Inflation-Linked Infrastructure Debt

Unlocking the barriers to pension scheme investment
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This document has not been prepared in accordance with legal requirements designed to promote the independence of investment research and is not subject to any prohibition on dealing ahead of the dissemination of investment research.
UK defined benefit pension schemes – with more than £1 trillion of liabilities – are the largest private payer of inflation-linked liabilities. UK infrastructure borrowers – many of which have inflation-linked revenues – represent the largest private source of inflation-linked cashflows. At present, these natural partners are often intermediated by banks on swap transactions, which imposes onerous collateral requirements and significant transaction costs to cover profit and expenses.

It is our view that the logic of pension schemes disintermediating banks and lending directly to infrastructure borrowers in inflation-linked form is overwhelming. We believe that significant benefits will be shared between the pension schemes and infrastructure borrowers. We also expect a “social dividend” as greater efficiency results in lower cost delivery of infrastructure to the UK economy. However, despite the compelling case for direct lending by pension schemes, to date the market has developed slowly.

This paper explores the scale of the opportunity for pension schemes to take advantage of this market inefficiency and the benefits this could deliver in terms of managing risk and funding costs. We identify barriers to growth of the market and discuss how these may be overcome.

The paper is organised across three Sections:

Section 1 – a high level overview of infrastructure debt, including details of historic performance, risk mitigation strategies by lenders and current yields;

Section 2 – background on borrower appetite for issuing inflation-linked debt;

Section 3 – a summary of the opportunity for pension schemes to utilise inflation-linked debt to optimise funding and investment strategy.

Our key findings are summarised below:

1. Infrastructure borrowers benefit from robust revenues which enjoy significant protection from normal business cycles. Historic data shows that lending to these businesses is relatively low risk and attracts an illiquidity premium over publicly traded corporate bonds;

2. There is significant unmet demand for investment grade inflation-linked debt from UK infrastructure borrowers, particularly in the utilities and renewable energy sub sectors – we estimate the core pipeline to be around £4 billion per annum with significant upside potential;

3. A large proportion of this demand is currently being serviced by borrowers entering inflation swaps with banks. Recent regulatory changes are rendering this product more expensive and less effective than it was in the past. With pension schemes sitting on the other side of these swap transactions the opportunity for disintermediation is clear;

4. Inflation-linked debt is particularly attractive for pension schemes, since in this sector attractive yields have persisted despite significant inflows of insurer money - which has largely been targeting nominal debt markets;

5. For a typical pension scheme, substituting inflation-linked infrastructure debt in place of index-linked gilts can serve to close a funding deficit by 17% of the amount of the reallocation. Alternatively, substituting inflation-linked infrastructure debt in place of equities can result in significant risk reduction without triggering increased deficit contributions;

6. Traditional barriers to entry, such as minimum scale or expertise to enter and concerns around liquidity in the event of a buy-out, have slowed many small and medium funds’ entry into this space. These barriers are breaking down and there is an attractive opportunity for early movers.

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1.1. Throughout this paper, we define “Infrastructure Assets” as physical structures and networks which provide essential services. This definition includes assets such as transport (airports, railways, motorways), regulated utilities (water, waste water, electricity and gas transmission and distribution), and renewable energy projects (wind, solar photovoltaic). These assets, along with the organisations which run them, are viewed as essential drivers of any economy as basic infrastructure is a precondition for sustainable economic development.

1.2. Investors in infrastructure are attracted to the fact that the underlying assets generate robust revenue streams. For example:
- regulated revenues for essential services (e.g. water) – based on an inflation-linked Regulatory Asset Value (“RAV”);
- proven legislative backgrounds providing guaranteed tariffs (e.g. high quality renewables); or
- revenues received directly from users of infrastructure which has a natural monopoly position (e.g. airports).

1.3. The remainder of this Section provides an overview of the key characteristics of infrastructure debt.

### Capital Structure: Debt versus equity

1.4. Infrastructure Assets tend to have simple capital structures and are typically financed by between 65% and 90% of senior ranking debt and the balance as equity (and in some cases subordinated debt):
- debt investors receive a pre-defined schedule of interest and principal repayments;
- equity investors receive any residual net income after meeting the payments due to debt investors.

1.5. Consequently, there is higher risk for equity investors who take the first loss arising from any unanticipated fall in revenue and/or cost overrun. The low volatility of Infrastructure Asset revenue streams and other lender protections (discussed later) mean that a relatively high proportion of borrowing can be safely sustained.

1.6. Banks have traditionally provided the debt financing whilst institutional investors, such as pension schemes, have previously invested in the higher risk equity part of the capital structure. However, in the light of the global financial crisis, and resulting changes to bank capital and funding rules, banks have largely withdrawn from long-term lending. This structural change presents an attractive opportunity for institutional investors to disintermediate banks and lend directly to Infrastructure Assets.

1.7. By way of an example, we consider a simplified illustration for a £100m Infrastructure Asset which is 80% debt funded via a Special Purpose Vehicle (“Project SPV”) and 20% by equity:

![Diagram](Diagram.png)

Note: this example is heavily simplified and additional parties may include insurer(s) and constructor(s). Also, the balance of debt to equity will vary according to the risk profile of the project. It is also common for these arrangements to require additional reserves and other protections to reduce the exposure of the debt investor (discussed later).
1.8. Under the base case illustration, equity investors receive a return of 8% whilst debt investors receive their pre-defined return of 6%. However, consider a pessimistic scenario where the revenue stream is 20% lower than expected - in this case, debt investors continue to achieve their pre-defined return, whilst equity investors lose most of their investment.

<table>
<thead>
<tr>
<th></th>
<th>Base Case</th>
<th>Pessimistic Scenario (20% fall in revenue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Revenue</td>
<td>£7.5m</td>
<td>£6.0m</td>
</tr>
<tr>
<td>b) Expenses</td>
<td>£1.1m</td>
<td>£1.1m</td>
</tr>
<tr>
<td>c) Debt</td>
<td>£4.8m</td>
<td>£4.8m</td>
</tr>
<tr>
<td>d) Dividend to Equity</td>
<td>£1.6m</td>
<td>£0.1m</td>
</tr>
</tbody>
</table>

1.9. Debt investors are purchasing an investment where cash flows are more robust to relatively extreme outcomes for performance of the underlying Infrastructure Asset. Consequently, infrastructure debt provides a predictable cash flow stream which can be utilised within the liability matching portfolios of pension schemes. By contrast, equity investors are much more exposed to variations in the performance of the underlying Infrastructure Asset and consequently are looking to earn returns more in line with levels targeted within the return seeking component of a pension scheme portfolio.

Protection for debt investors – low defaults and high recoveries

1.10. Infrastructure debt is designed with a range of protections to minimise the risk of default and maximise the recovery in the unlikely event of default. Key protections within project finance can include the following:

- **Cash flow covenants:** in the event that the Infrastructure Asset is underperforming, cash could be trapped within the Project SPV rather than being distributed to equity investors. This provides an additional buffer which could be available to support repayments to debt investors if there is further deterioration in performance;

- **Restrictions on business activities:** the Project SPV may be restricted to perform the activity for which it was established. This contrasts with corporate bonds where there is less certainty about the future risk profile of the business to which debt investors are lending;

- **Ability to replace counterparties:** underperforming subcontractors may be replaced. A level of bonding may also be available to mitigate potential increased costs incurred in replacing a counterparty;

- **Default/enforcement triggers:** if the Project is significantly underperforming, the lenders may either exercise greater control of the day-to-day running or look to achieve an exit by exercising their security and taking ownership of the Project SPV;

- **Insurance:** key risks are insured.
Inflation-linked infrastructure debt: unlocking the barriers to pension scheme investment

... many insurers and pension funds remain reluctant to directly invest in projects before completion (so-called “greenfield” projects). This is partly because of the possibility of delayed yields and the potential effects that loan prepayments have on long-term returns – but is perhaps more directly a reflection of their wariness of taking on construction risk. In our view, however, construction risk is seldom the main reason for a project to default...

S&P (18TH JAN 2014) “GLOBAL INFRASTRUCTURE: HOW TO FILL A $500 BILLION HOLE”

1.11. In addition, where the Project involves a construction phase, a range of additional protections may be put in place for the debt investor:

- the Project has a Contractor that provides a fixed-price, turnkey contract assuming all construction risks and cost overruns including a requirement for payment of liquidated damages by the construction contractor in case of delay;
- debt investors will not usually take risk on items such as land acquisition, consents, permits or approvals. These will generally be obtained prior to commencement of construction;
- funds are only released on confirmation by the technical adviser of work completed and time-to-complete tests.

1.12. In addition to the above protections, debt investors also undertake extensive due diligence in advance of committing to an investment. Key areas of focus would typically include the following:

- financial strength of the Project SPV’s counterparties;
- review of contracts and/or regulatory regime supporting the revenue stream;
- expert input in specialist areas: technical, insurance and legal;
- stress testing of the financial model to ensure robust financial structure.

1.13. This range of protections is tried and tested and has proven effective – translating into historic losses arising on European infrastructure loans which have been lower than “A” rated senior secured corporate bonds. This is observed by:

- default rates similar to investment grade (Baa-rated) corporate bonds (Chart 1); and
- recovery on default which is almost double the level achieved on senior secured corporate bonds (Chart 2). 100% recovery has been achieved in 65% of defaults.

Chart 1: Historic Default Rates (Cumulative) Infrastructure Debt versus Corporate Bonds


Cumulative Default Rate

<table>
<thead>
<tr>
<th>Years since issuance</th>
<th>infra (European infrastructure loans, 1990-2011)</th>
<th>A</th>
<th>Baa</th>
<th>Ba</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chart 2: Debt Recovery % on Default


1.14. Combining the default and recovery rates, we obtain an indication of expected losses on the debt. The chart below highlights that for periods of 10 or more years, infrastructure project finance debt covering all sectors and geographies has performed well compared with “A” rated corporate bonds.

Chart 3: Expected Loss

Yield in excess of corporate bonds of similar quality

1.15. A higher yield can be earned on infrastructure debt by comparison with corporate bonds of similar credit quality. This represents compensation to the investor for a number of factors:

- barriers to entry are substantial, such that only a subset of investors can access opportunities:
  - considerable expert resources and a strong network of borrowers is required in order to source, structure and analyse lending opportunities, which must then be closely monitored on an ongoing basis;
  - origination of each loan can require investment of resources over extended periods, often subject to the contingency of a bidding process;
  - only individual investors who can put £50m or more into a single transaction can gain access to a wide range of opportunities and have the ability to act as lead debt investor, which provides greater control in structuring the deal and in the ability to control decisions in enforcement scenarios.

- Infrastructure debt is less frequently traded than corporate bonds. This reduces the attractiveness of the asset to investors who speculate on short-term price movements and/or need to be able to sell at very short notice. As a result, investors who can follow a longer-term “buy and hold” strategy are able to earn an illiquidity premium in the yield.

1.16. The chart below shows how pricing (spread over gilts or Libor) on recent privately negotiated infrastructure debt transactions has compared with the iBoxx index over the same period:

Chart 4: Private Infra Debt Deals: New Issue Spread above Gilts or Libor
Comparison with iBoxx A > 15 year (non financials)

1.17. In current conditions, a yield premium in the region of 80-100 basis points is achievable for infrastructure debt relative to corporate bonds of similar quality. This assumes that genuinely “private” transactions are targeted which seek to replace the previous bank lending market, i.e. where the borrower would not otherwise have easy access to public bond markets.

1.18. As discussed further in Section 3, this level of expected return is similar to discount rate assumptions being made by pension schemes in relation to return seeking assets as part of their triennial funding valuations. This provides scope to substantially reduce funding level volatility without necessarily triggering an increase in the employer’s deficit contributions.
Market Segmentation

1.19. Infrastructure projects comprise a diverse range of transaction sizes. The chart shows the breakdown of 748 UK projects completed since 2004 amounting to around £170bn in total.

Chart 5

Source: Infranews database

1.20. As highlighted above, the majority of transactions fall in the sub £250m range. In many cases, these smaller projects would not have had easy access to public bond markets and historically relied upon bank funding. It is this substantial supply of smaller transactions which represents the opportunity for pension schemes to most quickly source a well diversified debt portfolio providing an attractive yield in excess of corporate bonds.

1.21. The £250m+ transactions will tend to have better access to public bond markets and can be subject to intense competition between very large insurers who are focused on rapidly sourcing a high volume of transactions. These larger transactions have tended to provide yields close to corporate bonds.
2. Borrower Demand for Inflation-Linked Debt

2.1 Infrastructure Assets often have large existing and ongoing inflation-linked funding requirements. Many borrowers have inflation-linked revenues and the ability to issue inflation-linked debt provides better matching of revenues and interest costs. This eliminates the risk that would otherwise be caused by fixed rate funding, where the revenue stream would be less able to meet interest costs in periods of low inflation.

2.2 Historically, a large proportion of borrower demand for inflation-linked debt was satisfied by borrowing from banks (on a floating rate basis) and at the same time entering into a swap with the same banks to convert the debt payments into inflation-linked payments to match the revenues – the net result being that Infrastructure Assets were, in effect, borrowing on an inflation-linked basis.

2.3 Infrastructure Assets with access to public bond markets (e.g. utilities) have additionally swapped their fixed rate corporate bonds to inflation-linked payment obligations.

2.4 As illustrated below, public issuance of index-linked corporate bonds has fallen from a peak of £7.5 billion in 2006 to an average of less than £1 billion since 2008.

Moody’s recognises the benefits of long-dated inflation-linked securities as they match a water [or electricity] company’s cash flow profile and asset values under the regulatory model.

MOODY’S CREDIT RATING AGENCY

Chart 6 – GBP Index-Linked Corporate Bond Issuance 2003-2013

Source: Bloomberg
Note: Excludes financial institutions and UK government backed issuers
2.5 The reduction in issuance stems in a large part from the withdrawal of certain banks, who were most active investors in the index-linked corporate bond market prior to 2008. This crowded out the “real money” investors such as pension schemes and insurers who are the natural holders of long dated inflation-linked bonds. However, when these banks’ funding and credit charges increased dramatically from 2008, they stopped buying, borrowers lost confidence in the depth of the market and issuance fell to a fraction of its previous levels.

2.6 Despite the drop in inflation-linked issuance, underlying borrower demand remains strong. Since then, the difference has largely been addressed synthetically, which means that the borrowers have entered into inflation swaps with banks who in turn entered ‘back-to-back’ swaps with pension schemes. However, changes in the swap market mean that borrowers are no longer able to obtain long-term swaps on the same terms as were available previously, leading to additional costs and/or unwanted features which negate much of the long-term inflation hedge and increase risk for the borrower (e.g. frequent mandatory break rights). These developments present an opportunity for pension schemes to disintermediate the banks and receive the long term inflation exposure directly, without the transaction costs, operational complexity or liquidity strains associated with swaps.

Inflation-Linked Debt Pipeline

2.7 The current medium-term pipeline of inflation-linked infrastructure borrowers is heavily weighted towards regulated utilities, renewable energy, transport and social infrastructure. Our bottom-up analysis by sector indicates a core pipeline for inflation-linked debt in the region of £4bn per annum, but with significant upside potential.

Chart 7: Inflation-linked borrower demand by sector

Source: Macquarie Funds Group

2.8 In the remainder of this Section we discuss the core elements of the pipeline over the coming years.
Water, electricity & gas utilities – £1.5bn per annum

2.9 The regulated water, electricity and gas utilities are upgrading their networks. The regulators OFGEM and OFWAT agree the upgrade works for regulatory cycles of five to eight years and the tariffs that may be charged to customers. The value of upgrade works will be included in the Regulatory Asset Value (“RAV”) over which the utilities are allowed to charge a return to cover their cost of capital. The RAV is indexed by inflation, making inflation-linked debt a natural funding route:

• it offers borrowers the ability to directly match their debt funding levels with their asset base. This reduces the frequency at which they need to access debt markets to maintain their capital structure, thereby reducing exposure to rising interest rates or credit spreads;

• inflation-linked debt pays a lower coupon than nominal debt, since a part of the return is paid in the form of indexation of principal. The borrower therefore receives the benefit of a lower annual interest cost.

2.10 Utilities have substantial funding requirements and routinely access public bond markets for fixed rate borrowing. They typically target 50% of funding on an inflation-linked basis, but often source the desired inflation exposure either through private debt placements or synthetically through swaps due to the perceived execution risk of going to public bond markets to raise inflation-linked debt.

2.11 In line with the start of the next regulatory period for water (2015-2020) and for electricity (2015-2023), most borrowers will be looking to source substantial inflation-linked funding. We estimate annual inflation-linked debt demand of £800m for the water and £300m for the electricity/gas utilities to finance their RAV expansion, alongside an additional £900m of annual potential refinancing need over the next four years. These estimates are based on business plan submissions that are currently the subject of the regulatory review process and assume 60-70% debt financing, with 50% inflation-linked.

**Chart 8: Estimated RAV growth per annum**

<table>
<thead>
<tr>
<th>RAV growth (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,500</td>
</tr>
<tr>
<td>2,000</td>
</tr>
<tr>
<td>1,500</td>
</tr>
<tr>
<td>1,000</td>
</tr>
<tr>
<td>500</td>
</tr>
</tbody>
</table>

- 2013/2014
- 2014/2015
- 2015/2016
- 2016/2017
- 2017/2018
- 2018/2019
- 2019/2020

**Source:** OFGEM, OFWAT and Macquarie Funds Group
OFTOs - £0.5bn per annum

2.12 Offshore wind farms require transmission cables to the mainland known as Offshore Transmission Owners ("OFTOs"). These are considered low-risk assets and receive their revenues from National Grid (rated A-/A3) which is regulated by OFGEM. The tariffs charged by the OFTOs are regulated by OFGEM and indexed with inflation. In 2009, commercial banks and the European Investment Bank started to finance OFTOs and in 2013, the first bond issuance was successfully completed (which was fixed rate debt with inflation swap overlays).

2.13 There is a large pipeline of new OFTOs going hand-in-hand with the UK’s offshore wind ambitions. Out of 78 planned projects, 26 have a planned connection date between now and 2017, with an estimated total capital requirement of £2.7bn. Based on typical debt levels, this results in funding needs in the region of £500m per annum.

Renewables - Solar, onshore- and offshore wind - £1.5bn to £2bn per annum

2.14 The UK and European Union have defined targets for renewable energy generation which requires significant investment in the short to medium term. Like most countries the UK has a subsidy scheme in place to allow private companies to build and operate renewable energy projects. UK regulation is well-established and, for larger renewable projects, the regulator OFGEM provides Renewable Obligation Certificates ("ROCs") which have a pre-defined inflation-linked value.

2.15 The most established renewable technologies are onshore wind and solar photovoltaic (solar PV). The offshore wind sector is less mature but we anticipate a number of projects will achieve investment grade credit ratings.

2.16 Over the last two years, there has been new installed capacity across both onshore and offshore wind and solar PV of 3.4GW per annum, and associated debt financing of approximately £2bn per annum.

Chart 9: Installed capacity and debt financing (2012-2013)

Source: DECC, IJonline, Infra-news, Macquarie Funds Group
2.17 Planning permission applications have substantially increased in 2012/13 indicating strong growth, consistent with the UK’s legal commitments to increase renewable energy generation. In 2011, the UK government set out a roadmap to meet the EU renewable targets which included 13GW of onshore wind (currently 7.1GW) and 18GW of offshore wind (currently 3.7GW). Solar PV was not included in the 2011 roadmap but in 2013, the UK government updated its view as solar PV became more cost efficient. The current central scenario assumes 10GW of solar PV by 2020 (currently 2.5GW) but with scope for this to be up to 20GW.

2.18 This roadmap foresees a roll-out of 4.7-6.3GW of investable renewable technologies with further opportunities in other sectors as they become more mature (e.g. biomass).

2.19 Based on 2012/13 activity, we estimate debt financing in the region of up to £2bn per annum for renewables, a significant portion of which (50%+) would be supported by inflation-linked revenues. However, the actual inflation-linked debt financing would be £0.5bn to £1bn higher if growth is in line with levels targeted by the UK government. Further debt financing could also arise from refinancing existing assets.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Current GW capacity (GW)</th>
<th>2020 target capacity (GW)</th>
<th>Growth p.a. (GW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore wind</td>
<td>3.7</td>
<td>18</td>
<td>2.4</td>
</tr>
<tr>
<td>Onshore wind</td>
<td>7.1</td>
<td>13</td>
<td>1.0</td>
</tr>
<tr>
<td>Solar PV</td>
<td>2.5</td>
<td>10-20</td>
<td>1.3 – 2.9</td>
</tr>
<tr>
<td>Total</td>
<td><strong>13.3</strong></td>
<td><strong>41-51</strong></td>
<td><strong>4.7 – 6.3</strong></td>
</tr>
</tbody>
</table>

2.20 It is difficult to predict in advance the timing or amount of other transactions that will give rise to inflation-linked debt opportunities. However, based on our view of activity over the next 6 to 12 months, it is clear that there is scope for much greater volume than the £4bn or so expected from the “core” areas. For example:

- refinancing of existing PFI and transport projects with inflation-linked revenues;
- in recent years, student accommodation projects have led to around £2bn per annum of investment, with a significant portion of this supported by inflation-linked debt. These projects can be viewed as infrastructure in cases where contractual arrangements with the University are sufficient to immunise revenues from the commercial rental market;
- Housing Associations have recently received confirmation that social rent increases will be linked to CPI for the foreseeable future. Whilst the majority of the £2bn to £3bn per annum funding market will continue to be fixed rate using large bond issues, in the light of certainty on rent increases, a number of social housing providers are now looking to borrow on a CPI-linked basis to provide closer matching of their revenues and interest costs.
3.1 Pension schemes and their sponsors have been increasingly looking towards fixed income investments as they seek to reduce funding level exposure to equities, interest rates and inflation. The chart below highlights the steady fall in equity allocations by UK pension schemes over the last decade.

Source: Mercer, 2013 Asset allocation survey.

3.2 However, falling real gilt yields (see Chart 11 below) has put pressure on pension scheme funding levels and traditional liability matching strategies are no longer providing returns which keep pace with inflation.

Source: Bloomberg (Barclays UK Inflation Linked 7 to 10 Years Avg Real Yield Annual).
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3.3 This has led many pension schemes to look at alternative asset opportunities which have presented themselves as a result of the financial crisis and the withdrawal of banks from long-term lending. These opportunities, such as infrastructure debt, provide the ability to lock-in a significant illiquidity premium above gilt yields.

3.4 We see two ways of characterising an allocation to infrastructure debt:

<table>
<thead>
<tr>
<th>Enhancing returns on liability matching portfolio</th>
<th>Affordable de-risking from equities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Switch from gilts or corporate bonds into infrastructure debt in order to address a funding deficit</td>
<td>• Reduce funding level volatility by switching from equities into infrastructure debt</td>
</tr>
<tr>
<td>• Potential enhancement of returns of 80bps or more over corporate bonds and 150bps over gilts</td>
<td>• Provides hedging against interest rates and inflation, in addition to reducing equity risk. It also provides diversification into assets with a likely reduced correlation to sponsor risk</td>
</tr>
<tr>
<td>• Scope to mitigate deficit contributions by up to 17% of the amount of assets shifted into infrastructure debt</td>
<td>• Scope to de-risk without triggering additional employer contributions</td>
</tr>
<tr>
<td></td>
<td>• A 20% shift of assets from equities into infrastructure debt is expected to reduce the pension scheme’s “value at risk” measure by around 20%</td>
</tr>
</tbody>
</table>

3.5 These alternative approaches are discussed in more detail below.

Enhancing Returns on Liability Matching Portfolio

3.6 Many pension schemes’ most recent triennial valuations have shown rising deficits with increased deficit contributions from corporate sponsors and/or lengthened recovery periods. A potential mitigant to this situation is the ability to earn an illiquidity premium on assets within the liability matching portfolio.

3.7 Infrastructure debt invested on a “buy and hold” basis provides a known (and low risk) cashflow profile which sits well within the liability matching portfolio to mitigate interest rate and inflation exposure. Chart 12 illustrates the expected cashflow profile that would emerge from lending to an indicative sample of Infrastructure Assets which represent the short-term pipeline of inflation-linked debt opportunities:

Source: Macquarie Funds Group
3.8 We consider below the relative impact on scheme funding of three alternative portfolios for matching inflation-linked liabilities for pensions in payment:

- **Base Case**: index-linked gilts
- **Scenario 1**: fixed interest corporate bonds (A-rated), inflation swaps and cash
- **Scenario 2**: investment grade infrastructure debt

3.9 Assume, for illustration, that the inflation-linked liabilities are as shown in the chart, with a present value of £200m discounting at gilt yields and an average duration of 13 years.

3.10 For the Base Case asset portfolio, the pension scheme would assign a liability value (or “Technical Provisions”) of £200m.

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### Chart 13: Pensioner Liability Profile

<table>
<thead>
<tr>
<th>Year</th>
<th>Liability Outgo (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>25</td>
<td>10</td>
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<td>30</td>
<td>12</td>
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<td>35</td>
<td>14</td>
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<tr>
<td>60</td>
<td>4</td>
</tr>
<tr>
<td>65</td>
<td>2</td>
</tr>
<tr>
<td>70</td>
<td>0</td>
</tr>
</tbody>
</table>

3.11 For Scenarios 1 & 2, the pension scheme can reasonably allow within the liability discount rate for the bond yield in excess of gilts, subject to making prudent allowance for expected defaults.¹

<table>
<thead>
<tr>
<th>Base Case Corporate bonds &amp; inflation swaps</th>
<th>Infrastructure Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross spread over gilts</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Prudent allowance for loss from defaults</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Swap hedging costs</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Management Charge</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Net spread over gilts</strong></td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:
- Scenario 1 assumes 20% allocation to cash or gilts to provide liquidity for potential margin calls on the swaps. The gross spread over gilts of 100bps is therefore a blend of 80% in corporate bonds (yielding 125bps over gilts) and 20% in cash (yielding no spread);
- Default allowances for Scenarios 1 & 2 reflect Moody’s historic analysis for corporate bonds and infrastructure project finance respectively (see Section 1), with 100% uplift to historic rates for prudence;
- Management Charges are illustrative only and vary according to the size and nature of the mandate.

¹ We note that pension schemes adopt a range of approaches to setting discount rate. Some pension schemes may alternatively choose to maintain the discount rate and instead allow for the additional yield to address the funding deficit through the Recovery Plan.
3.12 The table below illustrates the relative impact on the discounted value of pension liabilities (the “Technical Provisions”) if prudent allowance is made for the expected yield above gilts for Scenarios 1 and 2:

<table>
<thead>
<tr>
<th></th>
<th>Technical Provisions</th>
<th>% Improvement versus Base Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Case (IL Gilts)</td>
<td>£200m</td>
<td>—</td>
</tr>
<tr>
<td>Scenario 1 (Corporate bonds &amp; swaps)</td>
<td>£185m</td>
<td>8%</td>
</tr>
<tr>
<td>Scenario 2 (Infrastructure Debt)</td>
<td>£167m</td>
<td>17%</td>
</tr>
</tbody>
</table>

Note: Scenarios 1 & 2 assume that the spread above gilts can be factored into the discount rate for the full liability duration. This implicitly assumes that assets are sourced with a duration of c.13 years (which may be more difficult to achieve for a portfolio of fixed interest corporate bonds where there is a shortage of long-dated issuance).

3.13 Most pension scheme trustees and sponsors are keen to de-risk, but this can be constrained by the fact that this could reduce expected investment returns and trigger an increase in employer contributions. The Pension Regulator’s June 2013 publication on scheme funding assumptions indicates the following assumptions for 2010/11 valuations:

- average liability discount rate in the region of gilts plus 100bps;
- this represents a blend of (prudent) assumed returns on return seeking and liability matching portfolios;
- in many cases, this will translate into an assumption of 150-200bps above gilts on the return seeking portfolio.

3.14 Yields available on infrastructure debt are therefore sufficient to support de-risking from equities without necessarily triggering an increase in the reported funding deficit. As highlighted in the following example, the scope for risk reduction is substantial.

3.15 Many pension schemes monitor their exposures through calculating the “Value at Risk”, i.e. the deterioration in the funding level following a “1 in 20” adverse outcome. Consider the following scenario:

- Liability profile – 50% pensioners, 50% non-pensioners
- Current asset allocation – 50% equities, 50% gilts
- New asset allocation – 30% equities, 20% infrastructure debt, 50% gilts

3.16 As highlighted above, the shift from equities to infrastructure debt produces a reduction in “1 in 20” funding level exposure from 31% to 25%. This is due to the reduction in exposure to interest rates, inflation and equity markets, which is partially offset by taking exposure to uncertainty on bond defaults.
3.17 A further attraction of infrastructure debt, not captured in the above analysis, is the benefit achieved by moving into an asset class which is expected to show a low correlation to the pension scheme sponsor – where many schemes may see large falls in equity values at points where their corporate sponsor is least able to afford the resulting increase in deficit contributions.

Other considerations – illiquidity

3.18 The principal trade-off in securing the additional yield on infrastructure debt is that the assets will be less liquid – such that it would take longer to sell the assets and there would be less certainty of the value that will be realised on sale.

3.19 This is not a concern for the vast majority of pension schemes:

- the pension scheme has relatively predictable liability cashflows and will not therefore be a forced seller during depressed markets and can therefore follow a “buy and hold” strategy;

- if the asset value falls in response to rising interest rates, this can be compensated by a corresponding reduction in value placed on liability cashflows that are notionally being matched by the income from the debt investment, i.e. market volatility does not translate into funding level volatility.

3.20 One caveat to the “buy and hold” rationale is that many pension schemes aspire to transition their assets to a bulk annuity insurer when they are fully funded. However, a pre-existing allocation to infrastructure debt can deliver benefits to pension schemes at the point of transacting:

- the profit margin for annuity providers is, broadly, the illiquidity premium that is earned above gilt yields. Infrastructure debt has now become a core source of this illiquidity premium for many insurers, as highlighted by recent press coverage;

- bulk annuity pricing based on a transfer of cash/gilts to an insurer incorporates prudence about the credit spread above gilts that the insurer will earn when it transitions funds into less liquid investments – since for a period the insurer is exposed to risk of a tightening of credit spreads before assets are fully invested;

- providing an in specie asset transfer provides certainty of the credit spread that the insurer will receive, which all else being equal will support improved pricing. This has been observed where insurers have been able to “warehouse” assets in advance of bulk annuity transactions and deliver price reductions;

- the insurer views the assets as a set of liability matching cashflows, which means that the precise market value attributed to an asset at the point of in specie transfer is largely inconsequential, subject to a consistent view on credit quality. For example, if the insurer attributes a lower value to the asset than the pension scheme, then in the absence of concerns over credit quality this would simply result in the insurer taking a view that a correspondingly larger illiquidity premium is being earned.

3.21 It cannot be guaranteed that all insurers will be willing to accept an in specie asset transfer for a future bulk annuity transaction. However, even if the assets are not ultimately transferred to the insurer, by investing in assets which are more in line with insurer preferences, the pension scheme can achieve a more stable journey towards being fully funded on a bulk annuity basis compared with, for example, a strategy involving a mix of equities and gilts.

3.22 Furthermore, the activity and depth of demand in secondary market portfolio auctions has increased significantly in recent years. Macquarie’s own direct experience, supported by interviews with other market participants, indicates that auctions for portfolios of performing infrastructure debt assets now regularly attract widespread interest from institutional buyers. This depth has increased significantly over the last 12 months and the trend is expected to continue as more “real money” investors enter the infrastructure debt market.
4.1 Infrastructure debt is attractive to pension schemes by offering attractive yields, long duration, inflation hedging and low risk of losses on default. To date, however, pension schemes have not widely invested in the asset class. In part, this is a reflection of the relatively recent emergence of the opportunity (e.g. renewables) and the fact that commercial banks were dominating the market but this has changed due to Basel III regulations for banks (e.g. inflation-swaps for utilities). It is also the result of the level of expertise required to originate, underwrite and execute investments. This has also represented a significant barrier for all but the largest pension schemes.

4.2 Our analysis indicates that pension schemes are increasingly well positioned to break down these barriers and we expect pension investment into infrastructure debt to increase significantly over the coming year. This trend will be supported by the access now provided by institutional fund managers who have started investing on behalf of pension schemes and insurers over the last year. Managers provide access through one of two routes:

- **Separately managed accounts**: for pension schemes looking to make a large allocation to this asset class (e.g. £100m+), it is feasible for a fund manager to operate a segregated account in which the pension scheme invests directly in loans made to Infrastructure Assets. Whilst the pension scheme’s holdings are separately identified, they still benefit from the economies of scale and market access achieved by co-investing alongside the manager’s other clients. Once the portfolio of loans has been acquired, the fund manager would closely monitor the credit strength and continue to act as the point of contact with borrowers;

- **Pooled funds**: it is impractical for loans to Infrastructure Assets to be subdivided into very small units. Consequently, for the majority of pension schemes it will be preferable to gain access to this asset class by co-investing alongside other pension schemes through a pooled fund. This would lead to the pension scheme owning a share of a portfolio of loans rather than having direct holdings of individual loans.

4.3 The pipeline of inflation-linked debt opportunities is large and will support a major transition of pension scheme assets into this asset class over an extended time horizon. However, the inflation-linked debt market is at a relatively early stage and the benefits will be greatest for the early movers.

4.4 Pension schemes entering this market will gain the most attractive returns through targeting transactions which have historically been most reliant on banks for their long-term funding, i.e. where borrowers do not have easy access to public bond market.

All told, institutional investors look set to capitalize on what Standard & Poor’s sees as an unprecedented opportunity to invest in infrastructure around the world. A steady flow of projects and better grasp of the risks associated with infrastructure lending are helping to draw pension funds, insurers, and other nontraditional financiers to investments that boast higher yields, as well as comparatively low default rates and better recoveries, than those similarly rated corporate debt, whilst also offering the asset-liability management that these investors need.

S&P (18TH JAN 2014) “GLOBAL INFRASTRUCTURE: HOW TO FILL A $500 BILLION HOLE”
About Macquarie

Macquarie provides specialist investment, advisory and financial services in select markets around the world. Macquarie has more than 13,900 staff in 28 countries including the United Kingdom, France, Germany, Austria, Ireland, Switzerland, Australia, New Zealand, the United States, Canada, China, South Korea, South Africa and the United Arab Emirates. Macquarie is globally recognised for its deep infrastructure expertise including taking a leading and innovative role in private market financing of infrastructure assets. It has deep relationships with the majority of infrastructure market stakeholders, including sponsors, lending banks, advisers, construction companies. Macquarie has assets under management of £222 billion as at 30 September 2013, including over £63 billion of infrastructure investments and over £58 billion of assets managed for insurance client. Macquarie Group is the largest infrastructure asset manager with over 20 years of infrastructure sector experience.

About Macquarie Infrastructure Debt Investment Solutions (MIDIS)

In early 2012 Macquarie established the Macquarie Infrastructure Debt Investment Solutions (MIDIS) platform to leverage the infrastructure expertise within Macquarie into an investor-aligned global infrastructure debt investment management business. MIDIS’s strategy is to focus on the investment needs of pension schemes and insurers seeking a highly engaged, client service driven manager. A core pillar of MIDIS’s strategy is to deliver customised solutions to its investors.

Macquarie has been deliberate in its dedication of resources to MIDIS in order to create an institutional-grade funds management business which caters for the specific needs of long term investors:

- Senior management with extensive experience across the global infrastructure sector as members of the Investment Committee;
- A London-based Investment Team with a comprehensive lending track record across multiple infrastructure sub-sectors in the UK and broader international markets;
- A dedicated and independent risk function with deep infrastructure credit experience;
- Structuring and Investor Strategy Team with specific pensions and insurance regulatory, capital and liability management experience;
- A Specialist Advisory Panel made up of infrastructure sector specialists providing market insights and intelligence and an avenue into Macquarie’s unrivalled sector coverage; and
- A full-service Operations Team to ensure institutional-grade asset management, reporting and servicing.

2 As at 30 September 2013
3 As at 30 June 2013.