Exploring sentiment-driven trading behaviour of different types of investors in the London office market

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Abstract

The paper investigates the sentiment-driven trading behaviour of the four types of investors in the London office market, i.e. UK institutional investors, UK private investors, UK listed real estate companies/REITs and overseas investors. In addition, we examine the relationship between investor sentiment and property performance. Related indices are first calculated to examine whether sentiment change of one investor type leads to changes in the sentiments of other types of investors. We find that herding exists in the London office market. UK private investors follow a contrarian strategy to UK institutional investors and UK listed real estate companies/REITs and enter/exit the market at different points of time. UK institutional investors tend to follow the sentiment of UK listed real estate companies/REITs and overseas investors with lags. There is no evidence that overseas investors rely upon the sentiment of UK specialized property investors in their decision-making. We also find the sentiment-driven trading behaviour of different types of investors is influenced differently by market fundamentals. Property market returns such as yield and rental growth rate has significant impact on trading activity of overseas investors, but not on other investors. The stock market return and securitized real estate return has significant impact on the trading activity of UK institutional investor and overseas investor. Market fundamentals have no significant influence on the trading behaviour of UK private investor and listed real estate company/REIT.

Keywords: investor sentiment, different types of investors, trading behaviour, London office market

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Introduction

This paper examines the sentiment driven trading behaviour of the four types of investors (i.e. UK institutional investors, UK private investors, UK listed real estate companies/REITs and overseas investors) in the London office market. In addition, we examine the relationship between investor sentiment and property returns.

Investor trading on sentiment is a common theme in the herding literature. Investor sentiment, rational or irrational, can drive prices in ways that do not reflect fundamentals or changes in the investment opportunity set (Edelen et al. 2010). Conventionally, investors who rely to some degree on sentiment are termed 'noise traders', who by definition misprice investment in relation to rational expectation (Shiller 1989; Shleifer and Summers 1990). Sentiment and investor psychology in general can spread quickly throughout the market. This in turn affects investors' risk aversion independently of intrinsic cash flow prospects or measures for fundamental value. Many studies preset formal models on how investor sentiment may affect investor trading patterns and behavior which can lead to systematic asset mispricing in stock markets (e.g. Black 1986; Barberis et al. 1998 and 2005; Shleifer and Summers 1990).

Empirical studies also provide evidence that different types of investors behave differently in stock markets. For example, institutional investors rely upon other investors in their decision-making and herd in and out of asset classes as a response to bounded rationality (e.g. Froot and Teo 2008; Ro and Gallimore 2014). Regarding the other types of investors, it is found that the trading of individuals is systematic, persistent and is driven by their own decision, in the form of market orders rather than a passive reaction to the trading of institutions (Barber et al. 2009). Individual investors tend to buy stocks that catch their attention (Barber and Odean, 2008) and tend to underdiversify in their stock portfolios (Barber and Odean 2000; Goetzmann and Kumar 2008). Foreign investors tend to refer to the investment decision of domestic investors (Agarwal et al. 2009) due to higher information costs. Some studies report that foreign investors are better traders and generally outperform domestic investors (Grinblatt and Keloharju 2000); other studies report the opposite findings (Hau 2001; Cho et al. 2005).

If investor sentiment plays a significant role in explaining investor behaviour and affects asset prices in stock markets, to what extent might this also be true for real estate markets? The majority of the studies on the significant role of sentiment in the trading behavior focus on public stock markets, given the difficulties associated with obtaining return information on investment that trade in private markets such as real estate markets. Comparatively little is known about investor trading behaviour in private markets. Relative to more liquid and transparent public stock markets, private real estate markets exhibit significant information asymmetries, illiquidity, heterogeneous assets and the inability to short sell in markets. Where there is a deficiency in market data, real estate investors may lack the quantity or quality of information ideally required to make judgments. Thus, they may turn to indirect signals in the form of 'market sentiment' or investor sentiment' as conveyed for example, in published market analysis or commentaries of other investors in their decision-making. So sentiment is relevant to real estate investment decision (Gallimore and Gray

2002). Investor sentiment in unsecuritized real estate markets contains valuable information for investors as it helps to predict changes in real estate returns (Marcato and Nanda 2016).

In the real estate market, investor sentiment appears to be used alongside market fundamentals. However, little is known about how investor sentiment affects the trading activity of different types of investors on one property type in one market. Also little is known whether changes in sentiment of a given type of investors would lead to the changes in sentiment of other investors in the same market and the relationship between the sentiment of different investor types and office property returns. This paper aims to answer these research questions.

The objectives of the paper are defined as follows. First, we examine whether investors with a multi-asset investment focus (i.e. UK institutional investors) rely upon the sentiment of specialized property investors (i.e. UK private investors, developers, operators and/or listed real estate companies/REITs) and whether overseas investors rely upon UK property investors as a source of information in their decision-making and herd in and out of the market with them. Secondly, we test the relation between the sentiment of different investor types and property market fundamentals. We examine whether the trading behavior of different investor types is affected differently by the same economic conditions and real estate market fundamentals in one market.

The London office market is very dynamic, attracting different types of investors. Before the financial crisis in 2007/2008, the London office market enjoyed increasing levels of overseas investment. Private Investors and institutions from other European countries, Asia, Middle East and the US found UK real estate an attractive investment. According to our data, in Q12017, overseas investors accounted for 57% of total transaction volume in the London office market. Thus, the diversity of investor types in the London office market makes it an ideal laboratory to investigate heterogeneous investor sentiment and assess the interaction of the sentiments of different investor types and the factors that influence sentiment-driven trading activity.

The extant literature on investor sentiment in real estate markets tends to focus on institutional investors (e.g. Freybote and Seagraves 2017; Das et al. 2015; Fisher et al. 2009). This paper is different from them in a number of ways. Firstly, it includes the sentiments of overseas investor and UK private investor in the study. Secondly, our examination of investor sentiment is at the property-type level and in one market. Increased institutional investment has resulted in information transfers which have increased the correlation of firm-level prices and property-type common information (Chiang, 2010). Finally it examines the relationship between the sentiments of different investor types and property performance.

The empirical analysis is based on a sample of buy and sell real estate transaction data from Q1 2000 to Q1 2017 in the Central London office market, provided by Property Archive, a property data firm. We began by calculating and constructing related sentiment indices for each type of investor. The short-run dynamics among sentiments of the four investor types and their interaction are then examined using vector autoregressive (VAR) models. Finally, we examined the factors that influence sentiment-driven trading behaviour of different types of investors.

This is the first study to examine different types of investor trading behaviour in the Central London office real estate market. It contributes to the existing literature on real estate investor

sentiment in a number of ways. Firstly, it extends the study of investor sentiment from that seen in the US office real estate market by Freybote and Seagraves (2017) to one property market, i.e. the Central London market. Secondly, it addresses a shortcoming of previous studies on REITs and commercial real estate investor sentiment by focusing not only upon institutional investor sentiment, but also other types of investor sentiments such as private real estate investors, listed real estate companies/REITs and overseas investors and how they interact with each other. Different investor types vary in their investment behaviour due to their unique characteristics which affects their investment behaviour. This study has broad implications for regulators and policy-makers in their involvement /intervention in assessing the commercial real estate market and events that would undermine the real estate market. It will also assist investors, developers and practitioners to know what sentiment measures to effectively position themselves to either engage in momentum type strategies or to invest against such sentiment.

The remainder of the paper is structured as follows: literature review on investor sentiment, followed by discussion of the data and methodology. The test results are reported before the conclusions are drawn.

Literature review

The assumptions of traditional financial theory are that investors are fully rational and will make decisions that reflect all available information (De Bondt 1998; Harless and Peterson 1998). However, the financial profession has a long tradition of categorizing investor as either rational and informed or irrational and sentiment-driven. Investor sentiment is conceived of as expectation or judgements that are not fully justified by available information on market fundamentals. Investors who trade on sentiment are categorized as 'noise traders' (Shiller 1989; De Long et al. 1990; Shleifer and Summers 1990). The dynamic interplay between noise traders and rational arbitrageurs establishes prices (e.g. Shiller 1984; Shleifer and Summers 1990). According to this view, in addition to innovations in fundamentals, factors such as the correlated trading activities of noise traders also induce comovements and arbitrage may not fully absorb these correlated demand shocks. Therefore, in addition to being persistent, the effect of noise trading driven by sentiment matters because it is unlikely to be random. Therefore, practitioners spend considerable resources to extract investor sentiment measures in order to gauge levels of pessimism or optimism.

The studies of investor sentiment in real estate markets largely focus on institutional investors in US REITs market (e.g. Zhou and Anderson 2013, Nikolaos et al. 2013; Ro and Gallimore 2014; Viktoriya and Edward 2017) and find that institutional investors exhibit herding behavior. For instance, Viktoriya and Edward (2017) find that although institutional investors tend to follow their own lagged trades, but they are more likely to follow lagged trades of others.

In addition, researchers have found evidence that investor sentiment and capital flows have impact on returns and asset pricing (e.g. Ling and Naranjo 2003 and 2006; Ling et al. 2009; Das et al. 2015; Devos et al. 2013). For instance, Lin et al. (2009) explored the behavioral impact of investor sentiment on US REIT returns and found when investors were optimistic (pessimistic), US REIT returns became higher (lower) and investor sentiment was significant factor in explaining the return generating process. Das et al. (2015) analyzed sentiment-driven institutional trading

behaviour and asset pricing in the US REIT market and found that institutional investors behaved differently in various market situations and institutional real estate investor sentiment introduced a nonfundamental component into US REIT pricing. Freybote (2016) studied real estate sentiment as information for US REIT bond pricing and found sentiment to have a negative effect on US REIT bond yields. The sentiment effect was larger for US REITs that were not included in S&P indices than for S&P REITs.

The literature available to describe investor sentiment in private commercial real estate market also focuses on the impact of investor sentiment on returns and asset pricings in the US market. For example, Clayton et al. (2009) investigated the role of fundamentals and investor sentiment in US commercial real estate valuation. They found evidence that investor sentiment impacts pricing, even after controlling for changes in expected rental growth, equity risk premiums, T-bond yields, and lagged adjustments from long run equilibrium. Ling et al. (2014) examined the relation between investor sentiment and returns in US commercial real estate market. Investor sentiment was measured directly by survey data published by the Real Estate Research Corporation (RERC) and indirectly by the first principal component extracted from eight underlying proxies of investor sentiment in US commercial real estate markets. They found a significantly positive relation between investor sentiment and subsequent private market returns and that private commercial real estate markets were susceptible to prolonged periods of sentiment-driven mispricing.

In the UK commercial real estate market, Ling et al. (2009) studied the relation between capital flows, turnover and returns for the UK private real estate market with VAR methodology and found a strong positive relation between lagged returns and current levels of transaction activity. Although investor sentiment was not directly measured in these studies, capital flows in and out of mutual funds were regarded as one of the proxies for investor sentiment (Frazzini and Lamont 2008). Therefore, the empirical evidence shows that the changes in investor sentiment proxied by capital flows into private real estate market are related to lagged returns, i.e. the past property returns influence investor sentiment.

The foregoing studies focused on institutional investors and neglected other types of active investors. The sentiment–driven trading behaviour of publicly traded REITs, private developers/owners and overseas investors in the commercial real estate market has received less attention than institutional investors' trading behaviour in the real estate literature. It may be simplistic to characterize all investors as engaging in similar behaviour or strategies.

From the body of empirical work in equity markets, foreign investors tended to have different patterns of investment compared with local investors and that the effect was to lower firms' cost of capital (e.g. Kang and Stulz 1997). For example, when looking at the investment styles of different investor categories in Finnish equity markets, Grinblatt and Keloharju (2000) found that local institutions exhibited contrarian investment behaviour, i.e. a tendency to buy past losers and sell past winners. In contrast, foreign institutional investors tended to exhibit momentum trading; that is, buying past winners and selling past losers. Foreign investors who invested in multiple countries and whose performances were likely to be assessed in a global context would evaluate domestic stocks via a global benchmark, while domestic investors would use a local benchmark to

evaluate domestic stocks (Kang et al. 2010). The expectation was that a global investor base generates a lower cost of capital and hence a greater equity value (Stulz 1999).

The studies of foreign investors in equity markets focused on the relative performance of foreign investors to domestic investors. In a systematic review of the research, Chen et al. (2009) identified a range of contrasting and inconsistent empirical findings on the relative performance of local and foreign investors. This inconsistency suggests that the relative performance and pricing ability of local and foreign investors is contingent upon the timescale of investment, the locations of stock listing and the maturity of the local market inter alia. In the commercial real estate market, McAllister and Nanda (2015 and 2016) found that foreign investors impacted on US office real estate prices and that foreign buyers had a positive effect on real estate prices in 28 key European cities. However, these studies did not look at the factors that affect the sentiment and trading pattern of foreign investors in a given market.

Freybote and Seagraves (2017) were the first to study the heterogeneous investor sentiment in the US office market at national level. They divided investors into US institutional investor, US private investors and US REITs and examined whether institutional investors herded in and out of the office market with specialized real estate investors (i.e. US private investors and US REITs). Their study found that changes in US REIT and US private real estate investor sentiment lead to changes in US institutional investor sentiment in US suburban office markets and US office REIT markets, but not in US central business districts' office markets. This study did not take into account overseas investor sentiment.

It is clear from the literature review that herding exists and there is relationship between investor sentiment, trading activity and returns in public and private real estate markets (e.g. Zhou and Anderson 2013; Ro and Gallimore 2014; Viktoriya and Edward 2017; Ling et al. 2014, Ling et al. 2009; Freybote and Seagraves 2017). These studies provide evidence that investors, especially institutional investors are positive-feedback traders

Data and methodology

Data sources and definition

The Central London office transaction data is provided by Property Archive, a property data firm that collects the transactions of the commercial properties with value of £1 million or more across the UK. The data set contains the information of the date the transaction registered with Land Registry office, the name and category of buyer and seller, location, size, etc. The buyers and sellers are categorized as follows:

1. UK institutional investor (e.g. banks, pension funds, insurance companies, asset management with institutional clients).
2. UK publicly listed real estate companies including REITs.
3. UK privately held property companies in developing, operating and investing real estate.
4. Overseas buyer/seller.
5. Corporate occupier.

6. Unidentified or unknown.

As noted, the definition of overseas investor is becoming problematic. Given the growing integration of global investment markets and the growth of private, pooled funds, it has become increasingly difficult to classify investors by nationality. In our data, a purchaser is defined as overseas if the purchaser's source of capital or location does not come from the UK. The overseas investor group consists of institutional investors, private investors, sovereign wealth funds or private pooled funds. Although the group is not homogeneous, it is difficult to further categorize them by nationality and type of investors due to the small sample size in each study period and many different nationalities.

The categories of corporate occupier, unidentified and unknown were omitted from the analysis. The office buildings that were converted to residential buildings, those with incomplete information and the flip sales, i.e. the properties transacted twice or more within 12 months were excluded from analysis. There were 4,473 effective transactions.

Real estate trading activity has been found to be related to property market performance (e.g. Fisher et al. 2009; Ling et al. 2009 and 2014). Stock market returns have been found to affect real estate price changes and institutional investor activities (e.g. Gyourko and Keim 1992; Quan and Titman 1999; Ling and Naranjo 1999; Fisher et al. 2004). Therefore this paper used a number of exogenous variables controlling for macro-economics, capital market and property market fundamentals in the tests: GDP derived from National Office of Statistics; total returns index on FTSE 250 (FTSE 250) and the volatility of stock market return (VOL) measured as the standard deviation of FTSE 250 return index; the impact of capital debt markets by including 10-year UK government bond yield index (BOND), 3-month UK treasury bond yield (TBOND) and term structure defined as the difference in yields between a 10-year UK government bond and 3-month UK treasury bond (TERM). Bonds yields were obtained from Datastream.

Indirect real estate investment may be seen as a substitute of direct real estate investment by real estate investors. The sentiment in the public real estate market may affect the investment in the private real estate market (e.g. Giliberto 1990; Myer and Webb 1993; Das et al. 2015). Therefore, a variable of the FTSE-EPRA UK REIT return index (FTREIT) was included.

The commercial property market fundamentals were controlled through capital value growth rate (CAP), property yield (YIELD) and rental growth rate (RENT) of the London office market provided by CBRE, an international consultancy. Capital value growth is appraisal-based, net of any future known expenditure. Yield is equivalent yield.

In the private real estate market, investor sentiment can be directly measured by survey to capture investor sentiment. For example, Ling et al. (2014) employs survey data published by the Real Estate Research Corporation (RERC) in their study. Indirect measures of investor sentiment uses proxies of investor sentiment. They include: the percentage of properties sold each period from total properties, net commercial mortgage flows as a percentage of GDP or aggregate market liquidity. Baker and Stein (2004) argue that aggregate market liquidity can serve as a sentiment proxy. In a market with short-sale constraints, sentiment-driven investors are more likely to participate when they are optimistic. Therefore, liquidity will likely increase during periods of

investor overconfidence. For example, Ling et al. (2014) use aggregate market liquidity as proxy of investor sentiment in their study.

In the context of this study, we measure investor sentiment based on transaction volume, that is the buy-sell imbalance (BSI) measure in line with Kumar and Lee (2006). This method is employed in Freybote and Seagraves (2017) to measure investor sentiment in commercial real estate market. Investor sentiment is defined as the attitude of investors towards commercial real estate, i.e. either optimism or pessimism. It is measured by current investment conditions perceived by investors, which may be based on market fundamentals, irrationality or a combination of both.

We construct sentiment indices for the four investor types in the Central London office market: UK domestic institutional investor (INS), overseas investor (O), UK private real estate investor/developer (PI) and UK publicly listed real estate company/REIT listed on London Stock Exchange (REIT). Investor sentiment index is measured as quarterly net purchase scaled by quarterly total number of trading volume as expressed in Equation (1):

$$BSI_{ti} = \frac{(B_{ti} - S_{ti})}{(B_{ti} + S_{ti})} \quad (1)$$

Where BSI is buy-sell-imbalance index. B_{ti}(S_{ti}) is the sterling – denominated investment (disinvestment) by *i* investor type in the Central London office market in period (quarter) *t*.

Therefore, BSI > 0 indicates that there is a net demand for office properties in the London office property market. Investors positively perceive the future prospects of the market, implying optimistic investor sentiment. By contrast, BSI < 0 indicates that there is a net supply of office buildings in the market, meaning that investors negatively perceive the future prospects of the office market, implying pessimistic investor sentiment. As each type of investor might perceive the London office market differently, this study separately calculates the investor sentiment index of each investor type: UK institutional investors (BSIINS), overseas investors (BSIO), UK private investors (BSIPI), and UK publicly listed real estate companies/REITs (BSIREIT).

Following the similar studies in this area (e.g. Ling et al. 2009 and 2014; Freybote and Seagraves 2017), Vector Autoregresson (VAR) models are used which are composed of a system of regressions where the dependent variables are expressed as linear functions of their own and each other's lagged value in order to capture the joint dynamics of multiple time series. An unrestricted *p*th-order Gaussian VAR model can be constructed as Equation (2).

$$Y_t = \alpha + \beta_1 \gamma_{t-1} + \beta_2 \gamma_{t-2} + \cdots + \beta_\rho \gamma_{t-\rho} + \beta \chi_t + \epsilon_t \quad (2)$$

Where Y_t is a vector of variable, α is a p x 1 vector of intercepts, Y_{t-p} represents the respective lags, β_1, …, β_p and β are matrices of coefficients with all eigenvalues of β having moduli less than 1 so that the VAR is stationary. χ_t is a vector of exogenous variables and ϵ is a vector of error terms.

In a multivariate VAR framework consisting of changes in sentiments of UK institutional investor (BSIINS), UK private real estate investor (BISPI), UK publicly listed real estate company/REIT (BSIREIT) and overseas investor (BSIO) as endogenous variables, the diagonal coefficients of β represent conditional momentum in sentiments of these different investor types, whereas the off-diagonal coefficients of β represent conditional positive feedback trading (contagious sentiments

of different investor types). The autoregressive lag length selection is based on the Akaoke information criterion (AIC), which has been found to be the most appropriate for small sample size (Liew 2004).

The focus of the test is on the impact of change in one type of investor sentiment on changes in other investor type sentiments. The first difference score for all sentiment variables and other control variables are used in the model. Based on the existing evidence in REITs and US commercial real estate market, we expect that herding exists for certain types of investors in the London office market.

Furthermore, we investigate the relationship between sentiment and property performance. Our empirical analysis addresses two questions: do property market returns predict changes in investor sentiment-driven transaction activity of different investors? Secondly, can changes in sentiment-driven transaction activity of different investors predict the change in property returns? Behavioral theory suggests investors act on noisy information (Welch 1992; Daniel et al. 1998) creating momentum that ultimately pushes prices away from fundamental value over short horizons. Therefore, we expect a positive relation between changes in investor sentiment and subsequent short-run property returns as sentiment-driven demand, accompanied by limits to arbitrage, would drive prices away from their fundamental value. To test the dynamic relationship of the sentiment and property returns, VAR regression model is employed and the changes over prior quarter in *BSI* of the four investor types and property returns are included as endogenous variables in the estimations. Property returns are, rental growth rate (RENT) and yield (YIELD). All variables are change over prior quarter. The VAR model is shown as equation (3).

$$BSI_{j,t} = \alpha + \sum_{i=1}^{T} \beta_i \, BSI_{j,t-i} + \sum_{i=1}^{T} YIELD_{t-i} + \sum Control\ variable_{t-1} + \varepsilon_t \quad (3)$$

Where $BSI_{j,t}$ is change over prior quarter in sentiment index for *j* type of investor at *t* period (in quarter), α is the intercept and ϵ is the error term. $YIELD_t$ is change over prior quarter in property yield in London office property at time *t*.

To control for other potential sources of variation in sentiment-induced transaction activity, we included lagged values of macroeconomic variables as exogenous: 3-month UK treasury bond rate (TBOND), 10-year government bond yield index (BOND), the slope of the interest rate term structure (TERM) defined as the difference between 10-year UK government bond yield and 3-month UK treasury bond yield; total return index on FTSE 250 (FTSE250), stock market volatility measured as the standard deviation of FTSE250 return index (VOL) and UK economic output (GDP). Publicly traded real estate stocks are a substitute for private market real estate investment, therefore, we include total return on FTSE real estate index (FTREIT) as an exogenous variable. All variables are change over the prior quarter and lagged one quarter. All else equal, increases in interest rates, and therefore the cost of capital, are expected to decrease property prices and transaction frequency, at least in the short run. In contrast, increases in economic output are expected to increase the demand for commercial real estate space. This increase in tenant demand should increase property prices, all else equal, and may also lead to increased transaction activity.

Table 1 illustrates the ratio of trading volume among the investor types to total trade volume in the Central London office market. Over the 2000-2016 period, overseas investors (BO) attained the highest trade volume among the investor types, accounting for 54% of all acquisitions of the Central London office buildings on average, followed by UK institutional investors (BINS) and UK publicly listed real estate companies/REITs (BREIT) having 17% of total trade volume respectively. UK private investors (BPI) accounted for 7% on average and UK user-occupier (BCO) for 6%. The patterns of buying frequency are corroborated in IPF research report (2017) on the size of UK commercial property market.

In term of sales, overseas investor (SO) accounted for 31% on average, followed by UK publicly listed real estate company/REIT (SREIT) for 29%, UK institutional investor (SINS) for 27%, UK private investor (SPI) for 7% and UK user-occupier (SCO) for 6%. This information shows the importance of overseas investors in the Central London office market. During the financial crisis period of 2008-2009, UK institutions withdrew capital out of the Central London office market with their selling volume amounting to 50% and 43% of total trade volume respectively. Both UK institutions (SINS) and UK listed firms/ REITs (SREIT) were net sellers and their selling volume exceeded their purchasing volume; whilst the overseas investors (SO) increased their capital flows into the market, which amounted to 48% and 75% of total trade volume and were net buyers in the same periods. The shifts in and out of the market could be attributed to changes in sentiments for the different investor types and entrance/exit market timing, combined with changing risk-aversion.

Clearly, overseas investors were a major source of equity capital in the Central London office market and were actively engaged in buying and selling activities. However, this does not imply that the trade of overseas investors directed the entire Central London office market. Generally, the information held by these investors is less than that of domestic investors (Agarwal et al. 2009) and therefore they may have referred to the investment decisions of the domestic investors. Due to the large trade volume of overseas investors, their trading activity may influence domestic investors who may follow them in the market.

Table 1: Percentage of total buy and sell by investor types in the London office market

	BCO	BINS	BO	BPI	BREIT	SCO	SINS	SO	SPI	SREIT
2000	11%	27%	22%	3%	36%	7%	27%	13%	7%	46%
2001	3%	23%	37%	7%	30%	8%	30%	18%	6%	38%
2002	2%	18%	44%	11%	25%	2%	29%	19%	9%	41%
2003	5%	15%	47%	16%	17%	5%	32%	17%	5%	41%
2004	12%	16%	41%	8%	22%	6%	23%	31%	7%	34%
2005	1%	19%	43%	16%	21%	6%	16%	31%	9%	37%
2006	2%	29%	38%	11%	19%	4%	20%	39%	11%	26%
2007	1%	15%	58%	12%	14%	17%	30%	23%	8%	22%
2008	18%	4%	48%	7%	23%	4%	50%	19%	2%	25%
2009	5%	12%	75%	4%	4%	13%	43%	8%	1%	35%
2010	9%	26%	49%	3%	13%	2%	18%	41%	14%u	26%
2011	4%	23%	52%	5%	15%	2%	31%	44%	8%	15%
2012	8%	11%	68%	3%	10%	6%	26%	38%	5%	25%
2013	2%	9%	71%	4%	14%	1%	16%	52%	14%	18%
2014	3%	15%	72%	3%	6%	8%	16%	52%	7%	17%

2015	2%	13%	72%	7%	6%	6%	15%	44%	6%	30%
2016	6%	8%	73%	5%	9%	3%	35%	39%	5%	17%
Average	6%	17%	54%	7%	17%	6%	27%	31%	7%	29%

Table 2 reports the descriptive statistics of key control variables. The sentiments of overseas investors and UK private investors were more optimistic about the Central London office market. The average sentiment indices of overseas investor (BSIO) and UK private investor (BSIPI) was 0.3 and 0.01, indicating these two types of investors exhibited a buying volume higher than their average selling volume. By contrast, the average sentiment indices of UK institutional investors (BSIINS) and UK listed property companies/ REITs (BSIREIT) were -0.21 and -0.27, respectively, indicating these types of investors sold more than purchased over the study period. The standard deviation for the index of UK private investor sentiment (BSIPI) was noticeably the largest, whilst it was the smallest for UK publicly listed real estate companies/REITs (BSIREIT). Over the study period, the mean of capital growth rate is 1%, rental growth rate is 0.32% and yield is 5.62%.

Table 2: Descriptive statistics of key study variables.

	BSIINS	BSIO	BSIPI	BSIREIT	CAP (%)	Yield(%)	RENT (%)
Mean	-0.21	0.3	0.01	-0.27	1.00	5.62	0.32
Median	-0.16	0.26	0.05	-0.27	1.75	5.40	1.2
Max.	0.63	0.99	1	0.19	8.56	7.23	6.55
Min.	-0.96	-0.33	-0.91	-0.89	-17.06	4.41	-12.28
Std. Dev.	0.38	0.29	0.53	0.26	4.31	0.91	3.54

Figure 1: Changes in sentiment index of the four investor types over Q1 2000-Q1 2017

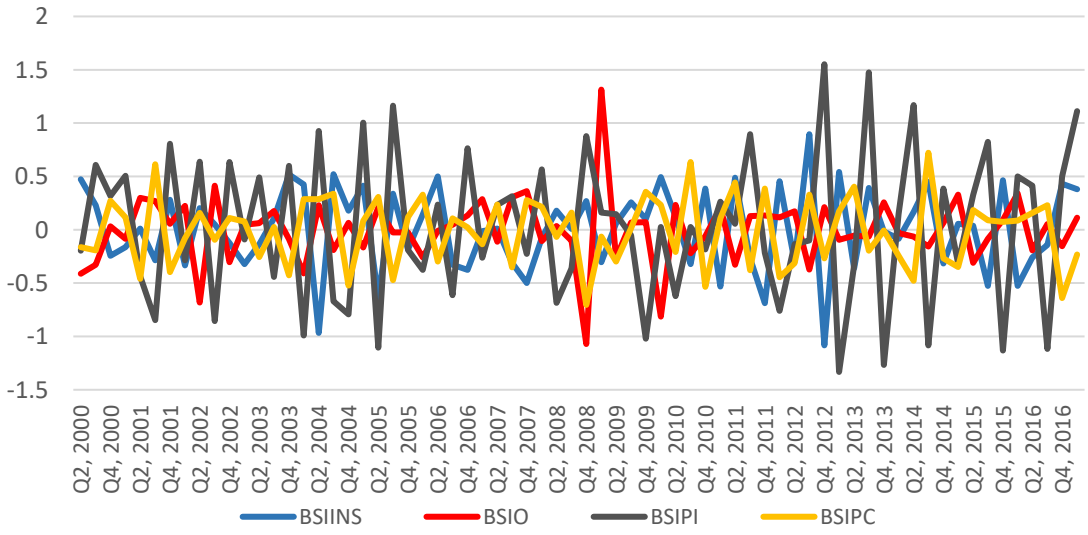

Figure 1 shows the changes over prior quarter in sentiment indices of UK institutional investor (BSIINS), overseas investor (BSIO), UK private investor (BSIPI) and UK publicly listed real estate company/ REIT (BSIREIT) measured by Buy-Sell Imbalance (BSI) following Kumar and Lee (2006). The graph clearly demonstrates that the four types of investor sentiments are different in the Central London office market. The changes in the sentiments of overseas investor and UK private investor were much more volatile than the changes in the sentiments of UK institutional investor and UK listed real estate company/REIT. For example, before the financial crisis, in Q3 and Q4 2007, BSIO was high and increased markedly by 0.31 and 0.36 respectively before falling. In Q4 2008, it fell to -1.07, then picked up quickly.

UK private investor seems to trade against the sentiments of UK institutional investor and UK listed real estate company/ REIT for most of the study periods. For example, in the post–crisis period, the sentiments of UK institutional investor and UK listed real estate company/ REIT were high through increased investment. However, UK private investors acted against this sentiment by decreasing their investment. Most of the UK private investors are property developer and/or manager who identify and purchase the underpriced properties, renovate, reposition and sell them. Therefore, these results raised the question: how do the market fundamentals influence the sentiment-driven trading behaviour of different investors in such a multidirectional way?

Test Results

To address the potential issue of seasonality in data, we used correlogram to check the net transaction volume of each type of investor. No strong regular patterns were observed, therefore, the data was not seasonally adjusted. Table 3 shows the results for the multivariate VAR tests. Panel A reports the change in sentiment of UK institutional investor and its impact on changes in sentiments of other investor types. Panel B reports the change in sentiment of overseas investor and its impact on changes in sentiments of other types of investors. Panel C reports the change in sentiment of UK private investor and its impact on changes in sentiments of other types of investors. Panel D reports the change in sentiment of UK publicly listed real estate company / REIT and its impact on changes in sentiments of other types of investors.

The changes in sentiments of all the four types of investors exhibit significantly negative autocorrelation as presented in Panel A, B, C and D. This suggests that these investors follow their own lagged trades and use their sentiment as source of information. This autocorrelation is less persistent for UK institutional investors as shown in Column 1 and 2 in Panel A than for other types of investors.

In Panel A, the change in UK institutional investor sentiment in the 3rd lag had a significantly negative impact on the change in UK private investor sentiment, indicating that when UK institutional investors increase buying, UK private investors increase their selling in this herding period (i.e. lag three periods). It showed that UK domestic investors differ in their investment strategies. Some UK private real estate investors are specialized property developers/investors and operators whose business strategy is to acquire properties needing redeveloping, renovation, rehabilitation and retenanting and then sell them. The changes in UK institutional investor sentiment signal information about the availability of future buyers for properties owned or

(re)developed by UK private investors. Another explanation could be that as UK institutional investors became more optimistic, they had easier access to capital and financing than UK private developers and investors. The change in UK institutional investor sentiment had no significant impact on changes in the sentiments of overseas investors and UK listed real estate companies/REITs.

Table 3: VAR results for different types of real estate investor sentiments

	ΔBSIINS		ΔBSIO		ΔBSIPI		ΔBSIREIT	
	1	2	3	4	5	6	7	8
Panel A: Institutional investor sentiment								
$\Delta BSIINS_{(t-1)}$	**-0.7**	**(-3.39)*** **	-0.16	(-1.05)	-0.16	(-0.5)	-0.12	(-0.89)
$\Delta BSIINS_{(t-2)}$	-0.37	(-1.37)	-0.27	(-1.31)	-0.36	(-0.89)	0.13	(0.71)
$\Delta BSIINS_{(t-3)}$	-0.15	(-0.52)	-0.14	(-0.63)	**-0.72**	**(-1.65)***	0.03	(0.13)
$\Delta BSIINS_{(t-4)}$	0.08	(0.28)	-0.27	(-1.3)	-0.32	(-0.76)	0.12	(0.64)
$\Delta BSIINS_{(t-5)}$	0.24	(1.09)	-0.1	(-0.60)	-0.16	(-0.49)	-0.08	(-0.52)
Panel B: Overseas investor sentiment								
$\Delta BSIO_{(t-1)}$	0.11	(0.43)	**-0.64**	**(-3.37)*** **	-0.04	(-0.11)	**-0.27**	**(-1.64)***
$\Delta BSIO_{(t-2)}$	0.07	(0.26)	**-0.42**	**(-2.11)** **	-0.39	(-0.96)	-0.07	(-0.38)
$\Delta BSIO_{(t-3)}$	0.33	(1.05)	**-0.4**	**(-1.72)***	-0.75	(-1.58)	-0.06	(-0.28)
$\Delta BSIO_{(t-4)}$	**0.57**	**(1.91)***	**-0.45**	**(-2.03)** **	-0.51	(-1.13)	-0.21	(-1.04)
$\Delta BSIO_{(t-5)}$	0.38	(1.5)	-0.04	(-0.19)	-0.17	(-0.45)	**-0.55**	**(-3.3)*** **
Panel C: Private investor sentiment								
$\Delta BSIPI_{(t-1)}$	**-0.25**	**(-1.87)***	0.04	(0.36)	**-0.73**	**(-3.6)*** **	0.07	(0.78)
$\Delta BSIPI_{(t-2)}$	-0.2	(-1.14)	0.12	(0.94)	**-0.7**	**(-2.61)** **	-0.03	(-0.27)
$\Delta BSIPI_{(t-3)}$	-0.01	(-0.04)	0.09	(0.62)	**-0.54**	**(-1.86)***	-0.1	(-0.82)
$\Delta BSIPI_{(t-4)}$	0.06	(0.37)	0.08	(0.68)	**-0.45**	**(-1.95)***	0.03	(0.32)
$\Delta BSIPI_{(t-5)}$	0.09	(0.76)	0.07	(0.83)	-0.16	(-0.91)	-0.03	(-0.34)
Panel D: Publicly listed real estate company/REIT sentiment								
$\Delta BSIREIT_{(t-1)}$	-0.29	(-1.3)	-0.18	(-1.07)	-0.12	(-0.35)	**-0.4**	**(-2.73)*** **
$\Delta BSIREIT_{(t-2)}$	-0.03	(-0.12)	0.02	(0.08)	**-0.87**	**(-2.17)** **	**-0.33**	**(-1.92)***
$\Delta BSIREIT_{(t-3)}$	0.02	(0.08)	-0.17	(-0.73)	**-1.01**	**(-2.17)** **	-0.2	(-0.98)
$\Delta BSIREIT_{(t-4)}$	0.07	(0.21)	0.05	(0.21)	-0.12	(-0.25)	**-0.51**	**(-2.46)*** **
$\Delta BSIREIT_{(t-5)}$	**0.43**	**(1.68)***	0.09	(0.48)	-0.32	(-0.83)	**-0.42**	**(-2.49)*** **
Adj. R^2	0.23		0.28		0.43		0.5	
AIC	1.02		0.45		1.85		0.19	
F	1.75*		1.96**		2.87***		3.47***	

Notes: *, ** and *** denotes significance at the 10%, 5% and 1%, respectively.

In Panel B, the change in overseas investor sentiment had a positive impact on change in the sentiment of UK institutional investor and the impact was significant in the 4th lag (i.e. four quarters), suggesting that the sentiment of overseas investors influences UK institutional investors. Therefore, the increase (decrease) in overseas investor sentiment in this quarter leads to an increase (decrease) in UK institutional investor sentiment. One explanation is that massive overseas capital inflows into this market could have created an optimistic sentiment in the market. Nevertheless, domestic UK institutional investors perceived a high level of influence from overseas investors who had a high ratio of trading volume, thus prompting UK institutional investors to follow the investment behaviour of the overseas investors.

The change in sentiment of overseas investors had a negative impact on change in UK listed property companies/REITs and significant in the1st and 5th lag, indicating that overseas investors tend to buy/sell office properties that domestic UK listed property companies/REITs sell/buy in the herding periods (quarters). The negative relationship between overseas investors and UK listed real estate companies/REITs is a reflection of the different investment behaviour and market timing of these two investor types. UK publicly listed real estate companies/REITs are likely to be pessimistic during a depressed office market when the property prices fall. Foreign investors exhibit different patterns of investment compared to UK local investors and increase their buying when the property prices are low.

In Panel C, the change in UK private investor sentiment had a significantly negative impact on UK institutional investor sentiment in the 1st lag. This was not surprising, as the change in UK institutional investor sentiment also had a significantly negative impact on the change in UK private investor sentiment but in the 3rd lag as reported in Panel A. The change in UK private investor sentiment had no significant impact on changes in the sentiments of both overseas investors and UK listed real estate companies/REITs.

In Panel D, the change in UK listed real estate company/REIT sentiment had a significantly positive impact on change in UK institutional investor sentiment in the 5th lag, suggesting when UK listed real estate company/REIT increased (decreased) investment, UK institutional investors would increase (decrease) investment, herding in and out of the market with a lag. This might have to do with organizational structures in listed property company/REIT facilitating quicker decisions. UK listed real estate companies/REITs are specialist property investors and can react immediately to signals in the market, whilst a real estate arm in institutions has to go to the multi-asset allocators to argue the case for an allocation to real estate versus the relative merits of other asset types at the time[1].The lagged effect of the UK listed real estate companies/REITs on UK institutional investor sentiment could mean that additional time is required for identification of appropriate properties.

The change in the sentiment of UK listed real estate companies/REITs had a significant negative impact on change in the sentiment of UK private investors in the 2nd and 3rd lag, consistent with the relationship between UK institutional investor sentiment and UK private investor sentiment. This demonstrated that UK private investor sentiment and strategy was different from both UK

[1] Thank one of the anonymous referees for the comment of institutional investor behaviour and helping to explain this phenomenon.

institutional investor and UK listed real estate company/REIT sentiment and strategy. When UK institutional investors and UK listed property companies/REITS were optimistic about the Central London office market and became net buyers, UK private investors (who purchased properties when the market was low) were net sellers. They were trading on contrarian sentiment.In summary, there appeared to be a spillover of sentiment among various investor groups in the Central London office market in different directions. UK private investors followed a contrarian strategy to both UK institutional investors and UK listed real estate companies/REITs who entered/exited the market at different time points. UK institutional investors tended to follow the sentiments of UK listed real estate companies/REITs and overseas investors with some lags. The herding behaviour of UK institutional investors is consistent with the findings of Freybote and Seagraves (2017) about US office real estate market. We didn't find the evidence that overseas investors relied upon the sentiment of UK domestic specialized property investors in their decision-making.

Next we investigate the relationship of sentiment-induced trading activity and property market performance. Table 4 reports the test results of VAR regressions of the factors affecting investment sentiment over the period of Q1 2000 to Q1 2017. The dependent variables are sentiment indices (BSI) of UK institutional investor, overseas investor, UK private investor and UK publicly listed real estate company/REIT. The independent variables are yield (YIELD), rent growth rate (RENT), 3-month UK treasury bond index (TBOND), 10-year UK government bond index (BOND), the slope of interest rate term structure (TERM) measured as the difference in yields between a 10-year UK government bond and 3-month UK treasury bond, FTSE250 total return, volatility of stock market measured as standard deviation of FTSE250 return (VOL), FTSE REIT return (FTREIT) and GDP growth rate (GDP). All variables are change over the prior quarter. -1, 2…n denotes the number of lagged quarters.

Table 4. Results of the relation between different investor group sentiments and market fundamentals (1)

	BSI	YIELD	BSI	YIELD	BSI	YIELD	BSI	YIELD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Institution		Overseas		Private		REIT	
$BSI_{(-1)}$	-0.67***	0.04	-0.55***	0.05	-0.63***	-0.09	-0.59***	-0.04
$BSI_{(-2)}$	-0.4**	-0.09	-0.27*	-0.11	-0.53***	0.02	-0.6***	0.09
$BSI_{(-3)}$	-0.28*	-0.06	-0.3**	0.07	-0.39**	-0.13	-0.46**	0.02
$BSI_{(-4)}$	-0.1	-0.02	-0.32***	0.04	-0.19	0.1	-0.17	-0.09
$YIELD_{(-1)}$	-0.18	1.08***	-0.07	1.2***	0.32	1.18***	0.11	1.08***
$YIELD_{(-2)}$	-0.03	-0.26	0.48*	-0.42*	-0.1	-0.39**	-0.3	-0.14
$YIELD_{(-3)}$	0.39	0.35*	-0.58**	0.47**	-0.42	0.48***	-0.12	0.21
$YIELD_{(-4)}$	-0.18	-0.24*	0.14	-0.32**	0.13	-0.35***	0.35	-0.22*
$TBOND_{(-1)}$	-0.07	0.04	0.02	0.04*	0.01	0.04*	-0.02	0.04*
$BOND_{(-1)}$	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$FT250_{(-1)}$	-0.01**	0.00	0.01*	0.00	0.00	0.00	0.00	0.00
$VOL_{(-1)}$	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00
$FTREIT_{(-1)}$	0.01***	0.00	-0.01**	0.00	0.00	-0.01**	0.00	-0.01*
$TERM_{(-1)}$	0.24*	-0.16**	0.17	-0.14*	-0.05	-0.16**	0.07	-0.15**

$GDP_{(-1)}$	-0.02	-0.1*	0.09	-0.07	0.13	-0.07	-0.04	-0.08
C	0.92	-0.01	0.01	-0.01	0.58	0.1	0.1	0.06
Adj. R^2	0.33	0.95	0.49	0.96	0.26	0.96	0.16	0.96
F-value	3.07	87.43	5.05	91.42	2.49	99.65	1.83	101.71
AIC	0.73	-0.36	0.04	-0.4	0.64	-0.48	1.42	-0.5
SC	1.27	0.18	0.58	0.14	1.18	0.05	1.96	0.03

Note: *, ** and *** stands for significance at the 10%, 5% and 1%, respectively.

First we look at the four BSI estimations: Institution in column 1, Overseas in column 3, Private in column 5 and REIT in column 7. We find that BSI is negatively influenced by BSI in the previous quarters in all four estimations and significant in t-1 to t-3 quarter in the estimations of Institution, Private and REIT and in t-1 to t-4 quarter in Overseas estimation. The autocorrelation is expected and consistent with the findings in table 3, indicating sentiment-driven trading activity predicts subsequent trading activity up to lag of one to four quarters.

The coefficients of prior YIELD are significant in Overseas estimation (column 3), positive in t-2 quarter and negative in t-3 quarter, indicating yield chasing behaviour of overseas investors. However, YIELD has no significant influence on the sentiment of other three types of investors.

The stock market performance measured by FTSE250 return is negatively and significantly related to institutional investor sentiment-driven trading activity, suggesting that institutional investors with multi-asset portfolio allocate the funds to real estate versus the relative merits of other assets performance. When stock market performs well, they will reduce the investment in real estate and move the capital to the outperforming asset type. The coefficients of FTREIT and TERM are positive and significant in Institution estimation. In Overseas estimation, coefficient of FTSE250 is positive and significant. The well performing stock market may indicate the investor confidence, and attract more overseas capital. The coefficient of FTREIT is negative and significant, suggesting overseas investors regard direct real estate investment as a substitute of indirect real estate investment. The negative relation suggests that overseas investors increase investment in direct real estate when listed real estate sector is underperforming. The market fundamental variables have no significant impact on trading activity of private investors and listed real estate companies/REITs.

We now turn to YIELD results estimated simultaneously with investor sentiment index (BSI). We did not find significant impact of prior sentiment-induced trading activity on property yield in all four estimations. The findings do not support the finding by McAllister and Nanda (2016) that foreign investors compressed office real estate yields.

In all four equations, YIELD is significantly influenced by its own growth in previous quarters, which is expected due to the widely documented autocorrelation (i.e. “smoothing”) in appraisal-based return series. The lagged TERM in all four estimations has negative and significant impact on YIELD, suggesting that the higher the interest costs, the lower the property yield. The coefficients of GDP in the four estimations are negative and significant in Instition estimation (in column 2).

Table 5. Results of the relation between different investor group sentiments and market fundamentals (2)

	BSI (1)	RENT (2)	BSI (3)	RENT (4)	BSI (5)	RENT (6)	BSI (7)	RENT (8)
	Institution		Overseas		Private		REIT	
$BSI_{(-1)}$	-0.7***	0.94	-0.6***	0.45	-0.62***	0.16	-0.61***	-0.2
$BSI_{(-2)}$	-0.45***	1.38	-0.38***	-0.74	-0.57***	0.09	-0.6***	0.76
$BSI_{(-3)}$	-0.34**	0.48	-0.22*	-0.53	-0.42***	-1.16	-0.37**	0.38
$BSI_{(-4)}$	-0.1	0.66	-0.35***	0.02	-0.18	-1.56**	-0.15	0.7
$RENT_{(-1)}$	0.00	0.67***	0.00	0.69***	-0.02	0.71***	0.02	0.74***
$RENT_{(-2)}$	0.02	0.19	0.01	0.2	0.00	0.21	0.04	0.09
$RENT_{(-3)}$	-0.02	-0.31*	-0.02	-0.3*	0.01	-0.32**	-0.05	-0.23
$RENT_{(-4)}$	-0.03	0.23*	0.03*	0.17	0.02	0.15	-0.01	0.14
$TBOND_{(-1)}$	-0.05	-0.26	0.02	-0.39	0.02	-0.25	-0.01	-0.34
$BOND_{(-1)}$	0.00	-0.02	0.00	-0.03	0.00	-0.01	0.00	-0.02
$FT250_{(-1)}$	-0.01**	0.01***	0.01**	0.01***	0.00	0.01***	0.00	0.01***
$VOL_{(-1)}$	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00
$FTREIT_{(-1)}$	0.01***	0.00	-0.01***	0.00	0.00	0.00	0.00	0.00
$TERM_{(-1)}$	0.25*	-1.04	0.13	-0.89	-0.11	-0.88	0.1	-0.87
$GDP_{(-1)}$	-0.02	0.67	0.07	0.69	0.09	0.54	-0.03	0.83*
C	0.51	2.62	-0.2	4.83	-0.17	2.49	0.17	3.6
Adj. R^2	0.38	0.75	0.47	0.74	0.23	0.77	0.19	0.75
F-value	3.54	13.75	4.67	13.22	2.26	15.09	2	13.68
AIC	0.66	4.12	0.09	4.15	0.68	4.04	1.39	4.12
SC	1.2	4.66	0.62	4.69	1.22	4.58	1.93	4.66

Note: *, ** and *** stands for significance at the 10%, 5% and 1%, respectively.

We reran the tests and replaced YIELD by rental growth rate (RENT). The results are reported in table 5. The coefficient of prior RENT is positive and significant in t-4 quarter in Overseas estimation (column 3), but insignificant in other three equations, indicating that the higher rental growth rate will attract more overseas capital. The relation of BSI and market fundamentals in all the estimations is by and large the same as in table 4.

We now look at RENT equations estimated simultaneously with investor sentiment index (BSI) for the four types of investors.

RENT was negatively and significantly influenced by prior BIS in t-4 quarter in Private estimation (column 6), but it is not significant in other three estimations, implying that private investors tend to buy the properties with negative rental growth rate. After renovation and refurbishment, they retenant and sell them for profit.

As expected, the coefficient of prior RENT is significant in many quarters in all four equations. For example, the coefficient in t-1 quarter is positive and significant in all the four equations. The coefficients of RENT in t-3 quarter are negative and significant in the estimations of Institution, Overseas and Private (column, 2, 4 and 6), but insignificant in the REIT equation (column 8). It is also positive and significant in t-4 in Institution estimation (column 2). The stock return measured

by FTSE250 is positively and significantly related to rental growth rate in the four estimations. The coefficient of lagged GDP is positive and significant only in REIT estimation (column 8). All other market fundamentals have no significant impact on rental growth rate.

We also ran the same tests with the spot exchange rates of Euro to sterling and US dollar to sterling included, but neither of them was significant. The test results are not reported here.

Conclusions

This study investigated the sentiments of four types of investors in the London office market, their interaction and the factors that affected the sentiment-driven trading behaviour of each of the four types of investors using quarterly transaction data from Q1 2000 to Q1 2017. It provided evidence that different investors behaved differently in the Central London office market. UK private investors herded against the sentiment of both UK institutional investors and UK publicly listed real estate companies /REITs. UK institutional investors relied upon not only specialized UK listed real estate companies/REITs as a trigger for their decision making, but they also responded to overseas investor sentiment, herding in the market with them. The paper did not find evidence that overseas investors relied on UK investor's sentiment in their decision-making.

Furthermore, the empirical study found evidence that various investor groups' sentiments were affected differently by property returns. For example, office property yield and rental growth rate significantly influenced the trading activity of overseas investors, but not the other investor groups. Overseas investor's trading activity was also influenced by the stock market performance and securitized real estate performance.

UK institutional investor's trading activity was influenced by the performance of stock market and securitized real estate, but in the opposite direction to overseas investor's sentiment, showing different investment strategies. UK institutional investors with multi-asset portfolio allocate the capital to real estate versus the performance of other asset types; whilst overseas investors use the stock market performance as confidence barometer and securitized real estate investment as substitute of direct real estate investment.

The market fundamentals had no significant impact on the trading activity of UK private investors and listed real estate companies/REITs. We did not find the evidence that transaction activities would compress the property yield.

This paper extends and complements previous research on the sentiment-driven trading behaviour of different investor types in the direct commercial real estate market. The empirical analysis shows that the sentiments of various investors in the Central London office market differ and are driven by different factors. The results suggest that disaggregated sentiment measures are more appropriate to capture the diversity of investor sentiment. The results show there are various factors that influence sentiment of different types of investors. The findings highlight the importance of how different investors formulate their investment decisions and strategy, including an identification of the information sources and the triggers used in decision making. However, the

small sample size does not allow an analysis of the degree of reliance placed on sentiment during times of rapid falls or increases in property values.

A number of studies have shown that real estate fundamentals (i.e. capital growth, rental growth and yield) are not sufficient to explain the comovement of asset returns (e.g. Barberis et al. 2005; Pindyck and Rotemberg 1993; Schiller 1989). Investor sentiment has been identified as an additional driver of comovement of assets that either from a category or are in the habitat of a particular investor type (Barberis et al. 2005). Therefore, understanding sentiment-driven buying and selling activity as well as analysing which sentiment indicators and whose sentiment matters will have great practical application to investors, developers and practitioners. It will assist them to know which sentiment measures to observe so they can effectively position themselves in the real estate market. This is the first study of sentiment-driven trading activity in the UK commercial property market. Its outcomes will have a broad international implication as the UK commercial property market is dynamic and attractive to various types of investors. The paper's outcome will extend global knowledge in this area.

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