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REPORT

# Time to Transact: Measurement and Drivers

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# Literature Review

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While illiquidity is an occupational hazard for investors in commercial property, it is a difficult phenomenon to measure and there is relatively little research on the subject. This research commissioned by the IPF presents new measures of the time taken to buy and sell commercial properties and looks at variations according to the state of the market, the type of property and other characteristics. The study is complemented by a separate IPF research paper, which presents estimates of the illiquidity premium for commercial property, and by a literature review. The research builds on the Liquidity in Commercial Property Markets report published by the IPF in 2004.

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### Disclaimer

## CONTENTS

Time to Transact: Measurement and Drivers

## 1. INTRODUCTION

Buying and selling commercial real estate investments 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, spatial and legal characteristics. Buyers must spend time searching for suitable assets and sellers must spend time attracting buyers. However, search is not the only lengthy or uncertain stage, with price agreement – the moment a bid is accepted by a seller – being only the start of further negotiations and processes that are neither immediate nor without friction.

For this reason, the time taken to transact is an important issue for real estate investors and within real estate research. Furthermore, price adjustment in real estate markets is sticky, with responses to changing market conditions occurring through prices, volumes traded and the time it takes to transact. That this is so is acknowledged through attempts to correct transaction price indices for liquidity variations (e.g. Fisher et al., 2003; 2007). By contrast, studies addressing liquidity for other major investment assets often incorporate assumptions of transaction transparency and immediacy, coupled with low to modest transaction costs.

Recognising the importance of the transaction process in real estate, the IPF has funded research on liquidity (IPF, 2004) that, amongst other things, explored the length of time involved with trading commercial real estate and the various stages of that process. This earlier research found the median sale time for a sample of investment-grade UK commercial properties to be 190 days (approximately six months) from the first record of the transaction to final completion and 81 days (nearly three months) from the point of price agreement to completion. It also found considerable variability around these averages. Most publicly traded equities and bonds, on the other hand, can be traded in a matter of minutes.

The length and variability of transaction times has implications for the investment strategies that can be applied to real estate and renders some measures that are traditionally used in determining the liquidity of other assets less relevant. As noted by the literature review report[1], the measures from research on financial assets concern not just trading volumes, but also the costs of trading (tightness and immediacy), e.g. in terms of bid-ask spread, and the sensitivity of prices to trading (depth). However, it is difficult to measure these in the direct real estate market. Even transaction volumes and rates are challenging to measure in the absence of robust information on market size. In contrast, the time taken to transact, and how this varies between assets, is of major relevance to real estate market participants.

This study extends the work begun in the previous IPF study by providing up-to-date measurements of the time taken to transact and it does this for both buyers and sellers of commercial real estate, not just sellers. It also explores relationships between time to transact, asset characteristics, market state and other features of the transaction process using a sample of nearly 600 UK commercial real estate transactions that took place over the period 2004-2013. The study aims to extend knowledge on what causes variations in transaction times and so drives liquidity at an individual asset level.

[1] Estimating Liquidity in Asset Markets - Literature Review, IPF 2014

## 1. INTRODUCTION

This is important for a number of reasons. Firstly, previous research by both IPF (2004) and Scofield (2013) highlights not only the length of the transaction process for real estate, but also significant variability in the time to transact both through time and across cases, as well as between different stages of the process. This uncertainty and variability in time to transact is an important element of the ex-ante risk of real estate investment (Lin and Vandell, 2007). However, there is currently little information on whether variation across cases and stages is simply random or whether other features of the asset or process (such as the approach adopted for sale and the use and structure of brokerage) can explain this.

Furthermore, earlier research worked with a limited evidence base when exploring these issues. IPF (2004) calculated disposal times using data on 187 sales provided by three large investors in UK commercial property. However, the limited sample and the lack of information on counterparties and other details limit the interpretative power of this research. Meanwhile, Scofield (2013) provides more recent evidence based on a further 115 transactions for 2005-2008, but, again, interpretation is weakened by the limited amount of evidence available for review. The expanded number of transactions on which this analysis is based means that deeper analysis can be conducted in this study, building on these earlier foundations.

The remainder of the study is structured as follows. First, a review of relevant work that studies time to transact is presented, with a focus on the commercial real estate sector. After this, the nature of data collected for this study is discussed. The dataset contains variables such as dates for transaction events, prices, sector, location and counterparty, in addition to other information. From this, tabular analyses of transaction times are presented in section 4 and this is followed by econometric analysis in section 5. Together, these techniques are used to address questions such as:

- How has time to transact changed since the earlier IPF work?
- What types of property take longer to transact?
- How do market conditions affect time to transact?
- Does time to transact vary with buyer or seller characteristics or with other features of the transaction?

## 2. PREVIOUS STUDIES

In this section, previous studies of the time to transact are reviewed. It considers earlier research on commercial real estate carried out in both the UK and US. However, before that, it outlines some of the work done for residential real estate. There is a larger literature from both a theoretical and an empirical perspective on the transacting of residential property and this includes many studies that explore in detail the main drivers of differences in transaction times between properties.

### 2.1. Residential real estate

Most studies of transaction times refer to housing markets and relate almost exclusively to locations in the United States, with only a limited number of studies originating elsewhere.[2] Such studies concentrate on the concept of time on market, which looks at time from a seller perspective, initially defined as the time from first listing to deposit, though some use the phrase to define the entire sale process (for a critique, see Benefield & Hardin, 2013). Early US research considered the impact of housing quality on selling time (Cubbin, 1974), explore differences between list price and sale price (Belkin et al., 1976) and analyse the impact of time on selling price (Miller, 1978). The literature has since considered issues such as the effects of atypical characteristics (Haurin, 1988; Haurin et al., 2010) and the motivations of parties to the transaction (Glower et al., 1998). Sirmans et al. (2010) provide a meta-analysis of some of the most important studies of time on market.

A particularly important theme is the effect of market state. It may be thought that stronger markets will show a shorter average time on market and empirical results suggest this is so, e.g. Pryce & Gibb (2006) and Carrillo (2013). Yet theoretical work, such as Novy-Marx (2009), indicates that the ratio of buyers to sellers matters and, as a boom progresses, more sellers may enter the market and sellers may change their pricing behaviour, both of which could cause time on market to lengthen. Anglin (2006) and Glower et al. (1998) indicate that the mix of market participants can change over time and Pryce & Gibb (2006) show that method of sale may also change. These points are emphasised as market conditions are an important influence on transaction times observed in this research.

Private markets such as residential real estate markets provide sellers with an informational advantage. Due diligence by buyers attempts to eliminate this, but comes at a cost. Brokers may be used to try and reduce search costs and information asymmetries, but they have their own cost. Jud et al. (1996) highlight the distribution of market information as a key measure of liquidity, while Baryla & Zumpano (1995) conclude that brokers increase buyer search intensity, reducing actual search time. Levitt & Syverson (2008) show that agents keep their own homes on the market longer, and achieve significantly higher sales prices, as compared to other sales. Anglin (1997) also looks at broker attributes and buyer behaviour.

While the context in which commercial real estate investment decisions occur is different from that in which individuals buy and sell houses, the housing literature provides ideas for factors that may matter in a commercial real estate context. For example, the quality of an asset may impact on the amount of interest in an asset and the due diligence that is undertaken. Relationships with price may be important and the housing literature suggests that price and time on market are endogenous (i.e. they influence each other) with implications for econometric modelling. More broadly, techniques for modelling transaction times are more developed than in commercial real estate research and so these experiences are drawn on in Section 5, when exploring models to use in this research.

[2] Examples of non-US studies include Pryce & Gibb (2006), Levin & Pryce (2007) and McGreal et al. (2009) who analyse UK data, Anglin (2004) who looks at Canada and Bjorklund et al. (2006) who examine Sweden.

## 2. PREVIOUS STUDIES

### 2.2. US commercial real estate

Early treatment of the relationship between transaction time and price in commercial real estate comes from Trippi (1977). His work posits that sellers of real estate face two conflicting objectives: maximise price whilst minimising transaction time, creating, "ceteris paribus, a clearly defined trade-off between expected time to sell and the capitalization rate (r = income/price) employed as a measure of investment attractiveness" (1977: 838). Trippi models these assumptions using a Cobb-Douglas production function in which price and time form a single dependent component, while factors relating to the economic environment (date of transaction), the age of the structure, number of rental units and subjective quality rankings based on location and appearance form a second set of variables. Drawing from Multiple Listing Service (MLS) data relating to residential investment properties in San Diego, the work finds a positive, significant relationship between discount rates and selling time, i.e. higher cap rates are associated with shortened expected time to sale. However, this rudimentary model of time and price was not developed in the years immediately following.

More recently, Johnson et al. (2007) examine 956 office sales from across 39 US markets, using data available via CoStar. Their study provides the following, sometimes counterintuitive, observations. First, they note that the average time on market in their sample is 260 days (over eight months), which is surprising given that the majority of transactions (98%) occurred during the peak market period of 2006-2007. This contrasts with findings by Scofield (2013) who empirically links transaction times with market conditions, noting strong, negative correlation between number of transactions in a market and median time to transact. Second, the authors find that lower grade properties with higher square footage take longer to transact and that longer marketing times overall correlate with price discounts.

Johnson et al. (2007) is the only recent empirical study of transaction times for US commercial real estate. They discuss two explanations for why such studies are not found in the literature. The first is that, unlike residential properties, commercial real estate continues to produce income for its owner during the sale process, mitigating capital loss associated with time on market for residential assets. However, the consequence to an investor of a delay in transacting is that it will affect their ability to use capital efficiently and so meet welfare and consumption requirements. In fact, the authors point to the absence of any accounting for opportunity costs in extant studies. Second, Johnson et al. note the lack of appropriate data necessary to perform duration studies in commercial real estate and call for increased provision of data by transaction principals (i.e. buyers and sellers).

### 2.3. UK commercial real estate

There is a greater body of work examining time to transact in commercial real estate for the UK than for the US. In the UK, IPF provided early support for the study of transaction times and stages from both a practice (IPF, 1995; 1996) and a research perspective (IPF, 2004). However, McNamara (1998) presented the first empirical study of time to transact for the UK commercial real estate market. This was followed by the IPF (2004) study while other contributions have been made by Orr et al. (2003) for rental markets and by Scofield (2013).

## 2. PREVIOUS STUDIES

### McNamara (1998)

McNamara explored the acquisition and sale process for commercial real estate and attempted to measure typical transaction times from both a buyer and a seller perspective. He did this through a survey of investment principals and agents directly involved in the transaction of investment-grade real estate on behalf of institutional investors. McNamara noted three key points in the transaction process – heads of terms/price agreement, exchange and completion – and used these to define three stages in that process: search (buyer) or marketing (seller), due diligence and settlement. His survey then generated indicative times for these stages for different segments of the real estate market.

The study found that simpler and more common forms of property were faster to purchase and to sell. For example, a seller was judged to need 4-6 weeks to find a buyer for high street retail units and individual retail warehouses versus 6-8 weeks for offices and 7-9 weeks for shopping centres. Due diligence was also thought to be quicker at 4-6 weeks versus 12 weeks for shopping centres. On the buy side, similar patterns were observed, though with longer time estimates to allow for search and selection of appropriate assets. It was also noted that there was more variability in opinions of transaction times for larger and more complex asset types. Meanwhile, one week was recorded for the duration of the settlement phase regardless of market segment.

This work provided valuable insights into the purchase and the sell sides of the transaction process. It also compared real estate liquidity to that of equities and developed a model of the opportunity costs incurred during time on market. This demonstrates that buyers and sellers of real estate incur differential opportunity costs concomitant with time to transact; time on market illiquidity is "a two tailed problem" affecting buyers and sellers differentially (1998: 17). The study found little evidence that investors in commercial real estate – whether buying or selling – were adjusting prices to reflect opportunity costs.

### Orr et al. (2003) – rental transactions

Research into time on market for commercial real estate includes some work on time to rent. Drawing on a sample of 333 lettings in Scotland observed between 1994 and 1998, the authors modelled times from listing to letting and used asked versus achieved rent to test a time discount effect. They found no significant relationship between time on market and rental price, though a lack of information on rental incentives not apparent in headline rents is likely to have affected the findings. The authors also speculate as to whether letting agents expand the pool of potential tenants, providing greater liquidity through reduced time on market (see also Buttimer & Ott, 2007).

### IPF (2004)

Designed as a springboard for a future programme of work on liquidity, IPF (2004) provides a good foundation for analysis of time to transact. In particular, this arises from work by Crosby & McAllister (2004) in Working Paper 2, which measured average times per stage of the sale process using data on 187 transactions collected from the records of three major commercial real estate investors for the periods 1995-1996 and 2000-2002. The authors adapted McNamara's stages of the sale process, expanding these to six: decision to sell sector, decision to sell asset, pre-marketing, marketing, due diligence and exchange to completion. Their paper marked the first attempt to systematically analyse data collected directly from transaction principals.

## 2. PREVIOUS STUDIES

The authors highlight the importance of the stages prior to marketing, though the length of these stages is very difficult to quantify. It is during these stages that specific assets are selected for sale while others are not. Some assets may be excluded from consideration on the grounds that there are short- or medium-term issues that make them unattractive to buyers while other assets may be retained for positive reasons, e.g. expectations of strong future performance. As a result, the sample of transactions observed may not be representative of wider portfolio holdings, reflecting assets that could be sold and which owners were motivated to sell. Furthermore, Crosby & McAllister note that some properties may be withdrawn from sale and some deals may be aborted, though interviews suggested that, at the time of their study, aborted transactions were relatively rare.

The results of their measurement exercise are reported in Table 2.1. Working from the first record of sale, which sometimes predated formal marketing, the mean transaction time was found to be more than nine months and the median time to be greater than six months in length. They noted considerable variability in the time taken to transact and that this not only affected the marketing stage, but also the due diligence stages of the transaction. From the data available to them, the authors found that "few generalisations can be made concerning the causes of longer and shorter transaction times", but to disaggregate and analyse further "the sample size needs to increase and the number of funds and range of ownership also needs to increase" (2004: 36-37).

Thus, the report highlights the need for further data collection to facilitate analysis and it also calls for similar research to be undertaken focusing on the buy side of the transaction (see Scofield 2011, 2013). To facilitate regular reporting and disaggregated analysis of transaction activity, it notes the importance of owners tracking and providing to an independent data handler transaction times for assets sold or acquired. Finally, the report notes a developing agreement as to the stages of the real estate transaction process. The stages presented in IPF (2004) and Scofield (2013) have also been confirmed by the data partners involved in this study.

### Bond et al. (2007)

Extending IPF (2004), the authors define how uncertainty and variability in time to transact is an important element of the ex-ante risk of real estate investment. The authors model this risk with reference to data on time to transact from IPF (2004) paying particular attention to the distribution of transaction times. They argue that uncertainty around the time needed to dispose of assets prompts real estate investment risk mitigation strategies such as longer holding periods and a minimum number of assets held in a portfolio. In addition to uncertainty in the time it takes to liquidate real estate, there is a comparable risk to investors of being unable to place capital when required to meet redemption and consumption demands in other areas of the investment portfolio. Moreover, the holding period and the market state at the time of disposal are also very important, i.e. the evolution of conditions, which determine the buying environment (see also Lin & Vandell, 2007; Lin et al., 2009).

## 2. PREVIOUS STUDIES

### Scofield (2013)

Scofield tests for changes in median transaction times by analysing buy side data sourced directly from transaction principals alongside that collected from the sell side and analysed as part of IPF (2004). The work concentrates on the due diligence stages of the transaction, so comparative analysis of changes in time to transact can be made between the two periods represented in these two studies. The work shows that time to transact varies with overall market activity: greater transaction volume and steadily rising returns are found to be significantly associated with shorter times from the point of price agreement to deal completion. However, this finding was based on a comparatively small number of transactions (93) and the present study adds to the evidence base in this respect.

Also noteworthy is that the median times reported by transaction principals during interviews point to persistent overestimation of asset liquidity. Respondents indicate typical times that are often substantially shorter than the median times determined from the samples studied. Underestimation of transaction times suggests that practitioners believe real estate assets transact faster and are by extension more liquid than the data indicate; this positive liquidity bias was also noted in interviews conducted as part of IPF (2004). Table 2.1 shows the results from IPF (2004) and Scofield (2013), respectively. The columns indicate median times per stage of the transaction process suggested by transaction principals and beside these are times as determined from the sample data in each case.

**Table 2.1: Typical transaction times in days as reported in IPF (2004) and Scofield (2013)**

| | Sales: IPF (2004) | | Purchases: Scofield (2013) | |
|---|---|---|---|---|
| | Interviews | Median from data | Interviews | Median from data |
| Marketing to price | 21-28 | 88 | n/a | n/a |
| Introduction to price | n/a | n/a | 20-30 | 29 |
| Price to exchange | 21-28 | 62 | 15-30 | 50 |
| Exchange to completion | 14-28 | 19 | 15-20 | 7 |
| Total time | 55-84 | 190 | 50-80 | 99 |

## 3. DATA COLLECTION

To facilitate an up-to-date and extended analysis of transaction times and stages for UK commercial real estate, primary data collection took place during the summer and autumn of 2013. The exercise was conducted by approaching different investment organisations and asking if they would release relevant information. Data from Real Capital Analytics/Property Data (RCA/PD) was used to identify the largest buyers and sellers of investment-grade real estate over the last decade in terms of the number of transactions. This provided a sampling frame across which enquiries were made. This list was supplemented with names of other organisations with which the research team had contacts. Furthermore, similar data on purchases collected by Scofield (2013) was reused in this exercise. This led to assembly of a dataset containing 578 transactions spanning 2004 to 2013.

Twenty-four organisations in total were approached, of which seven were able to provide data for this study. Those responding with data included insurance companies, fund management houses and property companies. An additional two organisations are represented through the data collected by Scofield (2013), raising the number of contributing firms to nine. It is worth noting that some organisations expressed interest in providing information, but did not provide data owing to the fact that data on transaction stages was not recorded in a systematic way. This is likely to reflect that information of this kind is not required for the day-to-day management or performance measurement of real estate investments. There were also differing views among and within organisations as to the utility of such data for analytical purposes.

In order to assist with data collection, a template was supplied by the research team to each firm that showed a list of the variables desired for this study. This is displayed in Table 3.1. The templates were pre-populated with a list of deals involving those organisations (either as buyers or sellers) and this was achieved with reference to data provided to the research team by RCA/PD – itself based on information in the public domain. However, contributors could report additional transactions if they wished. Funds were then asked to supply data on the variables noted on the right-hand side of Table 3.1, these relating primarily to dates but also to other asset and transaction features that were not recorded by RCA/PD or for which completeness was limited.

**Table 3.1: Variables obtained during data collection exercise**

| Provided by RCA/PD | | Sought from investors | |
|---|---|---|---|
| Address | Name of buyers | Introduction date (P) | Primary/secondary |
| Property type | Buyer broker | Marketing date (S) | Single or multi-let |
| Sub-market | Name of sellers | Price agreement date | Vacancy rate |
| Region | Seller broker | Date solicitor instructed | Unexpired lease length |
| Legal interest | | Date of exchange | Financing (P) |
| Price | | Completion date | Initial purchase date (S) |
| Capitalisation rate | | Number of bidders (S) | |
| Floorspace | | Method of sale | |

P = sought for purchases only. S = sought for sales only. The list of RCA/PD variables is not a complete list of variables that they collect.

## 3. DATA COLLECTION

In all cases, data was gathered by individuals working for the organisations concerned and templates then returned to the research team. This varies from IPF (2004): members of that research team were allowed direct access to property transaction files by the three organisations taking part at that time. This shift may mean reduced consistency in the data collected, though dialogue was maintained between the researchers and contributing firms throughout the process. Contributors worked back from 2013, supplying information on recent transactions first and then earlier deals as information or resources permitted. When returned, the data was checked for inconsistencies and completeness. Any cases that could not report at least two of the dates listed in Table 3.1 (and thus be used to measure time taken for at least one stage in the transaction process) were then omitted from the dataset for this study.

Table 3.2 reports the size of the dataset assembled for this research. It comprises 303 purchases and 280 sales.[3] Five transactions turned out to be duplicates in the sense that they were bought and sold between contributors and had been reported by both parties. Allowing for these instances, 578 transactions are captured representing £15.7 billion of expenditure.

**Table 3.2: Number and value of transactions in the sample over time**

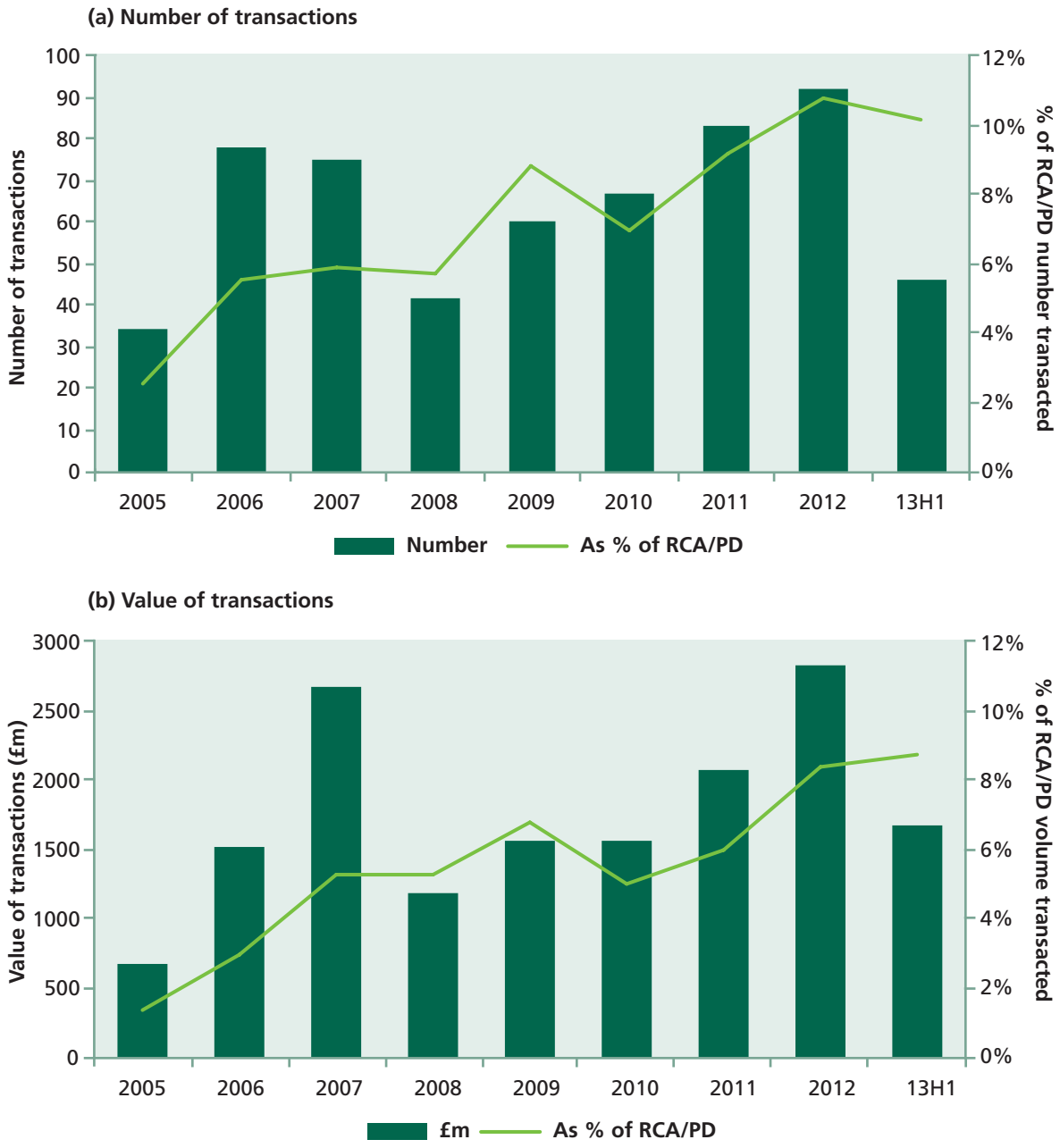
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Purchases | 1 | 21 | 48 | 49 | 16 | 20 | 38 | 42 | 53 | 15 | 303 |
| Sales | | 13 | 30 | 26 | 26 | 40 | 29 | 42 | 42 | 32 | 280 |
| Adjustment | | | | | | | | -1 | -3 | -1 | -5 |
| All transactions | 1 | 34 | 78 | 75 | 42 | 60 | 67 | 83 | 92 | 46 | 578 |
| Amount in £m | 18 | 679 | 1,515 | 2,671 | 1,175 | 1,552 | 1,560 | 2,062 | 2,830 | 1,663 | 15,724 |

Table 3.2 shows that there is a good spread of observations across all years from 2005 onwards, with most observations in 2011 and 2012. This is also shown by Figure 3.1, which displays the number and value of transactions over time plus the size of the sample relative to the total number or value of deals recorded by RCA/PD for each year (omitting 2004). Figure 3.1 shows that sample size increases in relative terms over the period, rising to over 10% of transactions by number and over 8% by value by 2012. In other words, a higher proportion of recent deals are observed even though the absolute number and value is not much greater. This makes sense given the relative levels of trading in the UK real estate market pre- and post the financial crisis and market correction of 2007-2009.

[3] Of the purchases, 222 were obtained through the latest data collection exercise and 81 were obtained from Scofield (2013).

## 3. DATA COLLECTION

**Figure 3.1: Number and value of transactions in the sample over time**




How the dataset is spread across different contributors, property types, locations, etc., is of interest for understanding whether the dataset is representative of wider patterns of real estate investment activity. In respect of contributors, two organisations account for 76% of the transactions by number and 78% by value. This dominance reflects the greater ability of these firms to provide historical data relative to the other contributors and it is a potential limitation of the dataset that must be borne in mind. Checks were

## 3. DATA COLLECTION

performed to see whether exclusion of data from these firms would have a major impact on results. The overall average times for different transaction stages were similar to the ones reported below, but it was difficult to meaningfully check results by market state, sector, etc., as the exclusion of these contributors significantly reduces the ability to disaggregate the analysis.

Table 3.3 shows that the spread of observations across property types and locations is more even. The three main commercial real estate sectors are all represented with a lesser weight to industrial assets reflecting the size and structure of the UK commercial real estate market (see IPF, 2014). In Retail, there were 33 transactions of shopping centres, 64 of retail parks and 18 of supermarkets in addition to transactions of standard high street shops and single retail warehouses. Meanwhile, the regional distribution of transactions shows some bias to London and the South East of England, but this reflects the general preferences of investors in UK commercial real estate (IPF, 2014).

**Table 3.3: Number and value of transactions by sector, location and transaction type**

| | Purchases | Sales | Total | % | £m | % |
|---|---|---|---|---|---|---|
| Retail | 137 | 103 | 237 | 41% | 6,449 | 41% |
| Office | 82 | 113 | 194 | 34% | 6,661 | 42% |
| Industrial | 62 | 63 | 124 | 21% | 1,846 | 12% |
| Other | 22 | 1 | 23 | 4% | 769 | 5% |
| Central London | 28 | 55 | 82 | 14% | 3,517 | 22% |
| Rest of South East | 79 | 78 | 154 | 27% | 4,355 | 28% |
| Rest of UK | 187 | 142 | 328 | 57% | 6,853 | 44% |
| Multiple locations | 9 | 5 | 14 | 2% | 999 | 6% |
| Portfolio deals | 22 | 14 | 36 | 6% | 2,101 | 13% |
| Other transactions | 281 | 266 | 542 | 94% | 13,624 | 87% |
| Total | 303 | 280 | 578 | 100% | 15,724 | 100% |

Table 3.4 presents information on how complete the different fields are within the data collected. The table is split into two parts, with date variables grouped at the top and variables capturing asset and transaction characteristics below. As noted earlier, observations must have two or more dates recorded to be included at all. It can be seen from the table that all the observations have final completion date as one of those dates. The date when solicitors were instructed is the next most populated, followed by date of exchange. The dates of introduction (purchases), marketing (sales) and price agreement are then much less populated, particularly that related to the initial marketing of each asset. This was disappointing, as it restricts the potential for analysis of the earlier stages beyond simple measurement across all of the available observations.

## 3. DATA COLLECTION

In regard to other fields, the sector, location and price are all 100% complete, as are the identity of the buyer for the purchases and that of the seller for sales. Information on the counterparties was also relatively complete and this facilitated construction of two further variables that described the type of organisation and nationality of the counterparty in each case. This step was guided by the classification scheme used by RCA/PD to determine the nature and sources of capital for real estate transactions. Capitalisation rate and floorspace are both fairly complete, but the additional variables requested directly from contributors are more sparsely populated, with some contributors able to describe assets as prime or secondary, or single or multi-let, but few able to retrieve data on vacancy or leasing status, especially once an asset had been sold.

**Table 3.4: Completeness of different variables within the dataset**

| | Purchases | | | Sales | | |
|---|---|---|---|---|---|---|
| | Observed | Absent | % complete | Observed | Absent | % complete |
| Introduction date | 141 | 162 | 47% | n/a | n/a | n/a |
| Marketing date | n/a | n/a | n/a | 43 | 237 | 15% |
| Price agreement date | 114 | 189 | 38% | 66 | 214 | 24% |
| Date solicitor instructed | 272 | 31 | 90% | 245 | 35 | 88% |
| Date of exchange | 225 | 78 | 74% | 207 | 73 | 74% |
| Completion date | 303 | 0 | 100% | 280 | 0 | 100% |
| Sector | 303 | 0 | 100% | 280 | 0 | 100% |
| Region | 303 | 0 | 100% | 280 | 0 | 100% |
| Price | 303 | 0 | 100% | 280 | 0 | 100% |
| Capitalisation rate | 222 | 81 | 73% | 228 | 52 | 81% |
| Floorspace sq. ft | 249 | 54 | 82% | 252 | 28 | 90% |
| Buyer nationality | 303 | 0 | 100% | 245 | 35 | 88% |
| Buyer type | 303 | 0 | 100% | 245 | 35 | 88% |
| Buyer broker | 206 | 97 | 68% | 197 | 83 | 70% |
| Seller nationality | 254 | 49 | 84% | 280 | 0 | 100% |
| Seller type | 254 | 49 | 84% | 280 | 0 | 100% |
| Seller broker | 183 | 120 | 60% | 226 | 54 | 81% |
| No. of bidders | n/a | n/a | n/a | 11 | 269 | 4% |
| Method of sale | 18 | 285 | 6% | 28 | 252 | 10% |
| Prime/secondary | 65 | 238 | 21% | 65 | 215 | 23% |
| Single or multi-let | 95 | 208 | 31% | 67 | 213 | 24% |
| Vacancy rate | 56 | 247 | 18% | 16 | 264 | 6% |
| Unexpired lease length | 59 | 244 | 19% | 33 | 247 | 12% |
| Financing | 16 | 287 | 5% | n/a | n/a | n/a |
| Initial purchase date | n/a | n/a | n/a | 45 | 235 | 16% |

## 3. DATA COLLECTION

Finally, in the case of sales, the number of bidders for the asset concerned was of interest. This was not only in terms of seeing its effect on time to transact, but also with an interest in tracking how the number of bidders varies over time and across asset types, as it may be a good indicator of liquidity in its own right. Yet number of bidders was only reported in 11 out of 280 cases, while method of sale was reported just 28 times. Nonetheless, the scale and depth of the data collected is far greater than for the 2004 IPF study and offers more possibilities for disaggregation and econometric analysis of transaction times than before, although it should be noted that the dataset has no examples of withdrawn or aborted sales, in common with IPF (2004).

## 4. RESULTS

In this section, the length of different stages in the transaction process is measured and reported. It starts by considering average times for different stages in the purchase process before moving on to examine stages from the seller perspective. After this, the distribution of transaction times is studied and the dataset is subsequently disaggregated in several ways, exploring how times vary with factors like market state, property type, price band and counterparty.

Throughout, focus is placed on the median number of days for each stage. However, Appendices A and B report further statistics such as the arithmetic mean as well as measures of variability. The means and standard deviations, in particular, are utilised in some models in the liquidity pricing report. It is important to note that times for different stages are not always measured using the same sample of transactions. This is because of variations in the availability of different dates across observations (underlying samples behind different statistics are reported in the appendices). Much more evidence is available for later stages in the transaction process, i.e. instruction of solicitors onwards, while a lack of evidence on earlier stages inhibits analysis of the sales data in particular.

### 4.1. Purchases

The first results are shown in Table 4.1 and relate to stages in the purchase of properties. The stages are described in the first column and the sample for which stages could be measured is shown in the second column. Around 100 of the 300 or so observations of purchases provide some data on the length of earlier stages, i.e. from when the asset was introduced to the purchasing investor. The remaining columns report the 10th, 50th and 90th percentiles of the distribution in time taken, the 50th percentile corresponding to the median time in days. These figures allow the typical time and the variation in time for each stage to be seen, but exclude outliers in the case of the latter.

**Table 4.1: Purchases dataset – Time in days for different transaction stages**

| | Number of observations | 10th percentile | Median | 90th percentile |
|---|---|---|---|---|
| Introduction to price agreement | 101 | 7 | 31 | 92 |
| Price to instruction of solicitors | 97 | -3 | 2 | 31 |
| Instruction to exchange of contracts | 206 | 16 | 37.5 | 98 |
| Exchange to completion | 225 | 0 | 7 | 31 |
| Introduction to price/solicitor | 127 | 10 | 35 | 143 |
| Price/solicitor to completion | 289 | 27 | 56 | 149 |
| Introduction to completion | 141 | 56 | 104 | 267 |

Measurements of medians are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion.

# 4. RESULTS

The stage from introduction to price agreement typically took around a month and was not usually longer than three months in this dataset. Price agreement to instructing solicitors was then more rapid, this typically taking a couple of days and rarely more than a month. Some transactions (n = 16) had price agreement dates that were later than the date for instructing solicitors, at odds with the stylised transaction process noted earlier.[4] Nor was it uncommon (n = 19) for instruction of solicitors to happen on the same day as price agreement. The period from instruction to exchange was then longer, with an average length of over a month, but not usually longer than four months in duration. Finally, exchange to completion typically took a week and there were a fair number of instances (45 or about 20% of cases) where these two events occurred on the same day.

A large number of transactions in the dataset report a date either for price agreement or instruction of solicitors, not both. Given that the gap between these dates is typically short where it is observed, a new date variable was created that equalled price agreement date where this was reported or the solicitor instruction date in other cases. This variable was then used to estimate again the time from introduction to price, as well as the time from price to completion, but now drawing on a larger pool of observations. Figures for these revised stages are summarised in Table 4.1, though the primary purpose of this step was to enable improved disaggregation for the analyses that follow. Additional statistics for the revised stages (mean, standard deviation and interquartile range in time taken) are shown in Appendix A.

Finally, the last row in Table 4.1 reports total time from introduction to completion of a purchase, where this could be measured. This suggests a typical timespan for purchasing property investments of over 100 days or around three and half months. Yet there is substantial variation around this time with the 10th and 90th percentiles indicating a range from under two to over nine months, outliers in the data lying beyond these points. However, some of the variation may reflect differences between property types or locations in the length of time needed to transact, explored below.

## 4.2. Sales

Table 4.2 lists stages from introducing a property to the market (or, for an off-market transaction, to the prospective buyer) through to completion of a sale. It uses the same format as the table for purchases, showing the sample available for measurement of each stage followed by the 10th, 50th and 90th percentiles of the distribution for time taken. Once again, revised stages are shown below the original stages for which data was sought, with additional statistics in Appendix B. Note: far fewer observations are available for the earliest stage, due to the lack of an initial marketing date in most cases, and this also impacts on assessment of the overall time to transact. Nonetheless, a number of interesting patterns may be observed.

[4] There are 16 such cases in the sample of 97 deals where this stage can be measured, 15 of which were deals completed in 2006 and 2007. There is no particular pattern in terms of sector, location or counterparty.

## 4. RESULTS

**Table 4.2: Sales dataset – Time in days for different transaction stages**

| | Number of observations | 10th percentile | Median | 90th percentile |
|---|---|---|---|---|
| Marketing to price agreement | 23 | 14 | 42 | 184 |
| Price to instruction of solicitors | 40 | 0 | 0 | 2 |
| Instruction to exchange of contracts | 203 | 16 | 39 | 113 |
| Exchange to completion | 207 | 0 | 10 | 43 |
| | | | | |
| Marketing to price/solicitor | 35 | 14 | 42 | 184 |
| Price/solicitor to completion | 271 | 24 | 64 | 197 |
| Marketing to completion | 43 | 57 | 135 | 355 |

Measurements are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion.

The stage from initial marketing to price agreement typically took about one and half months for this set of sales, but could be as long as six months or more. Price agreement to instruction of solicitors was more rapid, with the median time indicating a larger proportion of cases where solicitors were instructed on the same day than was the case in the purchase data. There are also no cases where price agreement was later than the instruction date. The period from instruction to exchange was longer, with an average length of over a month, but not normally longer than four months in duration. Finally, exchange to completion typically took 10 days and there were many instances (68 or about one third of cases) where these two events occurred on the same day.

These patterns show some consistency with the results from the purchase dataset. There is a small increase in the time from price to completion and no obvious explanation as to why, though Section 3 shows that the mix of assets is not the same between the sample of purchases and the sample of sales. There is also an increase in the length of the first stage. Given that this includes time spent on the market prior to introduction to the successful buyer, it is unsurprising that this stage is longer than its counterpart from the purchases sample. In fact, the surprising aspect is that the typical time is only longer by about 10 days, though the variation in time from marketing to price agreement is much greater than for introduction to price on the buy side. However, there is a bigger difference for total transaction time, with a typical time from marketing to completion of 135 days or about four and half months.

One explanation for the short average and wide dispersion in the period from introduction to price agreement may be that different approaches to marketing are represented in the dataset. Although not many organisations provided information on method of sale, the subset with such data indicates that at least three methods are present: open marketing, targeted marketing and off-market sales. If those sales explicitly identified to be off-market are excluded from the analysis, the typical time for marketing to price agreement rises by a week, from 42 to 49 days. Furthermore, the group of sales identified as receiving open marketing have a median time for this stage of 61 days, which implies a difference between initial marketing and introduction to eventual buyer of around one month.

# 4. RESULTS

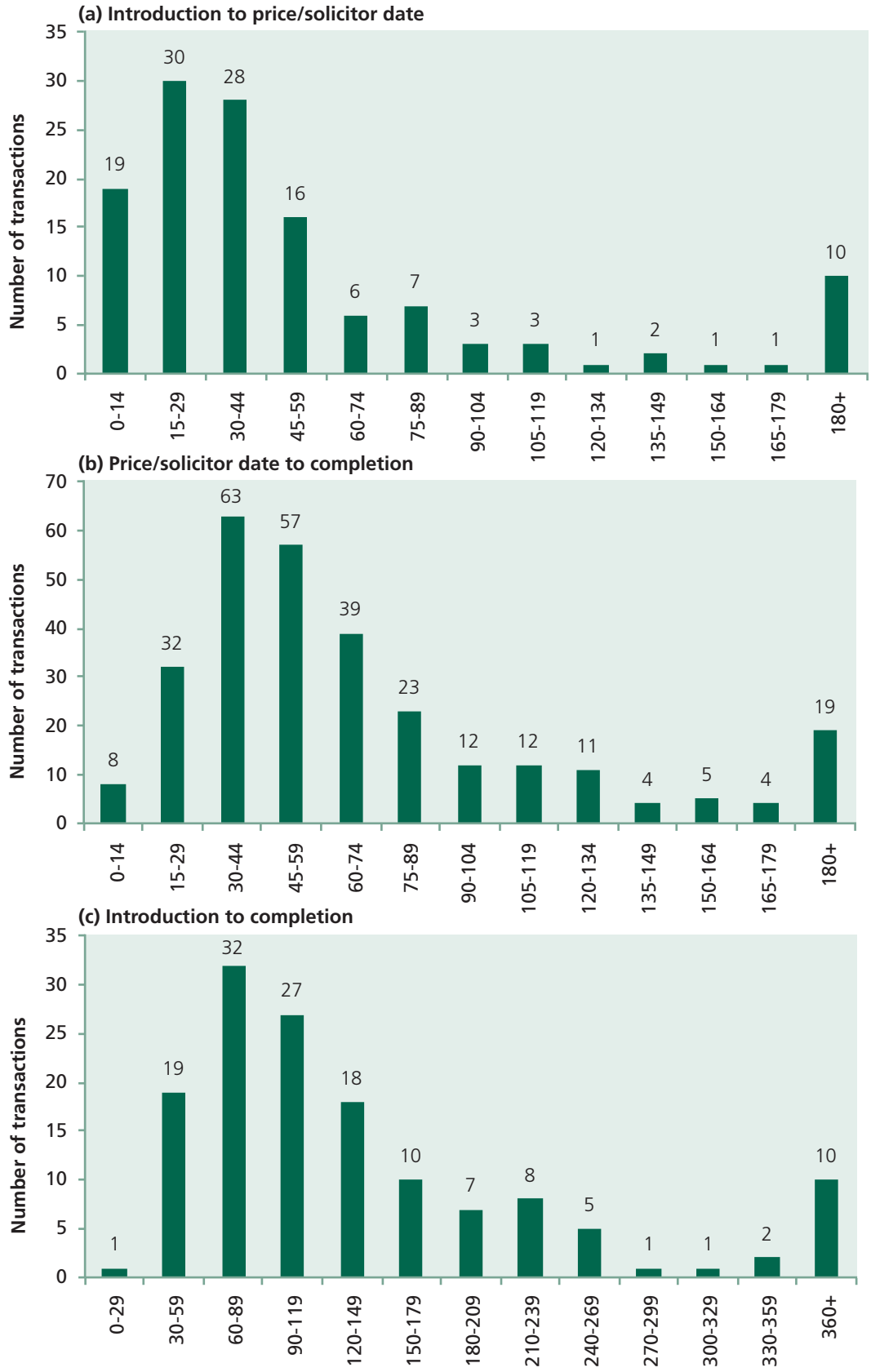
How do these findings compare to those in the 2004 IPF study of sales, which tracked cases from the date of the first record in each sale file rather than the date of initial marketing? The averages recorded are affected by the inclusion of some or all of the pre-marketing period for some assets. Therefore, it is unsurprising that the research found a longer median time for its first stage at 88 days and a longer overall time at 190 days. Estimates of price to exchange (median 62 days) and exchange to completion (median 19 days) are more comparable, though, both in definition and magnitude. Nonetheless, the evidence suggests that transactions have become faster in the decade since the previous IPF study, although market state plays an important role, as will be shown below.

## 4.3. Distributions of transaction times

The previous IPF study charted the distribution of times from first record to completion and for the different transaction stages. This is useful for showing the variety in experiences across transactions and, thus, is repeated in this study. Figure 4.1 displays distributions in times for the purchases, focusing on the stages of introduction to price/solicitor date, price/solicitor date to completion and introduction to completion. Figure 4.2 shows distributions of times for the stages relevant to the sample of sales.

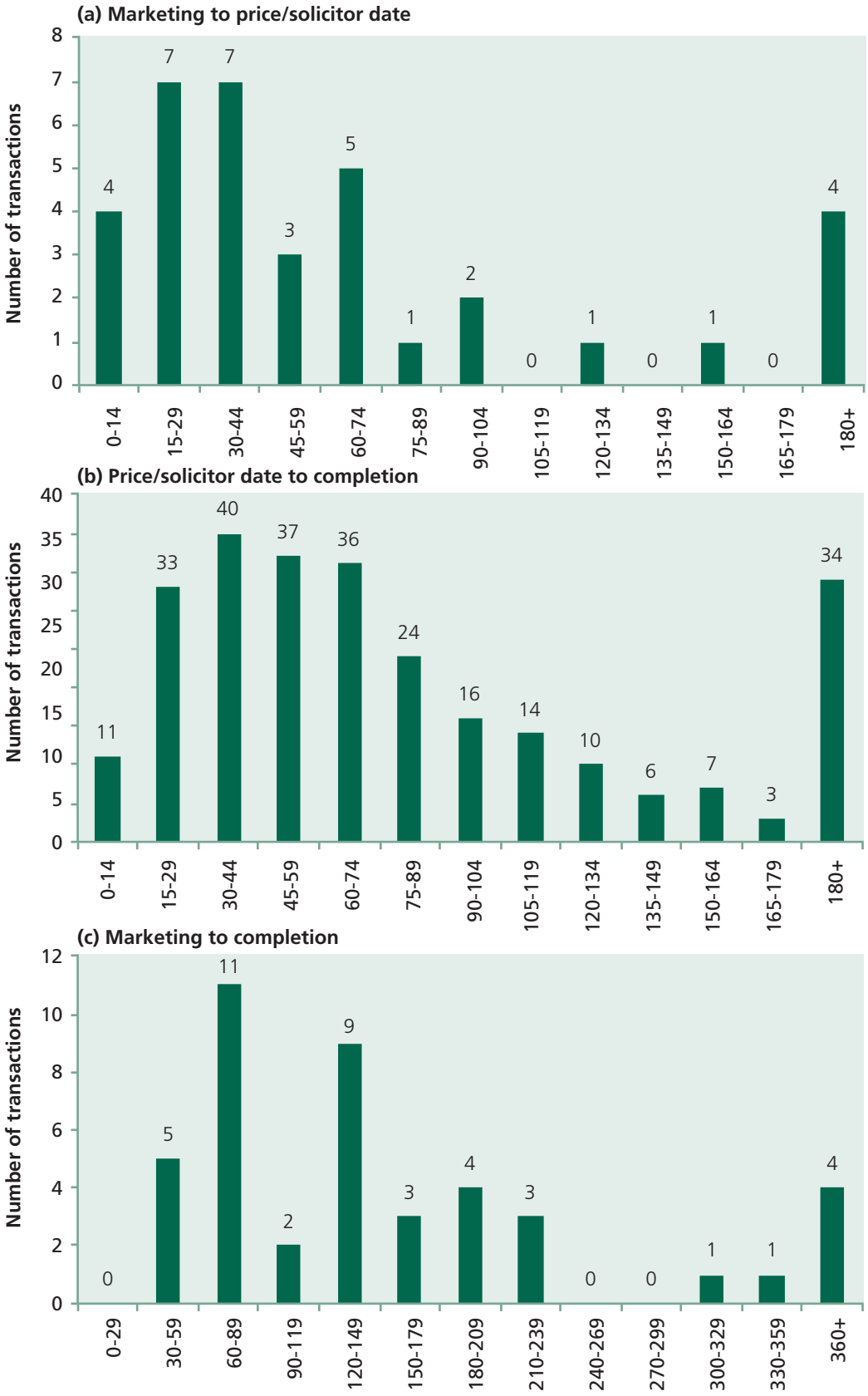
## 4. RESULTS

**Figure 4.1: Purchases – Distribution of time in days for different transaction stages**



## 4. RESULTS

**Figure 4.2: Sales – Distribution of time in days for different transaction stages**



## 4. RESULTS

The distributions exhibit similar shapes for each stage. In all cases, they are positively skewed, with a long tail of instances where lengthy delays occurred in either the marketing/introductory stage or in the due diligence and settlement phase following the agreement of price.[5] For the phase post-price agreement, there is a more distinct peak in the times obtained from purchasers than in the corresponding data provided by sellers. The variability in times following price agreement may seem surprising. However, IPF (2004) notes several reasons why transactions may be delayed in this stage: it could reflect discovery of previously unknown problems with the asset or changes to the market or asset while the deal is being negotiated. It could also be due to changes in the circumstances of the buyer, e.g. being unable to secure the finance needed to complete the sale.

Around three quarters of purchases reached price agreement in less than 60 days and three quarters of purchases took under 90 days to proceed from price agreement to completion. The modal group for introduction to price/solicitor date was just 15-29 days while the most populated groups for the price/solicitor to completion phase are 30-44 and 45-59 days, translating roughly to the 5-9 weeks for due diligence plus settlement reported by McNamara (1998: 4) for standard retail, office and industrial properties. In terms of total time, half of purchases took less than 120 days while three quarters took less than 180 days to move from introduction to buyer through to completion.

For sales, just less than three quarters of cases took under than 75 days to move from marketing to price agreement. This includes the off-market transactions and those subject to targeted marketing. However, one in nine cases had marketing periods longer than six months. Nonetheless, finding a buyer in many cases appears to be as or more rapid than reported in McNamara (1998: 6). In terms of total time, the sample of sales where this is measured is small and the distribution is uneven, but three quarters of cases took less than seven months and 9% took more than a year. While the size of the tails may be surprising, they appear to be smaller than those reported in IPF (2004).

As found by IPF (2004), there are no notable correlations (either positive or negative) in times taken for different stages. For instance, a long marketing period is not necessarily followed by a long due diligence phase.

### 4.4. Impact of market state

When trying to explain variations in transaction times, a key place to begin is market state. This is highlighted in Section 2 as an important issue, since wider economic, financial and real estate market conditions influence the relative number of buyers and sellers. In search theory terms, a fall in the number of buyers reduces the number of enquiries for a property and lengthens the time needed for a successful match. However, the potential number of buyers in the market is not a variable that is easy to quantify and it is usually proxied in academic studies by data on transaction volumes or other information on market conditions. The assumption would be that, in deteriorating markets where there are fewer buyers relative to sellers, prices fall and fewer real estate transactions occur.

[5] For times based on the purchases data, skewness coefficients are 3.01 for introduction to price/solicitor date, 2.60 for price/solicitor to completion and 1.79 for introduction to completion. For sales, 2.28 is the skewness coefficient for marketing to price/solicitor date, while it is 2.59 for price/solicitor to completion and 1.76 for marketing to completion.

## 4. RESULTS

For this study, market state was defined with reference to turning points in price and capital value indices for UK real estate. The IPD UK quarterly capital growth index peaked in Q2 2007 and then fell before reaching a trough in Q2 2009. Similarly, the RCA/PD UK Commercial Property Price Index peaked in Q2 2007 and bottomed out in Q2 2009, though some of the sub-indices indicate an earlier peak in Q1 2007, e.g. UK Retail. Using these series, four market phases were defined: Boom (up to June 2007), Downturn (from July 2007 to June 2009), Recovery (from July 2009 to June 2011) and Recent (July 2011 onwards). Transactions were then grouped into one of those four periods based on their date of completion.[6]

Table 4.3 shows the median times for key transaction stages according to the market state in which the transaction occurred. For brevity, the underlying sample sizes and other percentiles are confined to the appendices, though the samples available for measuring each stage mirror the pattern shown in Tables 4.1 and 4.2, with less data for the earliest stage and for measuring total transaction times. For sales, only the price to completion stage is shown as there were insufficient observations for the marketing phase to allow robust disaggregation by market state or in the other ways that follow. There are also fewer observations for the downturn than for other periods.

**Table 4.3: Median times in days for key transaction stages by market state**

| | Purchases | | | Sales |
|---|---|---|---|---|
| | Introduction to Price/Sol | Price/Sol to Completion | Introduction to Completion | Price/Sol to Completion |
| Boom to June 2007 | 29 | 55 | 88 | 63 |
| Downturn to June 2009 | 32 | 60 | 117 | 61 |
| Recovery to June 2011 | 67 | 50 | 145 | 50 |
| July 2011 to mid-2013 | 51 | 59 | 122 | 81 |

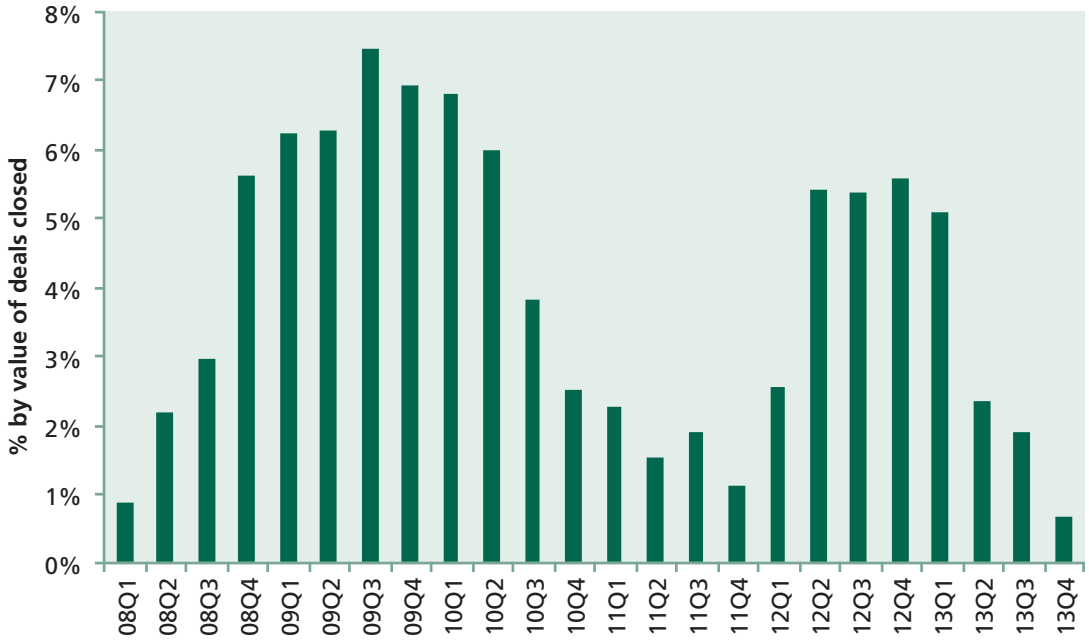
Measurements are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion.

The results for market state indicate that transaction times lengthened as the downturn began and continued to lengthen during the recovery. It is perhaps surprising that there is not a starker transition between boom and downturn, but some of the deals that completed during the downturn commenced and reached price agreement in the boom phase, which may explain why the time from introduction to price/solicitor date is so short. It also should be recalled that the dataset does not include time lost in withdrawn or aborted transactions. According to RCA/PD data, shown in Figure 4.3, the proportion of aborted deals rose during 2008 (deals that may have begun during the boom phase of the market). Thus, liquidity will have reduced much more in the downturn than figures on time to transact can indicate alone.

[6] An alternative would be to define market conditions with reference to transaction volumes. Data provided by RCA/PD indicate that the amount of trading peaked around Q2 2007, but the trough in activity was slightly earlier than the trough in prices, being Q1 2009 in terms of number of deals and Q4 2008 by value traded.

## 4. RESULTS

**Figure 4.3: Percentage of terminated to completed transactions per quarter as tracked by RCA/PD**




More recently, transaction times have fallen, though not to the speeds observed before 2007, which could indicate that, on the buy side, there is now less urgency and/or greater caution on the part of buyers before committing to a deal. The median time for purchases from introduction to completion is 122 calendar days (around four months) when based on the most recent transactions compared to 104 days (between three and four months) overall. Appendix C reports the outcome of tests to see whether differences in median times between different market states are statistically significant. The results support the idea that times do vary with market state. It is also notable from Appendix A that dispersion in total transaction time has increased in more recent periods.

### 4.5. Other influences on transaction times

A small number of portfolio transactions are included in the samples. Table 4.4 examines whether longer transaction times are associated with these, given the greater variety of locations, assets and tenancies relative to most other real estate transactions.

**Table 4.4: Median times in days for key transaction stages – portfolio versus other transactions**

| | Purchases | | Sales | |
|---|---|---|---|---|
| | Introduction to Price/Sol | Price/Sol to Completion | Introduction to Completion | Price/Sol to Completion |
| Portfolio transaction | 37 | 61 | 117 | 85 |
| Other transaction | 35 | 55 | 104 | 63 |

Measurements are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion.

## 4. RESULTS

In the case of purchases, Table 4.4 suggests that there are only minor increases in the amount of time taken to transact, but there is a greater difference when looking at the typical due diligence time for sales, as well as a large difference in the overall time (173 days compared to 124 days or roughly six months compared to four months). More marketing and due diligence might be expected in such cases, but assets selected for portfolio deals may exhibit a certain degree of homogeneity to facilitate liquidity – for example, a common property type or tenant, especially in sale and leaseback transactions. Such instances were clearly evident in the sample of transactions studied here.

Other possible sources of variation relate to property types and regions. Table 4.5 shows results for the three main sectors of the commercial property market together with transaction times for other assets belonging to sectors currently outside the UK investment mainstream such as apartments and hotels, though the sample for these is small. Furthermore, there is wide variation within the retail sector in the nature and scale of assets, so figures were computed for important sub-sectors, such as retail parks, shopping centres and supermarkets, as well as standard shop units. Meanwhile, a basic regional split was performed for the office and industrial samples, reflecting a concentration of deals in Central London for the office sector and in South East of England for the industrial sector.[7]

**Table 4.5: Median times in days for key transaction stages by type of property**

| | Purchases | | Sales | |
|---|---|---|---|---|
| | Introduction to Price/Sol | Price/Sol to Completion | Introduction to Completion | Price/Sol to Completion |
| Retail | 39 | 52 | 95 | 58 |
| Standard Retail | 28 | 46 | 96 | 48 |
| Retail Park | 43 | 55 | 95 | 57 |
| Retail Warehouse | 25 | 33 | 56 | 56 |
| Shopping Centre | 160 | 58 | 222 | 101 |
| Supermarket | 69 | 60 | 128 | - |
| Office | 32 | 53 | 102 | 73 |
| Central London | 30 | 46 | 91 | 63 |
| Rest of UK | 32 | 56 | 115 | 78 |
| Industrial | 36 | 69 | 122 | 62 |
| South East England | 29 | 56 | 129 | 56 |
| Rest of UK | 38 | 71 | 113 | 63 |
| Other | 31 | 79 | 143 | - |

Measurements are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion.

[7] Dashes within Table 4.5 and subsequent tables denote instances where there were six or fewer transactions and so no median time is reported.

## 4. RESULTS

The results in Table 4.5 exhibit inconsistencies. The clearest picture comes from the breakdown of the retail sector. This shows that standard shops and individual retail warehouses progress most quickly from introduction to price agreement, with a median time of under one month, whereas the median time for shopping centres is as long as 160 days, or just over five months. The period from price to completion is more uniform across the retail types, though the sales data suggest that this is longer for shopping centres. Thus, total time is longest for shopping centres, while individual retail warehouses take the least time to transact. Similar relativities between types of retail were reported in McNamara (1998).

For the other sectors, the sample of purchases suggests that industrial deals take longer than office deals, driven mostly by the stage following price agreement, but this is not echoed in results based on the sample of sales. This discrepancy may reflect differences between samples in terms of other factors such as lot size or counterparties, an issue addressed by regression modelling in Section 5. It also appears that transactions outside London and the South East take longer. IPF (2004) noted how commonly held views of liquidity in the Central London office market were belied by relatively low transaction rates of these assets. However, though traded less often, it may be that they trade faster once offered for sale. It is interesting that a difference in speed emerges most clearly in these data from price agreement onwards rather than in the introductory phase of the transaction.

Yet, in contrast with other findings, a significant difference in median times by location could not be demonstrated, either between Central London and other areas for offices or between the South East and the Rest of the UK for industrial assets. This was surprising, but reflects the degree of dispersion around the median transaction times in each case. Therefore, more evidence would be useful for investigating this angle further.

Another factor that could influence time to transact is the price of the asset, both in absolute terms and relative to the underlying value of the asset concerned. In this study, only the final price agreed between buyer and seller is observed. The correspondence between this and times for the different transaction stages can be studied, but it should be recalled that the relationship between time and price is complex. As noted in Section 2, time spent on the market can itself affect the eventual price accepted by a seller. However, in performing tabular analysis, no formal assumption about causality is necessary. The primary interest here is in whether assets at different value levels show differences in how long they take to transact; the drivers can then be debated if any relationship is found.

In trying to study the correspondence between price and time, a confounding factor arises from the fact that the transactions are spread over a number of years, with the first deal in the sample being completed in 2004 and the last being completed in 2013. Therefore, some properties may appear to be more valuable than others because they were sold in a stronger market, even though their price might have been similar had they sold at the same time. To address this, the price for each asset was adjusted for capital growth between the quarter in which they traded and Q4 2012, which was used as a base point. The indices used for this adjustment were the RCA/PD UK Commercial Property Price Indices.[8] Note: analyses using unadjusted prices produced similar results to those that follow.

[8] Properties were matched up with the most appropriate index in this family. The UK Retail index was used for retail assets while the Central London Office and UK ex-London Office were used for offices in those locations. For industrial and other property types, the aggregate UK Commercial series was used.

## 4. RESULTS

In Table 4.6, purchases and sales are segmented into price bands, using the adjusted prices and the thresholds of £5 million, £10 million, £20 million and £50 million, to define five different groups of transactions. For this analysis, portfolio deals were removed as these typically concluded at prices of £20 million or higher and so could distort the results. The table shows that there is some relationship in the sample of purchases between the value of the asset transacted and time taken to transact, with longer times for higher value assets. This still holds if shopping centres are removed from the analysis. This broadly matches the pattern noted by McNamara (1998), though his survey suggested that the smallest assets (under £2 million in value as at that time) may be relatively illiquid.

**Table 4.6: Median times in days for key transaction stages by price band (excluding portfolios)**

| | Purchases | | | Sales |
|---|---|---|---|---|
| | Introduction to Price/Sol | Price/Sol to Completion | Introduction to Completion | Price/Sol to Completion |
| Less than £5m | 23 | 55 | 80 | 64 |
| £5m to £10m | 32 | 51 | 107 | 60 |
| £10m to £20m | 41 | 53 | 104 | 59 |
| £20m to £50m | 39 | 56 | 122 | 64 |
| £50m and above | 61 | 63 | 114 | 61 |

Measurements are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion.

An exercise was then undertaken to distinguish between assets of different quality. The first step was to use the prime and secondary labels that were reported by some contributors in the data collection exercise, but the small sample of buildings with these descriptors produced inconsistent results. As an alternative, the samples of purchases and sales were each split into quartile groups, based on the achieved price per square foot (using prices adjusted to Q4 2012 terms) or on the yield.[9] The groups were formed by distinguishing properties in relation to the median price per square foot or median yield recorded in the sample for each sector to avoid distortions arising from different relative price or yield levels prevailing for different sectors. Analysis focused on properties in the retail, office and industrial sectors and the results of this exercise are set out in Table 4.7.

The results suggest that lower quality properties within each sector (defined by having the lowest prices per square foot or the highest yields) are associated with longer times to transact and this arises from a longer period from introduction to price/solicitor date. The results echo the findings of Johnson et al. (2007), noted previously, but contrast with the work by Trippi (1977), where lower yields were related to longer transaction times. However, Trippi was able to explicitly control for quality in his study whereas, in this study, yield embodies asset quality and pricing behaviour. Table 4.7 also reports results for single let versus multi-let assets and finds that the latter have a longer median time to transact, which may reflect the added complexity of a deal where greater numbers of leases and tenants have to be evaluated.

[9] Note that the issue of endogeneity is also relevant to yields and must be borne in mind before making causal statements.

## 4. RESULTS

### Table 4.7: Median transaction times in days for quartile groups based on price psf and yield

| | Purchases | | Sales | |
|---|---|---|---|---|
| | Introduction to Price/Sol | Price/Sol to Completion | Introduction to Completion | Price/Sol to Completion |
| Highest price psf | 38 | 49 | 96 | 56 |
| Second quartile | 30 | 56 | 94 | 67 |
| Third quartile | 34 | 57 | 90 | 67 |
| Lowest price psf | 69 | 57 | 156 | 76 |
| Lowest yield | 34 | 56 | 98 | 58 |
| Second quartile | 33 | 48 | 88 | 56 |
| Third quartile | 54 | 55 | 99 | 60 |
| Highest yield | 94 | 56 | 167 | 79 |
| Single let | 55 | 61 | 130 | 46 |
| Multi-let | 65 | 57 | 156 | 70 |

Measurements are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion. Quartiles for price per square foot are derived using prices in Q4 2012 terms as explained in the text.

Finally, for the sample of purchases, Table 4.8 records median times to transact, based on the nature of the counterparty (seller) that the contributing investors were dealing with. Two distinctions are noted: a difference between UK and non-UK sellers for how long key transaction stages took and a difference between investment institutions, such as insurance companies, fund management houses and pension funds, and other types of sellers, such as public and private property companies, private investors and non-investing organisations, such as owner-occupiers or government bodies. There is also an unknown group for deals where the identity and nationality of the seller concerned was not recorded. This analysis suggests that domestic organisations and investment institutions are quicker to transact with than other types of sellers. A corresponding analysis of the sales data supports these suggestions (see Appendix B).

### Table 4.8: Purchases - Median times in days for transaction stages by type of seller

| | Introduction to Price/Sol | Price/Sol to Completion | Introduction to Completion |
|---|---|---|---|
| UK | 39 | 55 | 104 |
| Non-UK | 63 | 56 | 132 |
| Unknown | 26 | 65 | 102 |
| Institution | 33 | 49 | 92 |
| Other type | 53 | 58 | 137 |
| Unknown | 26 | 65 | 102 |

Measurements are based on differing samples. Results for introduction to price/solicitor and for price/solicitor to completion will not sum to time from introduction to completion.

## 5. REGRESSION MODELLING

The results in Section 4 suggest several interesting relationships between the time taken to transact, its component stages and various factors related to either the state of the market, the asset or the parties to the transaction. However, an important criticism of tabular analysis is that each table only controls for the particular factor selected for tabulation. Thus, the results for different price bands may be distorted by the fact that a different mix of property types is present within each band, or those for type of counterparty could reflect their preferences for different sectors and locations. To address this, multivariate regression modelling was attempted to see what factors remain important in explaining transaction times once the influence of other factors is controlled for.

A complication that affects multivariate modelling in this context is that, where time is a dependent variable, there can often be violations of the assumptions under which Ordinary Least Squares (OLS) techniques are effective. Fortunately, an area of statistical modelling known as survival analysis has emerged that encompasses a number of techniques dedicated to analysis of time between events. These techniques are commonly associated with medical research, e.g. modelling survival of patients with particular illnesses, but they have also been used in studies of economic phenomena, such as the duration of unemployment, as well as for analysis of time on market in the residential literature.

The available techniques can be classified between parametric, semi-parametric and non-parametric techniques. The residential literature has often used parametric models to explore the determinants of time on market. Such models can be very effective, but they involve making certain assumptions about the underlying behaviour of the time variable in question, e.g. the time between listing and sale. Uncritical use of parametric models is criticised by Pryce & Gibb (2006), who highlight that time on market data can violate the assumptions of the most commonly used survival models. Hence, they use non-parametric techniques with residential transaction data for Glasgow to explore and illustrate the characteristics of time on market in different market states and districts.

Bearing this in mind, similar analysis was conducted here prior to multivariate modelling. This was to understand the best approach to modelling the available data. Most of the time data relates to the stage from price agreement/instruction of solicitors to date of completion and not from marketing or introduction date. This stage differs from the classic concept of time on market and measures the efficiency of the processes required to conclude a sale (Benefield & Hardin, 2013). Yet Figures 4.1 and 4.2 suggest that this stage is as lengthy and variable as the earlier stages of the transaction process and so drivers of variation in the time from price agreement to completion are of significant interest. Owing to the data available, the models below focus on this stage in particular.[10]

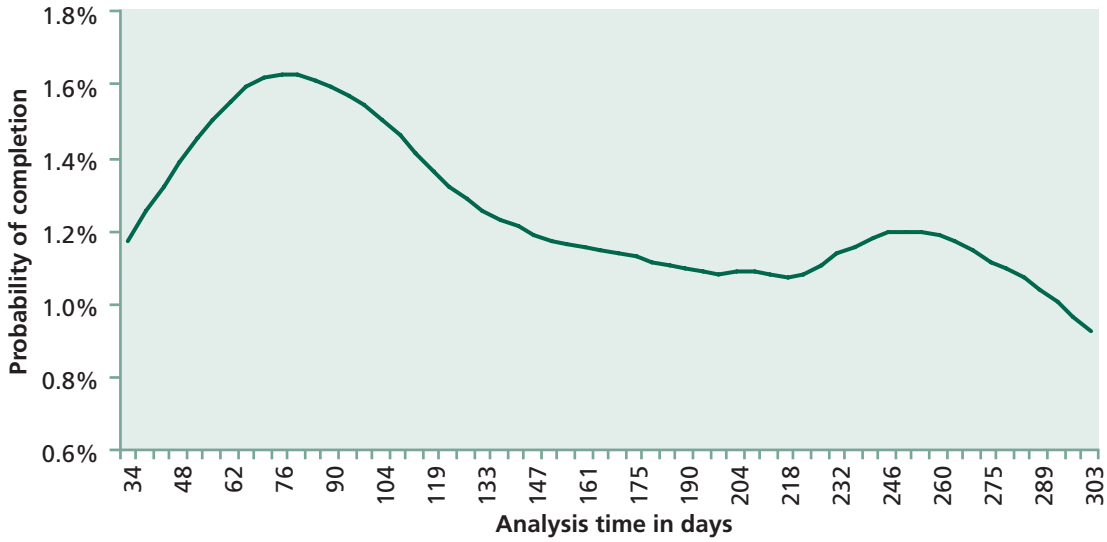
Non-parametric modelling was then used to explore the nature of the time data for this stage. This analysis started with the estimation of survivor and hazard functions. Beginning from a probability of 1 at time t=0, a survivor function plots how likely it is that properties 'survive' beyond time t, where 'survival' means remaining on the market or, in this context, the deal remaining uncompleted. The date of price agreement represents t=0 in the analysis and each observation, in the language of the method, 'fails' at a time greater than zero when the sale is formally completed. The hazard function then plots the probability of a completion event occurring within a given time interval, conditional on survival up to that point.

[10] Several models of the stage from introduction to price agreement using the purchases sample were tested, but these did not yield convincing results.

## 5. REGRESSION MODELLING

The dataset contains observations of times from a seller and buyer perspective. These observations should be compatible for the period from price/solicitor with variations in time to transact date to completion; the stage is common to both parties in a way that marketing period is not. Thus, samples were pooled prior to analysis and the hazard function estimated for the combined dataset.[11] Figure 5.1 shows the hazard function and this indicates that the likelihood of a deal reaching completion initially rises with time before falling after around three months, matching the patterns in Figures 4.1 and 4.2. There is also a small increase in likelihood at eight to nine months that is difficult to explain. This may reflect instances where sellers initially dealt with another bidder before negotiating with the successful buyer, though this cannot be confirmed. Further graphs in Appendix D suggest that this pattern may be sensitive to market state. Post-Q2 2007, the curve shows a more pronounced second peak as compared to pre-Q2 2007. This may reflect greater difficulties in concluding transactions following the downturn, with changes in the availability of financing during this period.

**Figure 5.1: Estimate of hazard function for the period from price agreement to completion**




The shape shown in Figure 5.1 rules out the use of several parametric survival models that rely on the hazard function either remaining constant over time or consistently rising or falling. Thus, regression modelling took place using a semi-parametric technique: a Cox proportional hazards model. Tests of whether data from the purchases and sales were compatible rejected the hypothesis of an identical hazard function between these samples. As such, stratified models were estimated that allow the baseline hazard function for the two groups of observations to differ. The modelling also allowed for possible correlations in measured transaction times between deals reported by the same firm. Such correlations might arise from differing transaction processes between firms having an influence on times or from measurement errors that might arise between firms, e.g. if one contributor defined price agreement date somewhat differently to another when completing the survey.

With time from price agreement/instruction of solicitors to completion selected as the dependent variable, independent variables were chosen to try to explain variations in the length of this stage. The choice of independent variables was constrained by the data available for each asset, with some variables being either unavailable or too sparsely populated to allow their inclusion in the models. In particular, this included

[11] For the five transactions that were recorded in both the sales and the purchases dataset, the sales version of the record was dropped to prevent double counting of the transaction in the subsequent models.

## 5. REGRESSION MODELLING

variables on leasing, financing and the method adopted for sale, which could be important omitted factors. At the same time, the choice of variables was guided by the analyses conducted in Section 4. So market state, property type, price, location and the nature of buyer and seller were explored as well as certain other factors.

Earlier, market states were defined by reference to turning points in market indices. Deals were allocated to these various periods, which could be used as a basis for creating dummy variables for different market conditions. However, it is also possible to measure the average rate of price growth between the price/solicitor date and the date of completion for each transaction in the sample using the same indices. This exercise was carried out using the RCA/PD Commercial Property Price Indices applied previously to adjust transaction prices into 2012 terms. The continuous variable that this generates captures market performance over the period when due diligence occurs, which proved more effective than dummy variables in explaining variations in transaction times, especially when a spline was used to allow for different relationships in rising versus falling markets.[12]

In contrast, price worked poorly, whether as a continuous variable or via dummies based on the price bands defined earlier. An issue with price noted in Section 2 is that this tends to be endogenous, i.e. it may affect time on market and may also be affected by how long a property has been on the market, as price may be reduced if the vendor considers the asset has been marketed for too long. When modelling the stage from price agreement onwards, though, price has been fixed by this point, so it could be argued to be exogenous (though renegotiations in some cases may have occurred). However, price was not used in the final models, although price per square foot was utilised through use of the quartile groups based on this measure to form dummy variables as proxies for asset quality.

Other dummy variables then identify whether or not a transaction is a portfolio deal, whether there are unusual legal features (non-freehold tenure and/or partial interest being traded), the sector to which an asset belongs (with standard retail being the base group), the nationality of the buyer (UK or non-UK/unknown) and the type of buyer (financial institution or other/unknown). For models of the retail and office sectors, additional dummies specifying sub-type and location, respectively, were substituted for the sector indicators.

During this process, a number of different models were estimated. The final models exclude assets from outside the three main sectors and they exclude one transaction with a time greater than one and a half years from price agreement to completion, as this unduly distorted some of the estimates. The following models are now presented for further discussion.[13]

1) Standard Cox proportional hazards model for price to completion times from the sales data.
2) Standard Cox proportional hazards model for price to completion times from the purchases data.
3) Stratified Cox proportional hazards model for price to completion times from the combined purchases and sales data.
4) Stratified Cox proportional hazards model for price to completion times from purchases and sales completed after Q2 2009 onwards (i.e. the more recent transactions).
5) Stratified Cox proportional hazards model for price to completion times from transactions in the retail sector.
6) Stratified Cox proportional hazards model for price to completion times from transactions in the office sector.

[12] A spline involves creating two or more variables whereby their values are determined by the level of another variable (e.g. price) and predetermined cut-offs where it is thought that the relationship between this factor and the dependent variable might change. It allows different regression lines to be fitted and is an alternative to deriving polynomial functions.

[13] There were insufficient transactions to estimate a reliable survival model for the industrial sector, though it was attempted.

**Table 5.1: Cox Proportional Hazard Models – Time from Price/Solicitor Date to Completion Date**

| | (1) Sales data | | (2) Purchases data | | (3) All data | | (4) Post-trough | | (5) Retail assets | | (6) Office assets | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average price growth where < 0 | 0.953 | *** | 0.919 | *** | 0.948 | *** | 0.995 | | 0.912 | *** | 0.976 | |
| Average price growth where > 0 | 1.074 | *** | 1.072 | *** | 1.066 | *** | 1.055 | *** | 1.087 | *** | 1.037 | *** |
| Portfolio deal | 0.770 | ** | 0.795 | | 0.809 | ** | 0.765 | | 0.673 | * | 0.657 | ** |
| Sector | | | | | | | | | | | | |
| Other retail | 0.801 | * | 0.888 | * | 0.852 | ** | 0.829 | | | | | |
| Office | 0.660 | *** | 0.906 | | 0.790 | *** | 0.883 | | | | | |
| Industrial | 0.733 | | 0.601 | * | 0.668 | *** | 0.776 | | | | | |
| Top quartile price psf | 1.537 | ** | 1.006 | | 1.290 | | 1.080 | | 1.247 | | 1.786 | *** |
| Not 100% freehold | 0.681 | * | 0.672 | *** | 0.632 | *** | 0.604 | *** | 0.670 | *** | 0.359 | *** |
| UK buyer | 1.271 | | | | 1.340 | | 1.454 | ** | 0.933 | | 2.156 | *** |
| UK seller | | | 0.972 | | 0.997 | | 1.112 | | 1.175 | | 0.770 | |
| Institutional buyer | 1.181 | *** | | | 1.203 | *** | 1.181 | | 1.061 | | 1.836 | *** |
| Institutional seller | | | 1.274 | *** | 1.028 | | 0.936 | | 1.297 | ** | 0.595 | * |
| Retail type | | | | | | | | | | | | |
| Retail park | | | | | | | | | 0.844 | | | |
| Retail warehouse | | | | | | | | | 1.466 | *** | | |
| Shopping centre | | | | | | | | | 0.687 | | | |
| Supermarket | | | | | | | | | 0.757 | *** | | |
| Rest UK location | | | | | | | | | | | 0.940 | |
| No of observations | 237 | | 230 | | 467 | | 276 | | 196 | | 173 | |
| $\chi^2$ | 361.48 | | 6.24 | | 191.92 | | 215.57 | | 388.94 | | 1636.4 | |
| Probability > $\chi^2$ | 0.0000 | | 0.2835 | | 0.0000 | | 0.0000 | | 0.0000 | | 0.0000 | |
| Harrell's C | 0.611 | | 0.608 | | 0.596 | | 0.596 | | 0.648 | | 0.636 | |

Notes: The table reports hazard ratios, which are derived by taking the exponential of the estimated coefficients. ***, ** and * denote 1%, 5% and 10% significance levels, respectively. The dependent variable equals the time in days from price/solicitor date to completion date. The omitted category for the sector dummies is standard retail and this is also the omitted category for the retail type dummies. The models adjust for possible correlation between observations from a given fund.

## 5. REGRESSION MODELLING

Results from the six models are presented in Table 5.1. It is common for the output from survival models to be presented in terms of hazard ratios rather than coefficients and the table follows this approach. Hazard ratios may be explained as follows. There is a baseline level of hazard for each time interval, and independent variables (i.e. asset or transaction features) increase or decrease that level of hazard. An increased level of hazard means an increased likelihood of completion in each interval, which should translate into a faster time. Thus, hazard ratios report the shift in hazard relative to the baseline. A ratio below 1 means reduced likelihood of completion while a ratio above 1 means increased likelihood. So if the reported hazard ratio is 1.2, completion is 20% more likely within each interval for a unit increase in the variable in question. Beneath the hazard ratios in Table 5.1, overall model significance and goodness of fit are reported as well as the number of observations that could be modelled given the availability of the chosen independent variables.

The table contains a number of interesting findings. Firstly, all models suggest that market state has an extremely important influence on the time to transact.[14] The results also suggest that this impact differs between up and down markets. In an up market, stronger price growth raises the likelihood of reaching completion, but, in a down market, the reverse appears to be the case. The latter point is difficult to understand at first sight, but, drawing on the earlier literature review, a strong downward market movement may alter the mix of buyers and sellers, with some sellers perhaps compelled to sell and sell quickly, e.g. unit trusts to meet redemptions, though this is not obvious from the data at hand. In strongly moving markets, buyers and sellers appear to move more quickly to completion if they agree to transact.

The other hazard ratios suggest that portfolio transactions are less likely to reach completion and this is also true for the various property types relative to the base group of standard retail. The only exception is standalone retail warehouses, which are separately identified within the retail model. Assets that are more complex legally also have a reduced hazard of completion, but the reverse is true for properties adjudged to be in the top quartile for price per square foot paid, although this variable is only significant within models 1 and 6. Finally, the buyer and seller variables present a mixed picture. These tend to suggest that institutional involvement, especially on the buy side, raises the hazard of completion versus other types of market participant.

Taken together, the results echo many of the messages emerging from the tabular analysis. When other factors are controlled for, the main relationships highlighted earlier continue to hold. The main exception to this appears to be price, since it is not significant in the presence of other factors when added to these models. However, IPF (2004: 35) found no strong correlation between time and price in their data on the different transaction stages. Meanwhile, the modelling of market state reveals an interesting dynamic in its effect on transaction times to add to the interesting patterns for market periods recorded earlier in the report.

[14] Note that model 2 appears to be insignificant overall, despite containing several significant coefficients. It is retained for comparative purposes.

## 6. CONCLUSION

**Key findings**

- The median time for purchase from introduction through to completion was 104 days, i.e. between three and four months.
- The median time for sale from marketing through to completion was 135 days, i.e. four to five months.
- There is a lot of variation around the median times, and market state has an important explanatory role, with slower transaction times recorded since the UK market crash in 2007-2008.
- 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.
- Price agreement was reached much more quickly for small lot sizes (below £10m) than for properties in larger lot size bands.
- Overall, there was only a weak correspondence between transaction times and price, with the largest differences arising in the introductory phase of a transaction.
- Shopping centres took longer to transact than other types of property, while standard retail units and standalone retail warehouses transacted more quickly.
- Tabular results indicate that Central London offices transacted 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.

A full assessment of the characteristics of liquidity in commercial real estate markets requires the study of transaction times. Building on work in IPF (2004), this research provides up-to-date measurements of the time to transact for both sales and acquisitions. It measures the time taken for different stages of the transaction process and it explores the significance of relationships between time to transact, asset characteristics, market state and other features of the transaction process using a sample of nearly 600 UK commercial real estate transactions that occurred between 2004 and 2013. This study goes further than previous commercial real estate studies in terms of isolating asset, market and investor factors associated with variations in time to transact. The findings extend knowledge on what causes variations in transaction times and on what drives liquidity at the individual asset level.

For the sample of purchases, the median time from introduction to an asset through to completion of a deal for that asset was found to be 104 days or between three and four months. This understates the total time involved with purchases, given that buyers must search and select between assets, though this activity is difficult to quantify as the process of evaluating opportunities may be ongoing for some investors. On the sell side, the median time from initial marketing to completion was found to be 135 days or four to five months, with the period up to price agreement taking 42 days. This was surprisingly short, but mixed together off-market and open-market transactions, with median time rising when off-market deals were excluded. Once again, total time may be understated given the need for selection and preparation for sale, but the lengths of such phases are difficult to quantify.

## 6. CONCLUSION

There is considerable variability in overall time to transact and in times for the component stages. In fact, the variability in time from price agreement/instruction of solicitors through to completion seems as large as that for introduction or marketing through to price. The distribution in times in both cases is highly skewed and this is consistent with findings from the 2004 IPF study. Portfolio deals were found to be associated with longer times to transact, which is logical owing to the increased complexity of deals that involve multiple properties. Poorer quality properties were found to take longer to transact, whilst smaller lot sizes were quicker to transact. Within the retail sector, shopping centres and supermarkets exhibited longer transaction times than standard retail units or individual retail warehouses.

The data also show an increase in time to transact for properties that sold during the downturn. This increase was initially muted, especially in the time from introduction to price, which may reflect the capturing of some deals where price agreement was reached before the downturn. Transactions that continued then completed relatively quickly, though proceeding with a deal agreed during the boom may have prompted a re-negotiation of price or other terms, resulting in the observed increase in time from price to completion. It should also been seen alongside falling transaction volumes and an increase in aborted deals during this period. After the trough in the UK market around Q2 2009, transactions then became even slower, especially from introduction to price. Such relative changes in times per stage provide important insights into buyer and seller behaviour during different market states.

Multivariate modelling supports many of the findings noted above, though this focuses only on the phase from price agreement to completion. Market state correlated significantly with transaction times for both acquisitions and disposals, while office and industrial assets had a lower probability of reaching completion within a given interval relative to standard retail units, which in practice means longer transaction times. Portfolio deals were less likely to complete rapidly compared to deals for individual assets, whilst transactions probabilities also varied by investor type. For instance, sales involving institutional buyers and acquisitions involving institutional sellers were more likely to transact faster. Further research into the internal organisation of actors in this investor group may facilitate a better understanding of how the organisation of investment might create transactional efficiencies that manifest in shorter transaction times.

Most findings were not unexpected, given what is known of the UK commercial real estate market, but not all. Firstly, asset price was not found to be a significant determinant of time to transact when tested alongside other factors. This is important, as finance theory assumes liquidity to be a function of price: lower price equating to greater asset liquidity. Secondly, it was assumed that the presence and structure of brokerage would impact transaction time in a significant way. Despite testing for such a relationship, though, this research could not identify any significant effect (either positive or negative) of brokerage on the time to transact. This is noteworthy, since brokerage represents the largest non-tax transaction cost in UK commercial real estate investment and so it was assumed that it would have a measurable impact on liquidity. However, more data on the marketing phase is needed to reach more conclusive findings.

Although this study represents a step forward in research on time to transact, improvements in the amount and coverage of data would benefit future research. This includes gathering more data on key dates and details pertaining to leasing, financing and the methods used to sell different assets. Furthermore, more information on the number and nature of bidders and the bids made for assets (successful and unsuccessful) would shed more light on potential buyers in different market states and their pricing strategies.

## 6. CONCLUSION

Thus, moving forward, and consistent with the recommendations in IPF (2004), fuller research into transaction times and their relationships with other liquidity measures, performance and risk across time, sectors and investor types requires collection of consistent and reliable information on the time taken to acquire and dispose of investment-grade commercial real estate. The information required comes from the largest investors of commercial property in the UK and it is only through their support for this endeavour that such information will become available. This study recommends, therefore, that the real estate investment industry investigates more regular collation of statistics on time to transact, with particular effort on the better tracking of marketing times. The appropriate parties to collect and analyse such data should also be considered.

# APPENDIX A: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – PURCHASES DATASET

This appendix provides detailed statistics for time to transact, focusing on the purchase side of the transaction. Three stages are reported below: 1) introduction to price agreement/solicitors date, 2) price agreement/solicitors instruction to completion and 3) introduction to completion. The tables report measures of central tendency and dispersion, as well as the 10th and 90th percentiles of the distribution in times both for the whole sample (all purchases) and the various subsamples for which median times are presented in the report. The tables also give the sample sizes for each subset. The definitions of and rationale for the different groupings are discussed in the main text. Here, it should be noted that, when added together, samples for some groupings do not sum to the total number of deals owing to missing data, e.g. not all observations include data on yields or floorspace (required for price per square foot).

**Table A1: Introduction date to price/solicitor date**

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| All purchases | 127 | 35 | 63 | 40 | 83 | 10 | 143 |
| Boom to June 2007 | 58 | 29 | 3 6 | 26 | 32 | 10 | 64 |
| Downturn to June 2009 | 21 | 32 | 53 | 28 | 96 | 7 | 48 |
| Recovery to June 2011 | 17 | 67 | 80 | 51 | 61 | 22 | 174 |
| July 2011 to mid-2013 | 31 | 51 | 110 | 111 | 122 | 21 | 306 |
| Portfolio | 9 | 37 | 117 | 27 | 179 | 7 | 432 |
| Non-portfolio | 118 | 35 | 58 | 40 | 71 | 10 | 139 |
| Retail | 51 | 39 | 80 | 66 | 108 | 13 | 174 |
| Standard Retail | 12 | 28 | 40 | 28 | 35 | 16 | 89 |
| Retail Park | 11 | 43 | 55 | 35 | 43 | 29 | 73 |
| Retail Warehouse | 8 | 25 | 30 | 25 | 24 | 3 | 76 |
| Shopping Centre | 9 | 160 | 224 | 334 | 172 | 22 | 438 |
| Supermarket | 8 | 69 | 86 | 85 | 98 | 0 | 306 |
| Other retail | 3 | - | - | - | - | - | - |
| Office | 38 | 32 | 52 | 33 | 72 | 3 | 117 |
| Central London | 15 | 30 | 69 | 64 | 101 | 10 | 197 |
| Rest of UK | 22 | 32 | 41 | 33 | 43 | 3 | 92 |
| Industrial | 29 | 36 | 48 | 30 | 40 | 16 | 81 |
| London and SE | 8 | 29 | 32 | 40 | 25 | 4 | 76 |
| Rest of UK | 21 | 38 | 55 | 29 | 43 | 24 | 81 |
| Other | 9 | 31 | 55 | 35 | 57 | 7 | 193 |
| Less than £5m | 24 | 23 | 30 | 20 | 22 | 3 | 64 |
| £5m to £10m | 24 | 32 | 43 | 40 | 37 | 4 | 89 |
| £10m to £20m | 27 | 44 | 88 | 87 | 112 | 10 | 198 |
| £20m to £50m | 39 | 37 | 71 | 55 | 99 | 8 | 193 |
| £50m and above | 12 | 50 | 83 | 91 | 78 | 15 | 197 |

## APPENDIX A: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – PURCHASES DATASET

**Table A1: Introduction date to price/solicitor date (continued)**

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| Highest price psf | 20 | 38 | 80 | 58 | 102 | 11 | 252 |
| Second quartile | 29 | 30 | 42 | 36 | 45 | 3 | 117 |
| Third quartile | 18 | 34 | 83 | 52 | 110 | 21 | 259 |
| Lowest price psf | 20 | 69 | 108 | 83 | 120 | 28 | 303 |
| Lowest yield | 30 | 34 | 58 | 29 | 68 | 7 | 163 |
| Second quartile | 24 | 33 | 55 | 45 | 78 | 7 | 92 |
| Third quartile | 6 | 54 | 59 | 49 | 38 | 22 | 118 |
| Highest yield | 18 | 94 | 151 | 151 | 147 | 21 | 432 |
| Single let | 18 | 55 | 83 | 41 | 70 | 27 | 198 |
| Multi-let | 28 | 65 | 125 | 138 | 139 | 4 | 432 |
| UK seller | 76 | 39 | 62 | 52 | 68 | 11 | 143 |
| Non-UK seller | 16 | 63 | 138 | 228 | 160 | 8 | 432 |
| Unknown seller origin | 35 | 26 | 30 | 20 | 17 | 14 | 51 |
| Institution seller | 44 | 33 | 45 | 28 | 42 | 10 | 98 |
| Other seller type | 48 | 53 | 102 | 101 | 118 | 7 | 306 |
| Unknown seller type | 35 | 26 | 30 | 20 | 17 | 14 | 51 |

## APPENDIX A: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – PURCHASES DATASET

**Table A2: Price/Solicitor date to completion date**

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| All purchases | 289 | 56 | 74 | 50 | 63 | 27 | 149 |
| Boom to June 2007 | 98 | 55 | 77 | 47 | 71 | 29 | 159 |
| Downturn to June 2009 | 40 | 60 | 83 | 64 | 59 | 31 | 164 |
| Recovery to June 2011 | 64 | 50 | 59 | 46 | 44 | 26 | 107 |
| July 2011 to mid-2013 | 87 | 59 | 78 | 51 | 67 | 23 | 158 |
| Portfolio | 20 | 61 | 64 | 42 | 32 | 27 | 116 |
| Non-portfolio | 269 | 55 | 75 | 50 | 65 | 27 | 153 |
| Retail | 129 | 52 | 69 | 45 | 63 | 26 | 127 |
| Standard Retail | 41 | 46 | 60 | 32 | 55 | 27 | 99 |
| Retail Park | 34 | 55 | 71 | 53 | 53 | 27 | 126 |
| Retail Warehouse | 13 | 33 | 37 | 23 | 16 | 16 | 60 |
| Shopping Centre | 17 | 58 | 74 | 9 | 50 | 31 | 186 |
| Supermarket | 18 | 60 | 98 | 76 | 106 | 16 | 292 |
| Other retail | 6 | - | - | - | - | - | - |
| Office | 80 | 53 | 69 | 38 | 59 | 27 | 128 |
| Central London | 24 | 46 | 56 | 30 | 39 | 21 | 125 |
| Rest of UK | 55 | 56 | 75 | 51 | 66 | 31 | 133 |
| Industrial | 58 | 69 | 88 | 77 | 69 | 29 | 153 |
| London and SE | 17 | 56 | 81 | 62 | 61 | 27 | 153 |
| Rest of UK | 41 | 71 | 92 | 70 | 73 | 33 | 150 |
| Other | 22 | 79 | 88 | 52 | 60 | 32 | 167 |
| Less than £5m | 33 | 55 | 81 | 81 | 76 | 30 | 150 |
| £5m to £10m | 64 | 51 | 80 | 58 | 70 | 27 | 206 |
| £10m to £20m | 71 | 56 | 66 | 44 | 58 | 21 | 110 |
| £20m to £50m | 86 | 56 | 74 | 44 | 65 | 27 | 133 |
| £50m and above | 34 | 63 | 76 | 52 | 43 | 32 | 130 |
| Highest price psf | 58 | 49 | 72 | 35 | 75 | 18 | 178 |
| Second quartile | 58 | 56 | 74 | 33 | 68 | 29 | 149 |
| Third quartile | 60 | 57 | 67 | 50 | 43 | 29 | 125 |
| Lowest price psf | 55 | 57 | 74 | 46 | 59 | 25 | 150 |

## APPENDIX A: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – PURCHASES DATASET

### Table A2: Price/Solicitor date to completion date (continued)

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| Lowest yield | 55 | 56 | 86 | 49 | 79 | 29 | 178 |
| Second quartile | 52 | 48 | 63 | 34 | 49 | 27 | 147 |
| Third quartile | 50 | 55 | 67 | 36 | 52 | 25 | 117 |
| Highest yield | 45 | 56 | 58 | 43 | 30 | 25 | 101 |
| Single let | 39 | 61 | 79 | 68 | 67 | 16 | 167 |
| Multi-let | 42 | 57 | 71 | 43 | 47 | 27 | 120 |
| UK seller | 206 | 55 | 73 | 48 | 59 | 27 | 147 |
| Non-UK seller | 37 | 56 | 62 | 31 | 45 | 21 | 125 |
| Unknown seller origin | 46 | 65 | 90 | 73 | 88 | 23 | 194 |
| Institution seller | 98 | 49 | 62 | 32 | 57 | 24 | 101 |
| Other seller type | 145 | 58 | 78 | 52 | 57 | 29 | 153 |
| Unknown seller type | 46 | 65 | 90 | 73 | 88 | 23 | 194 |

### Table A3: Introduction date to completion date

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| All purchases | 141 | 104 | 144 | 101 | 107 | 56 | 267 |
| Boom to June 2007 | 58 | 88 | 105 | 72 | 66 | 51 | 217 |
| Downturn to June 2009 | 23 | 117 | 156 | 106 | 119 | 68 | 267 |
| Recovery to June 2011 | 24 | 145 | 175 | 136 | 106 | 77 | 358 |
| July 2011 to mid-2013 | 36 | 122 | 179 | 129 | 134 | 58 | 464 |
| Portfolio | 11 | 117 | 216 | 356 | 185 | 49 | 490 |
| Non-portfolio | 130 | 104 | 138 | 99 | 97 | 57 | 250 |
| Retail | 59 | 95 | 154 | 124 | 131 | 55 | 431 |
| Standard Retail | 14 | 96 | 138 | 88 | 122 | 56 | 337 |
| Retail Park | 14 | 95 | 114 | 54 | 57 | 68 | 196 |
| Retail Warehouse | 8 | 56 | 60 | 30 | 21 | 30 | 92 |
| Shopping Centre | 12 | 222 | 271 | 355 | 172 | 77 | 490 |
| Supermarket | 8 | 128 | 191 | 180 | 137 | 78 | 464 |
| Other retail | 3 | - | - | - | - | - | - |

## APPENDIX A: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – PURCHASES DATASET

**Table A3: Introduction date to completion date (continued)**

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| Office | 40 | 102 | 136 | 69 | 94 | 58 | 277 |
| Central London | 16 | 91 | 126 | 69 | 100 | 40 | 287 |
| Rest of UK | 23 | 115 | 145 | 90 | 94 | 64 | 267 |
| Industrial | 33 | 122 | 136 | 100 | 83 | 58 | 214 |
| London and SE | 10 | 129 | 152 | 102 | 122 | 54 | 329 |
| Rest of UK | 23 | 113 | 129 | 107 | 62 | 63 | 214 |
| Other | 9 | 143 | 140 | 65 | 63 | 49 | 244 |
| Less than £5m | 26 | 80 | 110 | 78 | 90 | 35 | 186 |
| £5m to £10m | 28 | 107 | 134 | 86 | 86 | 69 | 220 |
| £10m to £20m | 29 | 113 | 158 | 119 | 125 | 40 | 431 |
| £20m to £50m | 43 | 120 | 161 | 103 | 120 | 58 | 358 |
| £50m and above | 14 | 105 | 151 | 135 | 93 | 68 | 287 |
| Highest price psf | 22 | 96 | 140 | 106 | 114 | 54 | 287 |
| Second quartile | 33 | 94 | 146 | 101 | 116 | 63 | 318 |
| Third quartile | 19 | 90 | 133 | 47 | 119 | 54 | 368 |
| Lowest price psf | 27 | 156 | 187 | 119 | 122 | 75 | 431 |
| Lowest yield | 30 | 98 | 138 | 150 | 101 | 56 | 277 |
| Second quartile | 24 | 88 | 110 | 62 | 73 | 58 | 177 |
| Third quartile | 9 | 99 | 147 | 24 | 134 | 38 | 476 |
| Highest yield | 25 | 167 | 215 | 142 | 141 | 87 | 489 |
| Single let | 19 | 130 | 149 | 73 | 102 | 38 | 318 |
| Multi-let | 39 | 156 | 204 | 199 | 140 | 72 | 474 |
| UK seller | 85 | 104 | 139 | 100 | 94 | 59 | 251 |
| Non-UK seller | 18 | 132 | 203 | 249 | 160 | 53 | 490 |
| Unknown seller origin | 38 | 102 | 127 | 80 | 97 | 36 | 220 |
| Institution seller | 51 | 92 | 129 | 87 | 100 | 57 | 267 |
| Other seller type | 52 | 137 | 171 | 126 | 117 | 75 | 368 |
| Unknown seller type | 38 | 102 | 127 | 80 | 97 | 36 | 220 |

## APPENDIX B: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – SALES DATASET

This appendix provides detailed statistics for time to transact, focusing on the sell side of the transaction. Three stages are reported below: 1) marketing date to price agreement/solicitors date, 2) price agreement/ solicitors instruction to completion and 3) marketing to completion. The tables report measures of central tendency and dispersion, as well as the 10th and 90th percentiles of the distribution in times both for the whole sample (all sales) and various subsamples for which median times are presented in the report (stage 2 only). The tables also give sample sizes for each subset. The definitions of and rationale for the different groupings are discussed in the main text. Here, it should be noted that, when added together, samples for some groupings do not sum to the total number of deals owing to missing data, e.g. not all observations include data on yields or floorspace (required for price per square foot).

### Table B1: Marketing date to price/solicitor date

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| All sales | 35 | 42 | 75 | 51 | 87 | 14 | 184 |
| All excl. Other | 34 | 42 | 70 | 36 | 83 | 14 | 158 |
| Retail | 14 | 42 | 49 | 35 | 42 | 15 | 61 |
| Office | 12 | 36 | 74 | 61 | 111 | 7 | 158 |
| Industrial | 8 | 69 | 100 | 73 | 91 | 30 | 309 |
| Other | 1 | - | - | - | - | - | - |

### Table B2: Price/Solicitor date to completion date

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| All sales | 271 | 64 | 92 | 74 | 88 | 24 | 197 |
| All excl. Other | 270 | 64 | 91 | 74 | 87 | 24 | 196 |
| Boom to June 2007 | 53 | 63 | 81 | 60 | 74 | 27 | 126 |
| Downturn to June 2009 | 46 | 61 | 80 | 64 | 59 | 24 | 176 |
| Recovery to June 2011 | 76 | 50 | 76 | 52 | 98 | 20 | 114 |
| July 2011 to mid-2013 | 96 | 81 | 116 | 114 | 94 | 28 | 252 |
| Portfolio | 14 | 85 | 113 | 77 | 81 | 51 | 220 |
| Non-portfolio | 257 | 63 | 90 | 73 | 88 | 24 | 197 |
| Retail | 103 | 58 | 76 | 63 | 73 | 21 | 127 |
| Standard Retail | 54 | 48 | 59 | 46 | 56 | 18 | 110 |
| Retail Park | 27 | 57 | 77 | 75 | 71 | 24 | 171 |
| Retail Warehouse | 7 | 56 | 112 | 62 | 161 | 14 | 472 |
| Shopping Centre | 13 | 101 | 119 | 62 | 59 | 66 | 192 |
| Supermarket | 0 | - | - | - | - | - | - |
| Other retail | 2 | - | - | - | - | - | - |

## APPENDIX B: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – SALES DATASET

**Table B2: Price/Solicitor date to completion date (continued)**

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| Office | 109 | 73 | 104 | 103 | 82 | 31 | 217 |
| Central London | 48 | 63 | 99 | 91 | 81 | 33 | 227 |
| Rest of UK | 61 | 78 | 108 | 100 | 83 | 31 | 207 |
| Industrial | 58 | 62 | 92 | 65 | 113 | 18 | 182 |
| London and SE | 15 | 56 | 76 | 58 | 94 | 18 | 99 |
| Rest of UK | 39 | 63 | 100 | 78 | 125 | 18 | 220 |
| Other | 1 | - | - | - | - | - | - |
| Less than £5m | 48 | 64 | 84 | 49 | 78 | 21 | 158 |
| £5m to £10m | 71 | 56 | 105 | 94 | 117 | 23 | 217 |
| £10m to £20m | 54 | 59 | 83 | 76 | 77 | 15 | 185 |
| £20m to £50m | 62 | 64 | 86 | 56 | 71 | 31 | 151 |
| £50m and above | 36 | 67 | 100 | 107 | 75 | 30 | 220 |
| Highest price psf | 61 | 56 | 72 | 39 | 67 | 23 | 144 |
| Second quartile | 60 | 67 | 95 | 61 | 83 | 30 | 211 |
| Third quartile | 60 | 67 | 109 | 91 | 113 | 31 | 211 |
| Lowest price psf | 63 | 76 | 88 | 80 | 59 | 24 | 182 |
| Lowest yield | 56 | 58 | 71 | 49 | 70 | 27 | 123 |
| Second quartile | 54 | 56 | 76 | 64 | 60 | 18 | 158 |
| Third quartile | 55 | 60 | 83 | 50 | 91 | 23 | 176 |
| Highest yield | 54 | 79 | 99 | 70 | 72 | 30 | 207 |
| Single let | 17 | 46 | 65 | 49 | 62 | 14 | 125 |
| Multi-let | 45 | 71 | 87 | 73 | 57 | 28 | 186 |
| UK buyer | 187 | 60 | 88 | 68 | 93 | 23 | 197 |
| Non-UK buyer | 50 | 79 | 100 | 77 | 68 | 37 | 196 |
| Unknown buyer origin | 34 | 65 | 100 | 82 | 89 | 32 | 199 |
| Institution buyer | 138 | 61 | 86 | 76 | 79 | 24 | 192 |
| Other buyer type | 99 | 69 | 96 | 72 | 99 | 23 | 207 |
| Unknown buyer type | 34 | 65 | 100 | 82 | 89 | 32 | 199 |

## APPENDIX B: DETAILED STATISTICS ON TIME TO TRANSACT IN DAYS – SALES DATASET

**Table B3: Marketing date to completion date**

| | Sample | Median | Mean | IQR | St. dev. | 10th pc | 90th pc |
|---|---|---|---|---|---|---|---|
| All sales | 43 | 135 | 165 | 117 | 131 | 57 | 355 |
| All excl. Other | 42 | 130 | 155 | 113 | 116 | 57 | 329 |
| | | | | | | | |
| Retail | 14 | 124 | 147 | 96 | 107 | 41 | 329 |
| Office | 15 | 168 | 163 | 118 | 114 | 57 | 355 |
| Industrial | 13 | 136 | 156 | 62 | 136 | 75 | 234 |
| Other | 1 | - | - | - | - | - | - |

## APPENDIX C: TESTS OF DIFFERENCE IN MEDIANS BETWEEN GROUPS

Non-parametric tests are conducted to see if the medians reported in the tables for different groups (e.g. sectors, price bands) are significantly different from one another. The null hypothesis is that no difference exists and the alternative hypothesis is that the medians do differ significantly. Table C1 reports the results of these tests in yes/no format, whereby yes indicates that the difference is statistically significant at the 10% level or better. The absence of a significant difference does not necessarily mean that the factor is unimportant. The result may be driven by small samples or by the presence of confounding factors, an issue that is tackled in the multivariate modelling.

**Table C1: Test results for whether differences in medians are significant**

| | Purchases | | Sales | |
|---|---|---|---|---|
| | Introduction to Price/Sol | Price/Sol to Completion | Introduction to Completion | Price/Sol to Completion |
| Market state | Yes | No | Yes | Yes |
| Portfolio or single asset | No | No | No | No |
| Sector | No | Yes | No | No |
| Retail type | No | Yes | Yes | Yes |
| Office location | No | No | No | No |
| Industrial location | No | No | No | No |
| Price band | Yes | No | No | No |
| Price psf quartile | No | No | Yes | Yes |
| Yield quartile | Yes | No | Yes | Yes |
| Single or multi let | No | No | No | No |
| Nationality of seller | Yes | No | No | No |
| Type of seller | Yes | Yes | Yes | No |

## APPENDIX D: HAZARD FUNCTIONS PRE- AND POST-Q2 2007

Hazard functions plot the probability of an event occurring within a given time interval, conditional on survival up to that point. The graphs in Figures D1 and D2 track the probability of a completion taking place within a given time from the point of price agreement. The first graph shows the function as estimated from transactions concluded by the end of Q2 2007, prior to the UK market downturn. The second graph is estimated from transactions concluded after this point. These can be contrasted with Figure 5.1 in the main text, which uses all observations.

**Figure D1: Hazard function based on transactions up to and including Q2 2007**

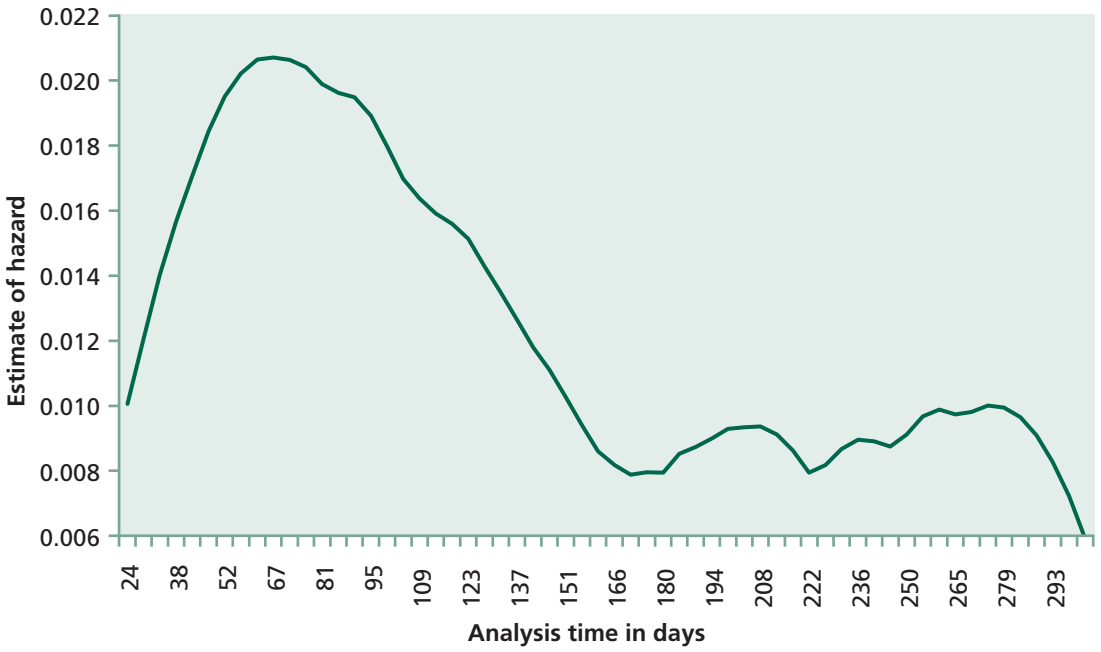
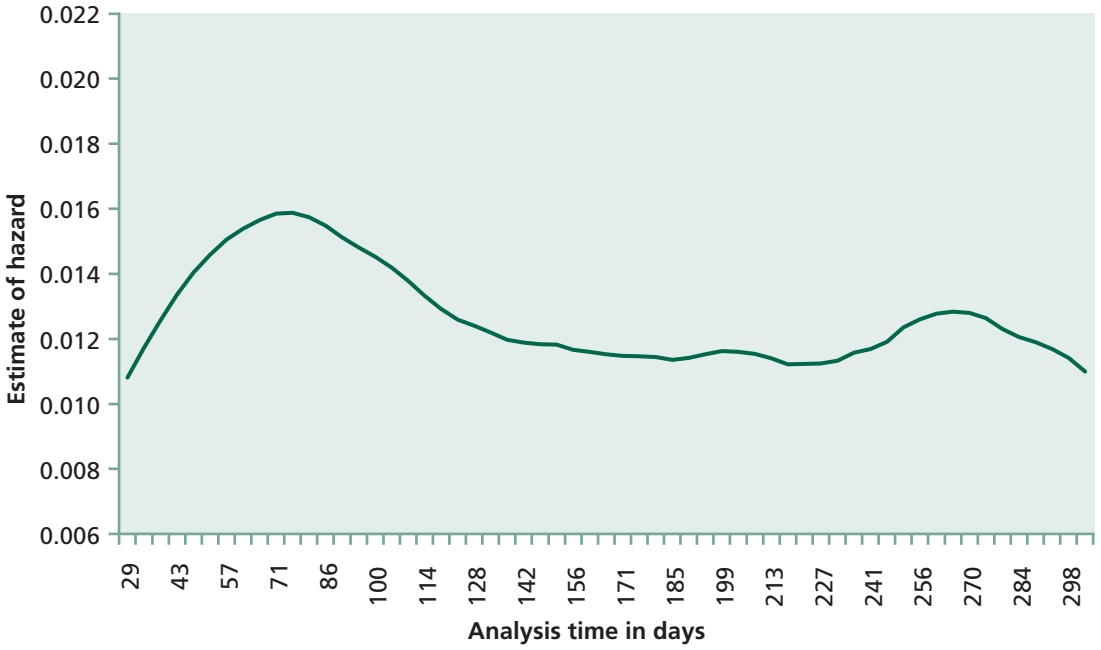



**Figure D2: Hazard function based on transactions subsequent to Q2 2007**



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## NOTES

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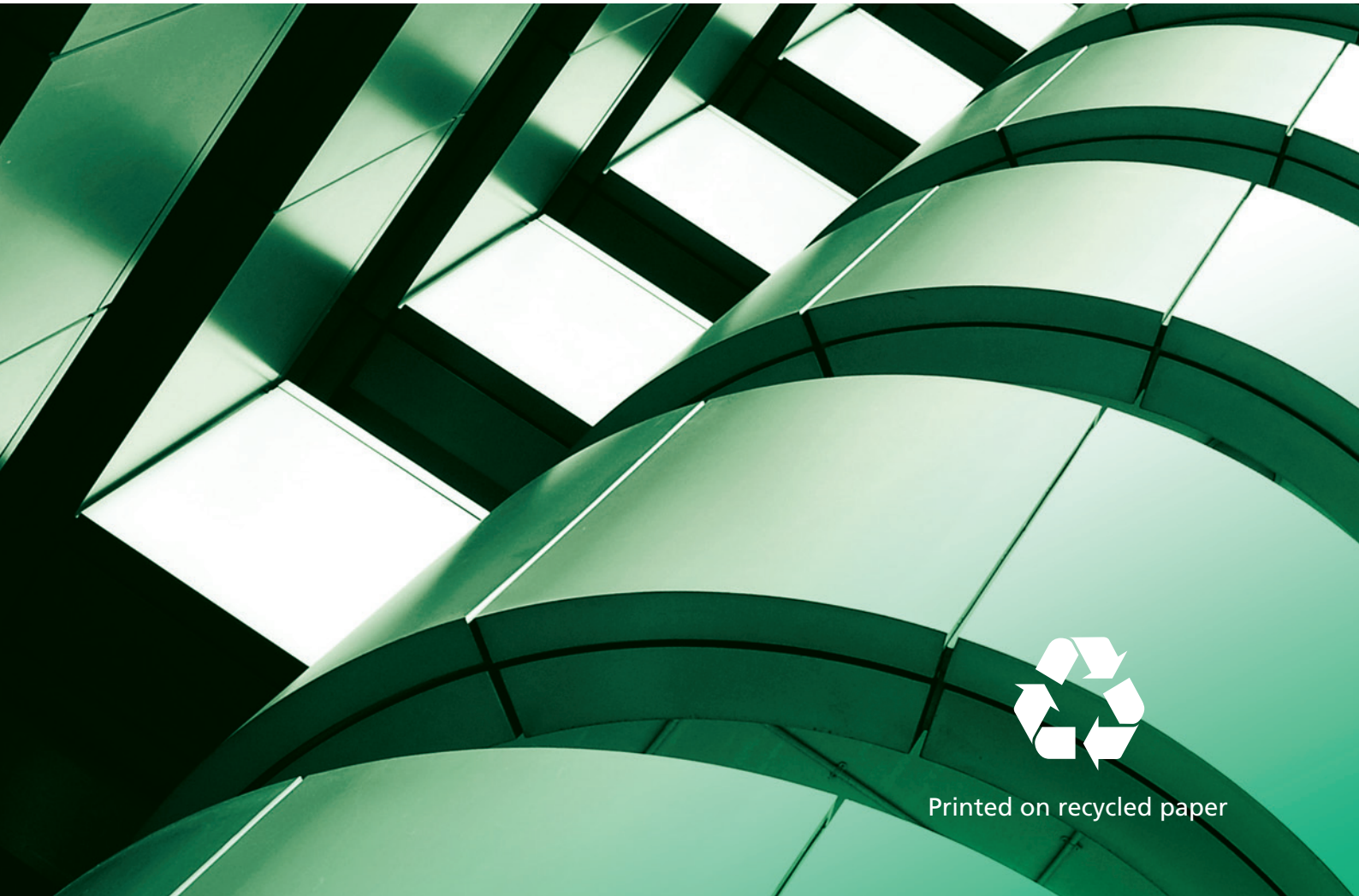

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