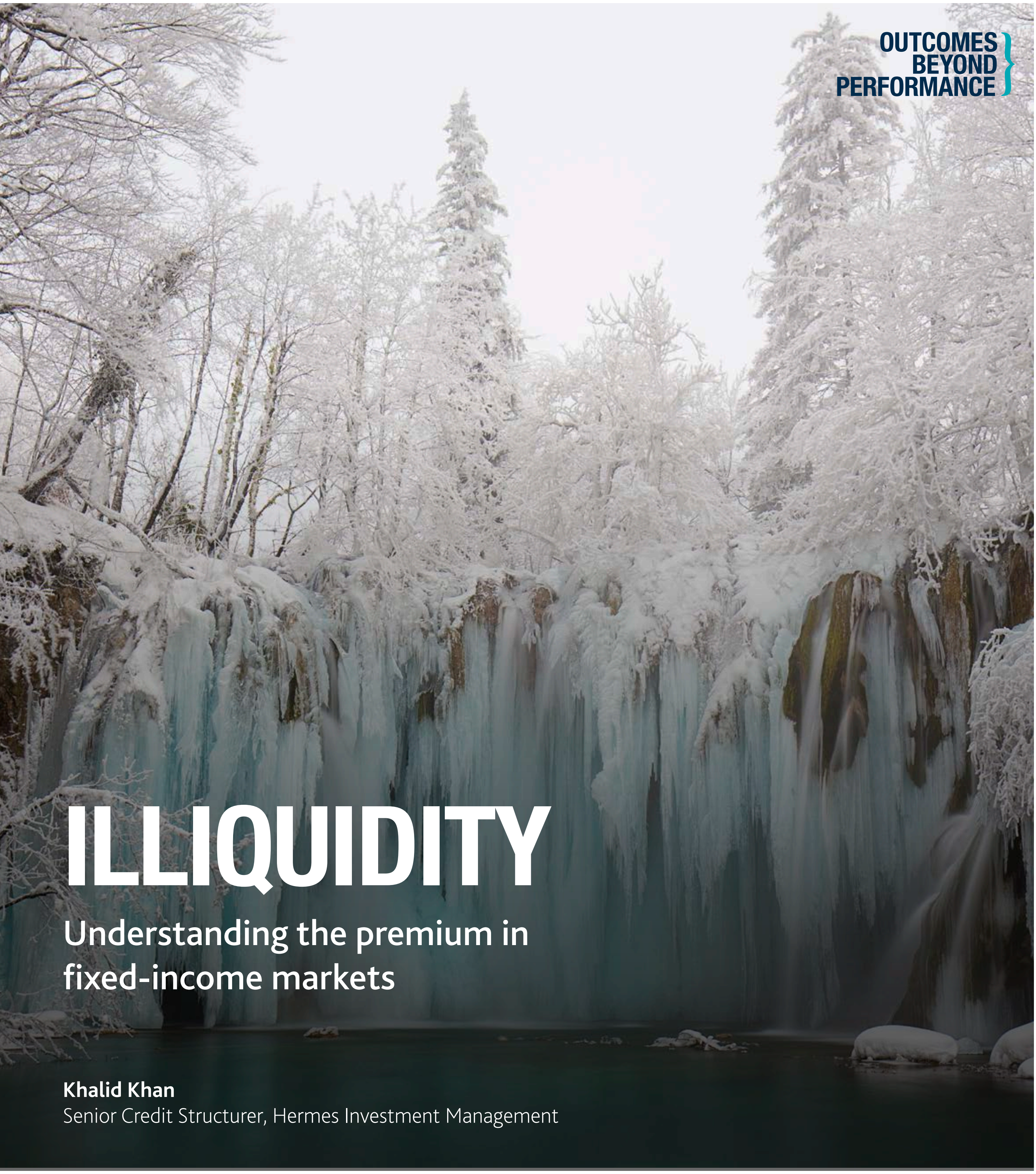

OUTCOMES BEYOND PERFORMANCE

ILLIQUIDITY

Understanding the premium in fixed-income markets

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Hermes Investment Management
Q3 2019

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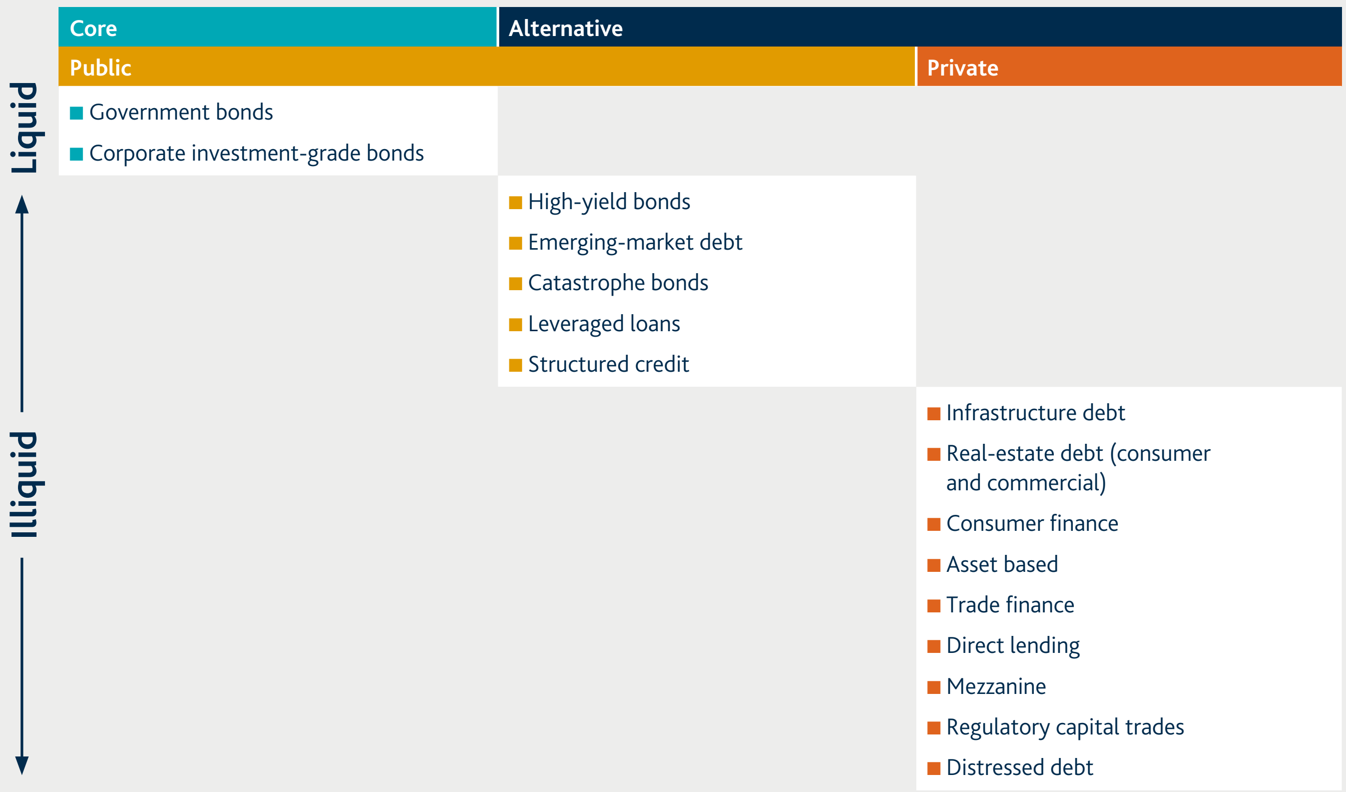
UNDERSTANDING ILLIQUIDITY

With fixed-income markets characterised by low yields and tight spreads, many institutional investors are turning to alternative-credit strategies as a way of increasing returns and diversifying risk. These benefits involve a trade-off – liquidity – but the evidence of supernormal returns over long periods attracts investors who are willing and able to accept illiquidity risk. But can this 'illiquidity premium' be measured accurately and is it different in distinct market environments? In this first instalment of a two-part research paper, we discuss our favoured approach to identifying the illiquidity premium.

Figure 1: Taxonomy of the credit universe



Source: NN Investment Partners, Hermes, for illustrative purposes only and not to scale.

The credit universe encompasses both core and alternative strategies, covering a large spectrum of return and spread, credit risk, rating, seniority and security, duration and liquidity.

Within this, alternative credit is anything that is not core investment-grade corporate or sovereign debt. Representing roughly 25% of the global credit universe[1], alternative credit encompasses both public debt and private lending.

Alternative credit from private origins has become increasingly prominent over the past decade, as regulation following the financial crisis transformed the role of banks as suppliers of long-term financing.

Within the liquidity continuum, alternative credit can be broadly divided into liquid and semi-liquid credit (high yield, bank loans, structured credit, emerging-market debt) and illiquid credit (direct lending, specialty finance, distressed debt, etc.). In the absence of a definitive terminology, illiquid credit has come to refer to bespoke, or narrowly syndicated private assets.

In our view, the concept of liquidity is widely discussed but poorly understood. There is a widely-held view that certain financial assets are 'liquid' (exchange-traded securities, for example) and that others are illiquid and must be held to maturity almost by definition.

Our firm view is that all financial assets exist within a spectrum of liquidity. Their position within that scale can change, as can the liquidity of the wider universe. However, the illiquidity premium – the extra return that investors expect to earn from accepting the risk of holding less-liquid assets – is inadequately measured. Studies have provided evidence that this premium exists but so far have not succeeded in quantifying it with any notable success.

[1] 'Alternative credit - credit for modern investors', published by Towers Watson in 2015.

An investor considering an allocation to alternative-credit strategies is likely to seek answers to a number of questions. How do we measure liquidity? Does an illiquidity premium exist and, if so, can it be reliably gauged? How significantly does it change through market cycles? Can it be harvested?

In this paper, we have three aims:

1 To understand the determinants of liquidity;

2 To formulate a methodology to measure the illiquidity premium consistently across a range of credit assets; and

3 To study the variations of the illiquidity premium in different liquidity regimes.

Seeking to fulfil them, we also explore in detail some of the key characteristics exhibited by the illiquidity premium.

UNDERSTANDING LIQUIDITY

Liquidity is a measure of the ease at which assets can be bought or sold: the more liquid an asset, the easier it is to buy or sell at low cost and with minimal impact on its price. To measure the illiquidity premium, we need to understand the various causes of illiquidity. Most researchers to date measure liquidity by analysing transaction costs, such as bid-ask spreads, commission and brokerage fees. But to understand illiquidity, we should consider the discount to market value an investor must accept in order to complete a transaction.

Generally speaking, an asset becomes illiquid when it is influenced by the following factors, which may sometimes overlap and reinforce each other:

- Exogenous transaction costs[2];
- Demand pressure and inventory risk[3];
- Asymmetric or private information[4]; and
- Search frictions[5]

Defining liquidity in theoretical terms or even measuring it empirically is fairly straightforward. But it is almost impossible to specify what premium an investor should expect as compensation for allocating to an illiquid asset. The existence of the illiquidity premium is widely acknowledged, but it hasn't been accurately or reliably determined in fixed-income markets, or any others.

Theoretically, the illiquidity premium can be defined as the difference between an asset's observed spread and that of a hypothetical asset which is identical in all aspects except for its perfectly liquid status. In short, the illiquidity premium is an asset's ex-ante difference in spread over a more liquid benchmark asset.

Although liquidity can be ascertained through the measures mentioned above, calculating the true illiquidity premium remains a complex task and there is no single correct approach. For example, difficulties arise in separating and calculating the different risk premia that contribute to market returns: illiquidity is intertwined with a host of other risk premia, such as complexity, scarcity, volatility and size. A further complication is the fact that liquidity is not constant, but variable over time.

ISOLATING THE ILLIQUIDITY PREMIUM

The illiquidity premium, and other risk premia contributing to the returns of fixed-income assets, cannot be directly observed and it is difficult to untangle them empirically. For example, it is widely understood that structured-credit products typically generate a higher yield over equivalent, unsecured, investment-grade instruments, and that this is largely attributable to the compensation paid for taking on a combination of the illiquidity, complexity and scarcity risk. In fact, the illiquidity and complexity premia are often more dominant than the credit-risk premium.

While taking on higher illiquidity risk in order to achieve higher returns is broadly accepted, understood and exploited by institutional investors, being rewarded for complexity is less commonly recognised or exploited in traditional portfolios. Many of the underlying assets in a secured-finance strategy are complex due to their structures or bespoke nature. Similarly, compensation for scarcity risk relates to the difficulty involved in sourcing private transactions, which is not as straightforward as buying publicly traded bonds. What's more, potential buyers often need to find the assets themselves, and this can be a resource-intensive, intricate process that is outside the comfort zone of all but the most committed investors.

It is extremely difficult to isolate the impact of each of these drivers on asset returns. To compound the problem, liquidity is multi-dimensional, and other factors may be driving returns, such as changes in market sentiment.

The limited availability of accurate real-time pricing, default and return information for less-liquid assets makes it even more difficult to reliably measure the illiquidity premium. There are rarely directly comparable liquid and illiquid versions of a particular asset or market, and where data do exist, they are not always reliable. Most private-market databases depend on self-reported data, and it is often difficult to separate the illiquidity premium from other factors affecting returns, such as manager skill, leverage, and value and size biases.

The liquidity of different assets and markets, and the price of liquidity itself, is not constant over time. Researchers have recently begun to investigate its time-varying nature in changing economic and market conditions. This relationship was clearly demonstrated during the global financial crisis, when illiquidity premia across asset classes widened to record levels as the demand for liquidity intensified. The gradual and sustained recovery since the crisis has caused liquidity risk to decline, resulting in tighter illiquidity premia across the board.

ILLIQUIDITY: MANAGE THE RISK FOR POTENTIAL REWARDS

Even though the illiquidity premium is notoriously difficult to quantify, there is the potential for a lot of value for investors in attempting to do so. The inherent risks in illiquid assets are often underestimated for two key reasons.

Firstly, the prices of illiquid assets tend to be 'sticky', which can make them appear less risky than they really are. They are not often marked to market accurately, which means they can appear less volatile than liquid assets, lulling investors into a false sense of security. Historically, illiquid assets seem to have higher Sharpe ratios without any additional drawdown.

In reality, the liquidity risks are significant because it is extremely likely that selling an illiquid credit instrument during times of market stress would result in a significant loss. Buy-and-hold investors who keep illiquid bonds throughout market turmoil are better positioned to capture the Sharpe ratios on offer.

Second, the return profiles of illiquid alternative-credit assets are not normally distributed, making standard deviation a poor measure of risk, as it does not account for tail risk or skewness.

[2] Explicit transaction costs, such as bid-ask spread, price reversal (the round-trip cost of buying and then immediately selling an asset) and the price impact (how much a large order trade moves the price of an asset). These measures capture various dimensions of market liquidity, including: tightness, depth, resilience, breadth and immediacy.

[3] This represents the demand-supply equilibrium in the market and finite risk-bearing capacity of market makers, who face price risk due to the inventory they hold while maximising the utility over their profit-and-loss target.

[4] Information about illiquid or private-market transactions can be particularly difficult to gather and analyse. The asymmetry of information between the buyer and seller can result in demand for a higher premium.

[5] A proxy for the effort it takes to find a counterparty for a transaction. In markets where search frictions play an important role, transaction costs are usually also higher.

According to Modern Portfolio Theory, it is the risk premium that generates excess return. But what actually constitutes risk is not widely understood. It is common for investors and their consultants to establish return, volatility and covariance assumptions for asset classes, and then use them to produce a slew of portfolio-return and risk statistics. One of the main assumptions underpinning this kind of analysis is that portfolios can be rebalanced to a target level with minimal friction costs, even after large market drawdowns. But the difficulty and expense involved in trading illiquid assets in stressed environments can invalidate this key assumption. While the Sharpe ratio is an adequate measure of risk for large, diversified, liquid portfolios, it should only be used as one of many risk-and-return measures for illiquid assets.

DETERMINING THE ILLIQUIDITY PREMIUM

There is no universally accepted approach for quantifying the illiquidity premium in any asset class. The lack of private-markets data, and absence of suitable liquid assets to use as a benchmark, does not help the cause. Still, the academic literature seems to agree that an illiquidity premium exists.

Studies have generally used reduced-form regression models or stylised modelling to calculate the illiquidity premium. Reduced-form regression models typically use indicators of liquidity – such as bid-ask spreads, volume and transaction information, or data from limit-order books– to measure the illiquidity premium.

Market participants, on the other hand, have generally relied on models that use option-pricing techniques to calculate a theoretical credit spread that only compensates investors for default and spread risk. The difference between the theoretical spread and the actual spread is typically judged to be the liquidity premium.

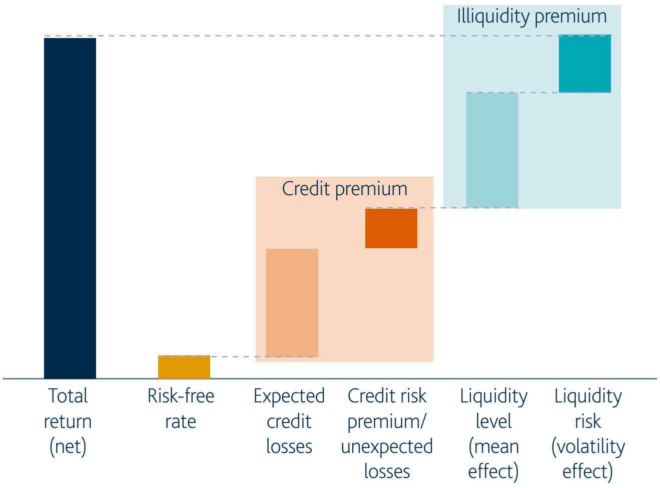
Some studies take a more nuanced approach (see figure 2).The credit spread includes compensation for expected credit losses causing a permanent loss of capital – which can arise due to defaults or, in some cases, to a credit-rating downgrade – and further risk aversion arising from the uncertainty of these losses.

The residual 'unexplained' spread is the illiquidity premium. It can be further decomposed into a liquidity-level premium, which compensates for the expected liquidity of an asset, and a liquidity-risk premium, which compensates for the unpredictable variation in the level of liquidity. The illiquidity premium components are often very difficult to disentangle with any degree of confidence - studies show that in most cases there will be a positive correlation between both premiums, which makes it difficult to attribute the premium to either the liquidity level (mean effect) or the liquidity risk (volatility effect).[6]

The liquidity level focuses on transaction costs and liquidity as a determining characteristic of assets. All else being equal, investors would prefer liquid assets to illiquid ones, hence the compensation for holding an asset with low liquidity. In effect, the liquidity level is a non-systemic, asset-specific component of the overall illiquidity premium.

On the other hand, the liquidity-risk premium could be viewed as compensation for holding assets that may perform poorly in the event of a liquidity shock and should be regarded as a systematic-factor premium. During episodes of liquidity stress, the systemic liquidity-risk premium is the component that widens disproportionately and drives up the overall illiquidity premium.

Figure 2: Identifying the components of the liquidity premium



Source: Hermes, for illustrative purposes only.

Despite the limitations of the studies to date, there appears to be a broad consensus among industry practitioners that the illiquidity premium can be quantified by stripping out the credit-risk premia from a given asset's spread and comparing it to a liquid benchmark. We aim to do this for an illiquid asset's spread and its comparable liquid asset, treating the difference between the two residual spreads as the illiquidity premium. By carefully selecting multiple benchmark assets and using more reliable data[7] about the decomposition of credit spreads, we expect to be able to determine the illiquidity premium more consistently.

This depends on a reliable estimate of expected return, which itself requires a significant amount of judgement. The quality of the data and methodology used introduce noise given that small, relative movements in the prices of other assets may cause larger moves in the measured premium. The most obvious limitation is that the residual premium captured by stripping out the credit spread could also consist of other risk premia, such as complexity and scarcity. Therefore, treating it as the illiquidity premium alone is, at best, simplistic.

It is generally accepted that only 25%-40% of corporate-bond spreads are attributable to credit risk. We should therefore treat claims about the historical or future size of the illiquidity premium – for example, those that suggest it drives the remaining spreads – with a degree of caution. That said, many empirical studies[8] conclude that an illiquidity premium across credit markets does exist and put its size at anywhere between zero and 3% each year, depending on the asset class, time period, data source and methodology.

Studies on illiquidity premia have not been consistent across asset classes as they use different methodologies and frameworks, while empirical measures are all relative – largely due to the inherent difficulty of placing their estimates in an overall framework that covers multiple asset types. It is particularly frustrating that past studies on illiquidity premia have been predominantly limited to corporate bonds, the most liquid asset in the credit universe. There have been few studies on the more illiquid private-credit sub-asset classes due to a lack of transaction data.

[6] 'Asset pricing with liquidity risk', Viral V. Acharaya and Lasse Heje Pedersen, published in the Journal of Financial Economics, August 2005 and 'The ins and outs of investing in illiquid assets', Thijs Markwat and Roderick Molenaar, published by the CAIA Association in Q2 2016.

[7] We use default and spread statistics from sources that have published or maintained these datasets for long periods. For consistency, we use the same research house for reference and benchmark data.

[8] 'UK insurers investments in illiquid assets', published by the Bank of England Prudential Regulation Authority in July 2017 and 'Setting an appropriate liquidity budget: making the most of a long investment horizon', published by Mercer in February 2015.

IS ILLIQUIDITY RISK SYSTEMIC OR NON-SYSTEMIC?

Illiquidity has traditionally been viewed as a non-systemic risk that is intrinsic to the asset itself. Yet the liquidity of an asset is also extrinsically linked to the state of the market. Because of this, illiquidity risk should be viewed as both systemic and non-systemic.

The level of liquidity is rarely consistent throughout the credit market. On one hand, larger and recently issued bonds that are eligible for benchmarks are typically reasonably liquid. But there is also a sizeable portion of the credit market that rarely trades (if ever).

Liquidity can also be scarcer in some markets than the data suggest. Within private debt, which typically trades very thinly, illiquidity metrics are usually biased towards the more liquid constituents and often inaccurately represent the overall liquidity of the market. Even among larger and more liquid bonds, it can be difficult to trade large amounts and during periods of market stress. Sometimes, even consistently liquid parts of the market, such as sovereign debt, can experience liquidity shortages.

Assets with returns that are highly sensitive to changes in market liquidity – those with a high 'liquidity beta' – are vulnerable to systemic disruptions in aggregate liquidity. During a liquidity shock, the prices of these assets are more likely to plunge. Because of this, the expected returns from these sensitive assets should be higher than for comparable liquid ones.

MARKET DEPTH

Throughout the past decade we have seen depth and immediacy (the discount or premium applied when selling or buying quickly) worsen in bond markets, which has led to diminishing transaction sizes. Some measures of price impact also show that smaller trading volumes have a greater influence on the prices of instruments than before. Meanwhile, turnover ratios for both corporate and sovereign bonds – which gauge trading volumes relative to the size of these markets – are in decline as trading volumes have not kept pace with the increase in issuance.

Figure 3: Average illiquidity in the European corporate-bond market has risen

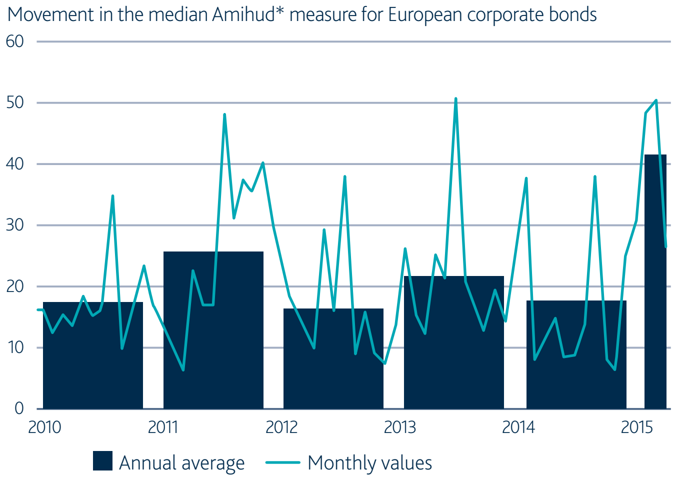
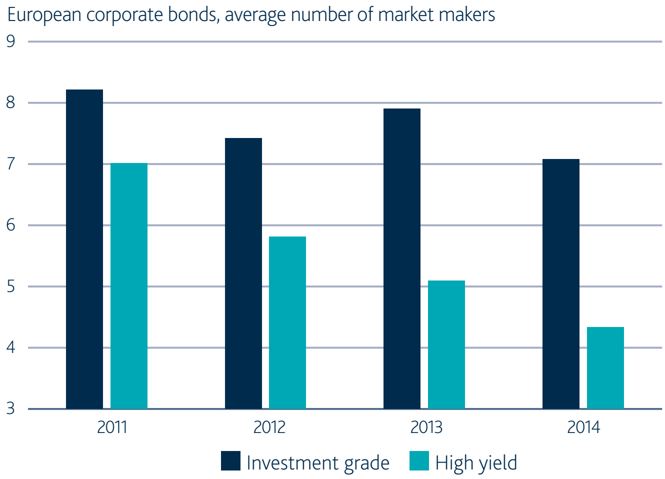


Figure 4: The number of market-makers has declined



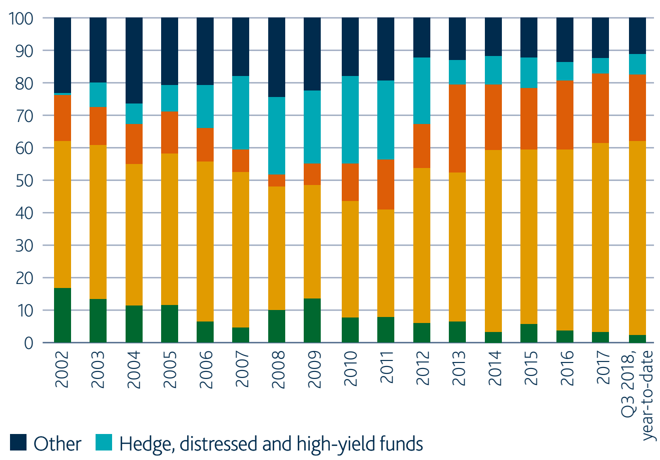
Source: 'Global financial markets liquidity study', published by PwC in August 2019. *The Amihud illiquidity measure uses the absolute value of the daily return-to-volume ratio to capture a rough measure of price impact.

The investor base in fixed-income markets has become more homogeneous since the financial crisis, making the market less diversified. The number of market makers has also declined while those still operating are less able to trade than before (see figures 3 and 4).

The leveraged-loan market is a case in point. Collateralised loan obligations (CLOs), loan mutual funds and other non-bank backers continue to buy most syndicated leveraged loans, which leaves their investors bearing much of the market risk. Indeed, primary investors' share of the total is now even higher than before the financial crisis (see figure 5). Should loan-to-value ratios fall below 85% – which means CLOs would not be able to house them – there would likely be a sharp fall in demand.

Within private debt, which typically trades very thinly, illiquidity metrics are usually biased towards the more liquid constituents and often inaccurately represent the overall liquidity of the market

Figure 5: Primary investors in newly issued leveraged loans



Source: S&P LCD, as at August 2019.

An increasingly concentrated investor base typically leads to herd behaviour, which amplifies risk aversion in down markets and further diminishes market liquidity. Studies also suggest that liquidity commonality – or the impact of common or market-wide liquidity factors – can mean traders like intermediaries or fund managers avoid taking positions when funding liquidity is tight. This leads to a downward spiral where falling funding liquidity results in reduced market liquidity, which causes asset prices to fall.

PUTTING OUR HYPOTHESES TO THE TEST

We would expect the illiquidity premium to exhibit the three following characteristics:

- Varying behaviour as liquidity regimes change: widening in times of stress (or even in a rallying market, given the tendency of illiquid assets to lag) and tightening in calmer periods;
- A term structure: in other words, it should increase at longer maturities; and
- It should become greater further down the credit-rating spectrum.

We will now attempt to validate these hypotheses.

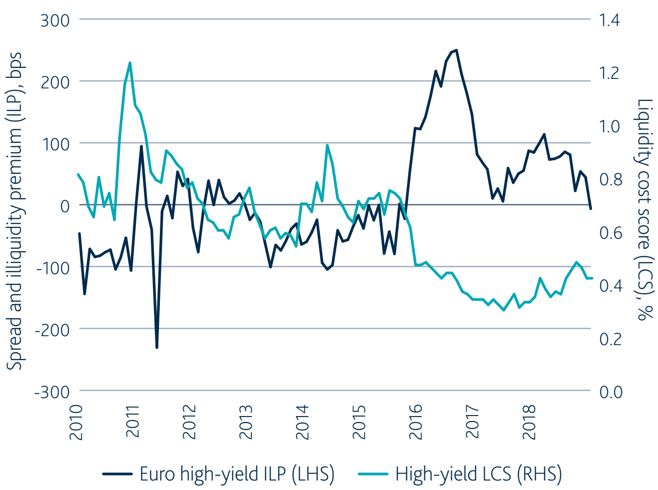
SHIFTING PREMIUM IN DIFFERENT LIQUIDITY REGIMES

The illiquidity premium for credit instruments evolves over time in response to market conditions. While it is common for market participants to observe adequate liquidity during non-stressed environments, it can disappear abruptly during episodes of market turbulence. To determine the precise impact of market liquidity on illiquidity premia, we mapped the change in the liquidity premium against different market-liquidity regimes.

We use the Liquidity Cost Score (LCS),[8] a bond-level quantitative liquidity metric developed in 2009 by Phelps and Dastidar, two Barclays researchers, to define various liquidity regimes. Figure 6 plots the illiquidity premium against the LCS of European high-yield bonds over time. We would expect the illiquidity premium to widen discernibly during periods of poor liquidity and vice versa, but the reality was different, for two clear reasons.

The illiquidity premium for credit instruments evolves over time in response to market conditions

Figure 6: Illiquidity premium changes in response to different liquidity regimes



Source: Hermes, Bloomberg, Bank of America Merrill Lynch Research, as at August 2019.

Firstly, only during periods of high-to-extreme liquidity stress – such as in 2011 – do we see any obvious causal relationship between liquidity stress in the market and an increase of the illiquidity premium. In more benign, middle-of-the-road scenarios, the size of the illiquidity premium is driven by other factors, such as episodic supply-demand dynamics and inventory levels.

The process of determining the illiquidity premium is also subject to various shortcomings. Since it is calculated by removing the credit spread from the excess return over an instrument that is liquid but otherwise comparable (and defaults and losses, although meaningful, did not spike commensurately with spreads in the aftermath of the financial crisis), any technical spread that widens during stressed market conditions is identified as the illiquidity premium.

During times of crisis, the difference in price between otherwise-similar liquid and illiquid bonds may widen, resulting in a higher cost of liquidity. This is because during turbulent periods capital constraints become binding, inventory-holding and search costs rise dramatically and asymmetric levels of asset-specific knowledge among sellers and buyers become more pronounced, all of which amplify the liquidity effects.

For example, banks face more stringent capital requirements when they hold illiquid assets and so may find it harder to access liquidity. Moreover, many investors typically have shorter time horizons, reducing demand for illiquid assets. Bond funds and hedge funds may also face redemptions, or be forced to meet value-at-risk requirements and margin calls, which could encourage them to seek more liquid assets. In addition, individual investors might shift more of their portfolio holdings from illiquid to liquid holdings as they become more risk averse.

While it may seem intuitive that periods of liquidity stress should be linked with market distress and volatility, the relationship is not straightforward. Casually, we can see that the correlation between LCS and equity-market volatility, gauged by the Volatility Index (VIX), peaks when LCS lags the latter by four to seven weeks. This indicates how long it can take for turbulence to be transmitted to fixed-income markets. However, advanced causality tests do not back up the claim that the VIX has any ability to predict future levels of LCS.

Intuitively, we would expect that in a rallying market, spreads would tighten more significantly for a liquid benchmark, while the spread of the illiquid asset would fall less, resulting in higher illiquidity premia.

[8] Dastidar and Phelps introduced the LCS to measure bond liquidity. LCS is expressed as a percentage of a bond's price and measures the cost of an immediate, institutional-size, round-trip transaction. More formally, LCS is computed as follows:

LCS = (bid – ask) spread x option-adjusted spread duration if bond is spread quoted.
= (ask price – bid price) / bid price if bond is price quoted.

A lower LCS value denotes better liquidity. Liquidity cost typically falls as issue size increases, volume increases, option-adjusted spread decreases, duration-times spread decreases, or age decreases.

Using LCS as an indicator of market-liquidity conditions must, however, be carried out with a degree of caution. Not all seemingly intuitive attributes are necessarily highly correlated with liquidity. The LCS and market-trading volume (a popular indicator of market liquidity) are not always in (negative) tandem. Although they are mostly negatively correlated, they occasionally move in concert. Only during the credit crisis of 2008-9 did LCS and trading volume exhibit a clear negative relationship.

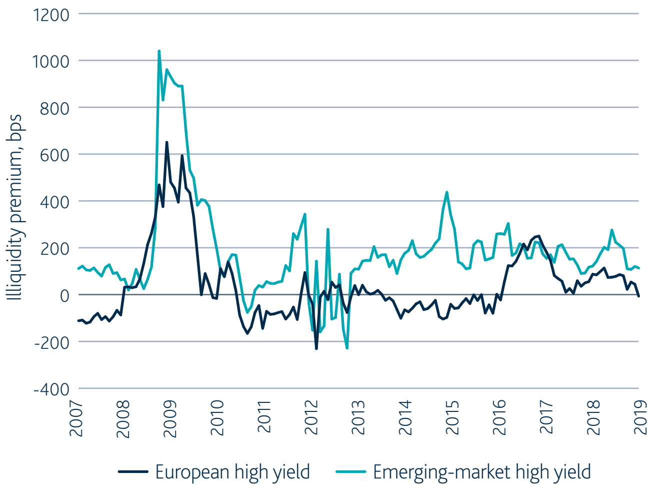
To test this hypothesis, we plotted the spread of the liquid benchmark – in this case, the US high-yield market – against the illiquidity premia of European and emerging-market high-yield bonds (see figure 7).

Apart from in cases of extreme market stress, our hypothesis is not clearly validated. It is possible that had we conducted this analysis on less-liquid assets, such as private debt or leveraged loans, our view would have been proved correct. However, as we pointed out earlier, the lack of data covering illiquid assets makes this analysis challenging.

that the term to maturity drives the illiquidity premium higher, shown by the increasing gap between the LPT yield curve and the average expected future short-term rate (see figure 8).

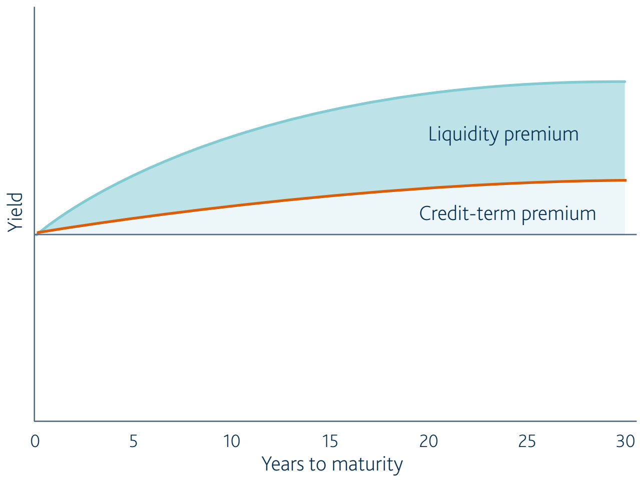
This is also borne out in a study that looks at the illiquidity risk premium demanded by investors for assets with liquidity ranging from six months to 10 years.[9] A PIMCO study[10] also finds a statistically significant relationship between higher average liquidity costs and longer bond maturities.

Figure 7: Illiquidity premium relating to US high yield



Source: Hermes, Bloomberg, Bank of America Merrill Lynch, as at August 2019.

Figure 8: The longer the maturity, the higher the illiquidity preference



Source: Hermes, for illustrative purposes only.

THE RELATIONSHIP BETWEEN ILLIQUIDITY AND CREDIT RATINGS

Most studies assume that the illiquidity premium is completely independent of the credit-risk component of the excess return. But a closer inspection of the interaction between credit and liquidity risk shows evidence of more pronounced liquidity effects among high-yield bonds.

We would expect the liquidity of investment-grade bonds to exceed that of high yield if liquidity concerns spurred a flight to quality. The lower liquidity of speculative-grade bonds and the stronger reaction of their investors to changes in liquidity indicate that this premia is far more important than others in explaining differences in spreads. Empirical studies strongly support the role of liquidity in flight-to-quality shifts during crises.

Higher-rated loans also tend to retain more of their value during periods when liquidity dries up. The sensitivity of loan prices to liquidity conditions rises proportionately as credit ratings decline. The prices of CCC-rated loans are three times more elastic to changes in aggregate liquidity than the prices of BBB-rated loans. While average spreads tend to rise as liquidity declines, smaller, lower-rated or unrated loans tend to bear a disproportionate share of the adjustment.

THE TERM STRUCTURE OF THE ILLIQUIDITY PREMIUM

Studies also indicate the existence of a term structure for the illiquidity premium – in other words, the premium rises in accordance with the expected holding period. The liquidity preference theory (LPT) implies

CONCLUSION

The illiquidity premium is widely discussed and actively sought, but poorly understood and inadequately quantified. The limited availability of accurate real-time data for the pricing, default and returns of less-liquid assets are among the chief obstacles to reliably measuring the illiquidity premium. Even if such data is at hand, it is difficult to isolate the illiquidity premium from other drivers of spreads, such as scarcity and complexity premia, after credit risk has been extracted.

In the first instalment of this paper, we aimed to overcome these challenges to measure the illiquidity premium. To do this, we separated the credit-risk premium from an illiquid asset's spread and that of its liquid comparator, and treated the difference between the two residual spreads as the illiquidity premium. In doing so, we sourced data carefully, using long-running sets of default and spread statistics and the same research house for reference and benchmark data.

After identifying the illiquidity premium, we assessed its behaviour during different market regimes, looked for any change in magnitude over time and whether assets further down the ratings spectrum generated a proportionately larger illiquidity premium. We observed that only periods of high-to-extreme liquidity stress result in a widespread increase of the illiquidity premium across credit markets, with any change in the premium in more benign conditions caused by asset-specific factors. We found that higher-rated loans tend to be proportionately more liquid than lower-rated loans and that the longer the holding period, the greater the illiquidity premium.

After measuring the illiquidity premium and better understanding its behaviour, we can apply it in a multi-asset credit framework – which will be the focus of the second instalment of this paper.

[9] 'Portfolio choice with illiquid assets', published by Ang, Papanikolaou and Westerfield in 2014 and 'Asset management: a systematic approach to factor investing', published by Ang in 2014.
[10] 'Liquidity in corporate credit markets', published by Sharif et al., at PIMCO Quantitative Research in August 2018.

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