Illiquid Assets – Key considerations for general insurance investors

October 2013

Agenda

- Illiquid assets – the opportunity
- Addressing the challenges
  - Managing liquidity
  - Modelling illiquid assets
- Discussion
Illiquid assets – the opportunity

Current investment strategies

► The following table shows an average return on investment for the last 5 years for 3 major insurers:

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.4%</td>
<td>5.9%</td>
<td>2.8%</td>
<td>3.2%</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

► Investment strategies are seen to be conservative, erring on the cautious side of the risk to return relationship given the ongoing uncertainty in financial markets.

► Asset allocations tend to be highly focused on fixed income investments and cash as can be seen in the following breakdown of a major insurer:
QIS5 results
BCSR components

SCR components pre-diversification between modules
(average across all companies)

Average diversification between modules = 14%

Market risk: 66%
Counterparty default risk: 19%
Health underwriting risk: 11%
Non-life underwriting risk: 4%
Intangible asset risk: 0%

Responding to the challenge of low interest rates

Source: Economist Intelligence Unit; n=206

- Increasing allocations to higher yielding fixed income instruments such as bank loans and lower rated debts
- Allocating more to less liquid strategies
- Increasing duration
- Reducing cash balances
- Reducing investment related costs by using low cost beta products
- Other
The liability profile of insurance companies make illiquid assets an appealing investment. General insurers are often considered to have short term liabilities but the incidence of claim awards in the forms of PPO (amongst other things) increases the amount of long tail liabilities present. Further to this, falling underwriting margins gives rise to potential pressure for profit emergence from other sources. The highly collateralised nature of certain illiquid assets (e.g. infrastructure) compared with the liquid equivalent implies a lower credit risk and therefore a favorable capital treatment. However, the yield on these assets may still be attractive compared to gilts or cash.

In summary, certain illiquid assets may present an attractive opportunity for general insurers.

In the current market insurers are exploring opportunities to generate additional income, reduce capital and/or increase IFRS earnings from their existing investment portfolio by making their high-quality assets (which they have in abundance) available to others. This is driven by:

- The implementation of central clearing which has increased the demand for high quality liquid assets.
- The lack of available growth in the current insurance market through new business.

Many illiquid assets (e.g. Infrastructure bonds) carry low credit risk as the sponsor is either a stable government or a government-backed agency. However, the complex nature and illiquid market of these assets lead to their return being >2% over risk free. Banks are experiencing an increased need for high quality liquid assets to meet funding costs creating an opportunity for insurers to acquire illiquid assets at a spread higher than that implied by the credit risk.
The Illiquid Asset Market
The Economic Opportunity

<table>
<thead>
<tr>
<th>Assets</th>
<th>Typical UK Spread (BPs)</th>
<th>Key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial mortgages</td>
<td>&gt;300</td>
<td>► Require specialist skills to enter market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>► High yield but relatively high default</td>
</tr>
<tr>
<td></td>
<td></td>
<td>► Immediate actions from the lenders in the event of foreclosures from borrowers</td>
</tr>
<tr>
<td>Infrastructure financing</td>
<td>&gt;200</td>
<td>► Low default because of implicit government support for PFI; non-PFI has higher spread</td>
</tr>
<tr>
<td>Social housing</td>
<td>&gt;150</td>
<td>► Low default because of implicit government support</td>
</tr>
<tr>
<td>Asset-backed securities</td>
<td>&gt;250</td>
<td>► Create diverse pools of underlying assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>► Varying default risk and characteristics depending on asset.</td>
</tr>
<tr>
<td>Covered bonds</td>
<td>&gt;100</td>
<td>► Collateral replaced by issuing institution and high quality</td>
</tr>
<tr>
<td>Liquidity swaps</td>
<td>50 – 100</td>
<td>► Indirect investments in overcollateralised illiquid assets</td>
</tr>
<tr>
<td>Student accommodation</td>
<td>&gt;150</td>
<td>► Low default because of implicit government support</td>
</tr>
<tr>
<td>Solar bonds</td>
<td>&gt;250</td>
<td>► Sometimes with explicit government guaranteed streams</td>
</tr>
</tbody>
</table>

* For reference the spread on AAA-A UK corporate bonds is 50-150bps
* The above asset classes may track narrower than this. These spreads are levels at which we believe the assets are interesting.
* Many asset types depend to a degree on government support or subsidy. It is interesting to consider the relative safety of the different asset types with regard to the risk of removal of subsidy. Generally social housing related assets are likely to be lowest risk and more niche assets such as solar higher risk. In all cases there is very little default data.

Addressing the challenges
Sample asset type – Infrastructure

Typical PPP/PFI Contractual Structure

- Public Sector Procureer
- Project Agreement
- Loan Agreement
- Shareholders Agreement
- Equity Provider (Sponsor)
- Facilities Management Contract
- Operations And Maintenance Provider
- Project Company (SPV)
- Engineering Procurement and Construction Contractor
- Non-recourse debt provider
- Transfers to Reserve Accounts
- Debt Principal
- Releases for equity

Typical Cash Flow Waterfall

- Revenue
- Operating Costs
- Fees and Interest
- Transfers to Reserve Accounts
- Debt Principal
- Releases for equity

Challenges for insurance investment

By their nature, illiquid assets are often more complex than liquid counterparts.

- Particular challenges for insurers include:
  - Sourcing appropriate investments or managing the relationship with a third party asset manager
  - Evaluating the attractiveness of such investments and determining an appropriate metric to use for evaluation
  - Valuing such investments
  - Determining capital treatment
  - Ongoing management of the illiquid asset portfolio

- These assets can be sold back in the secondary market (currently) but typically would trade at a significant discount to “economic value”.
- It is also possible that in a poor scenario, the assets would not be tradeable.
- Whilst there is opportunity in “selling” liquidity to the market, a company needs to understand its liquidity position before embarking on such a strategy.

- Typically, a company will need to invest in new infrastructure (systems and tools) as well as processes (challenge mechanisms and decision mechanisms) to both assess the opportunity at outset and to monitor the opportunity.
Liquidity management - good practice

<table>
<thead>
<tr>
<th>Risk appetite statements</th>
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<tbody>
<tr>
<td>Clearly defined risk policies stemming from the overarching risk appetite statements.</td>
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<table>
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<tr>
<th>Liquidity risk policy</th>
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<tr>
<td>Defining liquidity risk, what liquid assets are and how the management of the risk should be measured and reported</td>
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<table>
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<tr>
<th>Measurement structure</th>
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<tr>
<td>Specific metrics, methodology for monitoring liquidity, definition of stress scenarios, specification of management actions</td>
</tr>
</tbody>
</table>

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<th>Robust monitoring tools</th>
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<td>Critical to monitoring and managing the liquidity position</td>
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<th>Management actions</th>
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<td>E.g., obtaining lines of credit, changing asset allocations</td>
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</table>

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Methodology Overview

Loan Example

Typical illiquid asset loan spread decomposition

- The Gilt rate is further decomposed into principle components and combined with the Swap Spread to give the Swap Yield.
- The spread over swaps of the illiquid loan is decomposed into the following:
  2a. Bond Credit Spread – the typical credit spread of a bond issued by the same class of body issuing the loans
  2b. Bond Liquidity Spread – the typical liquidity spread of a bond issued by the same class of body issuing the loans
  2c. Portfolio Idiosyncratic Risk – The additional spread caused by differences in between a typical loan available in the market and the ones in the portfolio
  2d. Loan to Bond Premium – The additional liquidity expected on a loan issued by a body rather then a bond issued by the same body
  2e. Other e.g. Prepayment risk, Optionality etc. – The additional spread caused by any additional risk factors.
The typical risk factors for an illiquid asset are:

- Interest Rate Components
- Spread components (Typically credit and liquidity)

For risk factor the following need to be derived:

- **Loss Functions**: For each Risk Factor, a function describes the change in value from changes in the risk factor.
- **Probability Distribution**: For each Risk Factor, a PDF describing the probability of changes in the factor.
- **Correlation**: Matrix describing correlation of each Risk Factor with all other Risk Factors.

As modelling interest rate components is already a familiar tasks for insurers, the next slides will focus on modelling the spread components.

### Methodology Overview

- A robust methodology is defined to ensure an easy application across different illiquid asset classes.
- Risk factors driving the illiquid asset spread are identified, e.g. Credit and liquidity spread.
- As a result, we estimate Market Credit and Liquidity Factors which need to be transformed into Specific factors for the illiquid asset.
- An idiosyncratic adjustment must then be made to reflect the difference in riskiness relative to the illiquid asset market. One way of making this adjustment is by using a scorecard based on asset features to assign a credit score to the individual assets and then using a formula fitted with a regression on historic data to adjust the spread.

<table>
<thead>
<tr>
<th>Market Credit Index</th>
<th>Illiquid asset Credit Spread</th>
<th>Portfolio Tenor Adjustment</th>
<th>Portfolio Idiosyncratic Adjustment</th>
<th>Specific Credit Spread</th>
</tr>
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<tbody>
<tr>
<td>Market Liquidity Index</td>
<td>Illiquid asset Liquidity Spread</td>
<td>Portfolio Tenor Adjustment</td>
<td>Portfolio Idiosyncratic Adjustment</td>
<td>Specific Liquidity Spread</td>
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*In this example we assume that the illiquid asset spread decomposes into two factors (credit and liquidity). However, this approach can be generalised to multiple risk factors.*
Calibration of credit and liquidity bond spread

► 1. Identify the market indices: The aim is to identify two indices which are representative of market credit and liquidity considering:
   ▶ Market relevance
   ▶ Availability
   ▶ Correlation with the illiquid asset spread.
   These will then be used as a proxy for the credit and liquidity spread movements in the illiquid asset spread.

► 2. Calibrate the market distribution: Potential methods being methods of moments, MLE’s, least squares etc.

► 3. Calculate the central tendency: This is calculated differently dependent on what the risk factor is e.g. credit or liquidity

► 4. Transform the market distribution:
   ▶ After the market and credit indices have been identified a distribution is calibrated to the movements in these indices.
   ▶ A scaling is then applied to the market distributions to align their central tendency with the spread factor central tendency.

Questions?
Thank you