Institute and Faculty of Actuaries

Current Issues in Pensions: Investment

Redington

March & April 2014

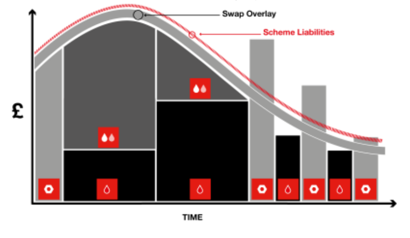
Agenda

1. Introduction to Illiquid Credit

Illiquid Asset Opportunities: Introduction

We believe illiquid assets can offer meaningful benefits to investors seeking to build a portfolio to match predefined liabilities:

- Short-maturity illiquid assets can offer investors excess returns for taking on the risk of not being able to sell an asset for a non-fire sale price at short notice. This can help generate sufficient returns over Libor to back a portfolio of interest rate and inflation swaps.
- Longer-maturity illiquid assets can help a pension scheme invest in line with the duration of its liability profile. In certain cases (e.g. real estate long leases), inflation linkage may also be available.



What Do We Mean By "Illiquidity Premium"?

The **illiquidity premium** is the incremental return ('premium') that investors require for holding an illiquid rather than a liquid asset.

It is commonly used to refer to the excess return of illiquid assets over comparable liquid assets.

Assessing the size of the illiquidity premium can be a difficult task owing to a number of factors:

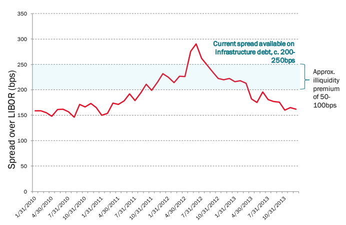
1) The difficulty of gaining accurate information about illiquid investments, as many are made privately and details are not widely available.

2) The choice of 'liquid' comparator asset (e.g. comparing privately-issued to publicly-issued bonds means that public bonds are assumed to be 'liquid' where this may not actually be the case).

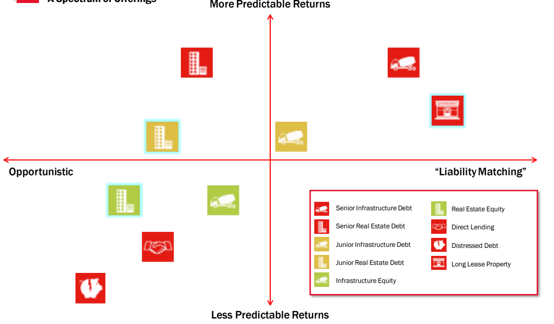
A common method is to look at the difference in price at deal closing between the illiquid asset and a widely-traded comparator of equivalent maturity and credit quality.

The chart, **right,** shows the premium available on private infrastructure loans compared to the Bank of America Merrill Lynch BBB Utility Index, made up of publicly-issued bonds.

Comparison of Pricing Available on Private Infrastructure Loans vs. BAML BBB Utility Index



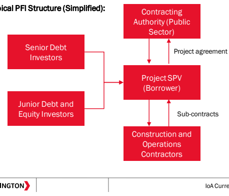
Illiquid Asset Classes: A Spectrum of Offerings



Senior Infrastructure Debt

Maturity Profile	15 years +
Liquid Alternative	Long-Dated, Publicly-Traded Debt of UK Utility Companies
Expected Spread / Rate	200-300bps (for PFI)
Approx. Premium over Liquid Alternative	50-150bps

Typical PFI Structure (Simplified):



What is it?

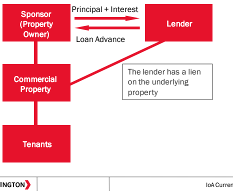
- Three major approaches are evident:
  - Bilaterally-negotiated transactions with utility companies or infrastructure-rich corporates (e.g. port operators), secured on specific infrastructure assets.
  - Direct lending to individual infrastructure projects, usually under the Private Finance Initiative (PFI, see diagram **below left**), with lenders benefiting from long-term revenue streams generated by the project, backed by a quasi-government guarantee.
  - Acquiring portfolios of existing infrastructure loans from banks in the secondary market. Difficult to source assets via this method.

Points to Note

- Cashflow profile of deals can be either fixed or floating. Inflation linkage is possible through either a direct corporate lending or a PFI-based approach.
- Prepayment risk exists, although managers are able to mitigate this through insisting on prepayment protection via Spens clauses and prepayment penalties.
- Limited availability of **senior debt** pooled funds thus far (min commitment c. £25m), segregated mandates require a substantial commitment (c. £100m).

Commercial Real Estate Debt

Maturity Profile	5-10 years (varies)
Liquid Alternative	Sterling ABS
Expected Spread / Rate	225-350bps for Senior Loans
Approx. Premium over Liquid Alternative	75-200bps



What is it?

- Illiquid, usually floating rate loans backed by commercial real estate, such as offices, retail, hotels, etc.
- A sponsor, typically a fund, private equity house, property company or a high net worth individual uses equity and debt to finance the purchase of a commercial real estate building (or buildings). Rental cash flow streams are used to cover the interest payments on the debt.
- The size of loans is typically relatively large, in the range of £10-100m.
- In the event of a default, the lender, depending on its position in the capital structure, receives a portion of the liquidated underlying asset.

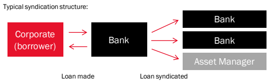
Points to Note

- It is possible to divide the market into two key offerings:
- Senior and "stretch senior" loans, typically up to 65-70% LTVs, on core and often "super-prime" property. A portfolio of these loans has the potential to earn spreads in the region of Libor +225-350 gross of fees.
- The second, riskier opportunity involves participating in a higher LTV mix of "stretch senior" and mezzanine loans from c. 65%-85% LTV. These loans typically earn in excess of Libor + 700bps and can involve Pay-in-Kind coupons which only pay off at maturity or successful refinancing. **ICG Longbow III** is an example fund.

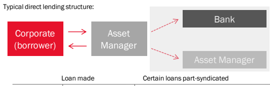
Direct Mid-Market Lending: Introduction

Maturity Profile	24 – 72 Months
Liquid Alternative	BB/B Non-Distressed US High Yield
Expected Spread / Rate	650bps prior to defaults, 450bps after defaults
Approx. Premium over Liquid Alternative	250bps prior to defaults

Typical syndication structure:



Typical direct lending structure:



What is it?

- Refers to managers taking the place of banks in lending directly to corporations (see diagram, below left).
- Maturity profile is typically 24-72 months.
- Managers can lend senior secured and add leverage at the fund level. Target unlevered IRRs are in the range c. 9-10%.
- Managers tend to specialise by target geography (i.e. US vs Europe) as well as according to target seniority (senior vs. mezzanine loans).
- Managers frequently co-operate on 'club' transactions as well as competing for available borrowers.

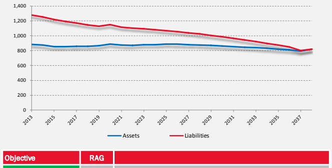
Points to Note

- There is currently a pronounced supply/demand imbalance for secured direct debt provided to mid-market lenders, owing both to regulatory change (e.g. Basel III) making it less economic for banks to lend, and mid-market borrowers being too small-scale to access the public bond markets.
- In the UK, the Government has entered into agreement with several established direct lending managers (e.g. Alcentra, Pricoa) to lend money to corporates via the Business Finance Partnership.
- Fund structures are similar to private equity vehicles and fees can be high.

2. Equity Tail Risk Hedging

A Pension scheme will set its investment strategy to achieve a required level of return to full funding

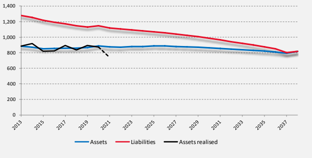
A Pension Scheme's Flightplan & Investment Strategy



Objective	RAG	
Primary Funding Objective	●	Expected return LIBOR + 179 Required return to 2037 LIBOR + 180
Risk	●	1 Year 95% VaR £122m
Hedging	●	Funding ratio swaps flat basis 73% Nominal hedge ratio 73% Inflation Hedge ratio 73%

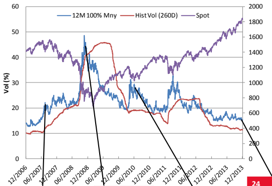
Volatility around the flight plan is expected, but significant events can knock the scheme off course

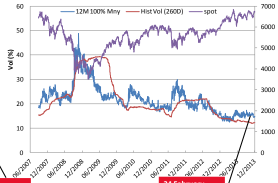
In reality, the path will not be smooth



Objective	RAG	
Primary Funding Objective	●	Expected returnLIBOR + 179 Required return to 2037 **LIBOR +370**
Risk	●	1 Year 95% VaR £122m
Hedging	●	Funding ratio swaps flat basis 73% Nominal hedge ratio 73% Inflation Hedge ratio 73%

At the same time equity markets are at or close to all-time highs, and protection costs are low





30 August 2007	
1 yr option cost (%)	
90%	3.9
80%	2.0
70%	0.6

1 November 2008	
90%	10.1
80%	6.0
70%	3.1

4 June 2010	
90%	8.1
80%	5.4
70%	3.4

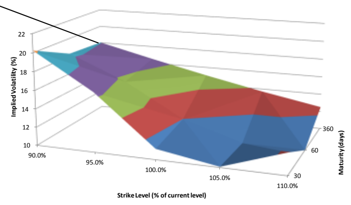
24 February 2014	
90%	3.4
80%	1.7
70%	0.8

24 February 2014	
90%	3.1
80%	1.4
70%	0.6

The Volatility Surface

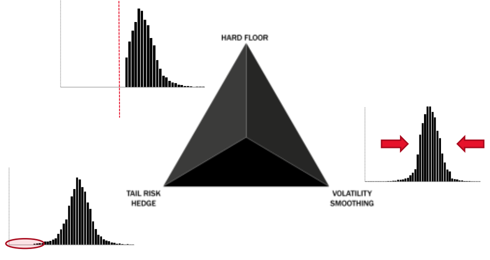
Actual option cost		
	Cost (%)	Volatility (%)
90%	3.4	18.3
80%	1.7	21.7
70%	0.8	25.1

Option cost if no skew	
ATM Volatility = 15.3%	
90%	2.6
80%	0.6
70%	0.06



- A persistent feature of options on equity indices is the existence of a "skew" to the volatility surface
- Which means that options protecting against larger downside moves price off a higher implied volatility than at the money options
- This means that downside protection can look expensive, it also limits the attractiveness of "collar" strategies

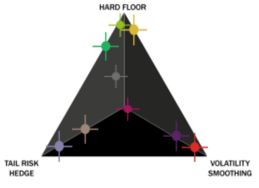
When we look at possible protection strategies, three distinct objectives emerge…



Possible protection strategies

Single Static Put Option Strategy	Purchase single downside option on equity index, eg 3 year 90% protection. Cost is both high and uncertain. Hard to make a viable strategy. Exposure to specific strike and expiry risk. Easiest approach to understand, gives certainty over floor.
Multiple Static Put Option Strategy	Purchase series of options eg at 70%, 80%, 90% at a series of different maturities. Diversifies the strike and maturity risk but shares other disadvantages with previous. Also removes the certainty of floor at a certain level.
Systematic Option Strategy	A common approach is "calendar collars" where short dated call options are systematially sold, eg each day sell 1/10 target size of 1 month 102% calls. Each month by 1/12 of desired size of 1 year puts. Strategy has been very profitable historically, but this is not guaranteed. Starts to look more like a quantitative trading strategy than a protection
VIX	Take a long position in futures on the VIX index. Simple to implement but the VIX futures historically exists in *contango* which means that long positions rolling down the futures curve lose money on average. These strategies have performed poorly historically
Variance	Take a long position in a variance swap. Relatviely exotic strategy so harder to explain and understand. Variance style payoff (vol squared) gives greater payoff under extreme scenarios. Historically has performed badly.
Volatility Control	An approach to constructing an index where exposure to equities is varied through time to manage the level of realised volatility to a target. Simple and easy to implement. Not a tail risk hedge or floor protection by itself. Involves rebalancing costs.
Low Volatility Stocks	Selecting a portfolio of low volatility stocks, a number of indices have arisen eg MSCI min vol. Easy and intuitive for clients to understand. Volatility level is not guaranteed (can still vary) may involve rebalancing costs.
Volatility Control + Annual Put Option	Once a volatility control index has been put in place options to protect the downside become much cheaper, as the index itself provides an initial risk protection through the de-gearing. This negates the skew pricing in vanilla options.

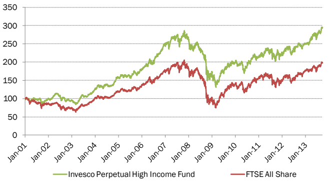
Protection strategies classified according to objectives



KEY
Single Static Put Option Strategy
Multiple Static Put Option Strategy
Dynamic Option Strategy
Systematic Option Strategy
VIX
Variance
Volatility Control
Low Volatility Stocks
Volatility Control + Annual Put Option

3. Style Investing and the changing use of hedge funds

Neil Woodford: Style Premia in Practice



- Neil Woodford presents us with an intriguing practical look into style premia investing in the UK.

- His track record is impressive – he has beaten the **FTSE All Share** over the past 12 years by **3.4% p.a.**

- But is this the **correct benchmark** to use to assess his performance?

Betting Against Beta – Frazzini and Pedersen (2013)


Betting Against Beta

Abstract

- Frazzini and Pedersen (2013) find that **"betting against beta"** has been a very effective investing strategy across many asset classes (US equities, 20 international equity markets, Treasury bonds, corporate bonds and futures).

- By going **long low beta assets** while going **short high beta assets**, this has historically produced a significant premium.

- They posit that due to **leverage aversion**, many investors seeking high returns will bid up high volatility assets rather than choosing to lever low volatility assets.

- This leads to a premium for those willing to invest in low beta assets which can be termed a ***"defensive style premium"***.

Academic Research Has Highlighted Other Effects Over Long Periods of Time

Fama & French (1992)

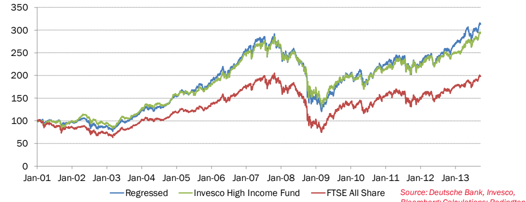
- Small cap stocks outperform large cap stocks over the long term (1962-1989). (On a risk-adjusted basis, however, the difference is negligible.)

- 'Cheap' stocks (based on fundamental ratios such as price-to-book or price-to-earnings) outperform 'expensive' stocks. This holds up even on a risk-adjusted basis and is known as the **value** factor.

Jegadeesh & Titman (1993)

- Buying rising stocks and selling falling stocks leads to excess outperformance of about 1% per month (1965-1989). This is known as the (price) **momentum** factor.

Applying Style Premia to Neil Woodford



Source: Deutsche Bank, Invesco, Bloomberg; Calculations: Redington

	Market	Value	Momentum	Defensive
Portfolio Weights	75%	13%	19%	52%

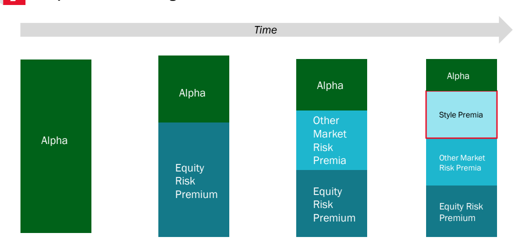
Woodford's performance can broadly be explained by: **a lower than 100% weight to the market** (represented by the FTSE All Share) along with allocations to value, momentum and defensive factors.

Buffett's Alpha

- Like Neil Woodford, **Warren Buffett** provides another fascinating example of style premia investing in equities.
- Berkshire Hathaway has a **Sharpe ratio of 0.76** from 1976 to 2012, double that of S&P 500 (0.37). This is a higher Sharpe ratio than any other US stock or mutual fund over that period.
- Berkshire has **levered 1.6-to-1** on average, borrowing partly through its insurance company's float at rates over 3% below the US T-bill rate giving it **ultra-cheap financing** (2.2% on average).
- Frazzini, Kabiller and Pedersen (2013) show that when controlling for exposures to style premia and leverage, Buffett's alpha over the S&P 500 becomes **insignificant**.
- Buffett has suffered large absolute and relative drawdowns. His success stems from being able to stick with his strategy over the long run.
- Neither Woodford nor Buffett ever likely thought about 'harvesting' premia. They do, however, state similar characteristics for companies they like: cheap, stable, profitable, growing and with high payout ratios.

Can their approach to investment be done systematically?

Is Alpha Just Beta Waiting to be Discovered?



Prior to cap-weighted indices, all returns were effectively viewed as alpha

With the introduction of CAPM, the equity market effect was separated from returns

This was then extrapolated to include other asset classes such as bonds and commodities

Now we can separate out a number of risk premia with much less being left as pure alpha

Major Style Premia Families Cutting Across Liquid Markets

Value
- Buying assets that are "cheap" relative to their fundamental value and selling "expensive" assets
- For example: go long lowest price-to-book stocks, go short highest price-to-book stocks

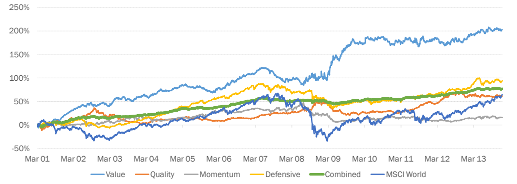
Momentum
- Involves buying assets that recently outperformed peers and selling those that recently underperformed
- For example: go long stocks with highest 3 month return, go short stocks with lowest 3 month return

Carry
- Implies buying high-yielding assets and selling low-yielding assets
- For example: go long highest yielding currencies, go short lowest yielding currencies

Defensive
- Consists of buying low-risk, high-quality assets and selling high-risk, low-quality assets
- For example: go long high return-on-equity stocks, go short low return-on-equity stocks

Need to be able to go long, go short and to leverage across multiple asset classes

Style Premia Performance in Equities



	Value	Quality	Momentum	Defensive	**Combined**	MSCI World
Excess Return	15.4%	5.1%	1.4%	10.7%	**9.8%**	2.7%
Volatility	29.0%	21.8%	26.9%	22.3%	**10.4%**	17.9%
Sharpe Ratio	0.53	0.24	0.05	0.48	**0.94**	0.15

Source: Deutsche Bank, Bloomberg; Calculations: Redington

An individual style premium may not work for a number of years. This is why diversification matters.

References

Fama, E.F. and French, K.R. (1992), "The cross-section of expected stock returns,", Journal of Finance, 47, 2, pp. 427-465

Frazzini, A. and L.H. Pedersen (2013), "Betting Against Beta", working paper, AQR Capital Management and New York University

Frazzini, A., D. Kabiller and L.H. Pedersen (2013), "Buffett's Alpha", working paper, AQR Capital Management and New York University

Jegadeesh, N. and S. Titman (1993), "The returns to buying winners and selling losers", Journal of Finance, 48, 1, 65-91

Conclusions

Illiquid credit

- Opportunity for pension schemes to earn an illiquidity premium by investing in long-term debt like instruments
- Helps pension schemes to meet their return objectives (and contributes to liability hedging) in an environment of tightening spreads on liquid credit
- Need to make sure the scheme is getting sufficient premium to compensate for giving up liquidity

Equities

- With equity markets at or close to their highs, and protection costs at pre-crisis levels, many managers and pension schemes are looking at equity protection structures to limit the potential effect of an equity fall
- There is a huge variety of possible structures available, which all achieve slightly different goals
- Ultimately the cost of protection depends on the volatility of the underlying index

Style investing

- Some of the returns of successful fund managers can be explained by exposure to style factors
- It is now possible to gain exposure to these style factors across asset classes in a systematic way by index investing

13-15 Mallow Street London EC1Y 8RD Telephone : +44 (0) 20 7250 3331 www.redington.co.uk

Contacts

David Bennett
Head of Investment Consulting
Direct Line: 020 3326 7147
david.bennett@redington.co.uk

Aniket Das FIA FIAA CFA
Vice President
Direct Line: 020 7250 3331
Aniket.dast@redington.co.uk

Pete Drewienkiewicz
Director
Direct Line: 020 3326 7138
pete.drewienkiewicz@redington.co.uk

Dan Mikulskis FIA
Director
Direct Line: 020 3326 7129
dan.mikulskis@redington.co.uk

Patrick O'Sullivan FIA CFA
Director
Direct Line: 020 3326 7104
Patrick.osullivan@redington.co.uk

Pension Consultant of the Year

Pension Consultant of the Year (2012, 2013)

Investment Consultant of the Year

Specialist Investment Consultant of the Year

European Pensions Awards

Risk Management Firm of the Year (2012); Investment Consultant of the Year (2013)

Disclaimer

For professional investors only. Not suitable for private customers.

The information herein was obtained from various sources. We do not guarantee every aspect of its accuracy. The information is for your private information and is for discussion purposes only. A variety of market factors and assumptions may affect this analysis, and this analysis does not reflect all possible loss scenarios. There is no certainty that the parameters and assumptions used in this analysis can be duplicated with actual trades. Any historical exchange rates, interest rates or other reference rates or prices which appear above are not necessarily indicative of future exchange rates, interest rates, or other reference rates or prices. Neither the information, recommendations or opinions expressed herein constitutes an offer to buy or sell any securities, futures, options, or investment products on your behalf. Unless otherwise stated, any pricing information in this message is indicative only, is subject to change and is not an offer to transact. Where relevant, the price quoted is exclusive of tax and delivery costs. Any reference to the terms of executed transactions should be treated as preliminary and subject to further due diligence .

Please note, the accurate calculation of the liability profile used as the basis for implementing any capital markets transactions is the sole responsibility of the Trustees' actuarial advisors. Redington Ltd will estimate the liabilities if required but will not be held responsible for any loss or damage howsoever sustained as a result of inaccuracies in that estimation. Additionally, the client recognizes that Redington Ltd does not owe any party a duty of care in this respect.

Redington Ltd are investment consultants regulated by the Financial Services Authority. We do not advise on all implications of the transactions described herein. This information is for discussion purposes and prior to undertaking any trade, you should also discuss with your professional tax, accounting and / or other relevant advisers how such particular trade(s) affect you. All analysis (whether in respect of tax, accounting, law or of any other nature), should be treated as illustrative only and not relied upon as accurate.

Redington Limited (6660006) is registered in England and Wales. Registered office: Austin Friars House, 2-6 Austin Friars, London EC2N 2HD

Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

Institute and Faculty of Actuaries