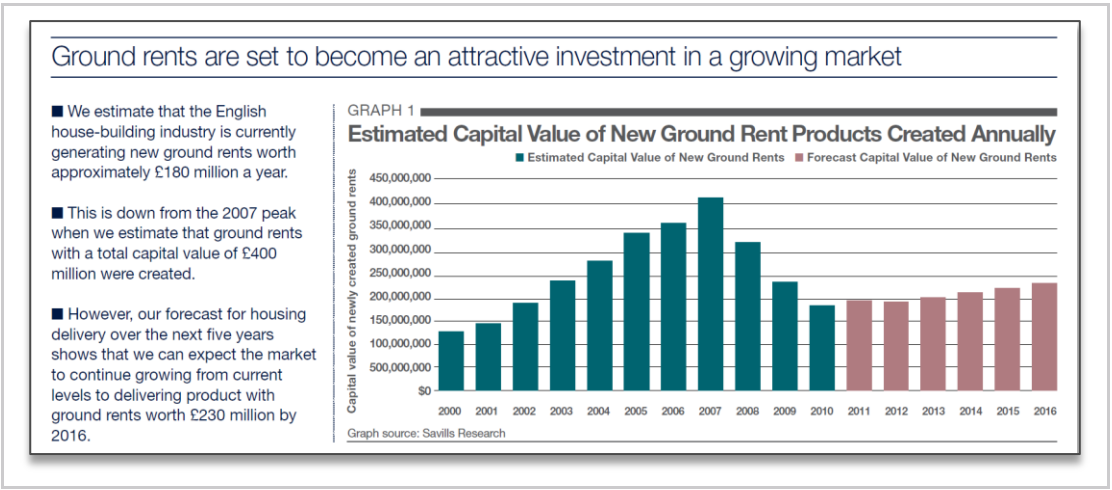
Given the finite pool of opportunities from new build residential developments (estimated in a 2012 report by Savills[41] at £200-£250m per annum) combined with increasing demand from institutional investors, originating assets in the primary market can be challenging.

Getting into the deal flow involves developing relationships with house builders and developers directly or through agents. The ability to be flexible, for example having the ability to forward purchase ground rents prior to the completion of a development, can be key to securing deals. This allows developers to use the pre-sale of ground rents a financing tool to fund developments, but involves the ground rent investor taking on some construction risk, e.g. that a contractor goes bust prior to the completion of the development.

The chart below is an extract from the Savills report which estimates that the market will deliver ground rents worth £230m by 2016.

[40] Annualised current passing rent divided by the property valuation plus notional purchasers' costs of typically 5.75%
[41] http://pdf.euro.savills.co.uk/uk/spotlight-on/spotlight-on-ground-rents---spring-2012.pdf

Chart 3.30 – ground rent projections



From time-to-time, aggregated portfolios of ground rents become available for purchase in the secondary market. Specific property sector expertise is required in order to conduct robust due-diligence on these transactions.

3.2.4.10 Complexity of ongoing management

The management of a residential ground rent portfolio of scale will involve the collection of rent in respect of tens of thousands of individual properties (and hence individuals), which requires bespoke systems and specialist experience (see below).

Managing residential ground rents also requires a good understanding of leasehold property legislation and an ability to model and manage potential prepayments (enfranchisement and lease extensions).

There may also be a perception of reputational risk associated with managing assets relating to retail-like customers that a firm must be comfortable with.

Managing a portfolio of commercial ground rents is less operationally intensive as there are fewer individual assets and counterparties are companies rather than individuals.

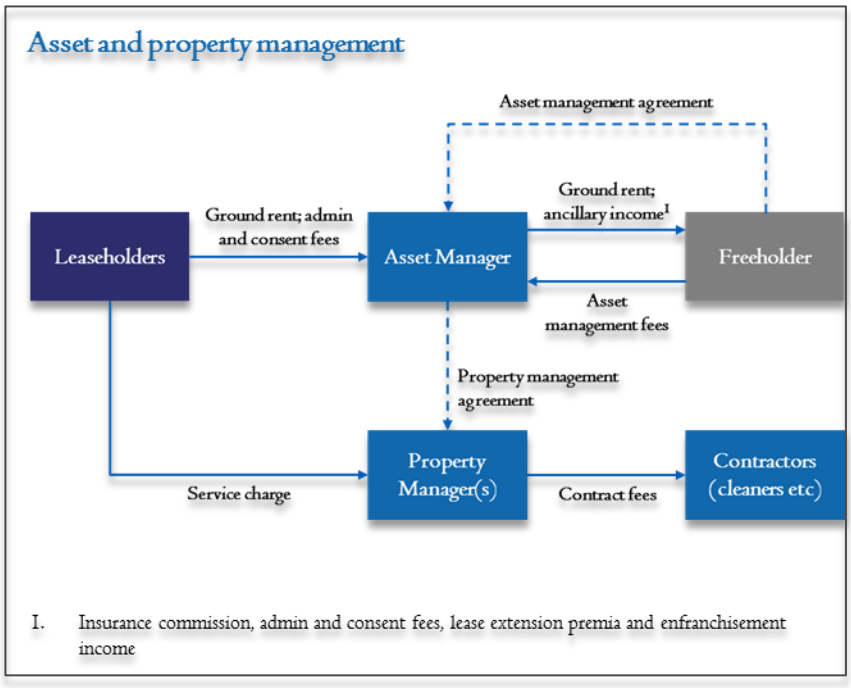
Servicing residential ground rents

There are two main aspects to servicing a ground rent portfolio:

Table 3.31 – servicing requirements for ground rents

Asset management	► Collection of ground rents, credit control, managing requests and granting consents; ► Maintenance of property records and archiving of leases; ► Appointing and managing property managers; ► Arranging buildings insurance; and ► Negotiation of lease extensions and enfranchisements.
Property management	For blocks of residential leasehold flats, the freeholder is often responsible for arranging for a property manager to: ► Manage the maintenance and upkeep of buildings, grounds and common areas; ► Supervise staff and contracts (cleaning, etc.); and ► Control parking. The property manager charges the associated costs back to the leaseholder as a service charge.

Chart 3.32 – property management structure



3.2.4.11 Solvency II capital requirements

The capital requirements will depend on the structure of the investment.

A ground rent asset held directly on balance sheet would be treated as a direct property holding and thus be subject to a 25% charge.

A secured bond/loan structure can be used to cleanse the underlying cash flows from a pool of residential ground rents to remove prepayment risk, which may then make the investment matching adjustment compliant. The investment would then be treated as a bond within the spread risk sub-module. An unrated loan with 30 years duration would have a charge of 20.25%, assuming that the collateral (i.e. the underlying property) would meet the tests set out in Article 214.

3.2.5 Student housing loans

Student housing loans are loans to companies (student housing operators) which are secured against student housing accommodation.

The loans are usually fixed rate in nature or index-linked with annual RPI uplifts (where income strips have been created by the investor). Lenders protect themselves by advancing loans at LTV levels such that they have an appropriate amount of headroom against market falls in the value of the underlying student housing accommodation that forms the collateral for the loans. Some loans include amortisation payments, although this varies by lender and by loan.

In recent years, there has been considerable growth in the number of student housing operators, which offers good potential for new investors in this asset class to form partnerships with borrowers.

Where the loans are not directly originated by the lenders, then these loans often form part of a wider senior commercial real estate debt investment mandate with an asset manager, rather than being standalone investment mandates that solely focus on investing in student housing loans.

3.2.5.1 Pricing transparency (availability of data/benchmarks/ratings)

As student housing loans are an illiquid asset class, no published index exits to track the performance of these loans.

A few student housing loan transactions have been quoted in the media, although the key financial terms are often not fully disclosed. Financial terms of deals are often reported by commercial real estate advisory firms and indicative historical financial terms are collated by independent bodies such as De Montfort University.

Commercial real estate debt investment managers typically allocate a portion of their fund/mandate to financing student housing loans. Therefore, they are a good source for obtaining insights into pricing. However, pricing varies by lender (banks, asset managers and insurers) due to differences in risk appetite and other key factors.

Insurers who directly originate their own loans will use their own internal ratings models to assign ratings to loans. Those insurers who have their own internal models for Solvency II purposes, may directly link their internal capital model to their internal ratings model for loans, or to an alternative internal ratings model that uses fewer risk factors.

For those insurers who do not directly originate loans themselves, the provision of ratings for individual loans will depend on input from the asset manager (a similar case as for commercial real estate debt funds). Insurers will need to ensure that they undertake their own due diligence on the rating methodology used by the asset manager so that they can demonstrate their understanding to the regulator and to satisfy themselves of the appropriateness of the rating methodology and the resulting loan ratings.

Some asset managers provide broad risk parameters and the insurer would need to translate this information into a loan rating. Other managers use the rating methodology from some of the approved credit rating agencies to determine their own internal ratings.

3.2.5.2 Cash flow certainty

Loans are secured against underlying student housing accommodation. An indicative range for LTV ratios is between 50%-75% for senior secured loans, with the majority in the 50%-65% range.

A key factor for student housing loans is whether there is a nomination agreement with the university or if the properties are directly let to students. Much more certainty exists with loan repayments with a nomination agreement compared to direct lets, as under a nomination agreement, the borrower (student housing operator) has a contract with the university to let all of its student housing accommodation to the university, who in turn lets the properties directly to students. As a result, the student housing operator has more certainty in its rental income, as the university is guaranteeing occupancy rates, which the borrower will use to fund the loan repayments to its lender.

The loans are typically fixed rate loans with early prepayment penalties to protect the lender. Different approaches are adopted by lenders, with insurance company backed lenders using ‘make whole’ or SPENS clauses to seek full recompense for early repayment, whilst bank lenders apply a penalty charge on a reducing scale (by time since the funds were lent) to the amount that is repaid early. Amortisation varies by loan and by lender.

Publicly available default and recovery rates are difficult to obtain. One recent example is Opal, a student housing accommodation provider, which went into administration in 2013 when it could not refinance its debt and its student accommodation properties were subsequently sold. It is imperative that insurers undertake an appropriate amount of upfront due diligence to fully understand the financial position of the student housing operator that they will be lending funds to. This will ensure greater certainty of cash flows and reduce the likelihood of the borrower being unable to refinance their existing loan at maturity. In addition, regular monitoring and communication should be undertaken to proactively manage the lender-borrower relationship.

3.2.5.3 Security/Recourse to assets

Loans are secured against underlying student housing accommodation. An indicative range for LTV ratios is between 50%-75% for senior secured loans, with the majority in the 50%-65% range.

Amortisation varies by loan and by lender.

3.2.5.4 Typical duration

Original loan terms of 5-35 years have been transacted but 5-10 years is the typical range. Banks tend to lend for shorter durations compared to other lenders.

Amortisation varies by loan and by lender.

Terms for income strips are much longer than standard student housing accommodation loans and are generally in the range of 25-45 years.

3.2.5.5 Typical clip size

Student housing loans usually have an issue size of £30m+ but there have been loans as low as £5m in the past, with a number of loans £100m+ at the other end of the spectrum.

£10m is a realistic minimum in the current market, although this varies by lender.

3.2.5.6 Typical return

Each lender will have its own criteria for assessing individual loan opportunities.

Some lenders say that returns are higher for student housing loans compared to more traditional forms of commercial real estate loans (secured against office, retail and industrial properties) because student housing loans are an emerging sector and there is a perceived lower level of liquidity due to a smaller universe of lenders (with this premium expected to erode as the sector becomes more established).

Other lenders view loans secured against student housing properties as equivalent to those secured against other commercial real estate, but that it is the covenant of the borrower (nomination agreement vs. direct lets), location and the volume of competing purpose built student accommodation properties that drives the margin.

Returns are of the order of swap/nominal gilt rate (at the relevant loan term) + 1.5% to 3.5%, excluding arrangement fees of c. 1%-1.25%. Higher returns are expected from longer loan terms and returns vary with the quality of the student housing operator. Direct nomination agreements typically result in a 25-50bps discount to target yields because they are preferred due to a more secure income stream.

Student housing loans are typically fixed rate loans with early prepayment penalties to protect the lender.

3.2.5.7 Format

Student housing loans can be directly originated by insurers, but this requires specialist expertise in origination, property management and risk management, etc. and is likely to be only suitable for the larger insurers, many of whom are already actively investing in this space.

For other investors (who may not have the appropriate expertise and resources), the typical approach to gain exposure to student housing loans is either by investing in a separate account or a pooled fund with an asset manager. This is usually as part of a wider commercial real estate debt investment mandate rather than a mandate that solely focuses on student housing loans.

Insurers might also consider co-investment arrangements, whereby insurers could potentially partner with existing investors and co-invest, thus leveraging the existing investor's origination, management and servicing capabilities.

The minimum investment in a pooled fund (wider commercial real estate debt mandate) is of the order of £10m, although it can potentially be lower (varies by asset manager). The minimum investment in a separate account is of the order of £50m (varies by asset manager, so for some it can be £100m+).

3.2.5.8 Liquidity

The liquidity of this asset class is poor. There is potentially a secondary market in the trading of unit holdings of pooled funds, although the authors are not aware of activity in this area to date due to the illiquid nature of student housing loans.

Liquidity should be viewed as low or that none exists. In reality, investors should assume that they are investing for the full term of the loans, pooled fund or separate account. Typical terms might be a 2-year capital drawdown period with a 10-year investment period, although this varies by pooled fund and by manager.

If the asset manager is struggling to lend on financial terms as set out within the investment mandate, then the manager would usually discuss this with the investor and a decision would be made as to whether or not to stop lending and to run down the remaining loans.

Pooled funds typically have quarterly distributions along with amortisation payments where applicable, which varies by loan and lender.

3.2.5.9 Ability to source

Relationship management and speed of execution are key for sourcing deals. Lenders generally source lending opportunities directly from borrowers (student housing operators and universities) but opportunities can also come through brokers. The market is becoming increasingly competitive as new entrants are attracted to a sector where banks have previously lent significant amounts.

Investors who are unable to originate the loans themselves should look for an asset manager who is a commercial real estate lender with a specialist lending platform, with expertise and experience in the area of student housing loans and the ability to manage the loans effectively throughout the term.

In recent years, there has been considerable growth in the number of student housing operators, which offers good potential for new investors in this asset class to form partnerships with borrowers and for those investors who want to directly originate the loans themselves.

There are areas in the UK that may see an oversupply of student accommodation so location is an important factor to consider.

3.2.5.10 Complexity of ongoing management

There are a number of complexities when investing in student housing loans.

Specialist property and lending skills are required, so it is difficult for insurers to originate the loans themselves if they do not have any prior experience. Insurers that are new to this asset class would need to invest via specialist asset managers. One of the main considerations when lending against student accommodation is the borrower's track record in managing similar types of properties, especially under a direct let lease arrangement.

Other complexities include:

- ► Determining credit ratings for individual loans. A methodology needs to be determined and agreed upfront with the asset manager;
- ► Direct lets and loan monitoring require specialist management;
- ► Relationships with borrowers (student housing operators) are key; and
- ► Line-by-line asset data reporting with specifics of each loan including credit rating.

3.2.5.11 Solvency II capital requirements

SCR standard formula

Student accommodation loans fall within the spread risk module of the standard formula. Most loans are unrated and for a 10 year duration unrated loan, the capital charge is 23.5% in the absence of an offset for collateral. If commercial real estate loans are deemed to meet the collateral requirements under Article 214 as discussed above, this would tend to fall to 11.5% for newly originated loans (or performing mature loans) which have a LTV of less than 75%.

Matching adjustment considerations

The matching adjustment, as currently drafted, does not permit assets with prepayment optionality. However, this could be managed through 'make whole' provisions, although these are not a standard feature in the existing market, particularly at the shorter end.

3.2.5.12 Other relevant information

Nomination agreements are generally preferred as they provide certainty of income. However, some lenders/operators like to have some element of direct lets because they provide more flexibility to react quickly and capture uplifts in market rent levels. In addition, in certain locations/universities, direct lets attract higher rental levels compared to the rents that universities are prepared to pay under nomination agreements.

Some lenders (particularly some insurers) are forward funding the building of student accommodation properties and are pre-letting the properties on long-term leases to universities, i.e., creating 'income strips' from the properties, rather than lending secured against student accommodation that is already built.

The number of overseas students has a significant effect on demand for student housing accommodation. Consequently, foreign exchange rates can affect the number of overseas students. Other factors that should be borne in mind include:

- ► Number of students from outside towns that will rent accommodation near the university; and
- ► Availability of purpose built student accommodation near the university.
- ► Location is key as well as the number of educational establishments in the vicinity of the property.
- ► The past performance history of the university is essential to the deal and the ability of the university/operator to prove the case for student and occupancy numbers.
- ► Changes in university funding could affect the overall number of students pursuing university courses, which could affect rental levels
- ► Other challenges include significant increases in student tuition fees and shrinking of the domestic student population.
- ► The student accommodation market is structurally undersupplied.

► There was positive rental growth every year during the economic downturn.

Table 3.33 - Example student accommodation deals by insurers[42]

February 2014	L&G loan to Unite to refinance its stake in Unite Capital Cities (UCC) portfolio of 14 student housing accommodation properties, its joint venture with GIC (the Singaporean government's investment corporation). Loan of £149m, nine year term, 55% LTV, fixed rate of 4.3%.
November 2013	L&G forward funded £15.7m to a Canterbury Christ Church University (CCCU) student housing scheme. Net initial yield of 5.14% (after purchase costs). The property is scheduled to be built by September 2015. The property will be let to the university on a 25-year lease with annual RPI-linked uplifts.
May 2013	L&G forward funded £25.7m to a University of Arts London (UAL) student housing scheme in Elephant & Castle. Fifth forward funding deal of a university-backed scheme, £330m invested in previous two years outside of £121m to Unite. Property is scheduled to be built by August 2015.
March 2013	M&G lent £32m of development finance for student accommodation at Swansea University (freeholder). M&G will be the leaseholder for 125 years, the tenant is a subsidiary of St. Mowden (tenant's obligations are backed by agreements with Swansea University) and will lease the property for 45 years.
January 2013	L&G forward funded a student accommodation scheme in Finsbury Park, London. Loan of £57m to University of Arts London (UAL) on a 25 year FRI lease from completion, with annual RPI reviews capped at 5% and floored at 1%. Property to be built by August 2015.
August 2012	Aviva lent £50m to Uliving providing 1,400 student rooms at the University of Essex.
August 2012	Aviva lent £36.5m to UPP at University of Reading.
April 2012	L&G loan to Unite, secured against a portfolio of student housing accommodation properties in London, Manchester and Bristol. Loan of £121m, 60% LTV, 10 year term, fixed rate of 5.05%. The loan will amortise to £109m (55% LTV) by 2022.
April 2012	M&G lent £266m to Round Hill Capital for its acquisition of a central London student housing portfolio from Blackstone.
December 2011	Aviva lent £184m to UPP at University of Reading.[43]

Sources for student housing loan related deals by insurers:
http://www.ft.com/cms/s/0/e679d31e-92f1-11e1-aa60-00144feab49a.html#axzz2swUPiV5Y
http://www.unite-group.co.uk/2012/05/01/unite-completes-new-121-million-debt-facility
http://www.costar.co.uk/en/assets/news/2012/May/Legal--General-close-maiden-120m-senior-loan-/
http://www.educationinvestor.co.uk/ShowArticleNews.aspx?ID=3719&AspxAutoDetectCookieSupport=1
http://www.bristol-business.net/unite-seals-121m-debt-deal-with-legal-general/
http://bridgingloandirectory.co.uk/2013/01/10/legal-general-to-forward-fund-student-accommodation-development/
http://bridgingloandirectory.co.uk/2013/05/20/legal-general-forward-funds-student-accommodation-in-elephant-castle/
http://www.lgim.com/uk/en/property/property-media/press-releases/
http://www.legalandgeneralgroup.com/media-centre/press-releases/2013/lgp_funds_canterbury_christ_church_university_student_accommodation_scheme.html
http://www.legalandgeneralgroup.com/media-centre/press-releases/2013/lgp_funds_canterbury_christ_church_university_student_accommodation_scheme.html
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http://www.mills-reeve.com/aviva_deal_august2012/
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[42] Web research.

http://www.ft.com/cms/s/0/69418106-dfce-11e1-9bb7-00144feab49a.html#axzz2swUPiV5Y
http://www.ft.com/cms/s/0/c3407d88-944c-11e1-bb47-00144feab49a.html#axzz2swUPiV5Y
http://www.manchestereveningnews.co.uk/business/business-news/more-20-manchester-student-accommodation-6100944
http://www.nationalcode.org/Feeds.aspx?Key=0dd3a3f5-b288-4a5b-bf04-b5c71a1a6cb3
http://www.ft.com/cms/s/0/13f7fcc2-faba-11e2-87b9-00144feabdc0.html#axzz2swUPiV5Y
http://forgetoday.com/news/opal-accommodation-to-be-sold-piece-by-piece/
http://www.investorschronicle.co.uk/2013/09/19/comment/property-matters/first-class-property-second-class-investment-gpUeRfxWuo8t1TZ0bREOzJ/article.html
http://www.mandg.co.uk/corporate/media-centre/press-releases-media/
http://www.themansiongroup.co.uk/mansion-student-accommodation-fund/downloads/CBRE/CBRE%20Student%20Housing%20View%20Point%20August%202012.pdf
http://www.ft.com/cms/s/0/13295db0-7ab1-11e2-9c88-00144feabdc0.html#axzz32AJdH1Oo

Table 3.34 – specific real estate glossary

Residential mortgages

Residential property	A building or structure that is used or suitable for use as a dwelling, including any related land that is wholly or partly the garden for the building or structure.[44]
Foreclose	A specific legal process in which a lender attempts to recover the balance of a loan from a borrower who has stopped making payments to the lender by forcing the sale of the asset used as the collateral for the loan.[45]
Loan to value (LTV)	The ratio of a loan to the value of an asset purchased. The term is commonly used by mortgage lenders. For instance, if someone borrows £100,000 to purchase a house worth £150,000, the LTV ratio is expressed as £100,000 ÷ £150,000, or 67%.
Mortgage Market Review (MMR)	The MMR was a comprehensive review of the UK mortgage market conducted. It started with a Discussion Paper in 2009 and culminated in a Policy Statement and final rules in October 2012.[46]
ASHE survey	The Annual Survey of Hours and Earnings. It provides information about the levels, distribution and make-up of earnings and hours worked for employees in all industries and occupations in the UK.[47]
Council of Mortgage Lenders (CML)	The Council of Mortgage Lenders is a not-for-profit organisation and the trade association for the mortgage lending industry.[48]
Prepayment	Prepayment is the early repayment of a loan by a borrower, in part or in full. In respect of UK mortgages, this often due to refinancing where borrowers take advantage of lower rates offered elsewhere in the market.
Original maturity	The stated maturity date of the loan at the date of issue.
Conditional Prepayment Rate (CPR)	The proportion of the principal of a pool of loans that is assumed to be paid off prematurely in each period. For example, a pool of mortgages with a CPR of 8% would indicate that for each period, 8% of the pool's remaining principal outstanding is paid off.[49]
Standard Variable Rate (SVR)	A standard variable rate mortgage (also known as an SVR mortgage) is a type of variable-rate mortgage. The SVR is a lender's 'default' rate – without any limited-term deals or discounts attached. Standard variable rates tend to be influenced by changes in the level of the Bank of England's base rate.[50]
Maturity transformation model	The term used to describe the act of banks and other financial institutions borrowing money on shorter timeframes than they lend money out for.

Equity release mortgages

No Negative Equity Guarantee (NNEG)	A feature of equity release mortgages that means that however large a loan is on the death of the policyholder, the amount repayable to the lender will be capped at the value gained by sale of the property securing it.
Early prepayment	In the context of an equity release mortgage, voluntarily repaying the loan before the death of the policyholder.

[44] http://www.hmrc.gov.uk/manuals/rpsmmanual/rpsm07109060.htm
[45] http://en.wikipedia.org/wiki/Foreclosure
[46] http://www.fca.org.uk/firms/firm-types/mortgage-brokers-and-home-finance-lenders/mortgage-market-review
[47] http://www.ons.gov.uk/ons/rel/ashe/annual-survey-of-hours-and-earnings/index.html
[48] http://www.cml.org.uk/cml/about
[49] http://www.investopedia.com/terms/c/cpr.asp
[50] http://www.which.co.uk/money/mortgages-and-property/guides/what-is-a-mortgage/what-is-a-standard-variable-rate-mortgage/

Halifax House Price Indices (HPI)	A range of indices published monthly by HBOS tracking the average value of properties in different regions of the UK.
Lifetime mortgage	One type of equity release, under which a loan is made on which interest is either paid or rolled-up within. On death, the proceeds of the property securing the loan are used to repay it, with any excess remaining an asset of the estate of the policyholder.
Reversion mortgage	A proportion of the property is sold to the lender. On death that proportion of the value is paid to the lender.

Commercial real estate mortgage backed loans

Lock-ups	Window of time in which investors are not allowed to redeem or sell shares. This helps portfolio managers avoid liquidity problems while capital is put to work in sometimes illiquid investments.

Ground rents

Periodic payment order (PPO)	This is an order made by a court to pay compensation to the victim of an accident or act of malpractice in the form of a regular payment rather than a lump sum.
Public Sector Average Earnings Index (PSAEI)	Average earnings index measuring short term earnings growth in the public sector.
Capital stack	A description of the total capital invested in a project, including pure debt, hybrid debt, and equity. The capital stack starts at the top with the least risky form of investment, typically a senior secured loan, traveling down to the most risky investment, equity.
Net initial yield (NIY)	Net initial yield is a calculation of the yield that would be received by a purchaser, based on the estimated net rental income expressed as a percentage of the acquisition cost, being the market value plus assumed usual purchasers' costs at the reporting date.

Student housing loans

Direct let	Student housing accommodation that is let by the property owner directly to students (no guarantee of occupancy).
Nomination agreement	Student housing accommodation that is let by the property owner to the university (who in turn lets the property to the students) and guarantees occupancy rates i.e. the university underwrites the rents.
Income strips	Lender lends funds to the borrower (university) to develop/build student housing accommodation i.e. forward funding of its development. In exchange, the lender obtains a rental income stream (which is usually index-linked) payable by the university through a long-term lease on the property. The development is usually pre-let by the lender to the borrower (university) from completion of the development. At the end of the lease, the freehold reverts to the university i.e. the freehold is retained by the university. The university retains control of the property and benefits from the freehold reversion and the lender is able to secure a long-term income stream.

3.3 Other asset-backed securities (ABS)

3.3.1 Introduction

In this section we consider investments backed by financial assets (principally mortgages and other loan receivables) and investments backed by moveable assets (e.g. aircrafts). A wide range of assets could potentially fall into this category. However we chose to focus on those other asset-backed securities (ABS) that represent the largest part of the market under consideration and/or are of most interest to an insurance company, for example: RMBS (residential mortgage-backed securities), CMBS (commercial mortgage-backed securities), CLO (collateralised loan obligation) and aircraft financing.

In general, securitisation is the pooling together of cash-generating assets, such as mortgages, auto loans or SME loans, and funding these assets instead by issuing bonds in the capital markets. The investors receive regular payments reflecting the interest and principal payments made by the underlying borrowers. The bonds are often divided into different tranches with different characteristics and varying levels of risk. The higher-risk tranches yield a higher return for investors.

Securitisation provides a means of diversifying exposures. The flexibility of securitisations to customise cash flows and risk exposures can be useful for those investors that have specific maturity, coupon, yield and risk preference needs, which can be difficult to satisfy elsewhere. For example, tranches can be structured to offer an exposure to the industry of the asset pool as a whole, with minimal exposure to idiosyncratic risk.

A collateralised loan obligation (CLO) refers to a limited liability vehicle that issues different classes of notes to investors, representing several tranches of debt and an equity tranche. The senior debt notes are secured with the assets purchased by the CLO vehicle, mainly consisting of leveraged loans. However, mandates can include other types of loans (infrastructure loans, SME loans, etc.) and bonds.

In addition to the investments backed by financial assets, insurers are increasingly showing interest in investments backed by moveable assets (i.e. shipping and aviation financing). Direct investment is only likely to be seriously considered by larger insurers who could justify building expertise in these areas. Investors can potentially participate in any part of the capital structure of shipping or aircraft finance, from senior secured debt through to equity. We focus on aviation financing as this is generally seen as a stronger credit proposition in terms of the credit riskiness of airlines, but also in terms of the expertise required to assess the collateral.

There are further types of ABS – which include securities backed by auto loans, credit card receivables, SME loans and even asset types such as mutual fund fees and intellectual property – that will not be covered in this section. However, as for aviation financing, there further types of ABS could represent attractive assets for those insurers willing to develop the investment expertise required to analyse the backing assets and securitisation structure.

3.3.1.1 Market for other asset-backed securities

In the years leading up to the Global Financial Crisis, securitisation grew significantly in Europe and the Eurozone. New issuance to third-party investors peaked at €477.6bn in 2006, before dropping substantially with placed volumes declining to €76.4bn in 2013 (this excludes an additional €104.5bn retained by issuers and used for repo purposes with the European Central Bank (ECB) or national central banks). This trend is continuing into 2014.

Most securitisation funding in 2014 was originated in the Netherlands, followed by the UK and Germany. RMBS has the highest volume of issuance (the majority being Dutch RMBS at €2.8bn in Q1 2014).

At Q1 2014, the size of the market for securitisations in Europe was around €1.4tn, with RMBS accounting for the largest proportion (with €835bn outstanding), followed by ABS (with €190bn outstanding). This represents a fall of 23% in the total outstanding over the last two years, reflecting lack of new issuance. The recent low level of market-placed issuance is not just due to 'post-Global Financial Crisis stigma'.

Recent transactions might not be priced in a way that meets the demands of either investors or issuers. Insurers may be deterred from holding ABS due to the proposed changes in capital charges under the Solvency II Standard Formula, which are perceived as onerous, particularly when compared with similar asset types.

The securitisation market in certain EU countries was negatively impacted by the introduction of structured finance credit rating caps (a hard sovereign rating cap) on ABS, where it is no longer possible to achieve an AAA rating regardless of the extent of credit support in the structure. Other issues include:

- lack of standardisation across the EU;
- more complex risk characteristics than other assets; and
- difficulty of assessing market liquidity due to historically low trading volumes.

In recognition of these challenges, the Bank of England and ECB issued a discussion paper in May 2014 on *"The case for a better functioning securitisation market in the European Union"* to stimulate discussion among stakeholders on "the impediments that may currently be preventing the emergence of a robust securitisation market … and the suggested policy options aimed at alleviating them".

3.3.1.2 Current participation of insurers as investors in the securitisation market

AFME[51] conducted in March 2014 "Solvency II insurance company and asset manager survey". Key insights relevant to this paper are:

- Insurance company investment in securitisation is a material issue.
- On average, insurance companies' holdings in securitisations comprise 24-45% in non-senior tranches.
- On average, of insurance company senior securitisation holdings, 25-50% is comprised of non-AAA-rated senior assets.
- CLOs are a significant investment asset for insurance companies: 35-40% of insurance companies have securitisation portfolios containing at least 20% in CLOs.
- A large proportion of insurance companies invest in non-AAA rated senior and non-senior securitisations because of yield and some because of maturity of the assets.
- The majority of insurance companies believe that the proposed EIOPA charges for non-senior securitisations will either cause them to cease investment entirely or only on a dramatically reduced basis. Other reasons given include underlying earnings, risk/return profile and credit profile/robustness.

Table 3.35 - Key features and considerations of other asset-backed securities

[51] The association for financial markets in Europe (AFME) - http://www.afme.eu/

	Attribute	RMBS/CMBS	CLO	Aircraft Financing (Enhanced Equipment Trust Certificate - "EETC")
1	Pricing transparency (availability of data, benchmarks and ratings) (Medium/High)	OTC trading. No specific benchmark index but performance can be measured against broad fixed income indices. Ratings range from AAA-BBB (and up to B for CMBS).	OTC trading. No specific benchmark index but performance can be measured against broad fixed income indices. Ratings range from AAA – below BBB and equity.	Relatively good, with quoted prices reported to broker screens such as Bloomberg. No index exists for EETCs. Typical ratings range BBB to A for "A" tranche EETCs
2	Cashflow certainty (Medium)	Cash flows are uncertain and driven by the performance (pre-payments, delinquencies and defaults) of the underlying mortgage assets. Legal final maturity is set at the date of the longest underlying mortgage (typically 25-30y for RMBS and 5-7y for CMBS) plus a work-out window.	Cash flows are dependent on the performance of the underlying collateral assets (prepayments and defaults). Therefore the investors in the senior debt tranches have security limited to the underlying assets.	Under solvent operation of the airline, EETCs pay a fixed interest coupon, and amortise according to a pre-defined amortisation schedule. Typically the airline has the option to redeem the EETC early; however this is subject to a make-whole payment. In the unfortunate event that an aircraft covered by an EETC were to crash, the full principle is covered by insurance
3	Security/ recourse to assets (easy)	Investors have security over the securitised assets. In turn, the underlying mortgages are secured, with recourse to the underlying borrower.	Investors have security over the underlying collateral assets in the order of the seniority of the tranche.	Investors have good recourse to the aircraft underlying the EETC but this is not automatic if airline decides to continue to operate the aircraft and make scheduled payments in bankruptcy. This makes the requirement to seize collateral in this event relatively less likely. In a weak market for aircraft this may be a more favourable outcome for investors.
4	Typical duration	3-5y for RMBS 5-7y for CMBS	3y-10y (senior tranches having shorter maturity)	Typical expected final maturity for A tranches is 8-12 years at issuance, although the duration will be materially shorter than this given the amortisation schedule
5	Typical clip size	€ 0.5-1.0bn	€ 0.3-0.6bn	$0.5bn (typical range $0.3-1.0bn)
6	Typical return	3mE+[50-70] bp for AAA tranche	3mE+140bp for AAA tranche	Z-spreads for A tranche EETCs currently range from around 50bps up to 200bps, although 150bps is typical
7	Format of investment	Floating rate notes	Floating rate notes and equity notes	USD fixed coupon structured bonds
8	Liquidity	For RMBS, the liquidity of the OTC secondary market is linked to general liquidity in the credit markets. For CMBS, secondary market liquidity is low.	OTC secondary market exists and its liquidity is linked to general liquidity in the credit markets	Whilst EETCs are illiquid, there is an active secondary market. A tranches are generally more liquid than more subordinated tranches due to their larger size and investor base. Typical trading size is $10-25m.
9	Ability to source investments	Largely primary market opportunity for RMBS Largely secondary market opportunity for CMBS	Largely primary market opportunity	Other than sourcing in the secondary market (see under 'Liquidity'), there is an average of around $4bn of primary issuance annually (average over the past 5 years).

	Attribute	RMBS/CMBS	CLO	Aircraft Financing (Enhanced Equipment Trust Certificate - "EETC")
10	Complexity of ongoing management	Relatively straightforward provided it is managed by someone with appropriate structured credit expertise. Can either be managed directly if that expertise is in-house or via an asset manager.	Relatively straightforward provided it is managed by someone with appropriate structured credit expertise. Can either be managed directly if that expertise is in-house or via an asset manager.	Under solvent operation of the airline, a holding of EETCs can be managed as a specialist bond portfolio. However, risk management of the exposure will be more complex as the credit risk of an EETC depends firstly on the credit risk of the operating airline and secondly on the quality and desirability (for the airline and the market) of the aircraft included.
11	Capital requirements and considerations	In the Standard Formula of Solvency II, the capital charge is captured under the spread risk module and is onerous. Capital treatment changing for both bank and insurance company investors under revisions to the BIS' Securitisation Framework and Solvency II.	In the Standard Formula of Solvency II, the capital charge is captured under the spread risk module and is onerous. Capital treatment changing for both bank and insurance company investors under revisions to the BIS' Securitisation Framework and Solvency II.	In the standard formula capital charge would be equivalent to corporate bonds of similar rating/duration. However there is a risk that EETCs could be seen as securitisations, since strictly speaking the cash flows are derived from underlying EETCs for individual aircraft. However, one could formulate a strong argument that EETCs are secured corporate bonds issued by the airlines (secured on underlying aircraft) Internal model firms would presumably also seek to make this argument. Given the fixed coupons and amortisation schedule, as well as the beneficial terms of typical make-whole payments, we would expect that EETCs could potentially form part of a matching adjustment portfolio, subject to appropriate hedging of the USD exposure.

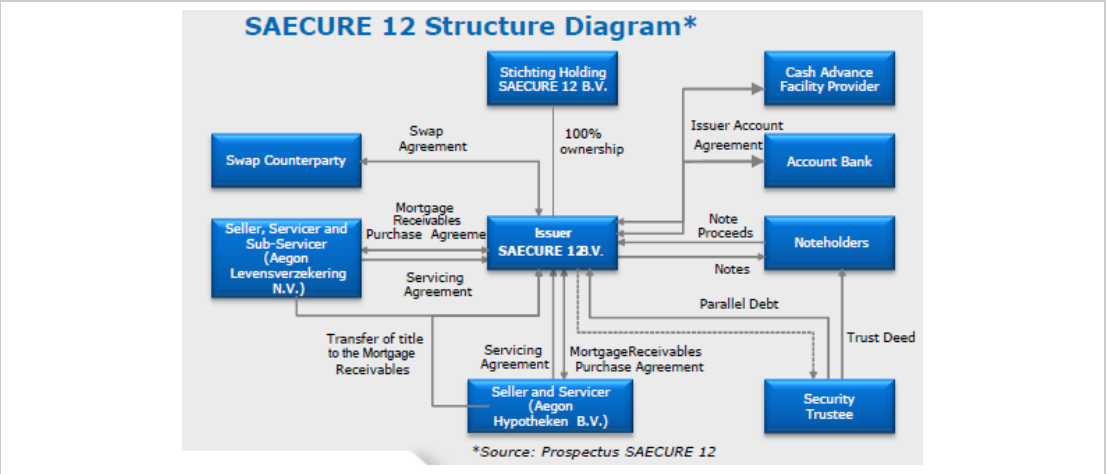
3.3.2 Securitisation – RMBS & CMBS

Residential mortgage backed securities (RMBS) represent financial instruments issued as part of the securitisation of a pool of residential mortgages; whereas commercial mortgage backed securities (CMBS) are based on a pool, usually smaller in number but larger in individual size, of commercial mortgages. RMBS and CMBS are typically used as funding instruments for the originator of the underlying residential or commercial mortgage loans, since the originators are usually required to retain some of the equity in the transactions. This is used as a means of ensuring they have 'skin in the game' or aligning their interests with the performance of the overall transaction, to avoid incentivising the origination and securitisation of poorly underwritten assets. The originator receives a cash advance from the issuance proceeds of the securitisation, while the investors in return are paid their principal and any interest from the variable cash flows arising from the pool of securitised mortgage loans.

Securities are issued in multiple tranches through a special purpose vehicle (SPV), a bankruptcy remote legal entity that enables separation of the pool of assets from the originator, which is of benefit to both the originator and the investors. SPVs are sometimes referred to or operate slightly differently across jurisdictions, e.g. they could be called special purpose entities (SPEs) or, in the case of Dutch RMBS, the SPV is owned by an independent foundation (Stichting), where the loan receivables are sold to the SPV through a silent assignment (stille cessie) at the closing of the transaction. Further, the SPV pledges such receivables and other rights to a security trustee (for the benefit of the investors). In addition, given that there are often mismatches in the type of interest rate used to derive inflows on the underlying mortgages and outflows on the notes, the SPV will often enter into an interest rate swap, usually ranked fairly senior in the priority of payments waterfall of the SPV, to hedge any interest rate risk.

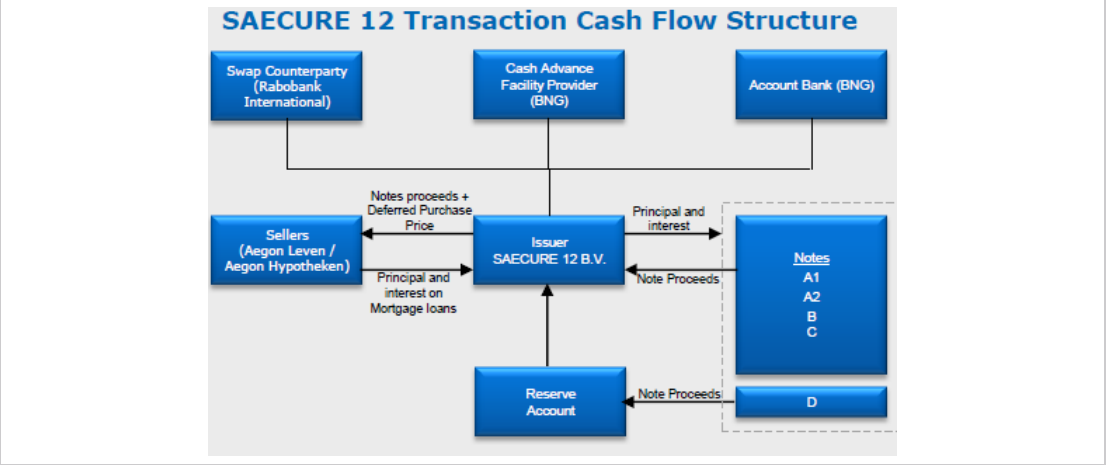
Example structure and transaction cash flows for a securitisation are illustrated in the diagrams below using *SAECURE 12* (a Dutch RMBS) as a specific example:

Diagram 3.36 – structure diagram for RMBS



Source: Aegon Presentation[52], Prospectus SAECURE 12.

Diagram 3.37 – transaction diagram for RMBS



Source: Aegon Presentation, Prospectus SAECURE 12.

The assets underlying securitisations vary substantially in nature across different markets, asset classes, jurisdictions and, sometimes, even within the same asset class in the same jurisdiction. It is important that, when making an investment decision, investors take into consideration the nature and specific characteristics of the assets underlying the security.

The nature and specific characteristics of the underlying mortgages varies widely between UK RMBS, Dutch RMBS and CMBS.

As an example though, Dutch residential mortgage loans (underlying Dutch RMBS) commonly have the following characteristics:

- Interest Type: Mortgage loans have fixed rate interest, which is resettable after a pre-defined minimum period (typically 10 years in the current market). In fact in recent years, the interest reset period has increased significantly given the low level of interest rates. As result Aegon estimates that 70% of Dutch borrowers have taken out mortgage loans with interest reset period in excess of five years.

- LTV and Maturity: Mortgage loans have typically at issue at LTV of 106% and a very long maturity.

[52] http://www.aegon.com/Documents/aegon-com/Sitewide/Presentations/2014/Aegon-SAECURE-14-NHG-investor-presentation.pdf

- Guarantees: Mortgage loans of up to €290,000, which are amortising, can benefit from NHG (Notionale Hypotheek Garantie) guarantee. This is a Dutch state guarantee provided by a non-profit organisation (Stichting WEW – which is guaranteed by the Dutch state)

- Tax Incentives: Mortgage loans are provided predominantly on the basis of income with the LTV having less significance due to the double tax incentive which mortgage loan borrowers have: (i) interest on the mortgage loan on a borrower's residence is deducted from taxable income and (ii) income on savings/insurance policies used to repay interest only mortgage loans are tax free. Such tax incentives have shaped the characteristics of the Dutch residential mortgage market: high LTVs, long legal loan maturities (>30 years), borrowers maximise interest–only component of the mortgage borrowing and accumulate significant collateral in saving/insurance products to cover principal repayments. As a result the market has created a range of mortgage products: interest-only loans, savings mortgage loans (borrowers do not make any principal repayments but instead make payments into a savings account with an insurance company/bank), life mortgage loans (borrowers do not make any principal repayments but have an insurance policy, into which they pay a monthly premium, which is either expected or guaranteed to repay the mortgage loan at maturity), investment mortgage loans (borrowers do not make any principal repayments but select an investment policy, into which they pay a monthly premium, which is expected to repay the mortgage at maturity) and repayment mortgage loans.

3.3.2.1 Pricing transparency (availability of data/benchmarks/ratings)

Securitisations are typically traded 'over-the-counter' (OTC), rather than over exchanges, and are usually held to maturity i.e. as buy-and-hold investments.

For small sizes of investment, however, say of EUR5-10m, and, particularly for more senior tranches, there is usually sufficient secondary liquidity, which also helps with the price discovery. Such prices can either be received upon request or, in some cases, can be found on Bloomberg (i.e., quotes from banks can be found by running function <ALLQ > GO under the selected security). For example, in the case of the *SAECURE 12* transaction (a Dutch RMBS), one can obtain for the A1 tranche (SAEC 12 A1 <Mtge>) the following pricing quotes:

	PCS	Description of Source	Bid Price	Ask Price
11)	BGN	Bloomberg Generic	100.388	100.388
12)	RABX	Rabobank Credit		
13)	CG	Citigroup	100.370	100.450
14)	ABSX	Hvb		
15)	NXAB	Natixis Abs Mbs		

Source: Bloomberg snapshot

The lack of comparability resulting from the broad range of characteristics and relative lack of standardisation across different RMBS and CMBS issues means there is little value in having market indices for price or spread reference. That said, their yields and prices can still be compared with relevant fixed income indices, e.g. iBoxx indices, especially in the case of the more standardised 'vanilla' senior RMBS tranches.

Credit ratings for securitisations can vary widely given the extent to which structures can differ. Generally speaking though, market appetite and liquidity means RMBS are structured to give publicly available tranches rated between AAA for senior tranches and BBB for junior tranches, as is the case for both UK and Dutch RMBS.

The relative lack of granularity for CMBS means structures attract lower ratings overall or, at least, smaller tranches of highly-rated (AA and above) tranches proportionate to the underlying collateral and, as a result, in order to attain higher levels of funding, the spread of ratings for publicly issued tranches is wider, ranging from AAA for senior tranches down to B for junior tranches.

In the case of both RMBS and CMBS, lower-rated and, indeed, unrated tranches are sometimes available through private channels.

3.3.2.2 Cashflow certainty

Securitisation cash flows are linked to the cash flows on their underlying assets, which are uncertain, as well as to the structure. As a result, the cash flows on both RMBS and CMBS are inherently subject to risk but this risk can be mitigated to a degree through the structure of the securitisation and, in particular, the priority of payments (also known as 'the waterfall').

For instance, although securitisation cash flows are linked to the underlying assets, the term of the bond cash flows can vary substantially from those on the underlying mortgages. Although for CMBS the linkage between the term of the bonds and the underlying commercial mortgages is usually much closer, this is usually not the case for RMBS and so we will use it to illustrate this point.

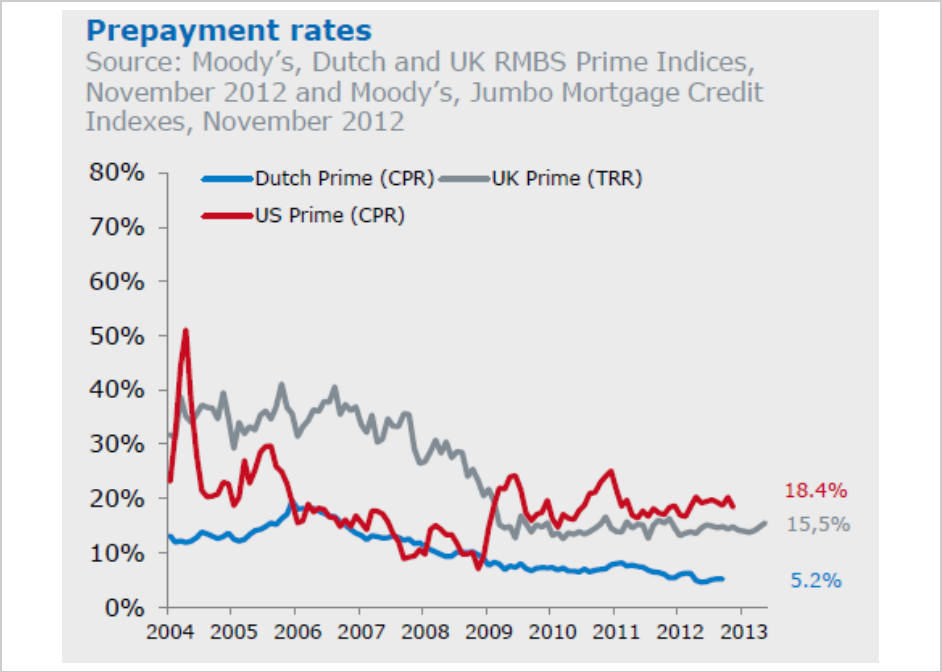
The underlying mortgage loans of RMBS have a long maturity profile, typically between 20 and 30 years, whereas RMBS bonds are frequently medium-term notes with a weighted-average life (WAL) of between two and ten years. This mismatch between the funding instrument and the underlying assets is managed by introduction in the securitisation structure of a call date and a step-up in spread after the call date. This ensures a strong incentive for the originator to repay the RMBS on the call date, with the underlying pool being refinanced through a new securitisation at the then prevailing market spreads.

In addition to this call date, each RMBS has a pre-payment risk that is linked to the pre-payment risk of the underlying pool of residential mortgages. However, it is important to note that, for borrowers, such pre-payments have high penalties (which compensate the lender for the loss on interest income), apart from special circumstances such as:

- When property is sold/destroyed;
- At interest reset date; or
- When the borrower is deceased.

The table below (from an Aegon presentation) illustrates the historical pre-payment rates for UK and Dutch prime RMBS:

Chart 3.38 – prepayment rates for UK and Dutch prime RMBS



Source: Aegon Presentation.

Typical terms and maturities are set out below for UK and Dutch RMBS, as well as CMBS.UK RMBS bonds are typically structured as 'soft-bullet' obligations. The expected maturity for such securities is reliant on originator behaviour, while ultimate redemption (i.e., following non-call of the soft-bullet obligation and reversion to a pass-through bond format) is based on the performance (repayment speeds, delinquencies and defaults) of the underlying securitised mortgages. Legal final maturity of the bonds is set at the date of the longest underlying mortgage – typically 25 years – plus a 'work-out window' (the period of time it takes to realise the recovery value following asset default or delinquency).

Dutch RMBS bonds are predominantly structured as 'pass-through' obligations based on the performance (repayment speeds, delinquencies and defaults) of the underlying securitised mortgages. The bonds typically include a dated call option that mortgage originators can exercise, with investors receiving increased margins if it is not called. Legal final maturity of the bonds is set at the date of the longest underlying mortgage – typically 25 to 30 years – plus a work-out window.

CMBS bond cash flows are driven by the performance (repayments, delinquencies and defaults) of the underlying securitised commercial mortgages. Unlike granular, consumer-backed RMBS bonds, CMBS include more concentrated pools (typically 10 to 20 individual exposures), making the repayment profile much lumpier. Legal final maturity of the bonds is set at the date of the longest underlying mortgage – typically 5 to 7 years – plus a work-out window.

3.3.2.3 Security/Recourse to assets

Investors have security over the securitised assets and, in turn, the underlying mortgages are secured, with recourse to the underlying borrower.

The SPV issuing the securitisation has legal title to the mortgage receivables, which are pledged to a security trustee for the benefit of the noteholders. In the case of the originator's default, the trustee could sell the mortgages if this is sufficient to pay back the note holders.

It is important to note that, in most cases of RMBS and CMBS, the underlying loans are neither substituted nor replenished by the originator during the life of the securitisations

3.3.2.4 Typical duration

The weighted average maturity at issuance of bonds varies both by type of securitisation, i.e. the type of underlying asset, and by seniority of tranche. It depends on the structure and the priority of payments of principal but, generally speaking, the more senior the tranche, the quicker the paydown and hence the shorter the weighted average maturity.

It varies from one transaction to another but; in general, the weighted average life of the bonds at issuance is as follows for the different types of securitisations covered in this section:

- UK RMBS: 3 to 5 years
- Dutch RMBS: 5 to 10 years
- CMBS: 5 to 7 years

Although the legal maturity of bonds may be far higher than their weighted average maturity, especially for RMBS, securitisations have specific call dates, which it is customary for the originator to exercise.

The duration, in the sense of interest rate sensitivity, of RMBS and CMBS bonds is low since such securities usually pay floating rate interest. In some cases though, fixed rate bonds are structured, in which case they will clearly have more interest rate duration than an equivalent floating rate instrument.

3.3.2.5 Typical clip size

Issue size varies by type of securitisation and is also very much driven the market appetite and hence the state of the market. For instance, issue sizes have increased slightly in recent years as market appetite has slowly returned but tend to be substantially smaller than they were in the years prior to the Global Financial Crisis.

The average size of issue for UK RMBS is c. €1bn, for Dutch RMBS it is c. €750mm and for CMBS it is c. €500mm.

3.3.2.6 Typical return & Risk / Return Profile

The return on securitisations varies depending on the type of collateral, market conditions prevailing at time of issue and tranche credit rating.

The return varies by seniority and WAL of tranches but typically the return for AAA-rated tranches of the different types of securitisation covered in this section are as follows (where the term ‘LIBOR’ refers to the relevant floating rate, e.g. GBP LIBOR for £, EURIBOR for €):

UK RMBS: 3-m LIBOR + 50bps

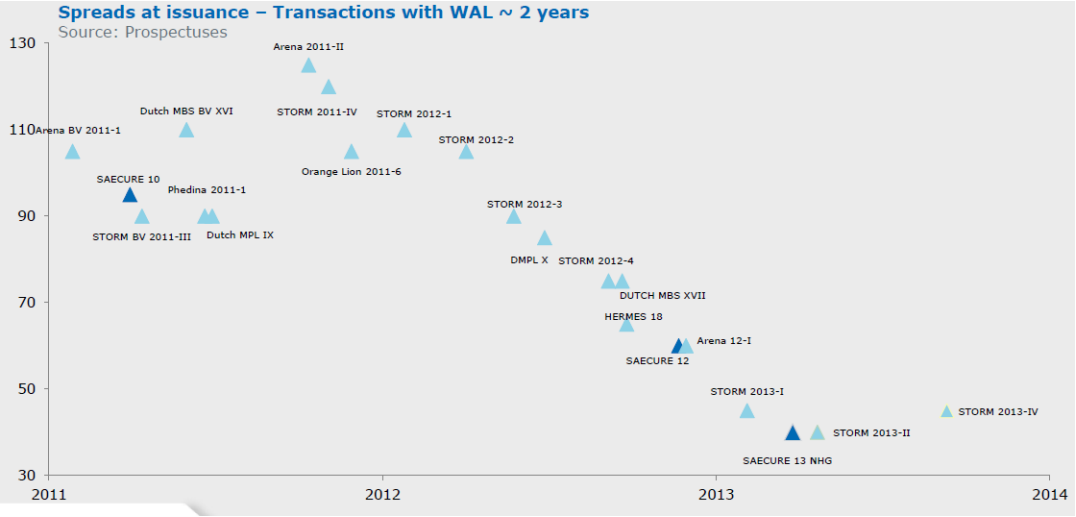
Dutch RMBS: 3-m LIBOR + 70bps

CMBS: 3-m LIBOR + 80bps

For both UK and Dutch RMBS, typically it is only the senior bonds that are distributed to investors in the public markets and more junior parts of the structure are either retained or, from time to time, sold privately. In the case of CMBS, typically the full capital stack is distributed to investors.

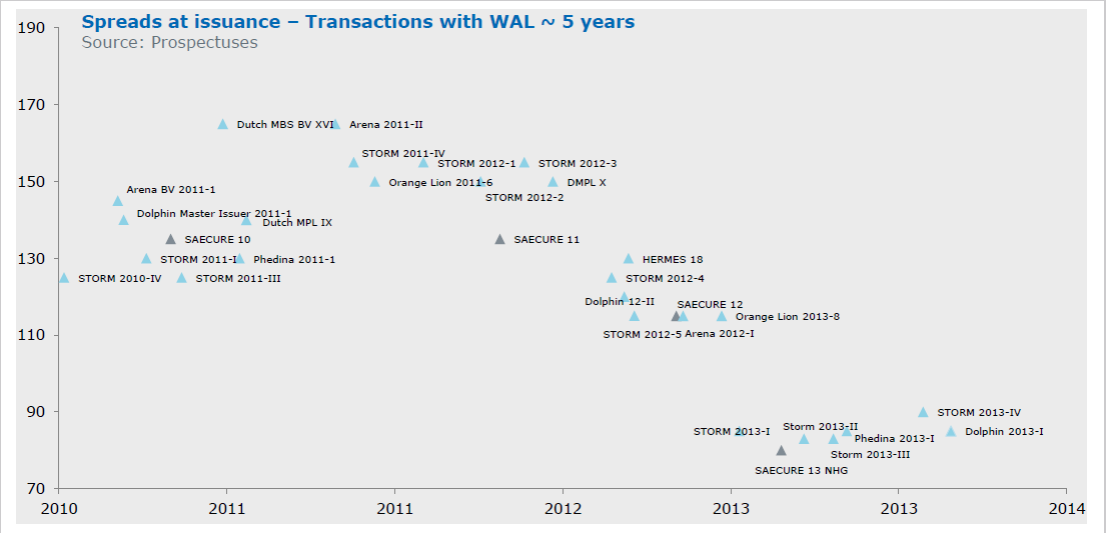
The graphs below provide, as an example, the recent spreads paid by different Dutch RMBS issues of 2-year WAL and 5-year WAL respectively:

Chart 3.39 – spreads on 2 year RMBS



Source: Aegon presentation, transactions Prospectuses, Bloomberg.

Chart 3.40 – spreads on 5 year RMBS



Source: Aegon presentation, transactions Prospectuses, Bloomberg.

3.3.2.7 Format

The bond instruments issued by SPVs in securitisations are in note format. The notes are typically floating rate notes (FRNs) and denominated in EUR, GBP or USD, depending on which currency and market they are issued in and the extent to which international investors are interested in the underlying assets.

3.3.2.8 Liquidity

Liquidity for securitisations can vary by tranche depending on their underlying asset class, their credit rating, the market in which they are issued and the general state of the market.

Except in extreme market conditions, liquidity in RMBS is generally good, especially for more senior, highly-rated (AA and above) tranches. Both UK RMBS and Dutch RMBS are a benchmark asset class in international securitisation markets and their liquidity is roughly equivalent to that of covered bonds. There is a secondary market for RMBSs and the average ticket size is around €5-10m. In addition, there are repo markets, which allow investors to raise funding against posting prime RMBS as collateral.

By contrast, the liquidity in CMBS is much lower than it is for UK or Dutch RMBS and in extreme market conditions like the Global Financial Crisis, the CMBS market ground to a halt.

3.3.2.9 Ability to source

Securitisation investments are reasonably easy to source for most insurers, particularly in the case of RMBS, which tends to have better liquidity and a greater number of market participants (both sellers and investors) than CMBS. Both UK and Dutch RMBS are largely sourced via primary market opportunities, whereas CMBS is generally sourced via secondary markets.

RMBS markets are an important source of funding for originators and, given the regular call dates of issued RMBS tranches, they frequently use the primary market to refinance existing RMBS or to finance new production of mortgages. This means the ability to source RMBS is fairly straightforward. CMBS is not quite as straightforward to source as RMBS, in part because the market is far smaller. Taking the Dutch mortgage market as an example, the main mortgage originators are Rabobank, ING, ABN Amro, Aegon, Obvion, Argenta, Delta Lloyd and the total outstanding residential mortgage debt in The Netherlands was c. €645bn at the end of Q3 2013, while the new lending during the same quarter was €9.1bn.

3.3.2.10 Complexity of ongoing management

Ongoing management of RMBS and CMBS is relatively straightforward provided it is managed by someone with the appropriate expertise in Structured Credit.

Securitisation note holders do not necessarily require ongoing management in respect of their investment but the uncertainty around repayment of principal and the reinvestment of proceeds require portfolio management expertise.

Portfolios of RMBS and CMBS can either be managed directly if that expertise is in-house (e.g. for larger insurers) or via an asset manager with relevant expertise if the required expertise is not available (e.g. for smaller insurers).

3.3.2.11 Solvency II capital requirements

Capital treatment for securitisation is changing for both bank and insurance company investors under revisions to the BIS Securitisation Framework and Solvency II. Highly-rated RMBS is also likely to be included to be included in the Liquidity Coverage Ratio (LCR) for financial institutions.

The main capital charges for investments in RMBS and CMBS are captured under the Solvency II Spread Risk Sub-Module (under the specific requirements for securitisation assets).

In the latest technical specifications, EIOPA has divided the securitisation assets under three types, shown in the table below. The most senior tranche in an RMBS is likely to qualify for Type 1, as the underlying collateral would be related to consumer loans, though CMBS assets are unlikely to meet the definitions for Type 1.

Table 3.41 shows the capital charges by Type of securitisation and by rating to multiply by duration. For example, an A rated Type 1 RMBS securitisation of five years duration carries a capital charge of 15%.

Table 3.41 – capital charges for securitisations by unit of duration

Type of securitisation	AAA	AA	A	BBB	BB	Below BB
Type 1	2.1%	3.0%	3.0%	3.0%	n.a.	n.a.
Type 2	12.5%	13.4%	16.6%	19.7%	82%	100%
Resecuritisation	33%	40%	51%	91%	100%	100%

UK RMBS, Dutch RMBS and CMBS will attract a higher charge per unit of duration than corporate bonds or loans with an equivalent rating and average maturity.

In addition, the fact that there is prepayment and extension risk for the repayment of securitisations means that these assets are unlikely to qualify as eligible for matching adjustment.

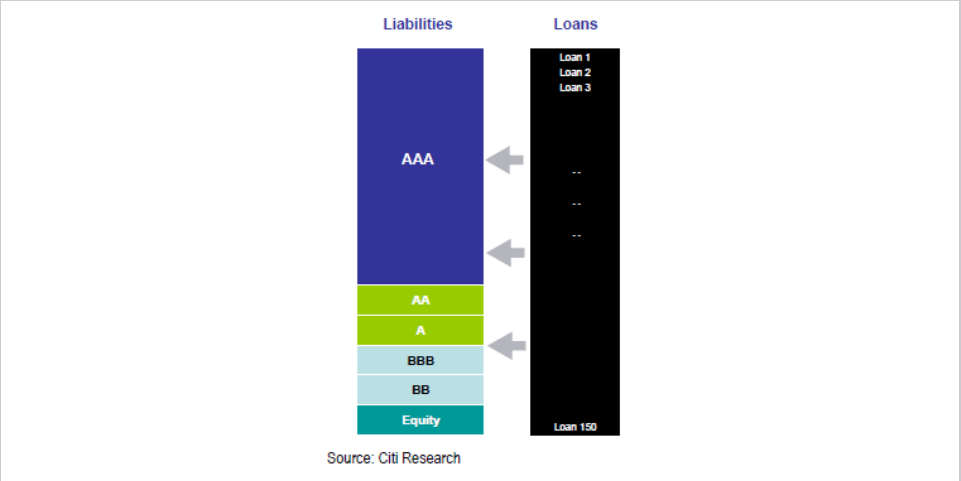
3.3.3 CLOs

A collateralised loan obligation (CLO) refers to a limited liability vehicle that allows investors to take exposure to loan and bond market with varying levels of risks and expected returns. This is achieved by the vehicle issuing different classes of notes to investors, which represent several tranches of debt (up to 90% of the capital) and an equity tranche (around 10%-12% of the capital).

Typically the debt tranches are rated with most senior ones achieving a AAA rating.

The diagram below illustrates the usual capital structure of a CLO with ratings on debt tranches.

Chart 3.42 – capital structure of CLO



Source: Citi Research

The senior debt notes are secured with the assets purchased by the CLO vehicle. The main type of assets purchased by a CLO vehicle is represented by the leveraged loans (note that "high yield" bonds, which is the broader universe in which leveraged loans exist, are covered in section 3.4.3).[53]. However other type of loans (e.g. infrastructure loans, SME loans) and bonds feature among the assets included in the mandate of the CLO vehicle.

The cash flows from the collateral assets are used in a pre-defined order to pay the fees for managers, administration costs and interest on debt tranches. The residual cash flows after such payments have been fulfilled are received by the investors in the CLO equity tranche (for more details see section 1.1.3 below).

The collateral assets of the CLO can either be static or dynamic/managed. Most of the CLOs in the market are managed by an appointed portfolio manager, who:

- Selects and buys the initial collateral assets

[53] The leveraged loans represent financing provided to companies with high leverage. Effectively leverage loans are a sub-set of the high yield market with different risk/return profile than the high yield bonds. For example leveraged loans represent senior secured bank loans, which pay floating rate coupons, whereas high yield bonds are subordinated to the leveraged loans and pay fixed rate coupons. The capital structure of a high yield/leveraged company is made of 40%-60% leveraged loans with the remaining being financed with high-yield bonds, subordinated debt and common equity. As result the recovery rate for leveraged loans is typically 65%-75% whereas that of high-yield bonds is 0%-35%.

- Makes sales and purchases of collateral assets during the reinvestment period (i.e., 6-7 years for pre-crises issues and usually 3-4 years for post crises issues)
- Makes sales and limited purchases of collateral assets from end of reinvestment period to maturity of the CLO
- In addition, the portfolio manager will sell the collateral assets upon the call exercise by the equity tranche holders
- Manages the assets (amendment and waiver requests, working out defaulted loans, etc.)

3.3.3.1 Pricing transparency (availability of data/benchmarks/ratings)

The CLO debt tranches benefit from external ratings but they do not benefit from any benchmark price indices. However the main collateral asset for CLOs, i.e., the leveraged loans, benefits from benchmark price indices:

- S&P LSTA Loan Index for USD
- S&P European Leveraged Loan Index for EUR

The secondary market liquidity of the CLO tranches is limited and investments in such instruments are typically seen as buy and hold.

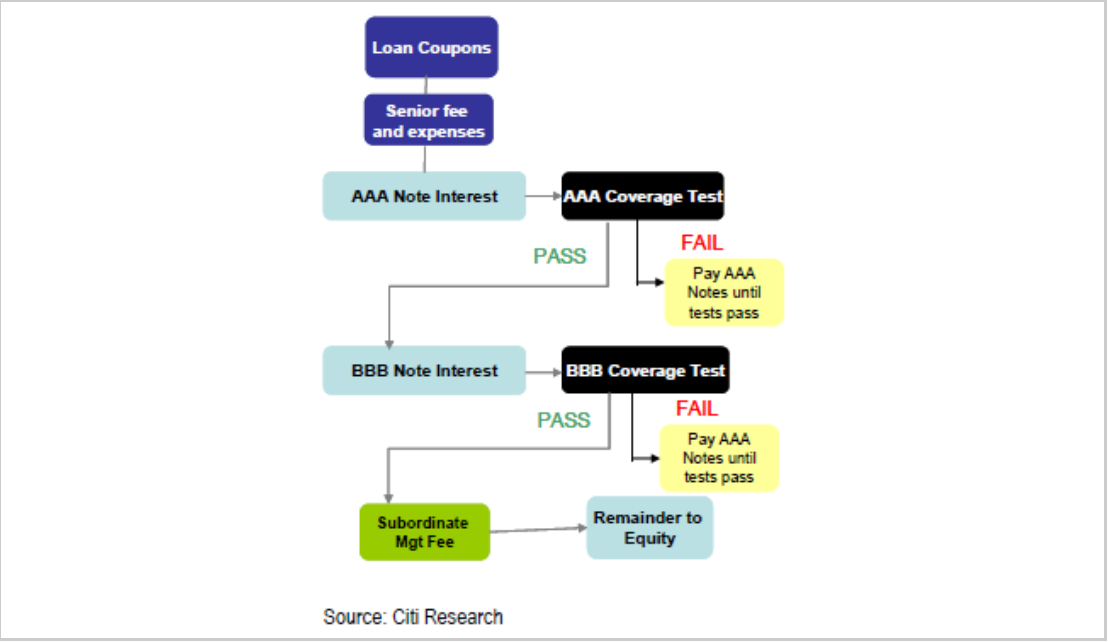
3.3.3.2 Cash flow certainty

The debt tranches of the CLO pays floating interest (typically quarterly), i.e., Libor/Euribor plus a fixed spread defined at the issuance date. The equity tranches receive the residual cash flows, i.e., the equity excess spread which in a simplified way represents:

Asset spread – Cost of debt – Management Fees – Administration Costs

The principal repayment typical starts after the end of the reinvestment period. Both the principal repayment and the interest payments follow a predefined 'cashflow waterfall', which reflects seniority of the different capital and the results of certain coverage tests (e.g., overcollateralisation, interest coverage). Below is a simplified cashflow waterfall assuming one senior debt tranche (AAA) and one mezzanine debt tranche (BBB):

Chart 3.43 – repayment flowchart



Source: Citi Research

The notes issued by the CLO vehicle have pre-payment risk which arises from a number of reasons:

- The collateral assets have pre-payment risk (i.e., borrowers have option to repay loans early) and therefore the earlier repayment of the underlying collateral assets after the end of the reinvestment period can trigger earlier partial repayment of the notes related to the debt tranches
- The waterfall mechanism, means that defaults and built-in triggers can create additional acceleration of principal repayment for the senior debt tranches
- The active nature of the portfolio management carried by the portfolio manager, means that the actual run-off profile of the underlying collateral assets is not known from outset.
- The equity would normally have an option to call the deal after a set number of years.

3.3.3.3 Security/Recourse to assets

The repayment of the notes issued by the CLO vehicle depends on the performance of the underlying collateral assets. Therefore the investors in the senior debt tranches have security limited to the underlying assets.

3.3.3.4 Typical duration

The maturity of the debt tranche depends on the speed of principal repayments. Typically the maturity will vary between 3y-10y with the more senior tranches having the shorter maturity. The duration of debt tranches is low given the floating interest paid by such securities.

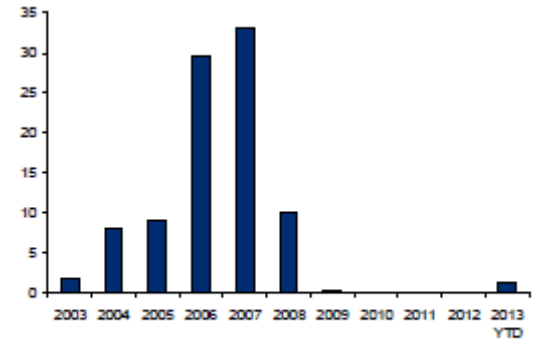
In recent EUR deals, the AAA-tranche is expected to start repaying principal after the end of year 4 and fully repay by the year 7. This is equivalent to 5.0-5.5 years' duration.

3.3.3.5 Typical clip size

Typical size of recent CLO issuances has been around EUR300-400m with the most senior tranche representing around 40%-50% of the total issuance.

The primary market of CLO has been very slow in the post Global Financial Crisis period, with 2013 being the first year of resurgent issuance. See below an illustration of past European CLO issuance.

Graph 3.44 – CLO issuance (EURbn)



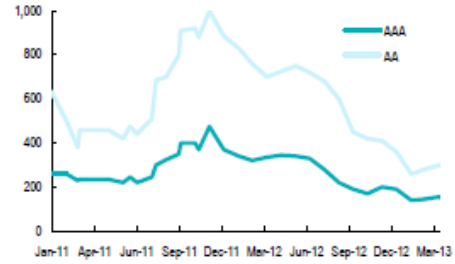
Source: Citi Research

The total outstanding CLOs in EUR was around 80bn at the end of Q2 2013.

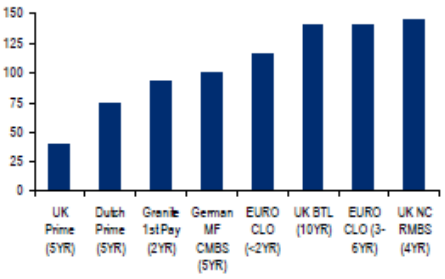
3.3.3.6 Typical return (as of Q1 2014)

The graphs below provide recent trends in the spreads (in basis points) of the senior tranches of EUR CLO, with graph on the right illustrating a comparison of the spreads on most senior tranches of different ABS and CLO issues.

Graph 3.45 - Typical returns on CLO and ABS



Source: Citi Research



Source: Citi Research

The table below illustrates the returns provided by CLO equity tranches vs. other asset classes

Table 3.46 – sample CLO returns

Exhibit 16: Return statistics – CLO equity vs. Other asset classes*

Period: Dec 2007 - Feb 2012	Avg Annual Return (1)	Annual Return Volatility (2)	Risk-Adj Return (1)/(2)
CLO Equity	61.6%	72.4%	85.1%
Leveraged Loan**	5.6%	11.3%	49.7%
High Yield Bond**	10.1%	14.1%	71.9%
S&P 500	0.5%	20.5%	2.2%
Russell 2000	5.5%	26.4%	20.7%
Hedge Fund***	-3.3%	7.8%	-41.7%
Listed Private Equity****	-6.1%	38.8%	-15.9%
CDX.HY.9.5Y 10-15%	70.5%	114.8%	61.4%
CMBX-4 BBB	-13.5%	56.1%	-24.1%
CMBX-4 AJ	4.4%	47.0%	9.4%
Period: July 2010 - Feb 2012	**Avg Annual Return (1)**	**Annual Return Volatility (2)**	**Risk-adj Return (1)/(2)**
CLO Equity	85.7%	38.6%	222.1%
LCDX 12 5Y_0-8%	56.8%	24.6%	231.3%
LCDX 10 5Y_5-8%	75.3%	38.7%	194.4%

Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service
* All the returns are calculated as total returns – i.e., by incorporating coupon/premium payments as well.
** Based on Credit Suisse High Yield and Leveraged Loan indices.
*** Based on HFRX Global Hedge Fund Index from Bloomberg, which is designed to be representative of the overall composition of the hedge fund universe.
**** Based on PRIVEXD Index from Bloomberg, which tracks the performance of globally listed 25 largest and most liquid stocks of the private equity companies listed in the world stock exchanges.

For a list of recent primary deals and associated spreads over Libor paid by the various tranches issued to the investors please refer to table 3.48.

3.3.3.7 Format

The instruments issued by CLO vehicle are in note format for both debt and equity tranches.

The instruments are typically denominated in USD and EUR.

3.3.3.8 Liquidity

Secondary market for CLO debt instruments exists and its liquidity is linked to general liquidity in the credit markets. However in general the liquidity is lower than that for insurance companies.

In addition, there are repo markets, which allow investors to raise funding against positing CLO instruments as collateral.

3.3.3.9 Ability to source

Most CLO investments are sourced in the primary markets directly through the bank mandated by the CLO portfolio manager to distribute the transaction.

In practice the size of the CLO market depends on the availability of collateral assets (in particular leveraged loans) in the primary market (or secondary markets).

3.3.3.10 Complexity of ongoing management

The CLO debt holders do not require ongoing management in respect to their investment. However uncertainty around repayment of principal is something that would need to be allowed for.

Similarly the exact credit exposure is expected to be changed over the life of the investment as the portfolio manager of the CLO makes changes in the underlying pool of collateral. However the broad credit exposure is known as constraints and criteria on diversification and rating are set out upon issuance of the CLO tranches.

3.3.3.11 Solvency II capital requirements

The main capital charge for investments in CLO related instruments is captured under the Solvency II Spread Risk Sub-Module (under the specific requirements for securitisation assets).

In the latest technical specifications, EIOPA has divided the securitisation assets under three types. The most senior tranche in a CLO vehicle would likely qualify for type 1 if the underlying collateral would be related to consumer and SME loans.

However in practice the vast majority of deals have as underlying corporate leveraged loans. This means that all instruments issued by the CLOs would fall under Type 2. If a CLO has a structured finance bucket, and such bucket has been used (expected to be more the case in legacy issuances) then the CLO would be a type 3 – a re-securitisation. In practice CLO T2, i.e. new primary deals will not include ABS deals; there is little investor appetite with high capital costs for both banks and insurers.

Table 3.47 – capital charges for securitisations

Type of securitisation	AAA	AA	A	BBB	BB	Below BB
Type 1	2.1%	3.0%	3.0%	3.0%	n.a.	n.a.
Type 2	12.5%	13.4%	16.6%	19.7%	82%	100%
Resecuritisation	33%	40%	51%	91%	100%	100%

As illustrated in table 3.47, the CLO instruments attract a high charge per unit of duration, particularly if they qualify as Type 2. For example, a five year duration A rated Type 2 CLO (which represents a large part of the market) would attract a capital charge of 83%.

In context of the most senior tranche, which given the high overcollateralisation can be seen more as a funding instrument rather than credit instrument, such capital charge look to overestimate the underlying risk for the investor. As such, firms looking to hold significant levels of investment in CLOs may wish to consider an internal model approach or access the investment in a different format.

Table 3.48 - Example deals by insurers

Below is the list of the European CLOs issued since beginning of 2013. The issuance was mainly distributed to banks ALM and specialised funds (including hedge funds). However, we understand anecdotally that some senior tranches have also been bought by some insurers.

Issuer	Issue Year	Notional (€m)	AAA (% total)	AAA spread
Cairn III CLO	2013	300.50	60.40%	3ME+140
Dryden XXVVII Euro CLO 2013	2013	300.00	56.50%	6ME+135
ALME Loan Funding 2013-1 CLO	2013	334.20	58.35%	3ME+130
Grand Harbour I B.V.	2013	403.35	59.50%	3ME+130
Carlyle Global Market Strategies Euro CLO 2013-1	2013	350.00	60.00%	6ME +130
GoldenTree Credit Opportunities European CLO 2013-1 BV	2013	303.29	44.61%	3ME+135
Jubilee CLO 2013-X	2013	400.00	57.88%	3ME+125
Cadogan Square CLO V	2013	309.25	56.27%	3ME+135
ICG-ST.Paul's CLO II	2013	400.00	60.00%	6ME+135
Ares European CLO VI	2013	310.50	57.00%	3ME+125
Harvest CLO VII	2013	309.60	57.17%	3ME+135
Herbert Park B.V.	2013	413.18	56.88%	3ME+135
Carlyle Global Market Strategies Europe CLO 2013-2	2013	335.90	53.29%	3ME+135
Grosvenor Place 2013-1	2013	361.57	55.90%	3ME+140
Avoca Capital CLO X	2013	310.75	53.42%	3ME+140
St. Paul's III	2013	556.50	58.71%	3ME+145
Euro Glaxay 2013-3X	2013	335.00	60.00%	3ME+130
Dryden 29 Euro CLO 2013	2013	414.75	54.31%	3ME+140
Richmond Park CLO	2013	615.69	57.02%	3ME+140
North Westerly CLO IV	2013	306.00	57.84%	3ME+145
Jubilee CLO 2014-XI	2014	413.50	54.90%	3ME+140
Carlyle Global Market Strategies Euro CLO 2014-1	2014	374.80	58.16%	3ME+140
Harvest CLO VIII	2014	425.00	57.18%	3ME+140
St. Paul's IV CLO	2014	435.12	57.06%	3ME+140
Babson Euro 2014-1	2014	412.50	56.06%	3ME+140
CVC Cordatus Loan Fund III	2014	450.00	57.02%	3ME+135
Holland Park CLO	2014	513.63	56.83%	3ME+140
Jubilee CLO 2014-XII	2014	513.10	58.86%	3ME+135
Avoca CLO XI	2014	518.50	53.04%	3ME+140
Oaktree Arbour CLO	2014	375.00	55.67%	3ME+145

(*) 3ME represents 3-month Euribor and (**) represents 6-month Euribor

3.3.4 Aircraft

Whilst the previous sub-section focused on the investments backed by financial assets (principally mortgages and other loan receivables), insurers are increasingly showing interest in investments backed by moveable assets (e.g. shipping and aviation financing). There is little question that these investments are further removed, generally, from the core expertise of most insurers, and as such are likely to be seriously considered only by larger insurers who could potentially justify investing in expertise in these areas or outsourced by smaller insurers to external asset managers.

Of the two (shipping and aviation), we have focused on aviation financing as this is generally seen as a stronger credit proposition than shipping – both in terms of the credit riskiness of shipping operating companies vs. airlines, but also in terms of the idiosyncrasies of, and expertise required to assess, the collateral.

Investors can potentially participate in virtually any part of the capital structure of aircraft finance, from senior secured debt through to equity (see summary table 3.49).

At the top end of the investment risk spectrum (lowest credit risk) sits Export Credit Agencies (ECA) guaranteed financing. Historically, the Export Credit Agencies of the key aircraft manufacturing countries, such as the US, UK, Germany and France, in recognition of the importance of aircraft manufacturing to their national economies, supported the export of their aircraft by offering guarantees to cover the losses of lenders to relatively risky airlines. Over the last few years this source of financing has been used even by relatively low risk airlines. ECA-guaranteed aircraft finance could potentially be an asset class of interest to insurers given the low level of credit risk; however we have not covered ECA bonds in detail below for two principal reasons:

a. Essentially this is government credit risk, albeit with a small illiquidity premium, and

b. The short duration (average life generally 3-4 years) and, since banks have returned in greater volume to the market, low spreads (generally low-mid 10s of bps over swaps), may not justify the investment in expertise for the majority of insurers to invest.

Table 3.49 – methods of investing in aircraft

Investment type	Example investments
ECA Guaranteed	ECA Guaranteed bond
Senior Secured Debt	Commercial loan secured by (recourse or non-recourse) mortgages on aircraft
	Class A Enhanced Equipment Trust Certificate
	Lessor Secured Term loan
	Lessor secured note
	Aircraft Asset backed security
Subordinated Secured	Class B Enhanced Equipment Trust Certificate
Unsecured Debt	Lessor unsecured notes
	Airline unsecured risk
Mezzanine Capital	Class C Enhanced Equipment Trust Certificate
	Subordinated loan participation
Structured Equity	Aircraft on lease

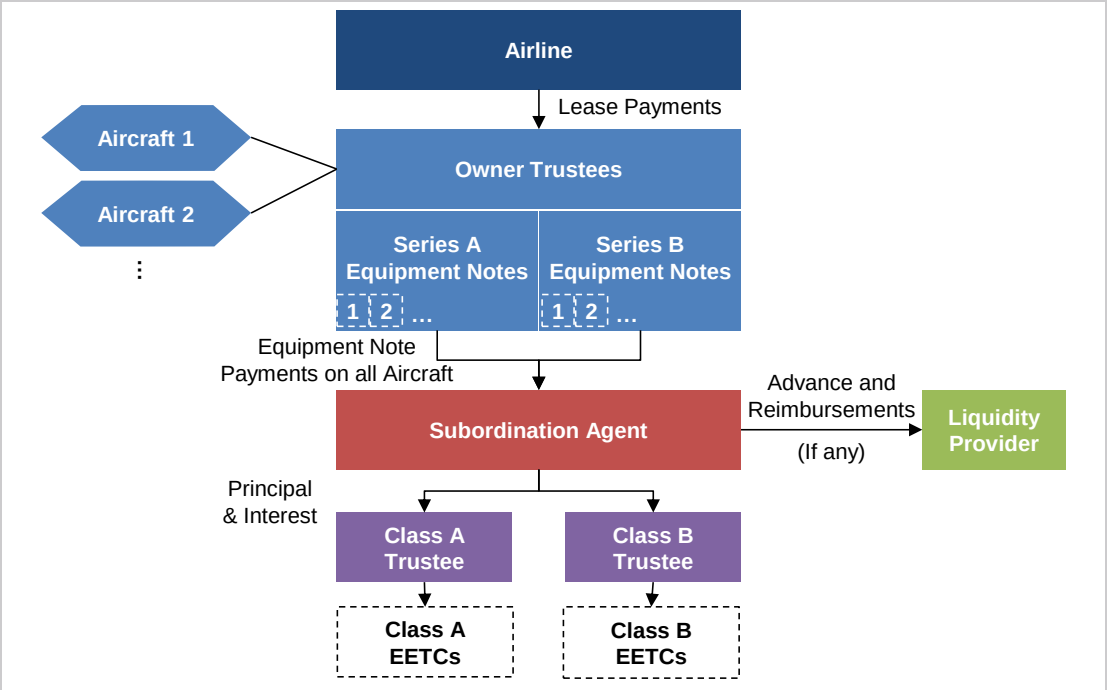
In the next level of increasing credit risk investment options include taking the traditional place of banks in lending directly to airlines – secured by mortgages on aircraft, lending to aircraft leasing companies or vehicles, or secured structured products. The latter two options to some extent shield insurers from the direct operational responsibility in the event of a default and therefore may be more attractive to insurers. One form of secured airline financing which could (particularly the senior, or 'A', tranches) potentially offer an interesting entry-point for in terms of duration and yield, as well as security structure, is the 'Enhanced Equipment Trust Certificate' (EETC; which is pronounced 'Double-ETC'). In the interests of space and recognising the fact that aircraft financing is likely to remain somewhat a niche investment undertaken by only a small number of insurers, we concentrate the remainder of this section in summarising this asset class, rather than providing extensive detail on the full range of potential investments in this area.

The Structure of an EETC

An EETC, as its name might suggest, has as its basic building block an Equipment Trust Certificate (ETC). In an ETC structure, which is a vehicle for financing a single aircraft, an 'Owner Trustee' purchases the aircraft from the manufacturer, financed by certificates issued to investors. Payments to certificate holders are financed by rent payments from the airline to the Owner Trustee.

In essence an EETC is a structure which aggregates a number of ETCs into tranched 'pass-through' securities. Essentially the most senior, or 'A' tranche of an EETC is paid principal and interest (absent a bankruptcy affecting the airline) from a series of 'A' class equipment notes financing a portfolio of aircraft operated by the airline. Under solvent operation of the airline, the A tranche generally has a longer maturity/amortisation profile than the more junior tranches, although the payment profile changes to prioritise A tranches if the airline files for bankruptcy.

Diagram 3.50 - the general structure of a typical EETC



EETCs also have a number of features which increase enhance investor security and recoverability in the event of an airline bankruptcy, in particular

1. Section 1110 protection

   EETCs are designed to take advantage of Section 1110 of the US bankruptcy code, which allows lessors and secured lenders to repossess their equipment in a bankruptcy without being subject to the 'automatic stay' provisions of the bankruptcy code. Being able to bypass the automatic stays gives lenders more control over their collateral, and therefore a better chance of reselling the collateral to someone else in a shorter period of time and (hopefully) at a more reasonable price.

   Part A of Section 1110 allows for the disposition of assets by creditors unless an airline decides, within 60 days, that it will continue to meet interest and principal obligations, thereby 'curing' the default. If an airline and the creditors of a specific EETC sign a Section 1110A agreement within that period, the creditors can continue to receive expected interest and amortisation payments, rather than having to repossess and sell the aircraft. Part B of Section 1110 in addition allows an agreement between lenders and the airline to extend the period over which the airline continues to operate the aircraft, and make expected lease payment, in effect 'buying time' for the airline.

   In effect, as well as making it easier for lenders to access collateral quickly in a bankruptcy process, Section 1110 also makes it more likely that this step will not be required and that instead lenders continue to receive scheduled interest and amortisation payments. In a weak market for aircraft, lenders may be better off doing this, compared with reselling the aircraft.

   More recently, the 'Cape Town Convention' effectively exports 'Section 1110 protection' worldwide to financiers of carriers in signatory states. This development provides a basis for constructing EETCs for non-U.S. airlines.

2. Liquidity facility

   EETCs generally provide liquidity facilities (similar to a revolving credit facility) which contain enough cash to fund interest payments on the tranches of an EETC for up to 18 months (i.e., enough cash to make three coupon payments). This is intended to cover a sufficient period for lenders to repossess, re-fit (if need be), and sell a plane after a default.

3. Control and Buy-out provisions

   In a bankruptcy process, the majority holder of the most senior tranche of an EETC (i.e., the largest holder of the A tranche) starts out with the right to control the proceedings. In order to allow for some protection of the interests of junior tranches, EETCs have buyout provisions which give the more junior tranches the right to buy out the senior tranches at par to gain control of the negotiating process. A junior tranche must purchase the entire amount of each of the senior tranches ahead of it to gain control of the process.

   These features combined effectively create a further degree of security for senior tranches.

4. Cross-default and Cross-collateralisation

   Since EETCs are comprised of individual aircraft ETCs, earlier incarnations in theory allowed airlines to take a selective approach to accepting or rejecting aircraft in a bankruptcy process, which could result in 'attractive' planes continuing to be operated – with associated lease payments – whilst other aircraft were in default.

   More recent EETCs contain cross-default and cross-collateralisation provisions which prevent airlines selectively accepting and rejecting planes in a bankruptcy process, and in addition allow a deficiency claim from one aircraft to be made good from proceeds of another.

3.3.4.1 Pricing transparency and ratings

Whilst EETCs are illiquid, there is an active secondary market, with quoted prices reported to broker screens such as Bloomberg. As such pricing transparency is relatively good. Valuation of the underlying aircraft collateral is, clearly, less transparent – we touch on this below in section 3.3.4.10.

EETCs are rated by the major rating agencies and the majority carry two or sometimes three ratings. Ratings vary according to the underlying credit of the airline (amongst other factors) but typically range from BBB to A for 'A' tranches.

3.3.4.2 Cash-flow certainty

Under solvent operation of the airline, EETCs pay a fixed interest coupon, and amortise according to a pre-defined amortisation schedule. Typically the airline has the option to redeem the EETC early, however this is subject to a make-whole payment (as an example from a 2010 EETC this is based on the PV of expected future payments discounted at US treasuries plus 50bps). In the unfortunate event that an aircraft covered by an EETC were to crash, the full principal associated with that aircraft is covered by insurance.

3.3.4.3 Security/Recourse to assets

Varies; EETC has recourse to the aircraft (see Section 3.3.4, *"Section 1110 protection"*).

3.3.4.4 Typical duration

As mentioned in the introductory section above, senior tranches of EETCs generally have longer duration/amortisation schedules than the junior tranches. Typically the expected final maturity is around 8-12 years at issue, although the duration/weighted average life is generally materially lower than this given the expected amortisation schedule.

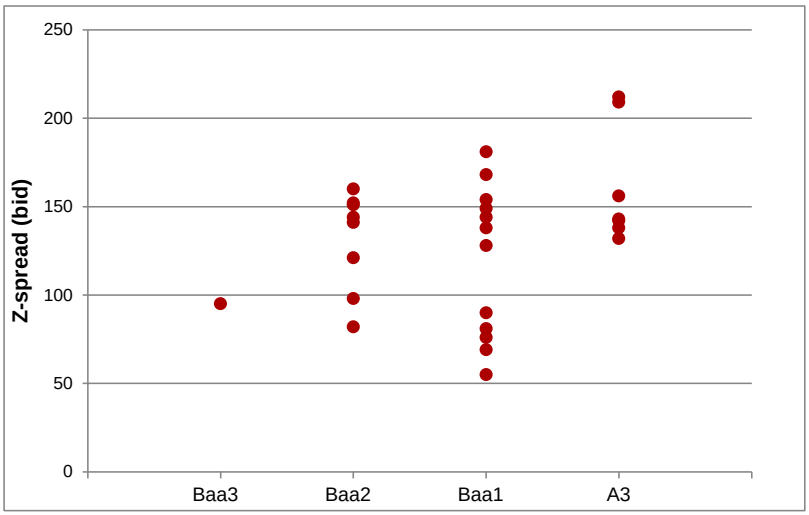
3.3.4.5 Typical clip size

A tranche EETC issue sizes vary widely, from around $300m, upwards to over $1bn; around $500m is fairly typical. Note that in the secondary market the outstanding notional will be materially lower than this given that the vast majority of A tranche EETCs are amortising. Clip sizes of $10m to $25m are more normal as explored in Section 3.3.4.8 below.

3.3.4.6 Typical return

We show (proprietary) data for selected recent A-tranche EETCs in the table at the end of this section. Spreads for the EETCs shown, split by Moody's rating, are shown in the chart below.

Graph 3.51 – typical returns for A-tranche EETCs



3.3.4.7 Format

EETCs are structured as dollar denominated bonds. Other formats are available for other types of aviation finance.

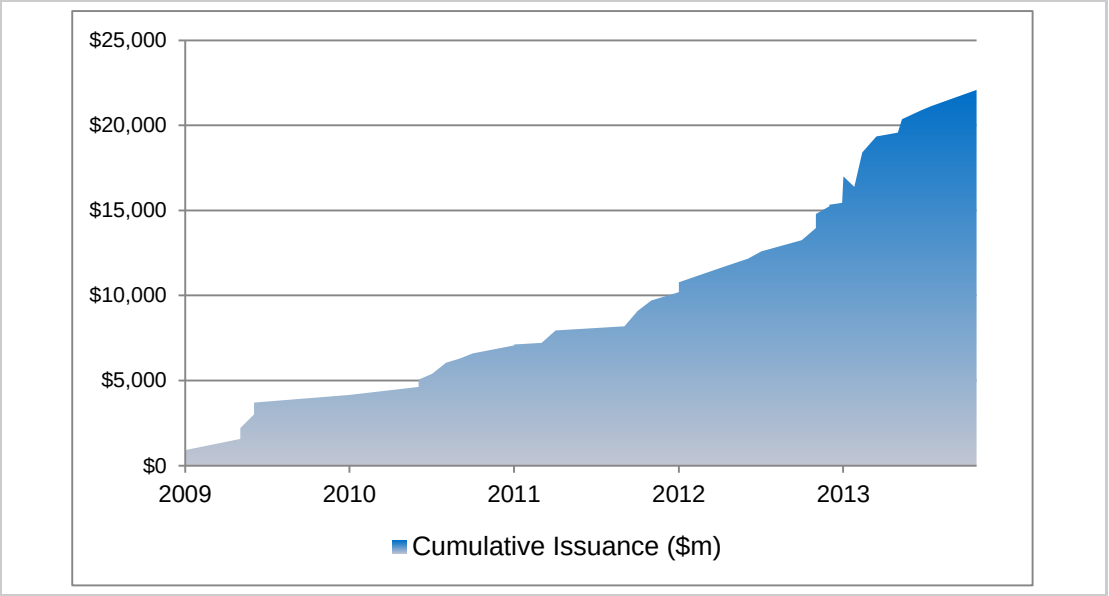
3.3.4.8 Liquidity

There is an active secondary market in EETCs, although only around five banks could truly be said to actively make markets in EETCs and the wider aviation market is dominated by a small number of players (c. 15). 'A' tranches are generally more liquid than the subordinate tranches due to their larger size and investor base. Trading volumes vary with some weeks very busy and others very quiet. – with typical trade sizes around $10m. Broker runs are generally for up to $25m in size, although sizes as large as $100m have been traded in a single block. The lack of new primary issuance in 2014 has created a more active secondary market currently.

3.3.4.9 Ability to source

Other than sourcing in the secondary market (see above), there is an average of around $4bn of primary issuance (averaged over the past five years). The chart below shows the cumulative issuance of EETCs from 2009.

Graph 3.52 – cumulative issuances of EETCs



3.3.4.10 Complexity of ongoing management

Under solvent operation of the airline, a holding of EETCs can be managed as a specialist bond portfolio. However, risk management of the exposure will be more complex. In principle, the credit risk of an EETC depends (roughly in order of importance) on the following factors:

1. The credit risk of the airline

2. The quality and desirability of the aircraft included (note that this is not merely a question of loan-to-value, i.e., the re-sale value of the included aircraft, but also the relative importance of the aircraft to the issuing airline, which will govern whether it is likely to continue operating the collateral in a bankruptcy)

3.3.4.11 Solvency II capital requirements

There is a risk that the standard formula capital charge could regard these as securitisations, since strictly-speaking the cash flows are derived from underlying ETCs for individual aircraft. In this scenario, and in particular given the rating and low likelihood of being defined a 'higher-quality' securitisation. The recent clarification that *"An exposure that creates a direct payment obligation for a transaction or scheme used to finance or operate physical assets should not be considered an exposure to a securitisation, even if the transaction or scheme has payment obligations of different seniority"* seems to remove this risk.

EETCs are in reality secured corporate bonds issued by the airlines (secured on underlying aircraft), and this is closer to how they trade in practice. In this case the standard formula capital charge would be the same as bonds of the equivalent rating/duration. For example, an unrated 10 year bond would attract a capital charge of 23.5% or 11.75% if the collateral was deemed to meet the requirements of Article 214, which we expect to be very difficult to apply for aircraft.

Given the fixed coupons, and the pre-defined principal amortisation schedule, we would expect that EETCs could potentially form part of a matching adjustment portfolio, subject to appropriate hedging of the USD exposure and given that the typical make-whole payment would be sufficient to replace the asset with cash flows generating an equivalent yield.

Table 3.53- selected Recent A-Tranche EETCs

	Coupon	EETC	Tranche	Agency Ratings	Expected Final Maturity	Amt. Issued (m)	Currently Outstanding (m)		Bid Price	Bid Yield to Par	Z-Sprd (Bid)	Aircraft
United (CAL)	9.000	2009-1	A	Baa2/BBB	7/8/2016	$389.7	$302.0	Amort.	$114.25	1.35%	82	3x777-200ER, 2x757-200, 5x737-900ER, 3x73780, 4x737-700
United (UAUA)	10.400	2009-1	A	Baa2/BBB+	11/1/2016	$659.0	$259.4	Amort.	$114.00	1.53%	98	10xA319, 6xA320, 7x767-300ER, 3x777-200ER5x747-400
United (UAUA)	9.750	2009-2	A	Baa3/BBB+	1/15/2017	$697.7	$419.3	Amort.	$114.25	1.56%	95	12xA319, 5xA320, 7x757-200, 3x777-200, 7x200ER, 3x747-400
Delta	6.200	2010-1	A	Baa1/A	7/2/2018	$450.0	$319.9	Amort.	$112.75	1.68%	55	10x737-800, 9x757-200, 3x767-300ER, 2x777-200LR
Delta	5.300	2011-1	A	Baa1/A	4/15/2019	$292.8	$211.3	Amort.	$110.75	2.17%	81	10x737-800, 12x757-200, 4x767-300ER
Delta	4.950	2010-2	A	Baa1/A	5/23/2019	$474.1	$343.8	Amort.	$109.25	2.00%	76	2x737-700, 6x737-800, 7x757-200, 3x757-300, 3x767-300ER 1x777-200LR, 1xA320-200, 3xMD-90
United (CAL)	7.250	2009-2	A	Baa2/BBB+	11/10/2019	$527.0	$422.5	Amort.	$117.50	3.10%	151	12x737-800, 3x757-200, 1x767400ER, 777-200ER
Delta	7.750	2009-1	A	Baa1/A	12/17/2019	$568.8	$377.2	Amort.	$117.75	2.07%	69	12x737-800, 9x757-200, 3x767300ER, 3x777-200LR
Delta	4.750	2012-1	A	Baa1/A	5/7/2020	$353.7	$317.2	Amort.	$109.00	2.44%	90	9xA319-100, 7xA320-200, 1x757-200, 8x767-300ER, 6x767-400ER
United (CAL)	4.750	2010-1	A	Baa2/A-	1/12/2021	$362.7	$312.1	Amort.	$107.75	2.94%	121	6x737-800, 4x737-900, 3x737-900ER, 5x767-400ER
AAL (AMR)	5.250	2011-1	A	Baa1/A-	7/31/2021	$503.3	$408.7	Amort.	$109.00	2.97%	128	15x737-800, 7x777-200ER, 6x757-200, 2x767-300ER
AAL (LCC)	6.250	2010-1	A	Baa1/A-	4/22/2023	$262.9	$211.9	Amort.	$113.75	3.55%	154	1xA320, 5xA321, 2xA330
AAL (LCC)	7.125	2011-1	A	Baa1/A-	10/22/2023	$293.9	$248.8	Amort.	$117.25	3.88%	181	6xA321, 1xA320, 2xA330
United (CAL)	4.150	2012-1	A	Baa2/A-	4/11/2024	$753.0	$716.0	Amort.	$102.50	3.75%	144	17x737-900ER, 4x787-8
AAL (LCC)	5.900	2012-1	A	Baa1/A-/A-	10/1/2024	$379.8	$352.1	Amort.	$112.75	3.70%	149	14xA321-200
Doric (Emirates)	5.125	2012-1	A	A3	11/30/2022	$433.8	$393.3	Amort.	$105.50	3.90%	209	4xA380
United (CAL)	4.000	2012-2	A	Baa2/A-/A	10/29/2024	$711.6	$691.4	Amort.	$101.50	3.77%	141	18x737-900ER, 3x787-8
AAL (LCC)	4.625	2012-2	A	Baa1/A-/A-	6/3/2025	$418.1	$418.1	Amort.	$105.25	3.75%	144	7 xA321-200, 4 xA330-200
AAL (AMR)	4.000	2013-1	A	A-/A-	7/15/2025	$506.7	$506.7	Amort.	$101.75	3.71%	142	8x737-823, 4x777-323ER, 1x777-

	Coupon	EETC	Tranche	Agency Ratings	Expected Final Maturity	Amt. Issued (m)	Currently Outstanding (m)		Bid Price	Bid Yield to Par	Z-Sprd (Bid)	Aircraft
												223ER
AAL (LCC)	3.950	2013-1	A	Baa1/A-/A-	11/15/2025	$620.1	$620.1	Amort.	$101.50	3.71%	138	14x321-231, 4x330-243
Air Canada	4.125	2013-1	A	Baa2/A/A	5/15/2025	$424.4	$414.3	Amort.	$100.75	4.01%	160	5x777-300ER
Hawaiian Airlines	3.900	2013-1	A	Ba1/BBB+/A-	1/15/2026	$328.3	$328.3	Amort.	$98.75	4.09%	168	6xA330-200
Doric (Emirates)	5.250	2013-1	A	A3	5/30/2023	$462.0	$442.1	Amort.	$105.75	3.95%	212	4xA380
British Airways	4.625	2013-1	A	A3/A/A	6/20/2024	$721.6	$721.5	Amort.	$105.25	3.75%	156	6xA320-200, 2x777-300ER, 6x787-8
United (UAL)	4.300	2013-1	A	A-/A	8/15/2025	$720.3	$720.3	Amort.	$103.00	3.86%	143	18x737-900ER, 3x787-8
AAL (AMR)	4.950	2013-2	A	A-/BBB+	1/15/2023	$1,408.1	$1,366.4	Amort.	$107.75	3.25%	138	41x737-823, 1x767-323ER, 14x757-223, 19x777-223ER
Virgin Australia	5.000	2013-1	A	Baa2/A	10/23/2023	$474.0	$457.7	Amort.	$106.50	3.02%	152	21x737-800, 2x737-700, 1x777-300ER
United (UAL)	4.000	2014-1	A	A-/A	4/11/2026	$736.6	$736.6	Amort.	$101.50	3.79%	132	13x737-924ER, 2x787-8, 1x787-9, 9xERJ175LR

Source: Bloomberg.

3.4 Other unsecured assets

There are many forms of unsecured debt. The common feature is the lack of specific collateral to secure the debt. As such, credit analysis is perhaps somewhat more straightforward and familiar to the reader than would be the case for other categories of assets studied in this paper.

There is clearly a large unsecured investment grade bond market which is relatively well understood and transparent. We have chosen to include in our definition of alternative asset classes private placement loans, emerging markets and high yield (non-investment grade) debt. While these markets tend to be more developed in the US and to an extent continental Europe, UK life insurers will tend to invest in the local currency and address the FX risk through a hedge overlay programme. Other unsecured assets are potentially interesting but the considerations in this paper are likely to be able to be extended for other similar assets.

Private placement loans tend to be more bespoke and potentially bilateral. This constrains the amount of public information which can be made available.

High yield and emerging markets debt are both widely traded with transparent pricing and indices. These two asset classes are higher yielding than most considered in this paper although the risk/return dynamics will not be to all investors tastes (recall for example that high yield is by definition sub investment grade and by most metrics less than half of EM debt is sub investment grade).

Table 3.54- Key features and considerations of unsecured assets

Attribute	Emerging Markets Debt	Private Placements	High Yield
Pricing transparency (availability of data, benchmarks and ratings)	Widely available with many indices across corporates vs sovereigns, investment grade vs all ratings, US dollar vs local	OTC trading. No specific benchmark index but performance can be measured against broad fixed income indices. Ratings range from AAA – below BBB.	Relatively good, with quoted prices reported to broker screens such as Bloomberg. No index exists for EETCs. Typical ratings range BBB to A for “A” tranche EETCs
Cashflow certainty	Cash flows are generally uncomplicated and have fewer bespoke features e.g. calls than other assets in this paper	Cash flows are dependent on the performance of the underlying collateral assets (prepayments and defaults). Therefore the investors in the senior debt tranches have security limited to the underlying assets.	Under solvent operation of the airline, EETCs pay a fixed interest coupon, and amortise according to a pre-defined amortisation schedule. Typically the airline has the option to redeem the EETC early; however this is subject to a make-whole payment. In the unfortunate event that an aircraft covered by an EETC were to crash, the full principle is covered by insurance
Security/ recourse to assets	None. This paper is typically unsecured.	Investors have security over the underlying collateral assets in the order of the seniority of the tranche.	Investors have good recourse to the aircraft underlying the EETC but this is not automatic if airline decides to continue to operate the aircraft and make scheduled payments in bankruptcy. This makes the requirement to seize collateral in this event relatively less likely. In a weak market for aircraft this may be a more favourable outcome for investors.
Typical duration	4-7 years on average. However there is wide variability	5y-12y term	Typical expected final maturity for A tranches is 8-12 years at issuance, although the duration will be materially shorter than this given the amortisation schedule
Typical clip size	$0.1bn-multi billion.	€ 0.3-0.6bn	$0.5bn (typical range $0.3-1.0bn)

Attribute	Emerging Markets Debt	Private Placements	High Yield
Typical return	5-6% on average although there is a wide variation across ratings	3mE+160bp for A tranche	Z-spreads for A tranche EETCs currently range from around 50bps up to 200bps, although 150bps is typical
Format of investment	Fixed rate notes	Fixed rate notes, some index-linked issuance. Although payments resemble a Bond (i.e. coupon rate plus nominal at maturity) the documentation is often based on a loan-type template.	USD fixed coupon structured bonds
Liquidity	High degree of liquidity in normal markets. However liquidity tends to be concentrated in some names e.g. Mexico and Brazil.	No established secondary market in UK, some evidence of secondary trading in US	Whilst EETCs are illiquid, there is an active secondary market. A tranches are generally more liquid than more subordinated tranches due to their larger size and investor base. Typical trading size is $10-25m.
Ability to source investments	Largely primary market opportunity	Largely primary market opportunity; requirement to have own rating capability	Other than sourcing in the secondary market (see under 'Liquidity'), there is an average of around $4bn of primary issuance annually (average over the past 5 years).
Complexity of ongoing management	Relatively straightforward. However one issue which investors must face is that for sovereign debt the key issue is often willingness to pay rather than ability to pay	Requirement for more direct and ongoing engagement with borrower; requirement to develop own valuation models as no market price	Under solvent operation of the airline, a holding of EETCs can be managed as a specialist bond portfolio. However, risk management of the exposure will be more complex as the credit risk of an EETC depends firstly on the credit risk of the operating airline and secondly on the quality and desirability (for the airline and the market) of the aircraft included.
Capital requirements and considerations	In the Standard Formula of Solvency II, the capital charge is captured under the spread risk is the same as for other bonds e.g. no specific treatment for emerging markets debt	In the Standard Formula of Solvency II, the capital charge is captured under the spread risk module. We would expect similar treatment to listed corporate bonds.	In the standard formula capital charge would be equivalent to corporate bonds of similar rating/duration. However there is a risk that EETCs could be seen as securitisations, since strictly speaking the cash flows are derived from underlying EETCs for individual aircraft. However, one could formulate a strong argument that EETCs are secured corporate bonds issued by the airlines (secured on underlying aircraft) Internal model firms would presumably also seek to make this argument. Given the fixed coupons and amortisation schedule, as well as the beneficial terms of typical make-whole payments, we would expect that EETCs could potentially form part of a matching adjustment portfolio, subject to appropriate hedging of the USD exposure.

3.4.1 Emerging markets debt

Emerging markets bonds are debt securities issued by companies and countries which are not considered part of the developed markets. The distinction between emerging and developed is rather arbitrary and not applied consistently but one possible definition is a country with low-to-middle per capita income as measured by the World Bank (less than US$12,195). Occasionally further differentiation is made between emerging and frontier markets but we do not observe this distinction in this paper.

Emerging markets debt has enjoyed a high profile in 2013 and 2014. In May 2013, the "taper tantrum" drove investors out of higher risk and interest rate sensitive investments such as

emerging markets debt. Since then, a regular series of localised issues (Ukraine/Russia tensions, Argentina/vulture fund investor legal dispute, Brazilian oil and gas company OMX' default etc.) have kept the asset class in the headlines.

In May 2013, the US Fed provided forward guidance which raised the prospect of gradually withdrawing (tapering) the extraordinary support it was providing to support the economy through asset purchases and the maintenance of low policy rates. The markets reacted negatively as the long end of the US curve increased by approximately 1%.

The credit markets sold off disproportionately as the Fed's support mechanisms had a knock on effect on risk assets. EM debt, much of it denominated in US dollars, became an obvious sell candidate for investors. The more illiquid investments prices e.g. Indonesia declined by more than liquid paper e.g. Mexico.

This risk on/risk off environment with very high correlations in times of stress is a sobering reminder that technical market features rather than credit fundamentals can have a significant impact on asset classes.

3.4.1.1 Pricing transparency (availability of data/ benchmarks/ ratings)

Relative to other asset classes discussed in this paper, pricing of this asset class is quite transparent. There are a wide variety of indices. 3 useful ones for insurers are JPM EMBI Global (USD denominated EM debt), JPM CEMBI Div (USD denominated Corporate EM debt), JPM GBIEMI Global Div (EM local debt).

The ratings profile of emerging markets debt is increasingly investment grade whereas previously the asset class was almost exclusively sub investment grade

Table 3.55 - Comparing Yields on 10-Year External (U.S. Dollar-denominated) Government Bonds

	Yield (%)	Spread to U.S. Treasuries (basis points)	S&P Rating
U.S. Treasuries	2.64	0	AA+
Chile	3.28	64	AA-
Mexico	3.82	118	BBB+
Peru	4.19	155	BBB+
Colombia	4.20	156	BBB
Russia	4.63	199	BBB
Brazil	4.67	203	BBB
Indonesia	4.96	231	BB+
Turkey	5.50	286	BB+
Ukraine	9.37	672	CCC

Source: Bloomberg as of 27 February 2014

3.4.1.2 Cash flow certainty

Relative to other asset classes described in this paper, the structure of emerging markets debt is relatively straightforward, with few examples of issuer optionality such as puts and calls

Typically the debt is structured as fixed rate bullet either in local currency or USD (also called external debt)

Perhaps more relevant for EM Sovereign debt and unlike the other asset classes considered in the paper, there is the issue of willingness to pay (e.g. a country could afford to pay its debts but may choose not to as a political matter).

3.4.1.3 Security

The assets are unsecured and so recourse to proceeds in the event of a default follow normal wind up procedures.

3.4.1.4 Typical duration

Many EM sovereigns will issue up to 10 year maturity debt. Examples of 10 year yields are in Figure 1

Of the 3 indices mentioned above the average duration is typically between 4 and 7 years (JPM EMBI Global (7 years), JPM CEMBI Div (6), JPM GBIEMI Global Div (5)).

2 recent examples include

- In March 2014 Mexico issued a £1B 100 year bond at 5.75% which has tightened since issue.
- In June 2014 Kenya raised $2B, ¼ of which in 5 year notes priced at 5.875% and the 10 year note priced at 6.875%

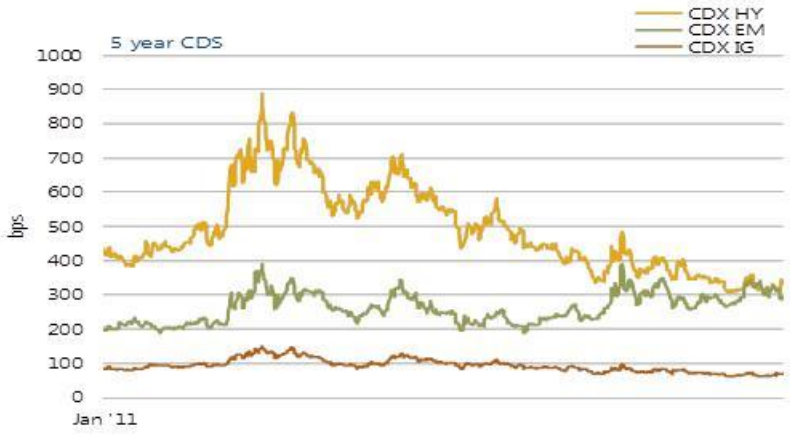
3.4.1.5 Typical clip size

Issuance size for emerging markets debt will typically be much larger than for other assets described in this section. Most benchmark issuance (large size, designed to attract liquidity and therefore lower pricing) will be in excess of $1B.

3.4.1.6 Typical return

Relative to both investment grade and high yield corporates, EM has become more attractively priced in recent months. As a comparison to alternatives discussed in the paper, one can examine CDS spreads

Graph 3.56 – CDS spreads for investment grade, high yield and emerging market bonds



Index: JPM EMBI Global

Emerging market debt asset class would have a 5.86% yield under the following basis

- Pricing data as of: 31 March 2014
- Currency (ideally only USD or £): USD
- Fixed vs Floating: Fixed, Duration: 7.11 years
- S&P rating: BBB-

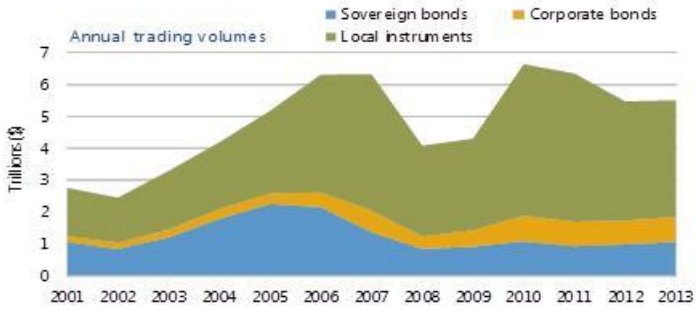
3.4.1.7 Format

Bonds are typically denominated in the local currency or USD. The latter is likely to be of most interest to UK life assurers as it is fairly easy to hedge the currency risk.
Euro and Sterling bonds are relatively unusual.

3.4.1.8 Liquidity

There is a deep and liquid market in emerging markets debt which is traded amongst many intermediaries. Trading volumes have grown over the last few years and rotated from sovereigns into corporate and local debt.
The recent decline in local debt trading volume likely reflects the effect of new U.S. regulations, which have discouraged banks from holding less liquid asset classes.

Graph 3.57 – trading volumes in emerging market debt



3.4.1.9 Ability to source

Relative to other asset classes, this is an easy asset to source with a long standing history.

The market has enjoyed over 16% annual average growth in size of EM local debt markets from 2002 to 2012. Local markets represent 88% of all EM debt outstanding in 2012. China accounts for a significant portion of this expansion, although the country has numerous barriers to foreign investor access

3.4.1.10 Complexity of ongoing management

Relative to other asset classes, ongoing management is relatively easy.

However in times of default/crisis (e.g. Argentina, Russia), the issue of legal recourse and willingness to pay may be a higher profile issue than ability to pay.

USD-denominated bonds may need to be hedged back to Sterling.

3.4.1.11 Solvency II capital requirements

SCR standard formula

A priori, we would expect most Emerging Markets debt to attract the same SCR capital charge for credit as comparably rated corporate bonds (e.g. a 10 year A rated emerging market bond attracts a charge of 10.5%), with emerging markets government bonds receiving a slightly more beneficial charge of 8.4%.

Crucially, Solvency 2's benign capital charge rules for European government bonds does not extend to emerging markets debt

Matching adjustment considerations

Emerging markets debt which is swapped back into Sterling (using cross currency swaps) appears to be eligible for matching adjustment.

3.4.2 Private placements

Private Placements are a form of unlisted debt (direct lending) issued by Mid-Sized and Larger Companies, structured as a syndicated note agreement and which looks similar to Listed Bonds from the point of view of an Investor, with the addition of greater structural protection. They are normally targeted at longer-term investors such as Insurers and Pension Funds.

3.4.2.1 Pricing transparency

Pricing transparency is very limited. Some of the larger brokers publish regular market reviews which cover the US Market, e.g. Bank of America Merrill Lynch[54]. This gives some transparency of recent new issue pricing. EY also cover the US PP market as part of a weekly review of New Issues[55]. Finally there are some US-based subscription magazines – "Private Placement Monitor" and "Private Placement Letter". From the data a significant number of capital raisings in the US market are from UK and European-based issuers (for which the issues may be denominated in USD, GBP, or EUR). The UK market (which is almost exclusively in GBP) is considerably smaller than the US market, and as a consequence does not have any publicly available data.

Private Placement Bonds are very lightly traded post issue, with no public disclosure of trades. Therefore benchmark indices do not exist. An investor would need to analyse their own book of Private Bonds, based on suitable mark-to-model valuations of the Bonds held. This could then be compared against easily available benchmarks for Listed Bonds. A pick-up in return vs. Listed Bonds would be expected as a reward for illiquidity (which might be partially offset by an allowance for the stronger covenants which generally exist for PPs).

Some companies issue both Listed Bonds and Private Placements, such that the Issuer Credit Rating can also be applied to the PP. However in most cases there will not be a public rating. In the US the market is organised to the extent that a central body[56] provides rating services. However in the UK the investor is required to determine a suitable rating, based on its own internal model (which may drive up the cost of investment).

3.4.2.2 Cash flow certainty

The table below summarises some of the main features to be considered here:

Table 3.58 – considerations for cash flow certainty for private placements

Fixed vs. floating	Coupons are mostly fixed rate, though occasionally can be variable rate. There is also some index-linked issuance in GBP.
Call protection	Call features are not common, other than Make-Whole calls (see below).
Bullet structures	Bullet Redemption is very much the market norm.
Make-whole call	Spens Clauses (a.k.a. "Make-Whole" clauses) are standardised at Treasuries+50bps in the US PP market, Gilts+50bps in the UK PP market.
Recovery on a Default	Due to the strength of covenants the recovery on a default event would generally be expected to be greater than for an equivalent Listed Bond. This is discussed further below.

There is very little published information on default experience, with one study by the Society of Actuaries Private Placement Committee in the US covering the period 1986 to 2002[57].

Main conclusions from this study were:

[54] "Debt Private Placements – Market Perspective".
[55] "Bank and Capital Markets New Issue Review"
[56] The National Association of Insurance Commissioners
[57] "1986-2002 Credit Risk Loss Experience Study: Private Placement Bonds", www.soa.org.

- During the period studied, private placements had materially better loss experience than publicly issued bonds, even after controlling for differences in aggregate portfolio quality.
- Privates with internal credit ratings that equate to AAA through BB at the start of each year had loss experience over one-year horizons similar to that for publicly issued bonds. Incidence or default rates were worse, but loss severities were better.
- Private placements with a most recent quality rating of B or riskier offered superior experience relative to public bonds. Incidence or default rates, loss severities, and economic loss rates were all better.

3.4.2.3 Security

The assets are unsecured and so recourse to proceeds in the event of a default follow normal wind up procedures.

3.4.2.4 Typical duration

Commonly 5-12 years term, although potentially up to 40 years.

3.4.2.5 Typical clip size

Typical clip sizes range around $300m/£200m, syndicated amongst a group of investors. Occasionally there are some much larger issues in the US Private Placement Market. There is no minimum issue size, although practically a new borrower would probably raise from £20m equivalent. On occasion there are some very large issues of around $1bn.

3.4.2.6 Typical return

This is difficult to assess for the reasons discussed above, but anecdotally in the US recent experience suggests about 20bps/25bps pick-up in gross spread above equivalent Listed Bonds. Some pick-up would be expected as a reward for the extra illiquidity of Private Placements.

3.4.2.7 Format

Similar to a Listed Bond, although the standard documentation has similarities to loan documentation, including financial covenants, structural protection, information and visitation rights. This is both for historic market reasons and also because investors view the product as providing similar protection to that available for bank finance.

Can be USD, GBP or EUR denominated.

3.4.2.8 Liquidity

There is no liquidity in the UK market, except where an issuer gets into trouble and the Bond might potentially have fallen in value significantly (e.g. to pricing in the 70's), at which point Hedge Funds may spend time looking at the transaction with a view to purchase the debt from the original investor.

There is some liquidity in the US PP market, where Bonds can sometimes be sold via brokers.

3.4.2.9 Ability to source

There is a large and well-established market in the US (with 47bn USD of new issues in 2013, including 4.5bn USD raised by UK-based issuers due to ease of access and standardised features of the market).

The US market has in fact been in existence for c90 years, while the UK market (which is strictly just one part of the European market) has been around since the mid-1990s. About 8bn EUR is raised each year in the German "Schuldstein" market (which has been in existence for around 20 years). In the UK, about 6bn GBP was raised in the 3 years to end-2013. There are a number of barriers which have been acting against the expansion of the

UK market, some of which could in theory be easily resolved in response to investor demand, notably the lack of pricing visibility and the lack of standardised documentation[58].

One driver for possible expansion of a GBP market for UK borrowers is the increasing cost of currency swaps (for hedging USD issues back to GBP) in line with recent changes to derivative regulations.

Deals are normally arranged by "Arranger Banks" (with Bank of America and RBS being the most active), who syndicate the issues to potential investors. Also some deals may be arranged as a purely bilateral transaction between the borrower and investor.

For most deals there will typically be 5-8 investing institutions in a syndicate. Each investor will know who the other investors are.

3.4.2.10 Complexity of ongoing management

A large number of issuers do not have a published credit rating, meaning that significant credit analysis is required up-front by the investor. Furthermore due to the more limited financial reporting from issuers there is also a requirement for on-going engagement between the investor(s) and the borrowing company. However assuming this engagement actually takes place PPs typically afford an investor greater information rights (e.g. the right to ask questions, visit the borrower, and even inspect books & records).

Issuers are typically less well-researched and less well-understood by the wider public bond investor community.

In the US PP market there is a large degree of standardisation for most of the documentation. This also applies to UK and mainland European companies accessing funds via that market in EUR or GBP. Efforts to encourage more local European or UK markets are considering whether any differing standardisation of documentation would help local interest.

3.4.2.11 Solvency II capital requirements

Private Placement Bonds or loans should be treated similarly to listed bonds but are generally unrated. A 10 year duration unrated private placement bond or loan attracts a capital charge of 23.5%.

The strength of modified Spens clauses is likely to be argued to be adequate to allow matching adjustment for assets backing annuity liabilities. In the US private placement market, early repayments are generally permitted with a present value of all future coupons and redemptions at swap rate plus 50bps.

It is important however that the regulator is comfortable with the approach taken to determining internal credit ratings, in particular where ratings are near the borderline between investment grade and high-yield.

One important further consideration, given that this market is dominated by USD assets, is the foreign exchange stress where the asset has been currency-swapped into the investor's local currency.

3.4.3 High yield bonds

High-yield bonds are debt securities issued by companies with sub investment grade ratings. The companies issuing the debt are usually seeking funding for growth or working capital.

The sub investment grade rating implies a greater chance of default than a comparable investment grade bond. Hence these companies must offer a higher coupon, and maybe even additional structural features, to encourage buying interest. The market is dominated by US issuers.

Investopedia[59] provides the following explanation:

[58] See the Association of Corporate Treasurers Report entitled " PP15+ Working Group on Developing a UK Private Placement Market", http://www.treasurers.org/node/8624.

"A high paying bond with a lower credit rating than investment-grade corporate bonds, Treasury bonds and municipal bonds. Because of the higher risk of default, these bonds pay a higher yield than investment grade bonds.
All "junk" connotations aside, high-yield bonds are widely held by investors worldwide, although most participate through the use of mutual funds or exchange-traded funds. The yield spread between investment grade and high-yield will fluctuate over time, depending on the state of the economy, as well as company and sector-specific events.
Generally, investors in high-yield bonds can expect at least 150 to 300 basis points greater yield compared to investment-grade bonds at any given time. Mutual funds provide a good way to gain exposure without the undue risk of investing in just one issuer's junk bonds."

3.4.3.1 Pricing transparency

There are a large number of published indices for high-yield bonds, for example:

- Bloomberg USD HY Corporate Bond Index
- J.P.Morgan USD Global HY Index
- S&P US Issued HY Corporate Bond Index
- CSFB High Yield Index
- Barclays Global HY Index
- Merrill Lynch US HY Master
- Citigroup HY Market Index

As an example, the Bloomberg Index had a market capitalisation of $1.37 trillion and 2,078 members as at 31 March 2014.

High-yield bonds score highly, relative to some other asset classes, in terms of pricing transparency and availability of data.

3.4.3.2 Cash flow certainty

There are a number of structural features for the investor to consider before committing funds:

Table 3.59 – considerations for cash flow certainty for high yield debt

Fixed vs. floating	Coupons are typically fixed rate and pay twice annually. However some deals may be floating rate – the issuance of these tends to increase during periods of rising rates.
Call protection	Call protection is typically out to half of the term of the bond, although terms can be negotiated during the underwriting process. (Floating rate paper is typically callable after 1 or 2 years.) Call premiums come into effect after the end of the call protection period. Usually the premium on the first call date is par plus 50% of the coupon, declining each year thereafter.
Bullet structures	These offer full term call protection. As a consequence, they typically command lower rates of interest.
Make-whole call	Make-whole call premiums are prevalent for high-yield bonds. The NPV calculation typically refers to a UST-based discount rate.

[59] http://www.investopedia.com/terms/h/high_yield_bond.asp

Put provisions	Put provisions allow bondholders to accelerate payments due to certain events, e.g. change-of-control.
Equity claw-backs	Equity warrants allow the issuer to refinance a certain amount of the outstanding bonds with proceeds from an equity offering. E.g. the claw-back would be for up to 35% of the outstanding bond issue, at a level equal to par plus the coupon.
Equity warrants	Equity warrants are often attached to the most highly speculative issues. These bonds carry a defined number of warrants to purchase equity in the company at a later date.

The inclusion, or not, of these features will have an important bearing on the degree of cash flow certainty for the insurer from the specific high-yield bond being considered.

According to J.P.Morgan[60], 2013 led to an increase in the total volume of called debt. 300 companies called all or part of 384 issues totalling $104.6bn, compared with 392 called deals totalling $102.1bn during 2012.

3.4.3.3 Security

The assets are unsecured and so recourse to proceeds in the event of a default follow normal wind up procedures.

3.4.3.4 Typical duration

High-yield bonds typically have a 7-10 year maturity.

The average duration is typically in the region of 4 years. As an example, reported durations for two of the published high-yield indices are:

- J.P.Morgan Global HY Index: 3.7 years[61], 29 November 2013
- Bloomberg USD HY Corporate Bond Index: 4.1 years[62], 31 March 2014

3.4.3.5 Typical clip size

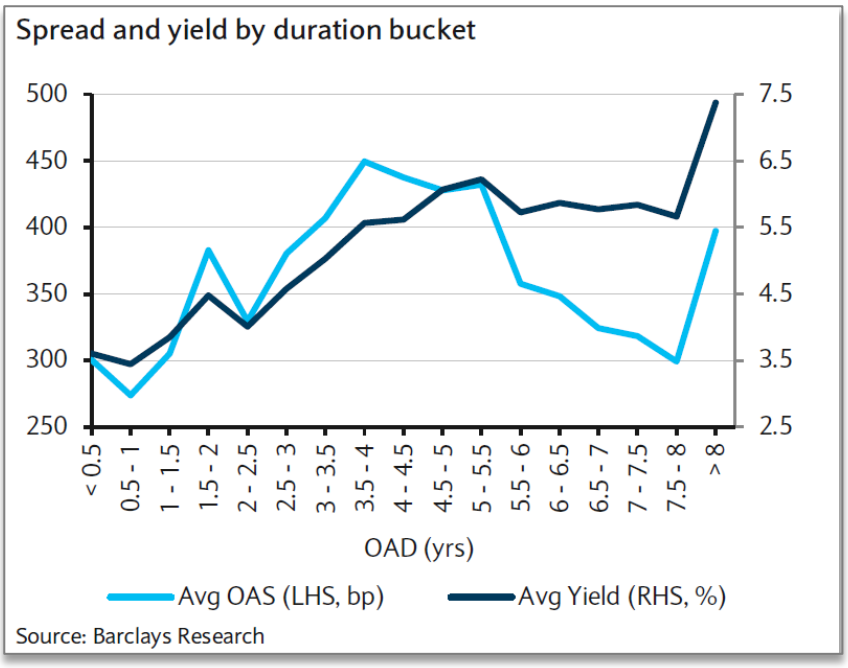
USD-denominated issues over 2013 ranged in size from $15m to $4,250m. The average size for the near 800 issues was c. $480m.[63]

3.4.3.6 Typical return

According to Barclays research[64], the spread curve for high-yield bonds peaks around the 4 year duration point (which corresponds approximately to the 6-7 year maturity point).

Graph 3.60 – spread and yield of high yield bonds by duration bucket

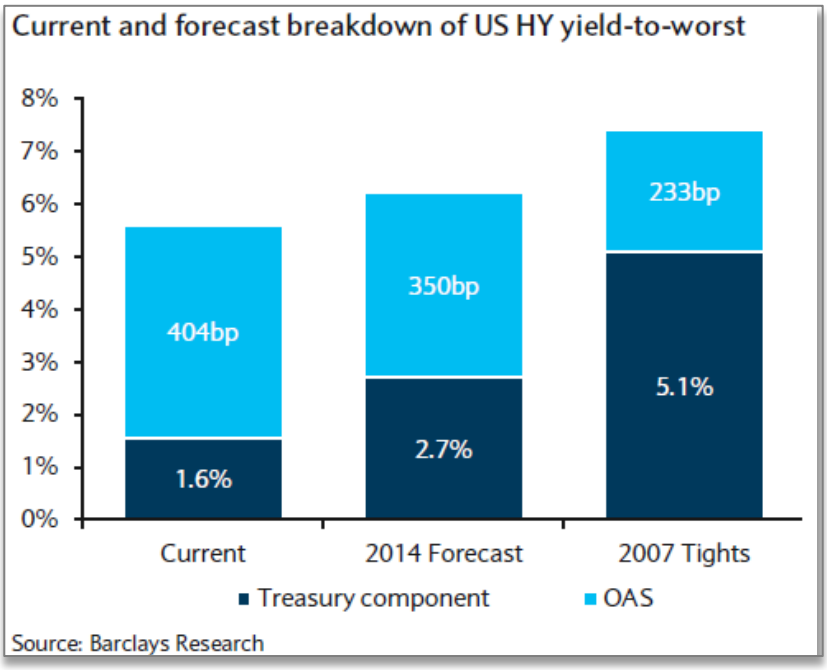
[60] J.P.Morgan 2013 High-Yield Annual Review
[61] J.P.Morgan 2013 High-Yield Annual Review
[62] Bloomberg
[63] J.P.Morgan 2013 High-Yield Annual Review
[64] Barclays Global Credit Outlook 2014



As an example, the Bloomberg USD HY Corporate Bond Index had a yield to worst of 5.56% at 31 March 2014, corresponding to a 4.1 year effective duration.

The Barclays base case forecast for 2014 takes USD high-yield spreads down from just over 400bps (at the end of 2013) to 350bp.

Graph 3.61 – illustration of recent history, current and forecast spreads



3.4.3.7 Format

Bonds can be USD, GBP or EUR denominated.

3.4.3.8 Liquidity

Secondary trading of high-yield bonds is well-established and there is a deep and active marketplace.

3.4.3.9 Ability to source

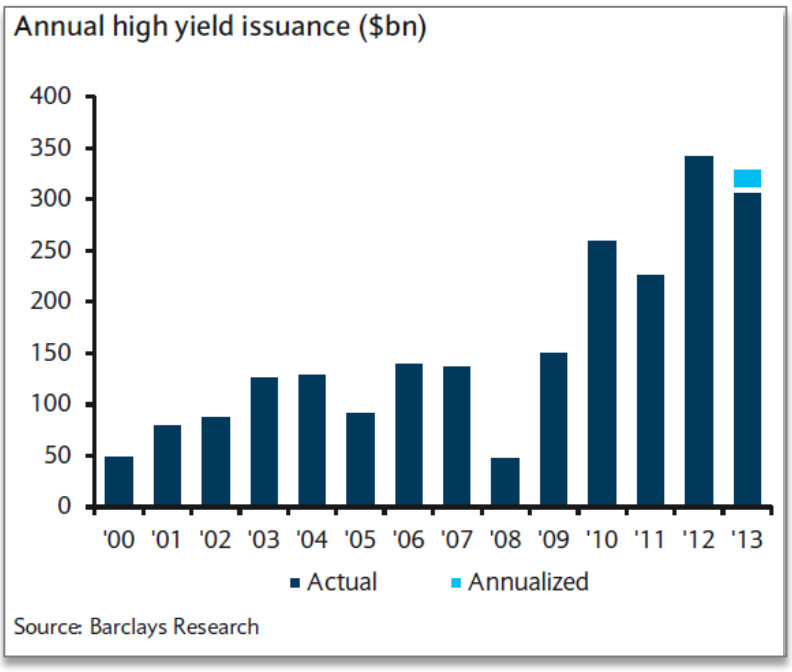
J.P. Morgan and Barclays forecast USD high-yield bond issuance in the region of $300bn for 2014.[65][66]

Barclays forecasts EUR bond supply of €75-85bn for 2014, in line with the volumes seen in 2013.

GBP-denominated issuance is reported to have been a large growth area for the European high-yield market. Barclays reports that GBP represented over 15% of the overall Pan Euro High-Yield ex-Fins Index at the end of 2013 (by market value).

[65] J.P.Morgan 2013 High-Yield Annual Review
[66] Barclays Global Credit Outlook 2014

Graph 3.62 – issuance of high yield debt



3.4.3.10 Complexity of ongoing management

There are no special considerations for high-yield bonds, over and above those for investment grade corporate bonds that UK insurance companies are very familiar with investing in and managing.

Note that USD-denominated bonds may need to be hedged back to Sterling.

3.4.3.11 Solvency II capital requirements

High-yield bonds are debt securities issued by companies with sub investment grade ratings. Bonds and loans fall under the spread risk sub-module of the Solvency II standard formula SCR. For example, a BB rated asset with a 10 year duration has a charge of 35%.

For reference, the split of the J.P.Morgan Domestic HY Index at 31 October 2013[67] was as follows:

Table 3.63 – JP Morgan High Yield Index breakdown

	JPMorgan Domestic HY Index
Split BBB	8.2%
BB	21.2%
Split BB	12.6%
B	33.5%
Split B	10.7%
CCC	11.8%
NR	0.9%

Some of the structural features identified in section 2.5 may present problems for qualifying as an eligible asset under the latest draft of the matching adjustment rules.

Table 3.64 – matching adjustment considerations for high yield debt

[67] J.P.Morgan 2013 High-Yield Annual Review

Fixed vs. floating	Floating rate paper needs to be swapped to fixed.
Call protection	Call premiums are not sufficient to mitigate issuer call options.
Equity claw-backs	Equity claw-backs would make the bond ineligible for the matching adjustment.

Note also that USD-denominated bonds would need to be hedged back to Sterling if the intention is to use them to back Sterling-denominated annuity liabilities.

3.5 Other assets

In the previous sections, we have covered different types of alternative fixed-income asset classes which could provide insurers with potential higher yield, largely at the cost of liquidity. In this section, we explore some assets that could also provide higher and arguably uncorrelated yields with traditional assets. This section is not designed to be comprehensive but widens the scope beyond straightforward fixed income investments. Other candidate assets for inclusion (e.g. commodities) were considered even more niche than those included here.

- Insurance Linked Securities (ILS), in particular Catastrophe ("Cat") bonds: this strategy has low correlation to the general financial market, but does involve expertise to invest. Returns are typically seasonal but, over the long term, the strategy has tended to provide positive risk adjusted returns.

- Hedge funds: can offer insurers low-correlated and superior risk-adjusted returns to mainstream equities and fixed-income assets. Significant expertise is likely required in the due diligence of manager selection and portfolio construction.

- Private equity: is viewed as long-term investment and the least liquid one among the three assets. Better returns can be achieved compared to public equities but with comparable volatility if not higher.

For each of these assets, it is expected that the "other equity" risk module is used for standard formula firms investing in the assets.

There are two different types of equity under Solvency II – "global" equity and "other" equity. If investing through listed funds in regulated markets in the countries which are members of the EEA or the OECD, the investment may fall within the "global" category. However, it would be more typical for PE and hedge funds to fall into the "other" category which covers unlisted equity and listed equity in certain emerging markets.

The capital charge for equity includes a symmetric adjustment to cover the risk arising from changes in the level of equity prices (a function of the current level of an appropriate equity index and a weighted average level of that index). This means that the charge can move within a range of twenty percentage points. For "global" equity the capital charge is 29-49% and for "other" equity the capital charge is 39-59%.

The table below summarises the key characteristics of each of the 'Other' assets:

Table 3.65 – key considerations for other assets

	Insurance Linked Securities	Hedge funds	Private Equity
Pricing transparency	Limited number of indexes Most Cat bonds are rated	Hedge funds typically report NAVs only monthly, sometimes with a significant delay. Benchmark indices are available but it's debatable how representative these are.	There are some listed PE funds and indices. In general, however, PE funds are not listed on any exchanges and can't be marked to market.
Cash flow certainty	Absent any trigger event, cash flows are well defined for Cat bonds - though coupons are floating rate. If a trigger event occurs, there is a reduction in the principal of the bond.	Hedge funds are most often open-ended now and allow additions or withdrawals by their investors (generally on a monthly or quarterly basis). Certain level of volatility in daily value.	Date of initial investment is not generally known in advance. Generally a definite 'maturity' of the fund, unlike with listed equity. Generally dividends (if any) don't feed through to the fund investors so no income received before maturity.
Security / Recourse to	No underlying assets. Investors' initial funds are held	Issues with investors being unable to retrieve	Equity investors are the ultimate beneficial owner

assets	in a secure collateral account.	their investment and access their capital during the Global Financial Crisis. Post-crisis, managed account platforms are gaining significant popularity - assets are ultimately owned by investors and are held by independent custodian.	of physical assets or contracts as long as the contractual promises to any debt holders are fully serviced.
Typical duration	3-5 years	Open-ended, typically viewed as a long-term investment	Fixed duration which is typically 8-15 years
Typical clip size	Generally $50-500m in the primary market. Smaller clip sizes are possible through investment in Cat bond funds or through the secondary market.	$500,000 is a common minimum investment level, but some established and sought after funds often have minimum level of $10m. Fund size varies significantly.	Most PE funds require significant initial commitment (usually upwards of £1m) from investors. Fund sizes typically range from a few hundred million to tens of billions. Deal sizes tend to range from only a few million to billions.
Current typical return	Dependent on loss probability, trigger type and also the stage of the insurance cycle, as well as general credit market conditions. Typically Cat bonds achieve mid-high single-digit (%) spreads	Over the last 15 years the HFRI Fund Weighted Composite has generated 7% per annum compared to 4.5% for the S&P 500. However, individual hedge fund returns vary significantly across strategies, funds, regions and other factors.	Historical returns have been up to 3% above public equity according to some studies it is debatable if this is a likely trend for the future.
Format	Bonds (or funds of bonds)	Equity: Direct investment, Investment in Fund of Hedge Funds, Managed accounts, UCITS vehicles	Equity: Most PE funds are structured as limited partnerships with a fixed term
Liquidity	Mainly primary market but now a functioning secondary market.	Managers typically require an initial lock-up period (up to two-years, but most are limited to one year) This may be a hard lock (no withdrawal) or soft lock (withdrawal allowed but with early redemption penalty). Post lock-up period, hedge funds can offer monthly, quarterly or annual liquidity, with a minimum period of notice for redemption	Once invested, liquidity of invested funds may be very difficult to achieve before the manager realises the investments in the portfolio though it is possible to sell investments privately. Better liquidity if investing through a listed fund/provider.
Ability to source	A relatively small number of dedicated ILS investors exist - investing in one of these Cat funds represents the lowest cost entry point into this asset class given the investment expertise which would otherwise be required.	The costs of establishing the infrastructure and relationships required except where using managed account platform. Experience and effort required to undertake the due diligence needed through initial manager selection and portfolio construction.	Can get access to investment in PE by investing in listed PE funds very easily. It is also reasonably straightforward to commit money to a sponsor as there are a number of PE firms to invest through.
Complexity of	Generally, little specialist	Manager review and	Little ongoing

ongoing management	expertise required to manage these investments once on the books, to collect payments due, or in managing through triggering events. Specialist expertise needed to monitor underlying risks or for due diligence to invest directly in the primary market.	risk management evaluation is labour intensive and likely to require significant in-house resources. For insurers this is often outsourced to "fund of hedge fund" managers.	management needed for a buy and hold strategy. Significant due diligence required on investments to take active interest in investments.
Solvency II capital requirements per standard formula	Where a "look-through" basis is possible for investment in a fund, the capital treatment depends on the underlying assets. However, there can be issues over transparency of holdings. With no 'look-through', capital charge of Type II equity is then applied (49% stress before systematic adjustment). With look through, the level 3 text suggests that Cat bonds need to consider both the credit risk and catastrophe risk underlying the assets.	Where a "look-through" basis is possible, the capital treatment depends on the underlying assets. However, there can be issues over transparency of holdings. With no 'look-through', capital charge of Type II equity is then applied (49% stress before systematic adjustment).	Falls into the "other" equity category for which the capital charge is a 49% stress before systematic adjustment.

3.5.1 Insurance Linked Securities

There is a wide spectrum of assets which fall under the general category of 'Insurance-linked Securities', including Cat Bonds, Sidecars, XXX[68] securitisations, other health or mortality-linked bonds, and VIF securitisations. Cat bonds receive more focus on the basis of their status as a more established market, with materially higher outstanding issuance and an established secondary market.

We would not anticipate insurers with material general insurance exposure on their balance sheet to view Cat bonds as a potential investment; insurance investors in this space, if any, would be likely to be pure life insurance players. In addition XXX securitisations have on occasion been mooted as potential investments for insurers with pure longevity exposure (i.e. annuity writers) as a diversifying investment, albeit there may be little or no overlap between the characteristics of the covered lives under XXX compared to a typical annuity book. Life insurers have invested in Cat bonds in the past, although generally constituting not more than low single digit % of the total investor base in any given year.

The following commentary relates primarily to Cat bonds on the basis both of greater transparency and ease of access, as well as potentially greater relevance to readers of this paper.

The Structure of a Cat Bond

The typical structure of a Cat bond works as follows (in highly simplified form):

A Special Purpose Vehicle is set up by the Sponsor (i.e. the ceding (re-)insurer); this is typically a Bermudan or Cayman Islands entity

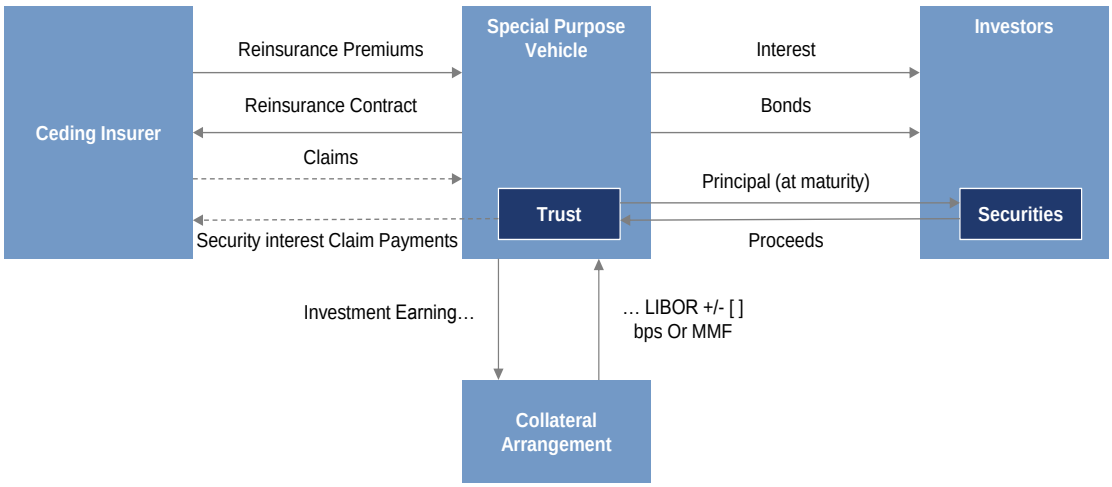
The SPV enters into a catastrophe reinsurance contract with the ceding (re-)insurer, for which it receives a premium, and the assets used to back the resultant liability are provided by the SPV issuing Cat bonds to investors

The assets in the SPV are held in trust and could be invested in a range of safe collateral types – typically treasury money-market funds

Absent a "trigger event", the SPV pays interest to investors and returns principal at maturity. If there is a trigger event meeting the criteria of the bond, the ceding (re-)insurer can claim assets from the trust and investors suffer a write-down of principal on the bonds.

Diagram 3.66– typical structure of an insurance linked security

[68] Regulation XXX is a US regulation specifying the reserving requirements for universal life business



Cat bonds can cover a wide range of events (or “Perils”), typically limited to a specific geography and event type, e.g. US Hurricane, European windstorm, Japanese earthquake. In addition the form of the trigger type can vary across a spectrum depending on how much basis risk the cedant is prepared to take, and, on the flip side, how much modelling expertise/risk the investor is prepared to accept, e.g.:

- Parametric trigger: Based on observed features of the event itself (e.g. magnitude and epicentre of the earthquake)
- Index trigger: Based on the industry loss reported by recognised agencies
- Model-based loss: Based on the predicted loss output from specialist catastrophe modelling software when applied to a specified “exposure portfolio”
- Indemnity: Based on the cedant’s actual losses

For each, the investor will only suffer losses once the triggering event passes a specific threshold of severity (the attachment point), and the structure will offer protection up to the point at which investors suffer a total loss of principal (the exhaustion point). Some Cat bonds only suffer losses on a second, or subsequent, event. As an early example of such a ‘second event’ bond, Atlas Re II, sponsored by SCOR in 2001, protected SCOR against 2nd or 3rd occurrences of European windstorms or Japanese/Californian earthquakes in a given year.

3.5.1.1 Pricing Transparency and Ratings

The secondary market for Cat bonds is not yet fully developed, with most trades executed on a matched trade basis. However, several intermediaries (including brokers and some banks) act as market makers and provide indicative bid-offer spreads on all traded Cat bonds. In addition, there exist a limited number of Cat bond indexes, e.g.:

- Swiss Re Cat Bond Total Return Index
- AON Cat Bond ILS Total Return Index
- AON Cat Bond US EQ Total Return Index
- AON Cat Bond BB Total Return Index
- AON Cat Bond US HU Total Return Index

The majority of Cat bonds are rated (generally a single rating, most commonly S&P), although some are unrated. Generally Cat bonds are sub-investment grade (average BB area). Note that Cat bond ratings are generally assigned strictly based on the probability of

losses on the bond which is calculated based on Catastrophe models. In this respect the ratings differ materially in terms of approach from vanilla corporate bonds.

3.5.1.2 Cash-flow certainty

Absent any trigger events occurring over the life of the bond, cash flows from Cat bonds are well-defined. However from a UK insurance perspective, considerations include the fact that Cat bond coupons are floating rate (often coupons are defined as a spread over the US Treasury money-market funds rate, rather than LIBOR), and are generally US dollar denominated.

Insurance events meeting the trigger type will begin to reduce the principal at the attachment point and principal write down will continue through to the exhaustion point. Since the inception of the market in the mid-1990s a total of twelve transactions have suffered losses to principal, with losses for all twelve combined totalling $990m. This can be set in the context of $45.5bn total issuance, i.e. 2.2% of total issued notional.

However, it should also be noted that four of these losses were as a result of the Lehman Brothers bankruptcy in 2008, rather than as a result of any trigger events. In theory Cat bonds should contain limited counterparty risk – in particular from the point of view of the issuing (re-)insurer the proceeds from issuance are held in a collateral trust. However, to increase returns to investors a number of Cat bonds issued prior to 2008 invested collateral in Total Return Swaps. Four of these had Lehman Brothers as their TRS counterparty and suffered losses to principal as a result of Lehman's default.

Subsequent to Lehman, naturally there has been considerably more attention paid to the collateral profile of Cat bonds, resulting in the majority of Cat bonds investing principal exclusively in treasury money-market funds.

In addition, for certain trigger types (in particular indemnity or industry loss), return of principal can be delayed by the need to establish conclusively whether a trigger event has occurred and, if so, to what degree the bond has been impacted.

3.5.1.3 Security / recourse to assets

Whilst there are no underlying assets for a Cat bond, the investor's initial funds are held in a secure collateral account bankruptcy remote from the sponsor.

3.5.1.4 Typical Duration

Generally the term of a Cat bond is between 3-5 years (3 years is typical).

3.5.1.5 Typical clip size

Cat bonds can cover a wide range of issuance notional, generally between $50-500m. Larger issues are typically split into a number of classes.

Clip sizes can be much smaller than this for investment in ILS funds or through investment in the secondary market.

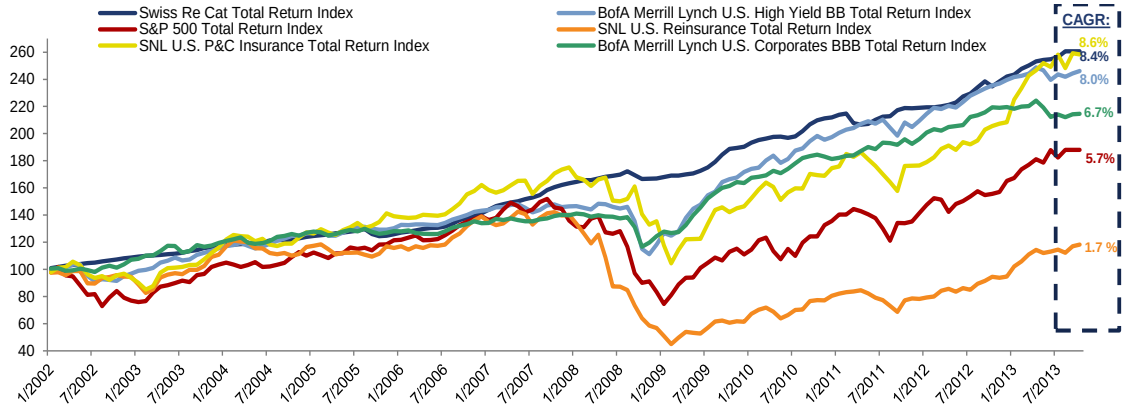
3.5.1.6 Typical return

Spreads on Cat bonds are dependent on loss probability, trigger type and also the stage of the insurance cycle, as well as general credit market conditions. Typically Cat-bonds achieve mid-high single-digit (%) spreads. For 2013 issuance a typical spread on a 2% attachment probability bond was around 540bps, with spreads increasing broadly linearly with increasing attachment probability. This is generally comparable with high-yield bonds of similar rating, although recent focus on ILS as a diversifying asset has compressed Cat bond spreads.

Over the past decade the Swiss Re Cat Bond Total Return Index has returned 8.4% (annualised) with a standard deviation of 4.5%. One attractive feature of the market heretofore has been that losses (and hence returns) are genuinely uncorrelated with financial market conditions (see below chart comparing the Swiss Re Cat Total Return Index with a range of other market indexes dating back to 2002). However, whilst losses will always be strictly linked to natural events, the increasing attraction of these bonds to real money

investors searching for yield could mean that the mark-to-market value of bonds in secondary trading may be increasingly sensitive to financial markets.

Graph 3.67- spreads of certain insurance linked securities



Spreads in the secondary market are also seasonal (e.g. prices on US hurricane Cat bonds are generally depressed prior to the start of the US hurricane season and recover at the end of the season)

3.5.1.7 Format

Bonds (generally 144A – US bonds available for sale to qualified institutional buyers only).

3.5.1.8 Liquidity

Cat bonds remain largely a primary market investment opportunity; however there is now a functioning secondary market which trades daily and a number of broker-dealers provide price runs.

3.5.1.9 Ability to source

There is around $6bn of Cat bond issuance annually. A relatively small number of dedicated ILS investors exist, and generally speaking these will take a disproportionate amount of primary issuance (typically 60-75% in recent years) – investing in one of these Cat funds represents the lowest cost entry point into this asset class given the investment expertise which would otherwise be required. Given the relatively low total issuance volumes it is possible that an insurer prepared to invest materially in this asset class would be able to tailor their investment mandate to a significant degree.

3.5.1.10 Complexity of ongoing management

Considerable specialist expertise is required to adequately monitor the underlying risks to principal of Cat bonds. Monitoring of the covered catastrophe risk is, however, facilitated by the existence of dedicated catastrophe modelling firms (e.g. RMS, AIR).

Relative to certain other “alternative fixed income” investments discussed elsewhere in this paper, there is generally little specialist expertise required to manage these investments once on the books, or to collect payments due, or, generally, in managing through triggering events if purchased through a fund. However, modelling these assets may be particularly difficult.

3.5.1.11 Solvency II capital requirements

For standard formula firms, if look through is not available and investment is made through a fund, the Type 2 equity risk module would be used and so the capital charge is 49% + / - symmetric adjustment.

Otherwise, if look through is available, we would expect that Cat bonds would be likely to be treated under spread risk module equivalently to bonds of a similar rating, but with additional consideration of catastrophe risks. We have not attempted to quantify this here due to the idiosyncrasy of individual Cat bonds.

Treatment under the catastrophe risk module only would be an interesting approach given resulting diversification benefits – however arguing for this treatment appears not to be possible unless in the context of a more detailed (i.e. internal) model. As a first step towards a differentiated treatment under an internal model it should be possible to argue for a correlation with other credit assets lower than 100%, given the data that exists demonstrating lack of correlation over the past decade.

Matching adjustment treatment would potentially be problematic in particular for indemnity or industry loss bonds, where there is a potential for extension in order for the extent of any losses to be established prior to principal repayment at maturity. In any case the bond cash flows would need to be swapped back to fixed-rate GBP from a USD floating-rate (see Section 2.4 on currency hedging).

3.5.2 Hedge Funds

A hedge fund constitutes an investment program whereby the managers or partners seek absolute returns by exploiting investment opportunities while protecting principal from potential financial loss[69]. Similar to mutual funds, hedge funds are "pooled" vehicles or managed portfolio where a manager or group of managers select securities and then group them in a single portfolio. The fund raising may either: grow over time by selling portions of the fund to investor or; perform rounds of capital raising such that when the fund raises enough money to support its mandate, the funds are invested. As such the fund is managing capital on behalf of the institutions which have committed money during the capital raising rounds.

Hedge funds also differ from traditional mutual funds in many aspects: leveraging, fees, liquidity, target investors and regulations.

Hedge fund investments can be subdivided into four main strategies:

1. Global Macro – focus on global macroeconomic variables such as rates, FX.
2. Event-driven – focus on distressed companies and companies going through M&A
3. Market-neutral Funds aka Long / Short funds aiming to take no overall exposure to the market
4. Multi Strategy – any combination of the above. Investors can gain exposure to the whole HF or specific funds within the HF.

Depending on the risk / return appetite of the insurer they can allocate capital to specific strategies or a fund of hedge funds, which largely performs manager selection on the investor's behalf albeit with an extra layer of fees.

Hedge funds can offer insurers low-correlated and expect to return higher risk-adjusted returns to mainstream equities and fixed-income assets. For example, Deutsche Bank's 11th Annual Alternative Investment Survey, published in February 2013, found that 58% of the institutional investors it polled achieved 5-10% returns in their hedge fund portfolios in 2012. A similar percentage reported portfolio volatility of 5-10%. It would have been difficult to find this type of risk-adjusted return in the fixed income or equity markets in 2012.

The same survey reveals that, around half of the insurers are planning to increase their allocations to hedge funds significantly (by over $500million) in the next couple of years. However, several factors such as lack of internal resources, lack of transparency, high risk capital under Solvency II standard formula are keeping most insurance companies, especially the smaller ones, from investing in hedge funds.

Currently European insurers' allocation to Hedge Funds remains at a relatively low level of below 5% of the portfolio. Deutsche Bank find that, at the end of 2010, the insurance industry had invested only 1.24% of its $5 trillion in general account investments in hedge funds, compared to pension fund's average allocation of around 5%.

[69] Alternative Investment Management Association, Roadmap to Hedge Funds (2012 ed.)

In the section below, we look at some of the basic characteristics of hedge fund as an asset class in more detail.

3.5.2.1 Pricing Transparency

Hedge funds' Net Asset Value (NAV), defined as a hedge fund's total assets minus the value of its total liabilities, is the basis for ascertaining the prices applicable to investor subscriptions and redemptions. Hedge fund administrators normally provide valuation and accounting services as part of the back office support. Most of the hedge funds also use an independent accounting firm to audit the assets of the fund (NAV and AUM). However, unlike mutual funds which usually disclose daily per share NAV information to public, hedge funds typically report NAVs monthly, sometimes with a significant delay. As some hedge funds invest in assets that have no market value these assets are marked-to-model. This causes delays to asset valuation and the use of "stale" prices can lead to underestimation of true variances and correlation.

Benchmark indices are available but it's debatable how representative these are due to the diversity of hedge funds and their associated strategies. *HFRI Fund Weighted Composite Index* and *HFRI Fund of Funds Composite Index* have the broadest acceptance as general indicators of sector performance but are not investible. The investible indices, the HFRX indices with the flagship *HFRX Global Hedge Fund Index*, comprise only a small fraction of overall market share and have generally underperformed due to the negative selection bias (the "best" managers shun the requirement for full transparency and liquidity required to participate). The HFRX index is typically shown as being 500bps lower than HFRI index on an annual basis. However, we should be aware that the HFRI indices are also subject to reporting bias, backfill bias, survivorship bias and other factors.

The fee structure of a hedge fund is a combination of an annual management fee (typically ranging from 1% to 4%) and a performance or "incentive" fee (typically ranging from 10%-50%), historically, "2 + 20" (i.e. 2% amc and 20% performance fee) has been the standard, with newer funds being marketed significantly lower than this.

However, this is likely to be simplistic with many variations such as high water-mark, hurdle rates and claw-back provisions linked to the performance fees. Since the Global Financial Crisis, investors providing sizeable allocations and with a long-term investment horizon found themselves in a position of considerable negotiating power for better terms offered by hedge fund managers as well as more aligned fee structure.

3.5.2.2 Cash-flow certainty

Beyond lock-up periods, hedge funds are most often open-ended now and allow additions or withdrawals by their investors (generally on a monthly or quarterly basis) [70].

3.5.2.3 Security / recourse to assets

The Global Financial Crisis revealed the asset-liability mismatch between the liquidity offered to investors in the hedge fund vehicle compared to the liquidity of the underlying portfolio. Unable to meet investors' redemption orders, many hedge fund managers suspended investors' redemptions from their funds, gated them or transferred the most illiquid portion of the portfolio into a side-pocket vehicle; leaving investors unable to retrieve their investment and access their capital.

Post-Global Financial Crisis the industry have seen hedge fund managed accounts and managed account platforms gaining significant popularity, as a response to investors' demand for better control and ownership of their assets. In a managed account, the assets are ultimately owned by investors. In addition to the increased liquidity and transparency, the assets are held by an independent custodian, which enables independent verification of the underlying assets and more protection in the event of redemption pressure.

[70] Gerald T. Lins, Thomas P. Lemke, Kathryn L. Hoenig & Patricia Schoor Rube, Hedge Funds and Other Private Funds: Regulation and Compliance (2013 - 2014 ed.).

3.5.2.4 Typical Duration

Hedge funds are typically viewed as long-term investment, in that HF managers can flex strategies to adapt to changing circumstances and opportunities. However, funds can and do close and return capital to investors; for example, Wall Street Journal noted that 424 funds were liquidated in the first six months of 2012 with numbers expected to rise. Investors should also be aware of the lock-up period, effectively imposing a minimum duration of investment, which can be up to two or three years for funds investing in illiquid strategies.

3.5.2.5 Typical clip size

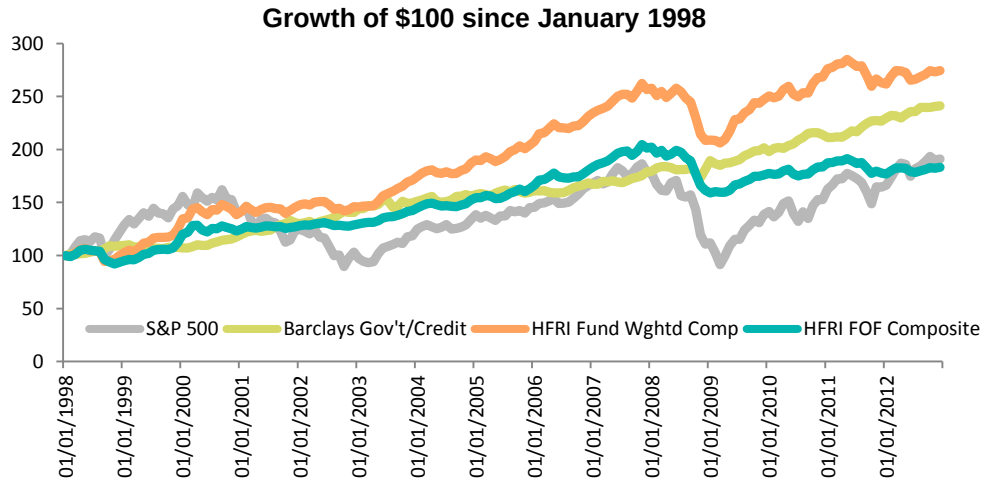
Around 61% of assets are concentrated in 3.7% of the hedge funds that have more than $1 billion under management. The $250m+ category represents around 14% of the number of funds and manages around 83% of the assets.

In terms of allocation to an individual fund, a common minimum investment might be $0.5m, but some established and sought after funds often have minimum level of > $10m.

3.5.2.6 Typical Return

According to the HFRI indices, the Hedge Fund market has performed substantially better than mainstream equities over the last 15 years. The HFRI Fund Weighted Composite has generated 7% per annum compared to 4.5% for the S&P 500. The HFRI Fund of Fund Composite has generated similar returns to equities, albeit with less risk (approximately 7.5% vs approximately 16%). However, we are aware that the individual hedge fund return does vary significantly across strategies, funds, regions etc.; therefore it is very difficult to generalize a “typical” return for hedge fund as an asset class. Moreover, due to the risks associated with the strategies hedge funds implement and conditions around certain positions, hedge funds often have limited capacity. Excessive size of a hedge fund could lead to lose of investment opportunities.

Graph 3.68 – historical hedge fund returns



Source: HFRI, S&P, Barclays

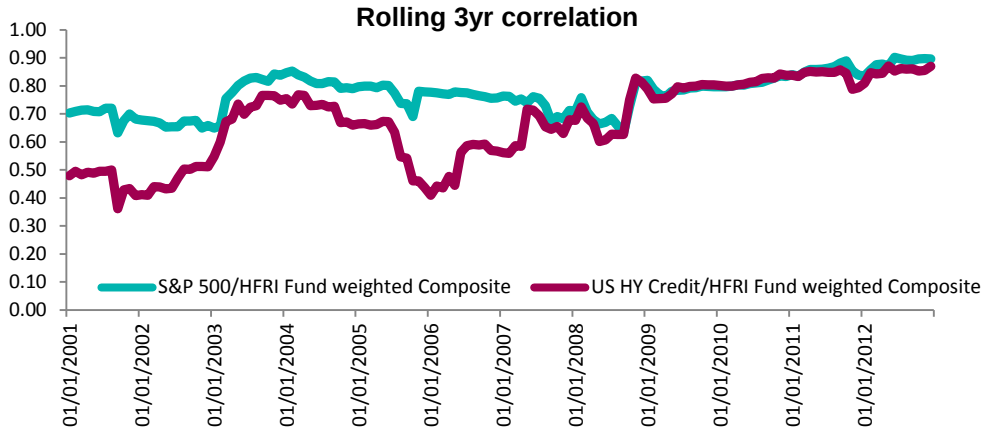
In fact, post the Global Financial Crisis, the hedge fund performance appears to have been more lacklustre, tracking equities down in 2011 but also underperforming on the upside. Some comments about many mangers struggling to adapt to the changed conditions, or too much money chasing too few opportunities (linked to the limited capacity issue above). We notice that the correlation of the Hedge Fund indices with equities and credit has increased substantially over time. This emphasizes the increasing importance of manager selection and portfolio construction.

In general, readers should be aware of various statistical biases associated with the historical returns of hedge funds. EIOPA (2013)[71] named a few biases generally applicable to any

[71]EIOPA , Discussion Paper on Standard Formula Design and Calibration for Certain Long Term Investments (2013)

unlisted fund/index, such as survivorship bias, backfill/instant history bias, mark to market or reporting bias, self-reporting or selection bias, database selection bias.

Graph 3.69– rolling 3 year correlation of credit, equity and hedge funds



3.5.2.7 Format

There are a number of ways in which a hedge fund portfolio can be implemented:

- Direct investment: with in-house resources or through an external consultant to filter through the universe of hedge fund managers, typically via the common general/limited partnership model. In this structure, the general partner assumes responsibility for the operations of the fund, while limited partners can make investments into the partnership and are liable only for their paid-in amounts.

- Investment in Fund of Hedge Funds (FoHF): FoHFs typically have lower minimum investment size and are a good way to invest in hedge funds with broad diversification (across strategies or through different managers under single-strategy funds). FoHFs can help defray the cost of manger selection (the Due Diligence can take several months to complete). FoHFs could also provide lots of support services such as portfolio construction, risk measurement, performance reporting / attribution etc. They are likely to charge an extra layer of fees at the FoHF level.

- Managed accounts – offer similar returns to a manager's main hedge fund, however differ from direct investment in that it provide investors with improved liquidity, transparency and investor control. They also allow investors to retain better control and ownership of their assets. Based on Deutsche Bank's 2012 Alternative Investment Survey, 43% of investors now use managed accounts. Access is often via platforms which provide a range of services though this might introduce another layer of fees.

- UCITS vehicles – offered as single fund or index products into a UCITS compliant pooled vehicle. Such combination of liquid, transparent and risk controlled managed accounts combined with UCITS regulation has proved popular with some investors over the past two years. But this is a more recent development and unclear on the extent it is gaining traction. Moreover, UCITS requirements often dramatically restrict the investment freedoms of the fund manager with the potential implications for fund's performance.

3.5.2.8 Liquidity

Hedge fund investment is generally viewed as medium to long term investment, to which managers typically require an initial lock-up period to build up the portfolio, implement certain strategies or secure better terms with counterparties. Some funds require up to a two-year "lock-up" period, but most are limited to one year. It could be a hard lock, preventing the investor from withdrawing funds for the full time period, or soft lock, where an investor can withdraw funds before, but subject to an early redemption penalty of 2%-5%.

Post lock-up period, hedge funds can offer monthly, quarterly or annual liquidity, with a minimum period of notice for redemption (normally ranging from 30 to 180 days). We believe the liquidity terms of hedge funds should reflect the inherent liquidity of the underlying portfolio.

In general, hedge funds' liquidity issue has been improved significantly in the wake of the Global Financial Crisis; in particular, managed accounts, managed account platforms and hedge fund strategies wrapped as vehicles compliant with UCITS regulations now commonly offer daily/weekly liquidity. Furthermore, insurance companies, as long-term institutional investor, might not necessarily need the excessive liquidity but rather capture the illiquidity premium associated with.

3.5.2.9 Ability to source

There are some possible supply / demand imbalances in hedge funds: assets heavily concentrated within the largest and most established managers, which are able to impose the highest minimum investment levels. Therefore the continued consolidation could ultimately bring access issues for small investors. Managed accounts, in particular, managed account platform, as an alternative to direct investment, could be a potential solution for smaller insurers to access hedge fund space without bearing all the costs of establishing the infrastructure and relationships required.

A further challenge is the level of experiences and efforts required to undertake the due diligence needed through initial manager selection and portfolio construction. In particular, the assessment of managers' skills is critical but difficult due to the massive heterogeneity embedded in hedge fund strategies, which is often be done through a combination of in-house resources and use of external consultant.

3.5.2.10 Complexity of on-going management

Insurers often choose the hedge fund (or FoHF) manager and delegate the choice of funds and strategies to each manager. Ongoing management of the investment, such as manager review and risk management evaluation, is labour intensive and likely to require significant in–house resources. For insurers this is often outsourced to FoHF managers, for example.

3.5.2.11 Solvency II Capital requirements

Solvency II poses certain challenges for hedge fund managers which receive allocations from EU insurance companies. The data reporting requirements under Pillars 1 and 3 will demand significant amounts of investment level data to be delivered to insurance companies by fund managers in a very short space of time.

The Pillar 1 capital requirements impose onerous capital standards upon insurance companies which use the "standard formula" for their allocations to hedge funds:

- Where a "look-through" basis is possible, the capital treatment depends on the underlying assets. However, there can be issues over transparency of holdings given perceived intellectual property around strategies, in this case capital requirements could be markedly higher, for example, at prospectus level detail of strategy and most onerous permitted by the fund's investment rules.

- With no 'look-through', capital charge of Type II equity is then applied (49% stress before systematic adjustment).

The latest EIOPA consultation on treatment of alternatives in the standard formula SCR generally defends the capital treatment above on the basis of lack of reliable data and heterogeneity of the alternative asset classes.

For companies with internal models, there is more possibility to reflect the historical behaviour of the hedge fund. Again, this depends on the fund manager's willingness to provide the look through into the fund's underlying holdings and the ability for companies to argue that the past is a good indicator of future performance.

One of EDHEC's research papers on Solvency II (2012)[72] found that a capital charge of no more than 25% is deemed to be appropriate for a well-diversified hedge fund allocation. Furthermore, companies will also be able to allow for the diversification benefits from investing in hedge funds, exhibited from the relatively low correlations with other traditional asset classes. But certainly there are more challenges:

- similar requirement will apply regarding reporting data: both FoHF and managed account platform providers are now actively developing their capabilities to meet the Solvency II challenges, for example, to provide consolidated position-level reporting on all hedge funds of an insurer on the platform or on a timely basis to run internal models.

- more importantly, an insurer would need to able to persuade the regulator that any modelled rebalancing was sufficiently formulaic to be predictable, assuming hedge fund managers were happy to share its algorithms. Given the focus of hedge funds on manager skill and ability to be highly adaptive, it seems difficult on both counts.

Hedge funds are not expected to be eligible for matching adjustment.

3.5.3 Private Equity

A private equity (PE) fund typically makes direct investments in companies (known as portfolio companies). These portfolio company investments are typically funded with the capital raised from limited partnerships, and may be partially or substantially financed by debt. There are four main types of private equity companies:

1. venture capital – capital for businesses in the conceptual stage or where products are not developed and revenues and/or profits may not have been achieved
2. "leveraged buy-out" (LBO) - some PE investment transactions can be highly leveraged with debt financing. The cash flow from the portfolio company usually provides the source for the repayment of such debt.
3. development capital – growth or expansion working capital for mature businesses in need of product extension and/or market expansion
4. restructuring capital – new equity for financially or operationally distressed companies.

3.5.3.1 Pricing transparency

In general, PE funds are not listed on any exchanges and can't be marked to market. However this helps to reduce balance sheet volatility which can be caused by swings in exchange-traded assets.

There are, however, some listed PE funds and indices: LPX50, S&P Listed Private Equity Index, Global Listed Private Equity Index by Red Rocks Capital, Privex by Société Générale.

3.5.3.2 Cashflow certainty

There are a number of differences between PE and listed equity:

- For many listed companies, an investor can be reasonably confident of dividends (both timing and amount), at least in the short-medium term, whereas for PE, this is not generally the case – mostly any dividends go towards financing and even if they do not they don't necessarily pass through directly to the fund investors.

- PE has the unique feature that an investor commits to investments which will only be drawn potentially up to a few years from the commitment date, so the date of your initial investment is not generally known in advance. An investor's commitment to a PE fund is satisfied over time as the fund manager makes capital calls on the investor. If a PE firm cannot find suitable investment opportunities, it will not draw on an investor's commitment, and an investor may potentially invest less than expected or committed.

- There is generally a definite 'maturity' of the fund, unlike with listed equity.

[72] Mathieu Vaissie, EDHEC Business School, Solvency II: A unique opportunity for hedge fund strategies (2012)

- There is increased uncertainty due to the illiquid nature of the asset held and the effect of gearing if used.

3.5.3.3 Security / recourse to assets

Equity investors are the ultimate beneficial owner of physical assets or contracts as long as the contractual promises to any debt holders are fully serviced; however, investors are formally unsecured.

Acquisition debt issued is usually non-recourse and has no claim on other investments managed by the financial sponsor, so limiting the recourse of leverage from a PE investor's point of view.

3.5.3.4 Typical duration

PE funds generally have a fixed duration which is typically between 8 and 15 years[73]; however, the investment horizon for investments is often < 5 years within a fund.

3.5.3.5 Typical clip size

Most PE funds require significant initial commitment (usually upwards of £1m) from investors. Most funds from the major PE firms have at least a few hundred million in committed capital from a range of investors with some of the biggest funds having a few billion and, the very biggest, tens of billions. There has been a marked increase in the committed capital over the last decade as PE has increased in popularity amongst investors.

As an example of fund size, the table below lists all of CVC's active and mature PE funds in Europe and Asia Pacific[74]

Table 3.70 – sample fund sizes

CVC EUROPEAN FUNDS	Year Raised	Fund Size (US$ millions)	Fund Size (€ millions)
EuropEnterprise		135	130
Fund I	1996	840	667
Fund II	1998	3,333	3,030
Fund III	2001	3,970	4,670
Fund IV	2005	7,260	6,000
Tandem Fund	2007	5,443	4,123
Fund V	2008	14,115	10,750
Fund VI	2013	15,009	10,907
CUMULATIVE		50,105	40,277
CVC ASIA PACIFIC FUNDS			
Asia Pacific	2000	750	780
Asia Pacific II	2005	1,975	1,530
Asia Pacific III	2008	4,120	2,610
CUMULATIVE		6,845	4,920
TOTAL		56,950	45,197

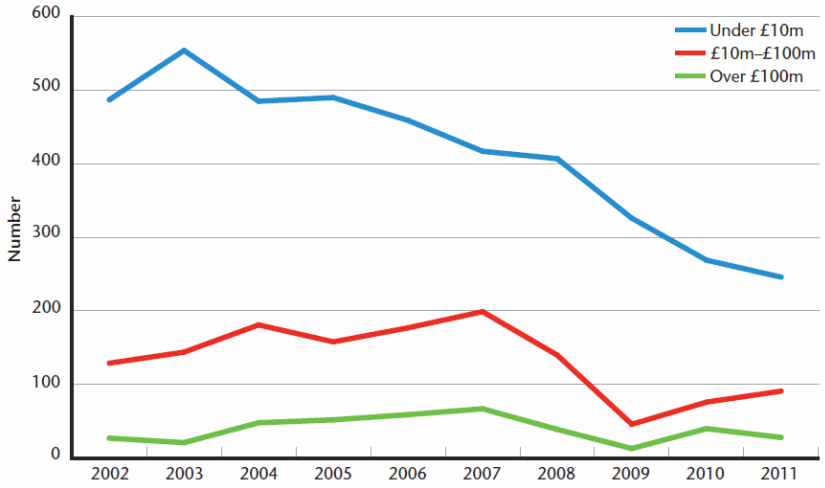
[73] Special report: Non-traditional Assets - InsuranceRisk (10 December 2013)
[74] From http://www.cvc.com/

Deal size

Within the PE fund, deal sizes can range from just a few million to more than £100m. The charts below from 'Private Equity demystified: 2012 update' illustrate this. Chart 4.13 shows all of the buyout transactions in the UK, only some of which involve a PE component. Chart 4.14 shows the percentage of transactions that do involve PE. By approximately combining the two graphs it can be seen that, in 2011, there were about 75 PE transactions under £10m, 90 between £10m and £100m, and 30 for more than £100m. Naturally enough the higher the value of a deal, the more likely it is to have involved an element of PE but there are still significant enough volumes of small transactions. Transaction costs tend to be somewhat fixed though which make returns lower than in larger deals.

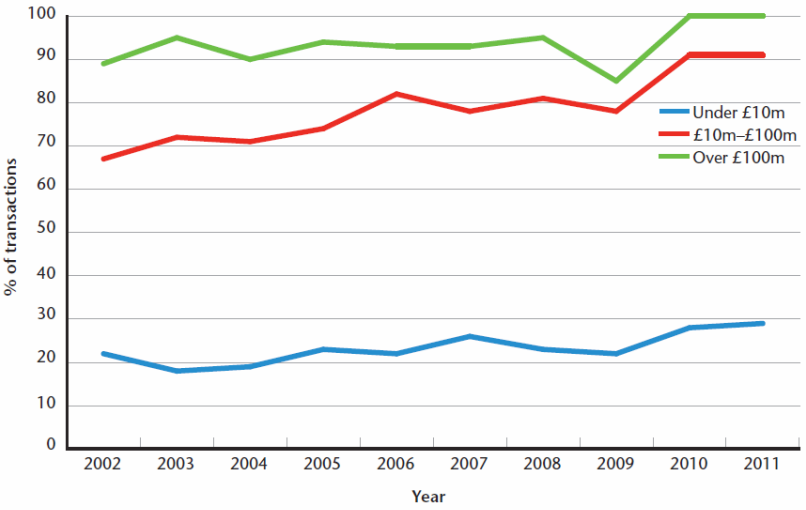
Graph 3.71 – number of transactions by size

Figure 4.13: UK buy-out market: number of transactions by size band



Graph 3.72 – private equity as a proportion of transactions

Figure 4.14: UK buy-out market: % of transactions backed by private equity by value bands



Source: CMBOR/Ernst & Young/Equistone Partners Europe.

3.5.3.6 Typical return

Historical returns have been quoted as up to 3% above public equity according to some studies[75] but this may not be expected to persist as a sustainable additional return.

Investment in PE has increased in the last decade as shown in section 3.5.3.5 and greater competition between PE funds in seeking out the best deals could be expected to put downward pressure on the returns. Different studies have also come to conflicting conclusions with some finding returns less than listed equity. The studies in question also

[75] Private Equity Performance: What Do We Know? – Harris, Jenkinson & Kaplan

had significant data issues. For example they often relied on voluntarily reported data so would miss out on funds that failed and maybe also those that did poorly, so returns were likely overstated. Each study also covered different periods and returns varied quite a bit between these periods. The study producing the 3% had data between 1984 and 2012 and seemed to have fewer limitations than some of the other studies.

It seems reasonable that there might be an illiquidity premium above listed equity but of a smaller amount than 3% for the reasons of increased investment in PE and competition in the past decade described above. The level of gearing will obviously also impact the return and risk. Anecdotally there seems to be evidence that the PE sector is maturing and prices of private companies are not as favourable as they might once have been, with competition increasing due to more funds being available for investment within this asset class. This situation could change to some extent if interest rates were to rise at some point in the future and alternative investment options (particularly FI) were to become more attractive.

The risk of loss of capital is typically higher in venture capital funds, which invest in companies during the earliest phases of their development or in companies with high amounts of financial leverage. Higher returns would typically be expected on these types of funds to compensate for this additional risk.

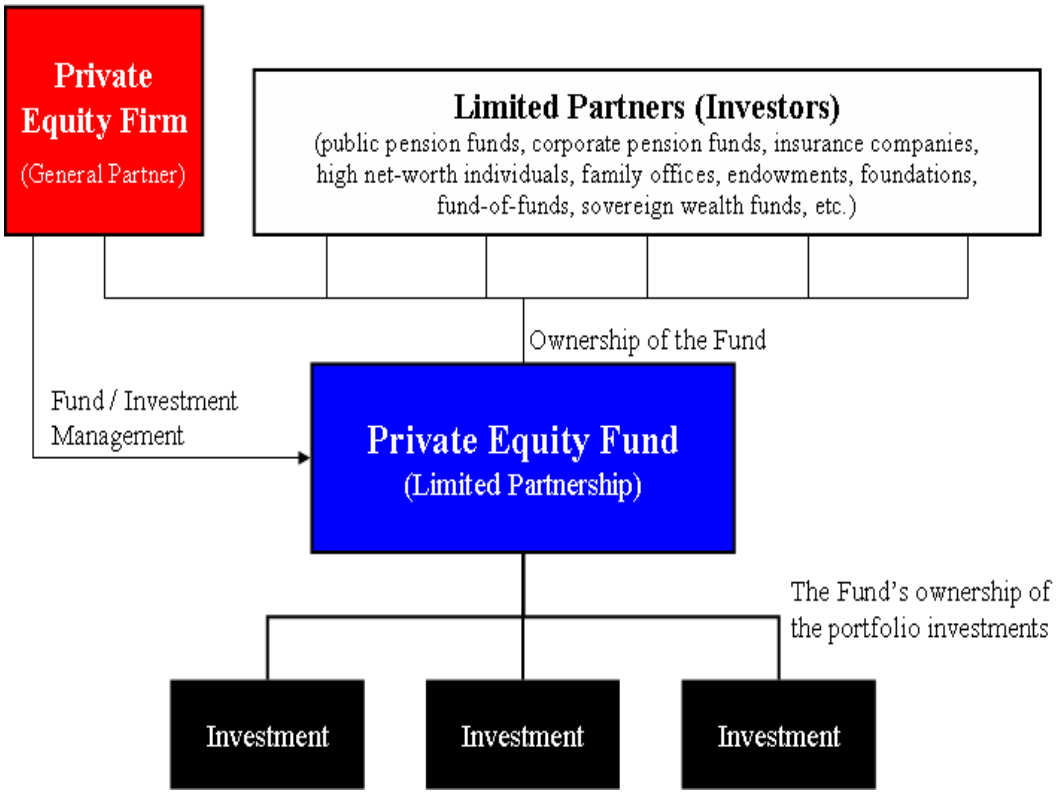
There are some indices for limited partnership PE funds including the Thomson Reuters Private Equity Performance Index (PEPI) and the Cambridge Associates U.S. Private Equity Index (CAPEI). These are commonly used for performance measurement purposes. The PEPI is calculated based on cash flow data and self-reported residual values of over 1,900 limited partnership funds in the Thomson One database. Similarly, the CAPEI incorporates takedowns, distributions, and residual values of 883 limited partnership funds in the U.S., comprising all major investment styles[76].

3.5.3.7 Format

Most PE funds are structured as limited partnerships with a fixed term and are governed by the terms set forth in the limited partnership agreement. Such funds have a general partner (GP), which raises capital from cash-rich institutional investors, such as pension plans, universities, insurance companies, foundations, endowments, and high net worth individuals, which invest as limited partners (LPs) in the fund. The basic structure of the partnership is shown in the diagram below. Investors make a commitment that is drawn down over the term of the investment. Typically the committed amount that is not yet drawn down would be held in listed equities.

[76] WORKING PAPERS ON RISK MANAGEMENT AND INSURANCE NO. 91: THE IMPACT OF PRIVATE EQUITY ON A LIFE
INSURER'S CAPITAL CHARGES UNDER SOLVENCY II AND THE SWISS SOLVENCY TEST – Braun, Schmeiser & Siegel – February 2012

Diagram 3.73 – format of sample PE investment



Among the terms set forth in the limited partnership agreement are the following:

- The partnership is usually a fixed-term investment vehicle that is typically about 10 years plus some number of extensions.
- An annual payment made by the investors in the fund to the fund's manager to pay for the PE firm's investment operations (typically 1- 2% of the committed capital of the fund).
- A minimum rate of return (e.g., 8–12%), which must be achieved before the fund manager can receive any carried interest payments.
- A share of the profits of the fund's investments (typically up to 20%), paid to the PE fund's management company as a performance incentive. The remaining 80% of the profits are paid to the fund's investors.
- PE funds are not intended to be transferred or traded; however, they can be transferred to another investor. Typically, such a transfer must receive the consent of and is at the discretion of the fund's manager.
- The fund's manager has significant discretion to make investments and control the affairs of the fund. However, the agreement does typically have certain restrictions and controls and is often limited in the type, size, or geographic focus of investments permitted, and how long the manager is permitted to make new investments.

3.5.3.8 Liquidity

PE is particularly illiquid as it is usually not listed on an exchange (except in the case where investing through a listed provider/fund). Once invested, liquidity of invested funds may be very difficult to achieve before the manager realises the investments in the portfolio. It is still possible to sell investments, e.g. to transfer a stake in a PE fund to another investor. This would be much more complex than selling listed equity, not least due to the lack of a market price, so it would likely take a number of months to complete.

3.5.3.9 Ability to source

A company can get access to investment in PE by investing in listed PE funds very easily. It is also reasonably straightforward to commit money to a sponsor as there are a number of PE firms to invest through. The minimum investment amounts required are not likely to be a barrier for a typical insurer.

Much more work would be involved in sourcing a direct investment in a company itself. The main issue is getting the required resources and expertise (investment banking, accounting, due diligence etc.) which an insurance company typically wouldn't have in-house. This is mainly a hypothetical point as, in the vast majority of cases; it is unlikely that this approach would be used over investing in listed funds or through a sponsor.

3.5.3.10 Complexity of ongoing management

Nearly all investors in PE are passive and rely on the fund manager to make investments and generate liquidity from those investments. There is little ongoing management needed.

For the investment manager, there can be significant ongoing management of investments. It is possible to be hands-off but the trend seems to be a more hands-on approach. As mentioned above though, for insurers investing through a sponsor, as most likely would be, the question of ongoing management of the portfolio companies is less directly relevant.

3.5.3.11 Solvency II capital requirements

As for other unlisted equity, the capital charge is 49% + / - the symmetric adjustment, unless the funds meet the definition of Article 168 below.

The recently published Delegated Acts widened the definition of Type 1 equities in Article 168 as follows:

- *(a) equities held within collective investment undertakings which are qualifying social entrepreneurship funds as referred to in Article 3(b) of Regulation (EU) No 346/2013 of the European Parliament and of the Council8 where the look- through approach set out in Article 84 of this Regulation is possible for all exposures within the collective investment undertaking, or units or shares of those funds where the look through approach is not possible for all exposures within the collective investment undertaking;*

- *(b) equities held within collective investment undertakings which are qualifying venture capital funds as referred to in Article 3(b) of Regulation (EU) No 345/2013 where the look-through approach set out in Article 84 of this Regulation is possible for all exposures within the collective investment undertaking, or units or shares of those funds where the look through approach is not possible for all exposures within the collective investment undertaking;*

- *(c) as regards closed-ended and unleveraged alternative investment funds which are established in the Union or, if they are not established in the Union, which are marketed in the Union in accordance with Articles 35 or 40 of Directive 2011/61/EU:*

    - *(i) equities held within such funds where the look-through approach set out in Article 84 of this Regulation is possible for all exposures within the alternative investment fund;*

    - *(ii) units or shares of such funds where the look-through approach is not possible for all exposures within the alternative investment fund.*

There is some evidence that using an economically sound Internal Model may lead to a significantly lower capital charge for this asset class based on an empirical calculation. An in-depth analysis conducted by the University of St. Gallen in 2012[77] showed this for a stylised

[77] WORKING PAPERS ON RISK MANAGEMENT AND INSURANCE NO. 91: THE IMPACT OF PRIVATE EQUITY ON A LIFE
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Balance Sheet of a representative Life Insurer. The report also demonstrated that it can even be less costly to increase the exposure to private rather than public equity. The actual capital charge and dynamics of changing asset mix would of course depend on a given insurer's own balance sheet.

But it is important to highlight some of the limitations in this analysis. It was based on data between January 2001 and December 2010 during which PE performed quite well relative to listed equity. This was also largely based on self-reported data (indices mentioned above) so there may have been sample selection issues.

We would also note that there is subjectivity over the capital treatment given the funding arrangement for private equity. Whilst the standard formula requires a "point in time" assessment of risk, in extremis, this could result in a 0% charge for a private equity fund that could be looked through and was 100% invested in cash (yet to deploy). Within a company's ORSA and certainly within an internal model, the risk of deployment of the assets over a one year period would be considered which would result in a higher capital charge. Further, to the extent that there is "undrawn" capital where there is "commitment to fund", an internal model or ORSA needs to consider the likely drawdown pattern in an extreme event.

4. Appendix A – SCR considerations

For comparison purposes, attached are the capital requirements for investment grade (IG) and high yield (HY) bonds.

Table AppA.1 – SCR for Investment Grade corporate bonds

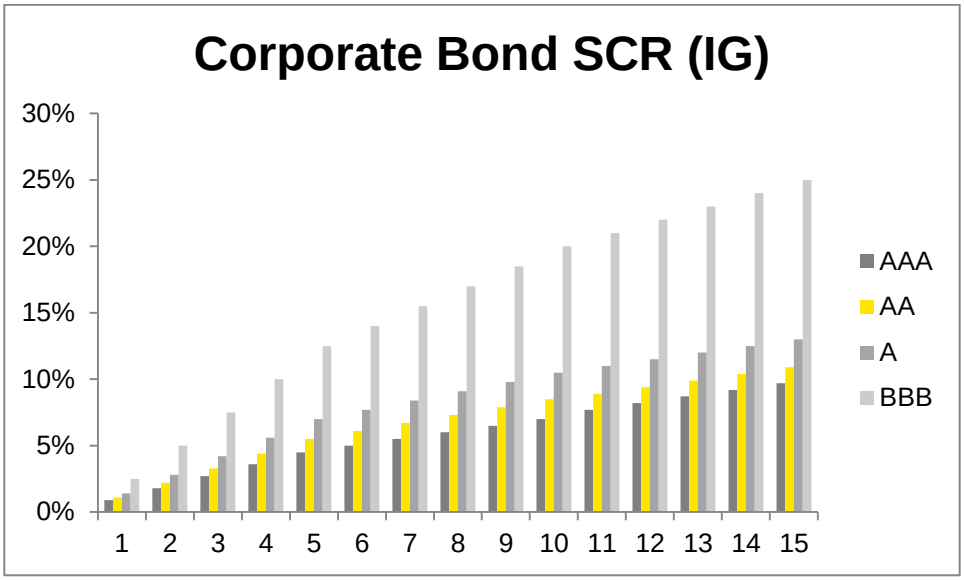
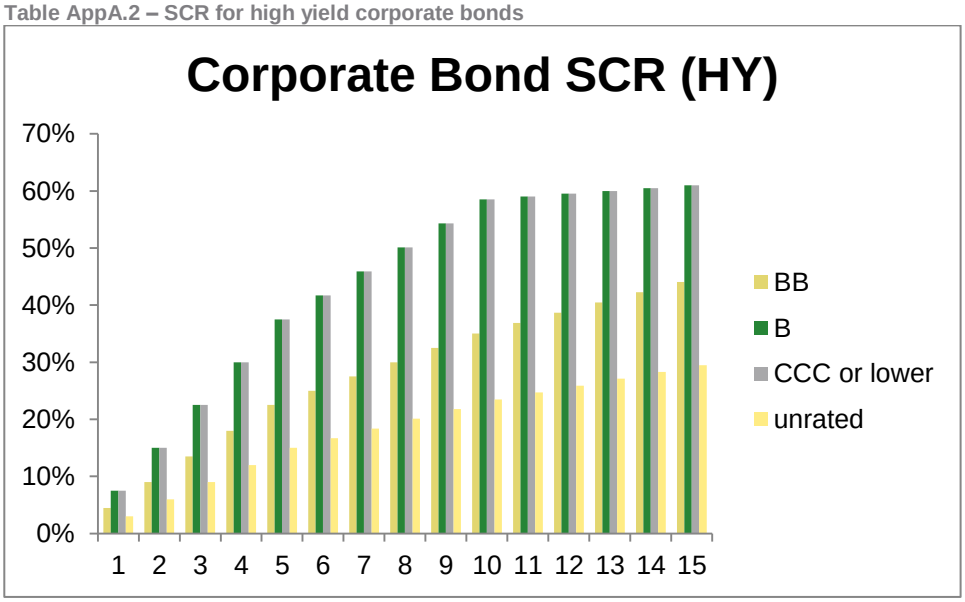


Table AppA.2 – SCR for high yield corporate bonds



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