

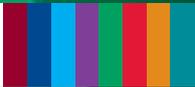


Research
Programme
2011–2015

SUMMARY

Liquidity in Commercial Property Markets

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Liquidity in Commercial Property Markets - Summary Report

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This Programme supports the IPF's wider goals of enhancing the understanding and efficiency of property as an investment. The initiative provides the UK property investment market with the ability to deliver substantial, objective and high-quality analysis on a structured basis. It encourages the whole industry to engage with other financial markets, the wider business community and government on a range of complementary issues.

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The role of liquidity in asset pricing has been the subject of a vast literature developed over the last 30 years. Particular attention to this asset pricing issue has been stimulated recently by the experiences of financial and other asset markets during the global financial crisis and economic downturn from 2007 onwards. Paper 1 comprises a literature review examining the research on liquidity that has been published since the release of the first IPF-funded study on *Liquidity in Commercial Property Markets*¹ – IPF (2004) from this point onwards. The review explores developments in both the finance and the real estate literature on this topic over this period. Paper 1 also discusses a wide range of possible liquidity measures and considers their merits in terms of both their formulation and their applicability to real estate markets.

Two types of liquidity are distinguished at the outset: trading liquidity and funding liquidity. The first of these is related to the nature of different assets and the markets in which they are traded, while the second is related to investors and their ability to gain funding to execute trades of those assets. The focus of this review is on trading liquidity. Building on IPF (2004) and others, the authors identify five main dimensions of liquidity that relate to the time, costs and potential price impacts of trading:

- (i) Tightness: the cost of trading even in small amounts;
- (ii) Depth: the capacity to sell/buy without causing price movements;
- (iii) Resilience: the speed at which the marginal price impact increases as trading quantities increase;
- (iv) Breadth: the overall size of the volume traded;
- (v) Immediacy: the cost (discount/premium) to be applied when selling/buying quickly.

If markets were fully efficient, assets would be perfectly liquid. However, a variety of market imperfections mean that assets with different characteristics exhibit variations in one or more of the liquidity dimensions listed above. Imperfections include participation costs, search costs, transaction costs, asymmetric information, imperfect competition and funding constraints, and they lead investors to demand compensation in the form of a liquidity premium. A large body of empirical work has attempted to quantify this liquidity premium for different assets and markets, but work on the liquidity premium for real estate is much more limited.

In order to quantify the liquidity premium and to understand liquidity more generally, the authors first identify several measures of liquidity within each dimension. They follow market microstructure and finance literature, which suggests a variety of proxies as liquidity itself is not directly observable. It is clearly useful to try to capture all these facets because different results for liquidity premiums may arise from the use of different measures of liquidity in the analysis. As a consequence, the researchers have mapped in Table 1.1 a series of liquidity measures within five main categories, indicating the dimensions that each measure refers to.

¹ IPF (2004), *Liquidity in Commercial Property Markets*. London: Investment Property Forum.

Table 1: Summary of Main Liquidity Measures

Liq. Cat.	Description	Liquidity Measure	Proxy	Liquidity Dimension	Used Here
Transaction Cost	Relate to the difference between the ask and bid prices for an asset, when such prices are observable.	Absolute Quoted Spread	I	Tightness	No
		Relative Quoted Spread (or "inside spread")	I	Tightness	No
		Effective Spread	I	Tightness	No
		Relative Effective Spread	I	Tightness	No
Volume- Based	Relate to the number of transactions or traders.	Transaction Volume	L	Breadth	Yes
		Turnover Ratio	L	Breadth	Yes
		Quote Size	L	Depth	No
		Number of Bids	L	Breadth	No
		Market Depth	L	Depth	No
Price-Impact	Separate liquidity from other factors driving price changes such as market conditions.	Amihud measure	I	Depth, Resilience	Yes
		Regressed lambda	I	Depth, Resilience	No
		Pastor-Stambaugh Liquidity Factor	I	Depth, Resilience	Yes
		Percentage of Zero Returns	I	Depth	No
		Percentage of Zero Volumes	I	Depth	No
		Market efficiency coefficient	I	Resilience	No
Time-Based	Capture the time interval between trades or the time required to trade once a decision to buy or sell has been made.	Holding Periods	I	Breadth	No
		Trading Frequency	L	Depth	No
		Volumes Volatility	I	Depth, Breadth	No
		Time on Market (TOM)	I	Immediacy	Yes
Return-Based	Explore the impact on price changes of a lack of transactions and only use return data	Roll Measure	I	Resilience	Yes
		Run-Length	I	Depth, Resilience	No

Legend: Proxy L = liquidity measure; Proxy I = illiquidity measure.

No measure or category is able to reflect all the dimensions of liquidity. However, the use of a variety of measures allows the relative liquidity of different assets, markets or periods to be assessed. Therefore, an important question is the extent to which different measures can be used or adapted for use in real estate markets. The review considers this challenge with reference to the measures themselves and the literature on real estate liquidity.

Studies of the liquidity of REIT or property company shares have been able to take advantage of many of the measures devised in the wider finance literature. This includes transaction cost measures such as spread and price impact measures such as the Amihud measure, facilitated by the high-frequency return and trading data available for such assets. Links between trading and funding liquidity have also been explored. In contrast, there is a much smaller volume and variety of literature relating to the liquidity of direct real estate investment or to non-listed real estate vehicles. This is not least owing to a scarcity of relevant data.

In fact, concepts and measurement of liquidity in direct real estate markets are complicated by the decentralised and private nature of these markets, whose features increase the time to trade and the uncertainty around it, both of which vary significantly with changing real estate market conditions. The length of and uncertainty around time to transact increases the risk of investing in real estate in ways that ex-post performance data do not capture – an issue already considered by IPF (2004) and several further studies. Yet far more studies of time-on-market or time to transact have been done for residential than commercial real estate. Meanwhile, changes over time in the ease of entering or exiting real estate markets may have implications for interpreting real estate return indices.

The rest of the project builds on the literature review in two ways. First, given the importance of time to transact in understanding direct real estate performance and risk, and the limited data currently available for non-residential properties, Paper 2 Time to Transact: Measurement and Drivers, improves the evidence on this measure by creating a database of the time to transact for hundreds of individual properties traded over the last 10 years. This paper – by Devaney and Scofield – measures the average time to transact and seeks to explore potential determinants of variations in transaction times at asset level. Secondly, Paper 3, Liquidity Pricing of Illiquid Assets – by Marcato – estimates the liquidity premium for UK real estate at all property and sector levels, using a number of measures identified in the literature review. In particular, financial models estimate the impact of the time to transact and other liquidity measures on the pricing of real estate assets over time.

The focus of Paper 2, Time to Transact, is motivated by the fact that buying and selling commercial real estate involves a process of exchange that occurs over an extended period and incurs risks and costs of a character and order that is different from many other investment assets. This stems from the private and dispersed nature of real estate markets and the fact that real estate assets are heterogeneous, with varying physical, legal and location characteristics. Buyers must spend time searching for suitable assets and sellers must spend time attracting buyers, while both must spend time negotiating and then finalising the transaction. For this reason, the time to transact is an important issue for real estate investors and its length and variability has implications for the investment strategies that can be applied.

Yet, to date, there has been only limited research on the time taken to transact commercial real estate, with most studies of transaction times relating to housing markets. The IPF (2004) study was notable for outlining the different stages of commercial property transactions and measuring the time taken to transact for a sample of UK real estate investments. They found a median sale time of 190 days (c. six months) from first record on the sale file to final completion and 81 days (c. three months) from price agreement to completion, as well as considerable variability around these averages. However, they did not examine transaction times from a purchaser perspective, which has been the focus of subsequent data collection and research by Scofield (2013).²

Paper 2 extends the existing work in three ways. Firstly, it provides up-to-date measurements of time to transact from both buyer and seller perspectives. Secondly, it uses a much larger dataset than the previous studies, with data on 578 commercial real estate transactions. Thirdly, it explores relationships between time to transact, asset characteristics, market state and other features of the transaction process using tabular and regression analysis. Currently, there is little information on whether variation in times across cases and stages is purely random or whether the nature of the asset or process adopted (e.g. method of sale or use of brokerage) can explain it. Hence, the research aims to extend knowledge of what causes such variations and so drives liquidity at an individual asset level.

Data collection took place during 2013. Public domain data collated by Real Capital Analytics / Property Data were used to identify major buyers and sellers of UK commercial real estate. Twenty four investment organisations were then approached for further data, including precise dates for key transaction stages. Seven were able to provide such data, resulting in 578 usable transactions spanning 2004 to 2013.³ The completeness of the data varied, with less information available on the earlier stages of the transaction process. Nonetheless, it was possible to measure the average length of key stages in the purchase and sale processes. Table 1 summarises the median time in days for these as measured from the data collected.

² Scofield, D. (2013), Time to Completion Liquidity in Commercial Real Estate Investment: 2000-2008. *Journal of European Real Estate Research*, 6 (1): 34-47.

³ The data contributors were purchasers of the assets in question in 303 cases and sellers in 280 cases, with five instances where a transaction was reported twice (once by its buyer and once by its seller).

Table 2: Median Time in Days for Different Transaction Stages

Purchases – stages	Median time in days	Sales – stages	Median time in days
Introduction to price agreement	31	Marketing to price agreement	42
Price to instruction of solicitors	2	Price to instruction of solicitors	0
Instruction to exchange of contracts	37.5	Instruction to exchange of contracts	39
Exchange to completion	7	Exchange to completion	10
Introduction to price/solicitor	35	Marketing to price/solicitor	42
Price/solicitor to completion	56	Price/solicitor to completion	64
Introduction to completion	104	Marketing to completion	135

Measurements of different stages are based on differently sized samples. As a result, figures for intermediate stages will not necessarily sum to the length of longer stages.

The median time for purchase of real estate from introduction through to completion was 104 days (i.e. between three to four months), while the median time for sale from marketing through to completion was 135 days (i.e. between four to five months). These figures understate the total time needed to transact because buyers must search and select between assets, while sellers need time to prepare assets for sale prior to marketing. However, the length of these additional steps is very hard to quantify. There is considerable variability around the averages and this variability is discussed in Paper 2. Meanwhile, there are no notable correlations between stages in the sense that a long (short) marketing period is not necessarily followed by a long (short) period of due diligence.

Tables in Paper 2 set out average transaction times by market state, sector, sub-market, lot size and the nature and nationality of the counterparties involved. These factors are also used in multivariate regression modelling to try to understand their relative significance in explaining time to transact. The transactions are analysed using survival analysis techniques, which are often used in housing studies to explain variations in time-on-market (specifically, Cox proportional hazards models have been used). Together, the tabular analysis and regression results produced the following findings:

- Market state has an important explanatory role for variations in transaction times, with slower transaction times since the UK market crash in 2007/08.
- Transactions involving institutional investors appear more likely to complete quickly, as do transactions involving UK buyers.
- Top quality offices (by price psf) were quicker to transact than other offices while lower quality assets (by price psf and yield) and portfolios of buildings took longer to transact.
- There is only a weak correspondence between transaction times and price; the largest differences arising in the introductory phase of a transaction.
- Price agreement was reached much more quickly for small lot sizes (below £10m) than for properties in larger lot size bands.

- Shopping Centres took longer to transact than other property types, while standard retail units and standalone retail warehouses transacted more quickly.
- Tabular results indicate that Central London offices transact more rapidly than offices located elsewhere in the UK.
- Location, method of sale and leverage are likely to be influential factors on transaction times, but more evidence is needed to explore their influence further.

Although this study represents a step forward in research on time to transact, improvements in data would benefit future studies. This includes having more data on key dates and on details pertaining to leasing, financing and the methods used to sell different assets. Furthermore, more information on the number of bidders and the bids made for assets would not only shed more light on transaction times but also on liquidity and pricing in general. A fundamental requirement for further research, though, is the continued collection of consistent and reliable data on the time taken to acquire and dispose of commercial real estate assets. Therefore, it is recommended that the real estate industry investigates more regular collation of statistics on time to transact.

The final part of the project builds upon the first two papers to estimate a range of liquidity risk premia for property.⁴ The third paper, *Liquidity Pricing of Illiquid Assets*, empirically computes several measures of liquidity identified in Paper 1, the literature review, and uses these measures – along with the results on time to transact (or time to market, i.e. TOM) from Paper 2 – in a modelling exercise that allows the estimation of a risk premium linked to TOM and its uncertainty, one determined by a liquidation bias and a risk premium for market liquidity more generally. To the researchers' knowledge, this represents the first attempt to use different measures and models simultaneously to gather empirical evidence about the liquidity premium associated with real estate investment. The research focuses on the UK market because it has the best available information.

The first model studies the impact of the time to transact and its uncertainty on the ex-ante risk of real estate, presenting liquidity as a possible source of extra risk. This new measure of risk, corrected for varying levels of liquidity and applicable to several segments of the real estate market, may then be used by investors to set their investment strategy – against other asset classes and/or between market segments. Initial results are in line with previous analyses of US commercial and residential real estate data and suggest an ex-ante risk that does not deviate significantly from the ex-post measure of volatility especially as the investment holding period increases.

However, the researchers then present a second version of the same model to allow for a correction of the smoothing issue present in valuation-based real estate indices. Still in line with previous findings for the US market, they find that UK ex-ante measures of risk, including an adjustment for liquidity, are significantly different from ex-post volatilities and they range between 12.3% for residential and 29.4% for industrial properties. The research also finds that the marginal extra volatility exclusively due to the time to transact (hence excluding the effect of smoothing) decreases as the holding period increases. Finally, this second set of results shows that the impact of time to transact is significantly influenced by the deviation from the assumption of random real estate returns and this feature seems to be dominant.

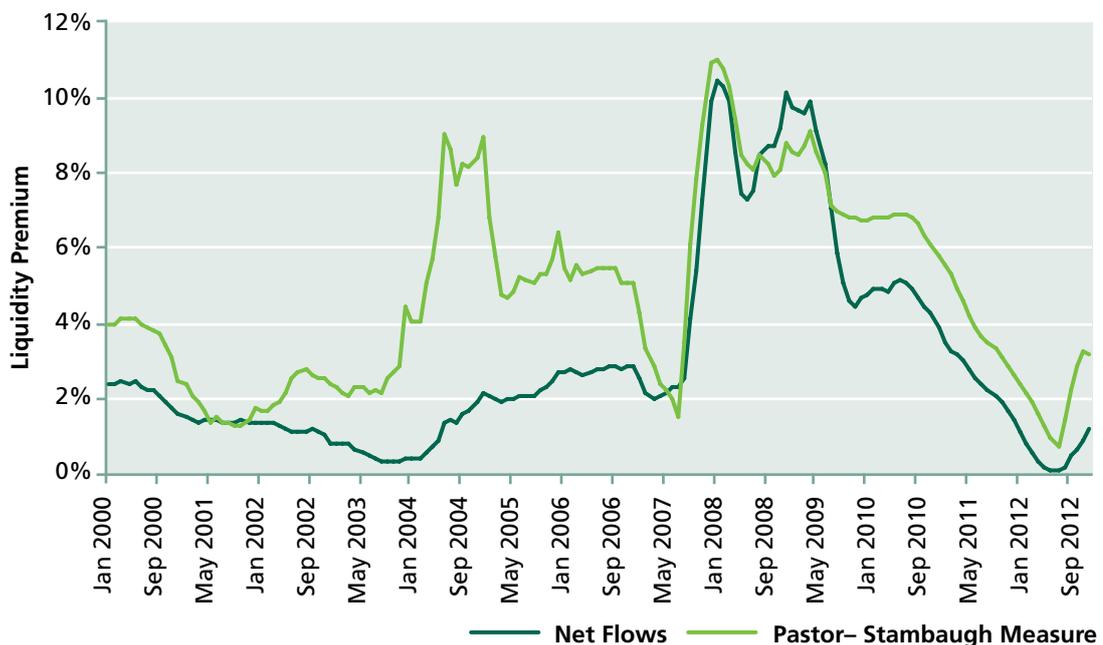
The second model in the final paper studies the so-called liquidation bias, which reflects the impact of the sudden sale of a property on the transaction price due to the inability of investors to sell instantaneously their properties at observed market prices, in contrast to financial markets. The evidence of this bias is represented by the low turnover and small portion of properties successfully sold at the first attempt, as well as the fact that transacted properties may have been up for sale for a longer time than the recorded time on market. The extent of the liquidation bias also seems to be amplified by the use of indices whether they are transaction-based – where observed prices are only reflecting the information on a sub-sample of the overall market, i.e. successful transactions – or valuation-based – where underlying appraisals are derived from comparables of transacted properties – in order to compute ex-post return and risk measures. The argument is that the liquidation bias leads to an overestimation of returns because only those properties where the offer price exceeds the seller's investment value normally transact and the rest are withdrawn.

⁴ The study is not concerned with the other elements of the overall risk premium for property, e.g. obsolescence, tenant default, etc.

Overall, the researchers find that investors are expected to require an ex-ante premium due to liquidation bias which ranges between 1.0% and 3.5% depending upon the investment horizon (and given their assumptions on marketing time). The risk premium for an investor with a short holding period (5 years) is around 3.2% for commercial real estate and around 1.5% for residential properties while it tends to decrease for longer investment horizons (15 years). They also find that the liquidation-adjusted ex-ante volatility is around 1.3 to 1.4 times (1.2 for residential properties) higher than the original one. These findings lead to a perception of the risk/return profile of real estate investments which is worse than the one computed with original data and not corrected for liquidity – perhaps justifying the fact that most institutional investors have low allocations to property compared with the weightings suggested by portfolio optimisation models.

The final step of the modelling exercise uses several risk factors along with liquidity to capture the impact of this risk on actual price movements and to estimate an ex-ante liquidity risk premium. The inclusion of other standard risk factors – market, size, value/growth and momentum – is important to isolate the liquidity premium and obtain a ‘pure’ estimate that does not include other sources of reward. In their study, the researchers do not restrict the estimation to one of the liquidity measures but use several proxies – trading volumes, turnover rates, net flows, Amihud measure, Roll measure and Pastor– Stambaugh liquidity factor – and find consistent results. A static estimation of the model using the full sample 1998-2012 leads to an average liquidity premium of around 4.5%, compared to 7.0% using a dynamic estimation (with rolling windows of 60 monthly observations) which allows liquidity to have a greater impact during the recent crisis (with premiums around 16.6% at the peak of the credit crunch). Looking across all the different measures of liquidity, we find that the net flows and Pastor and Stambaugh (2003) measure⁵ provide the most stable results, suggesting an overall liquidity premium of between 3.0% and 3.5% for all property and between 2.5% and 3.5% for the different sectors. Figure 1 presents the evidence of liquidity premia over time using these two measures.

Figure 1: Ex Ante Liquidity Premium over Time



⁵ Pastor, L. and Stambaugh, R.F. (2003), Liquidity risk and expected stock returns. *Journal of Political Economy*, 111 (3), 642 – 685.

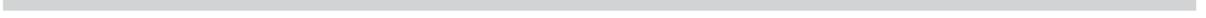
Finally, considering both the liquidation bias approach (model 2) and the market liquidity estimation (model 3), the researchers find conclusive evidence that the ex-ante liquidity premium is around 3% on average and it varies over time by between 1.5% and 10%. As real estate investors normally use a rough estimate of 2% to 4% for the overall risk premium (incl. other factors such as obsolescence, tenant default) to determine the required rate of return for real estate assets, the results uncover a risk premium puzzle: investors may argue that ex-post returns do not justify a 3% liquidity premium, but the counter argument is represented by the hidden costs associated with poor liquidity (i.e. inability to sell or to sell within a short period of time), which are not necessarily recorded in the observable data (e.g. IPD returns). In fact, if a property is not sold due to the inability to find a counterparty, this information remains hidden because the transaction price (and hence discount due to liquidity) is not observed. Importantly, the estimated liquidity premia do not necessarily imply a radical shift of required returns and consequent repricing of the entire asset class. This study is helpful for the real estate industry because some of the liquidity proxies may be updated periodically for the market, so that liquidity premia can be estimated using the models illustrated and liquidity considered more formally in investment decisions. Finally, estimates are in line with liquidity premia estimated for more traditional asset classes (bonds and equities),⁶ which range between 0.1% (for very low risk bonds) to between 3.5% and 5.5% (for either domestic or international equities).

In conclusion, liquidity is a multi-faceted concept that can be measured in many ways. For direct real estate, the most commonly measured facet is transaction volumes, but paper 1 highlights other measures that can be applied in direct real estate, as well as some measures more appropriate to indirect forms of real estate investment. New measures for the direct real estate market could be developed through further data collection by market participants or through further interrogation of real estate return patterns. Paper 2 makes the case for continued and more formal collection of data on time to transact owing to the length and uncertainty of the real estate trading process and its important implications for investors. Paper 3 then demonstrates how such data may be used to quantify the impact on risk from uncertainty in the time taken to trade before using a selection of liquidity proxies to quantify the illiquidity premium for holding real estate directly; not just volumes and turnover, but also price-impact and return-based measures. Taken together, the papers from this project thus seek to advance our understanding of liquidity not only through their main findings (how long to trade, how much additional return), but also through their advocacy of analysing liquidity in new and different ways.

⁶ Hibbert, J., Kirchner, A., Kretschmar, G., Li, R., and MacNeil, A. (2009) Liquidity premium: literature review of theoretical and empirical evidence. Barrie+Hibbert research report.



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