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The illiquidity conundrum: does the illiquidity premium really exist?

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Locking your money up for a longer period of time can be a risk, particularly in times of market stress. However, some believe that long-term investors should be able to stomach illiquidity and will receive higher returns as a result.

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In this paper we examine the illiquidity premium and its place in a UK defined benefit pension scheme portfolio.

We consider:

- To what extent pension schemes can tolerate illiquidity
- Approaches to identifying, isolating and quantifying the illiquidity premium
- To what extent illiquidity is a rewarded risk
- An illiquidity premium does appear to exist for some alternative asset classes (in particular property). Furthermore, being able to tolerate a degree of illiquidity enables pension schemes to access a wider range of asset classes for return generation and diversification purposes. However:
  - There are a number of difficulties with measuring illiquidity risk. A key difficulty is isolating asset specific illiquidity risks from systematic or market risk
  - Returns may not fully compensate investors for the risks embedded in illiquid assets, such as tail risk
  - Higher returns may be the result of other underlying risk factors which can be exploited in other ways, without locking up assets for a long period of time.

Although illiquid assets may (and arguably should) play a role in a pension scheme's investment strategy, given the challenges above, pension funds should be wary of investing in illiquidity "for illiquidity's sake."

Understand the liquidity needs of your scheme. The extent to which a scheme can invest in illiquid assets may be driven by more than just its cashflow needs. De-risking plans and the trustees' and sponsor's tolerance of losses can also have an impact.

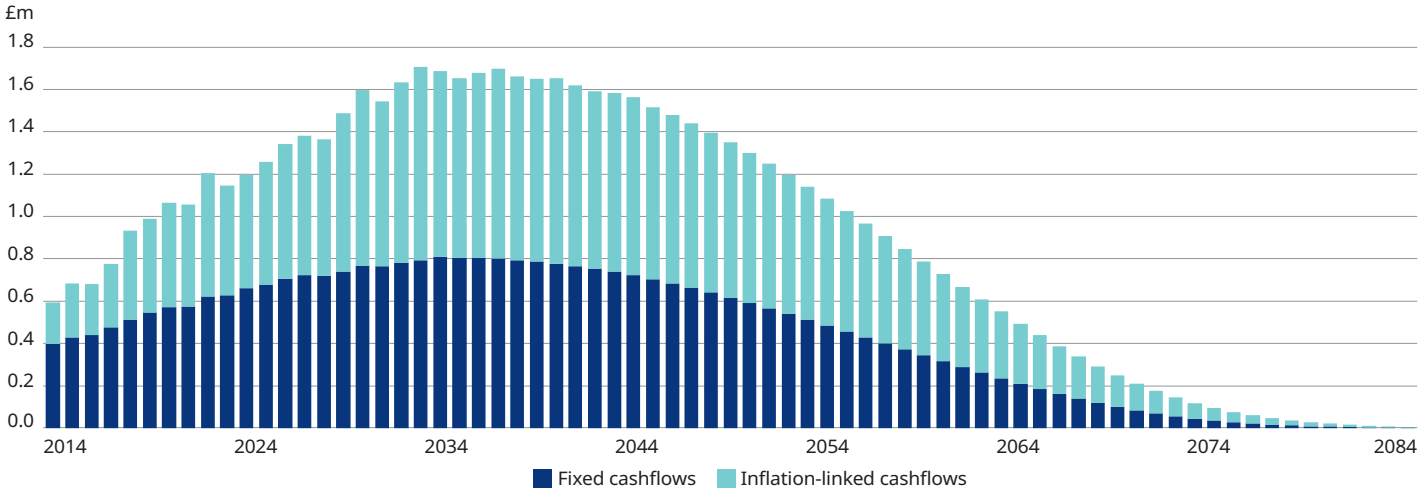
Be aware of hidden risks in illiquid assets. Traditional risk measures, such as standard deviation, only provide a partial picture. Losses on illiquid assets can be higher than suggested by their measured volatility.

What is the role of illiquid assets in your investment strategy? Are you investing for diversification, to exploit a particular return opportunity or to earn an "illiquidity premium"? Different illiquid assets can offer different benefits and not all illiquid assets will earn an illiquidity premium.

How much liquidity do pension schemes need?

A key principle of investing is that investors with longer-term time horizons have fewer liquidity requirements than shorter-term investors and so have the ability to invest in longer-term, illiquid assets. Defined benefit pension schemes are generally seen as long-term investors as their liabilities frequently have a duration of 15 to 20 years. However, in reality, pension schemes often have relatively low allocations to alternative or illiquid asset classes, with the majority of their assets invested in equities or bonds. The reason for this difference may be attributed to a mismatch between investors' willingness and ability to tolerate illiquidity. For example, a pension scheme may have a reasonably high ability to invest in illiquid assets because most of their liabilities are due in the future. However, the governance requirements may be higher to access certain illiquid alternative asset classes, and so pension schemes are less willing to invest in them.

Figure 1: A typical pension scheme's cashflows



Source: Schroders, for illustration only

In addition, there is an element of regret risk in investing in illiquid assets. In order for investors to lock up their money for a number of years, they need to be very confident in their investment decisions; if they change their mind, it can be very difficult for them to sell out of an illiquid asset and buy into something else.

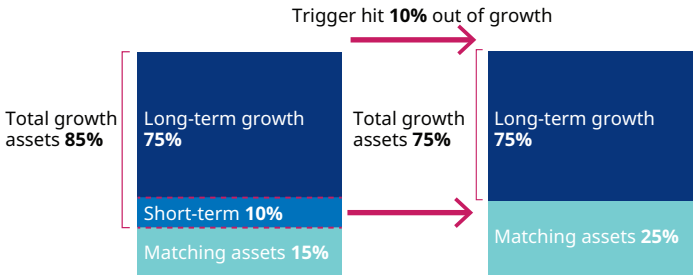
The cashflow profile of a typical defined benefit pension scheme is shown in figure 1. Although some benefit payments are due within the next five years, the 'peak' of these payments is likely to be 15 or 20 years into the future. Therefore, while a proportion of the pension scheme's assets need to be liquid in order to pay benefits, the majority could potentially be invested in illiquid assets.

For the average pension scheme, most pension payments are due relatively far into the future. However, there are other issues which may lead pension schemes to have a shorter-term focus, such as triennial valuations, annual accountancy disclosures and changes to the sponsor covenant. Although schemes can theoretically stomach large losses in the short-term, assets and liabilities are valued at least triennially and a large fall in asset value may mean sponsoring companies have to increase contributions into the scheme. Pressure on schemes to report asset values may also mean they are reluctant to invest in illiquid assets, which could force them to endure and report losses if they are unable to sell.

A further influence on a pension scheme's time horizon is the unpredictable nature of pension payments. Transfer values and enhanced transfer values give members the opportunity to transfer out of the pension scheme, effectively substituting a longer-term benefit payment for one due today. Similarly, the new pension freedoms, introduced in April 2015, may encourage more members to transfer their pension as a cash lump sum to a defined contribution pension scheme, causing their liabilities to be more short-term than envisaged. The unpredictable nature of these activities can make the timing of pension liabilities uncertain, which can lead to schemes wanting to hold more short-term liquid assets to match these.

The time horizon will also be affected if the scheme has a flight path in place. Usually, a flight path will de-risk scheme assets over time, decreasing the growth asset allocation and increasing the matching asset allocation, in the form of bonds and/or Liability Driven Investment (LDI). The length of time they hold their growth assets for depends on the timing of their triggers. While most of their assets will be held for the long-term, there is a proportion that will be de-risked at the first trigger, as illustrated below.This portion of the assets will have a shorter time horizon and therefore, arguably, needs to be more liquid.

Figure 2: Time horizon of growth assets in an example flight path



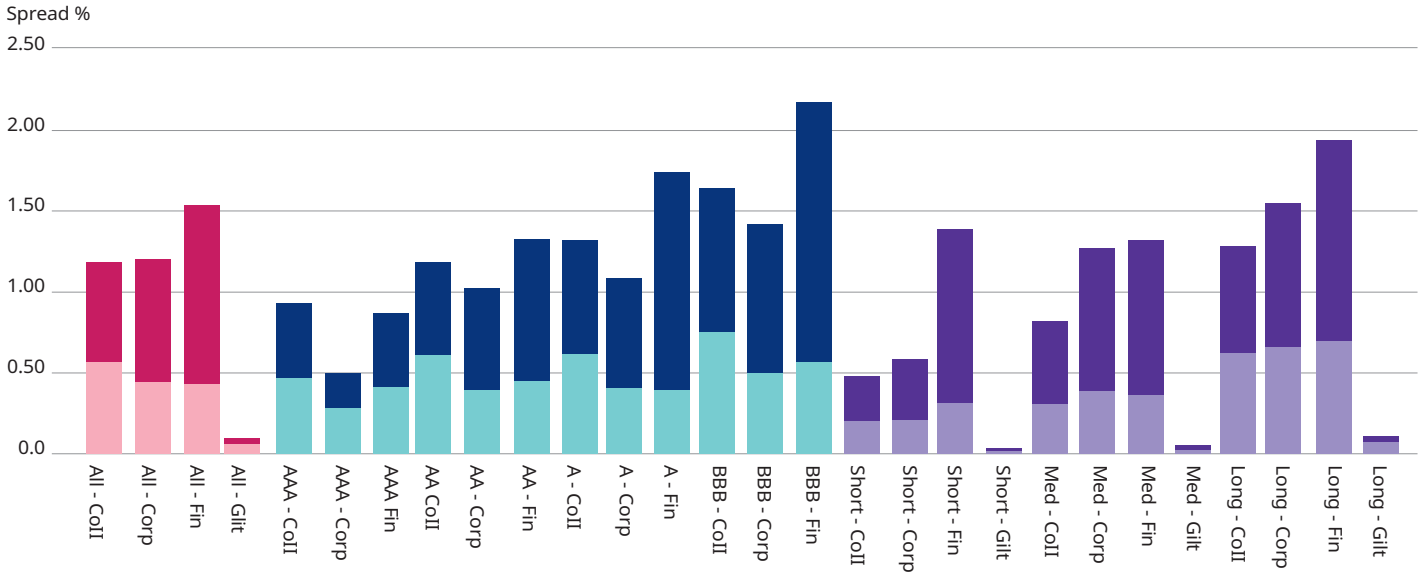
Source: Schroders, for illustration only.

Furthermore, defined benefit pension schemes may wish to cover off some of their liabilities with buy-ins from an insurer. Holding liquid assets to be able to transfer to an insurer may be necessary to fund such an exercise.

What is the illiquidity premium?

The illiquidity premium is generally understood to be the additional return received for the additional risk of tying up capital in a less liquid asset. Illiquidity becomes a particular concern when markets start to fall; investors may be forced to endure large price drops if they have difficulty selling the asset.

Figure 3: Pre and post-crisis quoted spreads



Source: IMA, May 2009.The lower portion of the bar shows the spread before the crisis and the upper portion the change following the crisis. Corp – corporate, fin – financial, coll – collateralised.

Furthermore, illiquidity tends to rise as markets fall; if the price of an asset is falling, it is likely that a lot of people will try to sell and the lack of buyers may make the asset even harder to sell. This was seen in 2008 in the corporate bond market, which experienced large falls in liquidity during the credit crisis. The liquidity in the market dried up as it became harder to sell securities. Dealers became unwilling to buy corporate bonds, often only quoting offers or even not quoting at all. If they were willing to buy corporate bonds, they would sometimes only be willing to take small orders, making it difficult for investors to sell their entire position[1].

Although spreads for all bonds widened, the greatest spread difference was seen in riskier bonds i.e. those with higher maturities and lower ratings. This can be seen in figure 3. The change in spreads following the crisis was generally more prominent in those bonds with lower credit ratings and longer maturities.

Can the illiquidity premium be quantified?

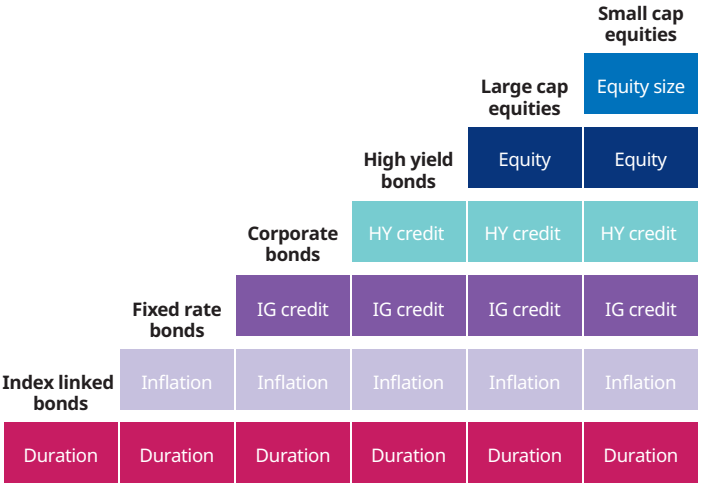
Illiquidity is a consideration for the majority of investors. When addressing whether there is a case for investing in illiquid assets or an 'illiquidity premium,' it is important to look at the issues with quantifying illiquidity. We have identified four key issues with quantifying the illiquidity premium.

1. It is difficult to isolate the illiquidity premium from other risk premia

An asset will often contain various risks which should all, in theory, be rewarded. For example, corporate bonds are exposed to duration, inflation and credit risk. Establishing which part of the overall return is associated with each risk is challenging and is likely to be inaccurate.

1 The Impact of the Credit Crunch on the Sterling Corporate Bond Market,' Investment Management Association, May 2009.

Figure 4: Breaking asset classes down into premia



Source: Schroders, for illustration only.

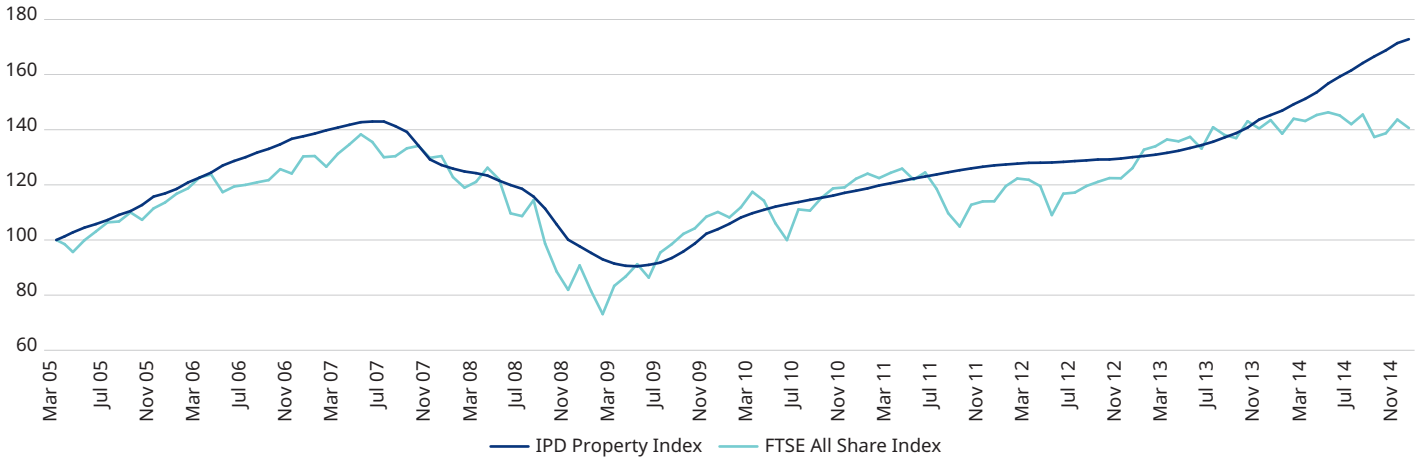
2. Illiquid asset return data is flawed

Ang (2014)[2] summarises many of the key issues with illiquid asset return data which pose problems for accurately quantifying the illiquidity premium. Biases such as survivorship bias and selection bias[3] exist in some alternative asset data including property and hedge funds, which can make returns overstated. An additional problem is that there is no realistic benchmark for illiquid assets as many passive alternative indices are not investable. For example, the IPD property index or HFRI hedge fund index contain a relatively large number of constituents, while property and hedge

2 Ang, Papanikolaou and Westerfield (2014) Portfolio Choice with Illiquid Assets

3 Survivorship bias – poor performing hedge funds are closed and therefore excluded from the index. Selection bias – returns tend to be observed when asset values are high, as this is when there is demand and interest in investing e.g. property is usually sold when prices are high and delayed if prices are low.

Figure 5: FTSE All Share vs IPD Property Index



Source: DataStream, 27 February 2015.

fund investors are likely to hold much fewer investments and so may face very different return profiles. This means it is difficult to separate out alpha and beta returns, creating further difficulties isolating an 'illiquidity premium.'

3. The risk of illiquid assets is difficult to measure

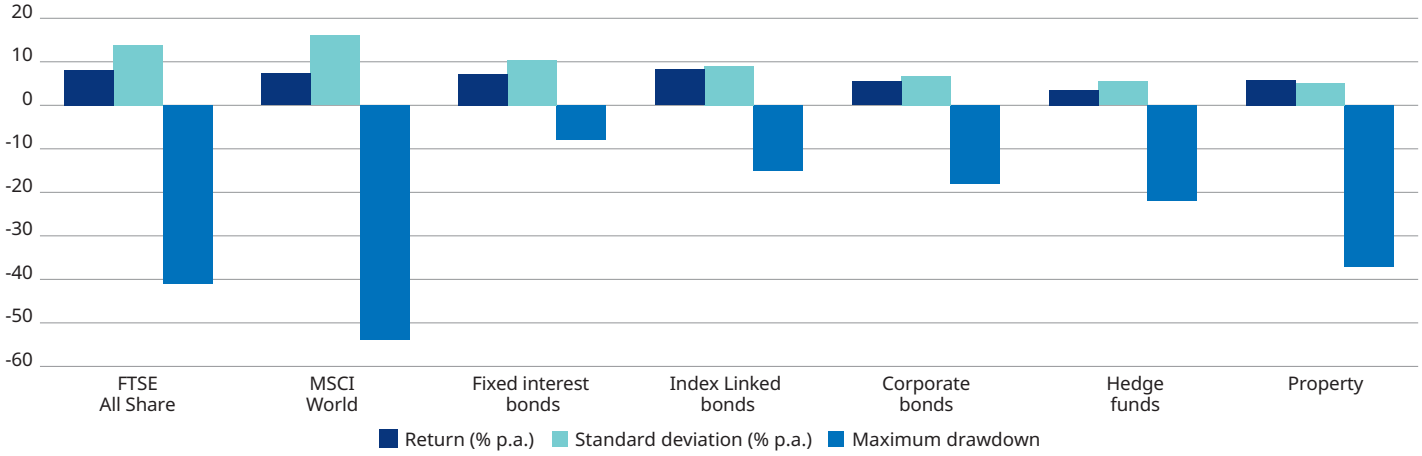
The risk of illiquid assets is often underestimated for two key reasons. Firstly, prices tend to be 'sticky' which can make them appear less risky than they are in reality. Secondly, the return profiles of alternatives are not normally distributed. Therefore, standard deviation is a poor measure of risk as it does not account for tail risk or skewness. We expand on both of these points below.

Liquid assets, such as exchange traded equities, are constantly valued as they are bought and sold extremely frequently. As a result, equity prices can move around significantly, even within a single day. In contrast, an illiquid asset such as property may only be valued monthly and may be based on appraised or 'backward-looking' valuations. Therefore, prices tend to be more 'sticky' and may appear artificially smooth. This is illustrated in figure 5. Although this can be overcome by 'unsmoothing,'[4] this is at best an approximation of the price. Illiquid assets can appear less volatile than liquid assets which can lead to investors perceiving them to be less risky than they are or misjudging their risk-adjusted returns. These can make quantifying the illiquidity premium a challenge.

Furthermore, some alternative assets, such as hedge funds, have a high likelihood of large losses, or 'tail risk.' High tail risk is an indication that returns are not normally distributed, which is an assumption underlying traditional risk measures, such as standard deviation. As a result, traditional risk measures may not be appropriate for less liquid asset classes. Observing maximum drawdowns or maximum losses may be a better way to measure the risk of these assets.

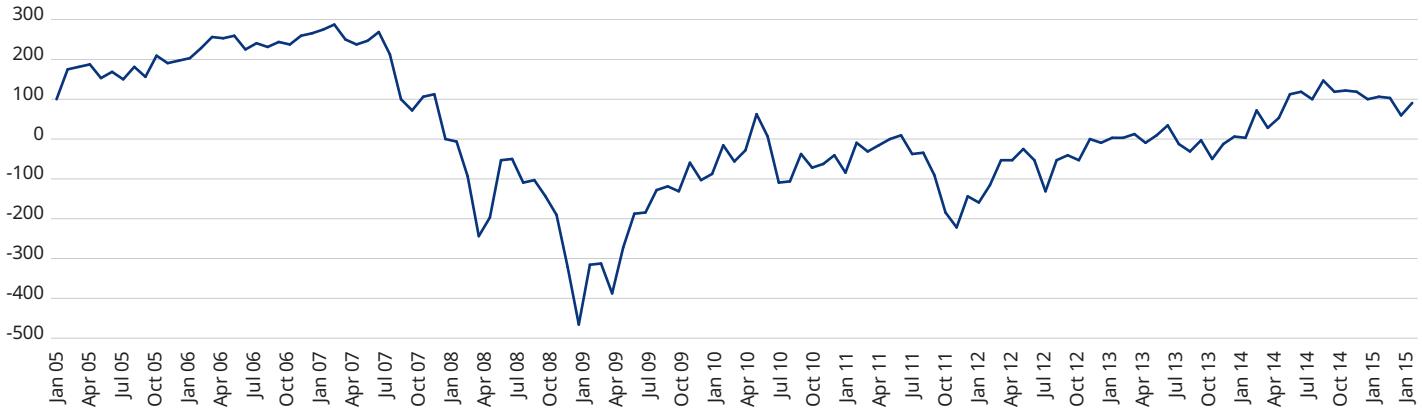
4 Unsmoothing – Initially constructed by Fisher, Geltner and Webb (1993), unsmoothing is a procedure to recover the underlying market values from a valuation-based commercial property index.

Figure 6: Maximum drawdown, standard deviation and return



Source: Schroders, DataStream, FTSE, MSCI, IPD, iBoxx and HFRI, 31 May 2015. For illustration only. Drawdown defined as maximum loss over the 10 year period from 31 May 2005 to 31 May 2015.

Figure 7: Citigroup US Liquidity Index



Source: Bloomberg, February 2015. Rebased to 100 on 1 January 2005.

The chart in figure 6 shows the difference between standard deviation and maximum drawdown for a variety of asset classes. We can see that standard deviation is not directly related to the amount that can be lost. This illustrates that standard deviation is not always the best measure of risk, as it does not capture the magnitude of losses or 'price swings.' Price swings are prevalent in alternative assets, meaning that their returns are not normally distributed. Returns are subject to skewness and kurtosis[5], distorting them away from those expected under a standard normal model. Price swings become problematic if liquidity is required unexpectedly or assets values have to be crystalized. When this happens, investors may be forced to sell out of an asset at the bottom of a 'swing' and endure a large loss as a result. While some investors may be able to endure these price swings, pension schemes have to consider benefit payments and triennial valuations for which large losses can be problematic.

4. Illiquidity is not constant

A further problem with measuring the illiquidity premium is that illiquidity is not constant over time. Assets often become harder to sell in times of crisis. Assets which are normally fairly liquid may see liquidity dry up in market turmoil, as discussed previously with the example of the Sterling Corporate Bond Market in 2008. The Citi Liquidity index aims to estimate the liquidity of the US market by looking at a variety of indicators such as swap spreads and volatility futures[6]. The chart above (figure 7) illustrates the plummet in liquidity that occurred during the financial crisis. This shows that illiquidity cannot be viewed as a constant premium above a risk free rate, but needs to be viewed in a market context. Market factors such as investor demand may have a significant influence on how liquid an asset is at a particular point in time.

Pension schemes can be doubly hit in times of market downturn. Not only may their assets be falling and becoming less liquid with a market drop, but pension schemes' sponsoring companies may also be struggling if the market downturn coincides with an economic downturn. This combination of a weaker sponsor covenant and poor asset performance is a key concern for pension schemes.

These difficulties with isolating and quantifying the illiquidity premium provide challenges for evaluating whether investments in less liquid assets are appropriately rewarded.

How should the illiquidity premium be measured?

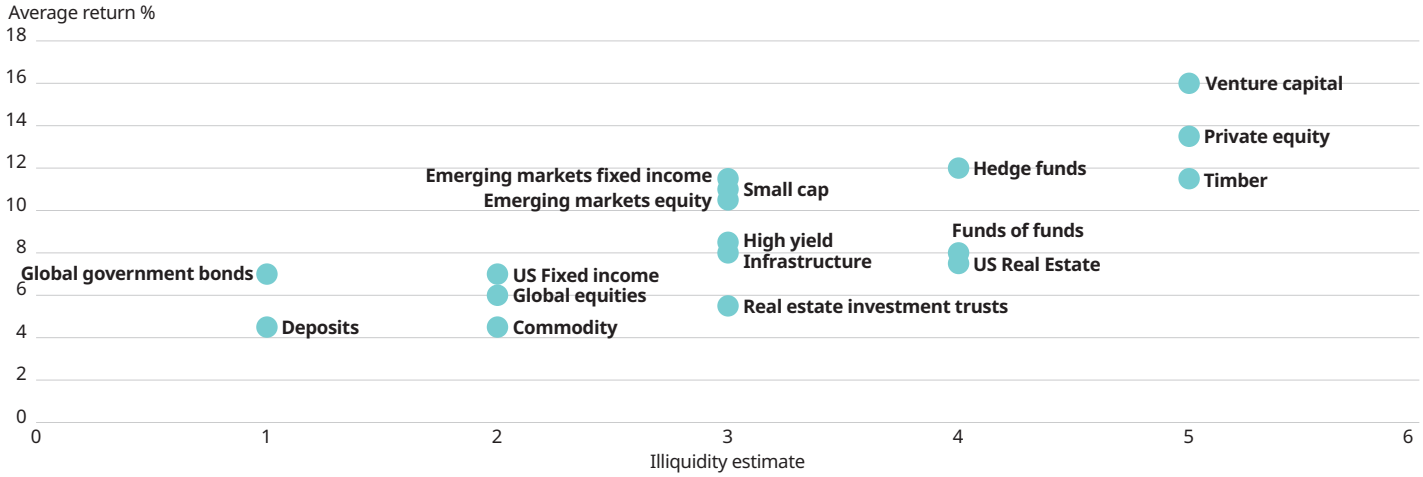
The illiquidity premium has traditionally been viewed as a non-systematic risk or a risk intrinsic to the asset itself. However, we have seen that liquidity is not constant over time. Although liquidity is, in part, specific to the asset (i.e. infrastructure is more illiquid than equities), the liquidity of an asset is also linked to the liquidity and state of the market. Therefore, illiquidity should be viewed as both a systematic and non-systematic risk. Intuitively, investors may be more willing to hold illiquid assets in good market conditions and so may demand a lower risk premium. In contrast, in times of market turmoil, investors are likely to be more concerned about holding illiquid assets for fear of the price falling and being unable to sell the asset. In these conditions, investors may demand a higher return or 'compensation' for investing in these assets.

This has been examined in various studies, including Chordia, Roll and Subrahmanyam (2001) who find that their liquidity estimate is strongly correlated to market returns. They find that when liquidity peaks, returns are likely to be high, and vice versa. This supports the concept of illiquidity as a 'systematic' risk or market-related risk as opposed to a non-systematic risk. Traditional capital asset pricing models suggest that an asset's return is made up of an element of market risk (beta) and an element of stock specific risk. Market beta is generally defined as the asset's sensitivity to the market; a beta of 1 means the asset is perfectly correlated to the market and the size of its changes are the same, while a beta of 0 means there is no correlation. Pastor and Stambaugh (2003) suggest that an asset also has a liquidity beta, which is a measure of how sensitive the asset is to changes in market liquidity. In this case, a beta close to 1 would suggest that the asset price is very strongly affected by movements in market liquidity, while a beta close to 0 would suggest it is uncorrelated.

5 Kurtosis or 'fat tails' is the risk of extreme events occurring.

6 Citigroup US Market Liquidity Index is derived from five liquidity indicators in the swap and options market and is calculated as follows. = 0.2 x [(swaption price)/200.7 – (Rate swaps)/0.68 + (swap spreads)/22 + (Markit North America Investment Grade CDX Index)/57.71 + (VIX futures)/11.30 – 1.2074]

Figure 8: Average asset returns vs illiquidity estimates



Source: Ilmanen (2011) Expected returns. Average asset returns 1990-2009. Subjective illiquidity estimates.

A possible way to reduce this risk is to diversify across alternative assets which are likely to have different liquidity betas. This may be a way to decrease the risk of losses in market downturn compared to just holding one asset with a highly liquidity beta.

This suggests that there is no fixed level of illiquidity that investors will be exposed to by holding an illiquid asset. Instead, illiquidity varies significantly depending on market factors. Using a broader definition of liquidity, which encompasses systematic and non-systematic illiquidity, may help us to better evaluate whether investing in illiquid assets is rewarded with a return premium.

Is illiquidity a rewarded risk?

Having discussed ways of measuring illiquidity risk, we now turn to the question of whether a premium exists to reward investors for holding illiquid assets; i.e. is illiquidity a rewarded risk?

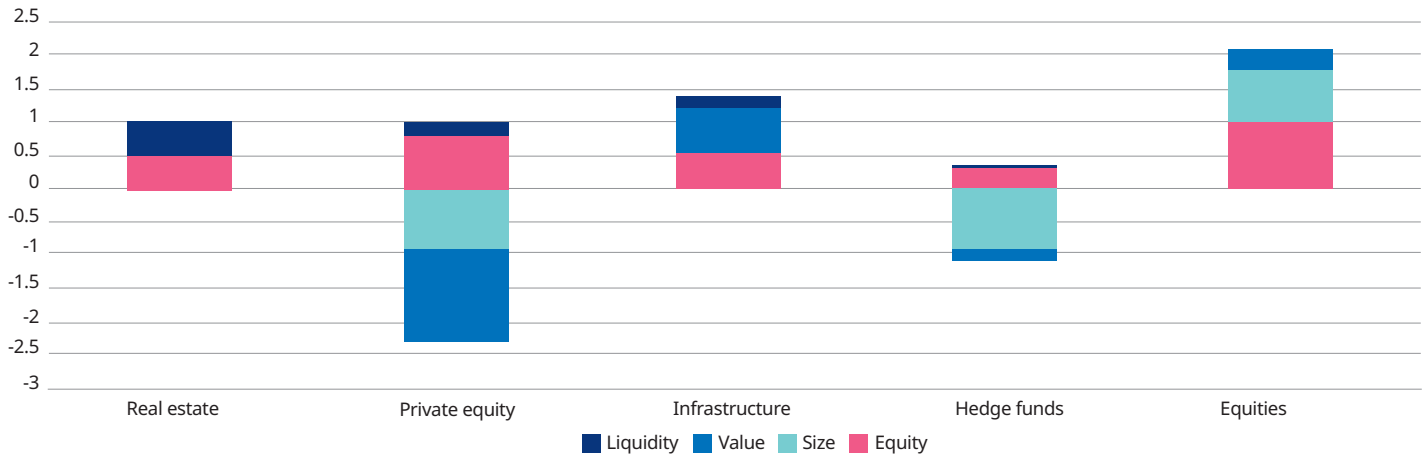
On the surface, less liquid asset classes appear to yield higher returns, as depicted in Ilmanen's chart above (figure 8). However, a number of studies suggest the answer is much less straightforward.

Ang (2014) looks to quantify the illiquidity risk premium demanded by investors and match this with the observed returns received when investing in these assets. He measures the illiquidity premium demanded by an investor for assets with liquidity varying from 6 months to 10 years. Ang finds that the premium required above an identical liquid asset ranges from 0.7% to 6% depending on how illiquid the asset is. However, in practice these levels of excess returns are rarely realised.

Pedersen, Page and He (2014) take this argument a step further and attempt to isolate the underlying risk factor exposures of alternative investments. They do this by intuitively narrowing down the set of factors to consider. They then use econometric analysis to estimate an asset class's exposure to each factor, based on historic returns. The results are shown below (figure 9).

Pedersen, Page and He find that the amount of illiquidity premium received depends on the alternative asset class in question. It is not the case that investing in illiquid assets will automatically yield an identifiable illiquidity premium.

Figure 9: Risk factor exposures



Source: Schroders. Pedersen, Page, He (2014) Asset Allocation: Risk Models for Alternative Investments

The stacked bars indicate the amount of risk that can be attributed to each factor. We can see that the amount of return attributed to liquidity or an 'illiquidity premium' is much higher for real estate than for private equity and infrastructure. The illiquidity premium appears to be negligible for hedge funds.

Furthermore, the higher returns that can sometimes be observed in less liquid asset classes may be a result of other underlying risk factors which can be exploited in other ways.

Aside from the liquidity factor, many of the other risk factors, such as size and value, can be accessed without investing in illiquid assets. Although a large portion of real estate returns seems to be linked to liquidity, this does not appear to be the case for many other alternatives. This raises the possibility of being able to replicate the excess returns often observed in these asset classes without tying up funds for a long period of time.

What role should illiquid assets play in a pension scheme's investment strategy?

Although there are challenges to holding illiquid investments, there can also be benefits. An extremely efficient and liquid market, such as the US equity market, will usually respond quickly to new information. It is likely to be researched by a large number of analysts, and information about the market is easily available to most people. In contrast, the alternatives market is less liquid, and therefore, prices will take longer to adapt to new information. As a result, information and its effect on the market can be harder to analyse. However, for those with expertise in these markets, there may be more opportunities. Having the flexibility to tolerate illiquidity will allow investors to access a wider universe of assets, without having to exclude investments that are not liquid enough.

A good example of this is in the insurance linked securities (ILS) market. The majority of assets in the ILS market are catastrophe ("cat") bonds, which are relatively illiquid bonds written by insurance companies, designed to pay a fixed coupon and repay the principal. However, these may be forgone if a certain catastrophic event occurs. They have been popular with investors due to their high returns and low correlation with other asset classes. However, recently some investors have become concerned that the cat bond market is overvalued and the opportunity for excess returns is now over. In reality, the ILS universe is much wider than cat bonds alone. For example, non-tradable private transactions have been less impacted by this price increase and still offer attractive investment opportunities for those who can tolerate a lower level of liquidity. By investing in these less liquid securities, an investor is able to access a wider range of opportunities within the ILS market. This illustrates how investing in some less liquid assets can increase an investor's opportunity set. However, as discussed previously, illiquidity is not necessarily rewarded in all alternative assets.

An additional benefit of investing in alternatives is the diversification properties of these assets. Many alternative assets have low correlations to mainstream growth assets such as equities and so can be used as good diversifiers. Increasing diversification can limit large losses in the portfolio, as it can reduce the probability of all assets falling at the same time. However, diversification will only get you so far. Correlations tend to spike in times of market stress when most asset classes tend to fall together.

A key challenge of holding illiquid assets within a pension scheme's portfolio is the risk of large falls in asset value. For example, if these drawdowns occur shortly before an actuarial valuation, this will be reported in the funding position and the sponsoring company may have to increase contributions. As discussed previously, the often higher risk of large losses or drawdowns with illiquid assets is not captured in traditional measures of risk, such as standard deviation.

That said, diversification across alternative assets can reduce the risk of losing a large amount at one time if the drawdown is due to asset specific rather than systematic risk factors. While some upside may be sacrificed using this approach, the downside protection offered may be of greater value to pension fund trustees.

Another issue investors face when holding alternatives is the lack of transparency in these lesser-known asset classes. Investing in alternatives requires a large amount of research and understanding, which can be a high governance burden for pension schemes.

One option is to delegate these high governance decisions to an asset manager by investing in a pooled fund of diversified alternatives. While this may reduce some of the alpha that can be achieved by very specialist managers, cost and governance can potentially be greatly reduced. In addition, diversification can limit the large drawdowns often experienced in less liquid asset classes.

Conclusion

In this paper we have examined the illiquidity premium and its place in a UK defined benefit pension scheme portfolio. We have discussed the extent to which schemes can tolerate illiquidity, concluding that although pension schemes are generally long-term investors, there are other constraints that may cause them to be wary of holding illiquid assets. An illiquidity premium does appear to exist for some alternative asset classes (in particular property). In addition, being able to stomach a degree of illiquidity enables pension schemes to access a wider opportunity set. However, there are a number of difficulties with measuring illiquidity risk, including:

- **Difficulty isolating asset specific illiquidity risks from systematic or market risk**
- **Returns may not fully compensate investors for the risks embedded in illiquid assets, such as tail risk**
- **Higher returns may be the result of other underlying risk factors which can be exploited in other ways, without locking up assets for a long period of time.**

Illiquid assets can play a valuable role in a pension scheme's investment strategy. However, given the challenges above, pension funds should be cautious about investing in illiquid assets "for illiquidity's sake."