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Learning or Partnering? An Investigation of Foreign Real Estate Investment Strategies

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Learning or Partnering? An Investigation of Foreign Real Estate Investment Strategies

INTRODUCTION

In 2021, the IPF Research Programme created a grants scheme to provide financial assistance to new or recent entrants to the property industry, including graduate students and junior practitioners, to encourage real estate investment research. While no specific themes were proposed, prospective applicants were encouraged to examine issues that would advance the real estate investment industry's understanding of and implications for asset pricing, risk-adjusted performance and investment strategy.

An evaluation of proposals received by the 30 September 2021 deadline resulted in four submissions being selected as recipients of awards, subject to delivery of final papers by 31 March 2022, with limited supervision of each study provided by a sub-committee of the IPF Research Steering Group during the intervening period.

Three applicants successfully met the requirements of the scheme, covering a diverse range of topics comprising an investigation of foreign real estate investment strategies, an examination of the risks to Indian commercial office portfolios during COVID-19 and the determinants of UK self-storage rents.

Each paper is available to download from the IPF website and we hope you find them interesting reading.

The following paper is that written by Professor Anupam Nanda, *University of Manchester*, and Dr Fangchen (Melanie) Zhang, *Northumbria University*.

Simon Marx

*Chair IPF Research Steering Group
May 2022*

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Learning or Partnering? An Investigation of Foreign Real Estate Investment Strategies

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[This study is sponsored by the Investment Property Forum.]

SUMMARY

This study examines international real estate investors' strategy choices and highlights the implications for the commercial real estate (CRE) market. The empirical work adopts a network framework to quantify the market connections and influences of the investors, to address foreign investors' incentives to choose strategic partnerships and strengthen the bargaining power in the host market. We show network patterns and the findings indicate that as the UK market becomes a leading CRE market globally, the number of international investors and the fund asset volume significantly increases. More importantly, an increasing number of international investors (especially fund managers) become the core nodes in the network which will have impacts on the transaction process in the market.

1. INTRODUCTION

International capital flow has been reshaping the CRE market over last few decades. Besides the leading institutional investors with global asset portfolios, an increasing number of investors from emerging markets have been proactive in recent decades as part of the cross-border real estate investment¹. Typically, foreign investors with diversified home-market and capital backgrounds contribute to higher transaction volumes, improve market transparency and influence the local-embedded nature of the CRE market. However, the exploration process of the local market by foreign investors is not straightforward due to unfamiliarity with local market dynamics and practices. In order to improve the coverage of market information and strengthen the bargaining power of the market entrants in an opaque host market, the market entrants need to use their accumulated experience, information networks, and partnering choices strategically (Holsapple, Ozawa, and Oliyenk, 2006; Zhang, 2020).

Existing studies have investigated asset searching and negotiation strategies of non-local investors, for example, broker's representation (Elder, Zumpano and Baryla, 2000; Devaney and Scofield, 2013) or the accumulated local experience from past deals (Chinloy, Hardin and Wu, 2013; Agarwal, Sing and Wang, 2018). However, the mixed findings from these studies raise further questions about the

¹ For example, see RCA (2019) for the global CRE capital trends. <https://www.rcanalytics.com/gct-2018-year-overview/>

interpretation of market experience and the role of participants' market connections. The real estate transactions rely on the information circulation and market influence of the participants, which can drive formation of networks and sub-networks. Hence, a new method that can quantify the market connections of participants is required.

On the other hand, foreign investors can form strategic alliances, whether in joint venture partnership or participating in a fund with professional management, to strengthen their position as non-local investors.² The information from wider market connection and reputation established in the local market could be a crucial advantage that influence bargaining power. Therefore, it is worth investigating how the collaboration strategies and local advantages of the investors can be brought together, and how the market power is distributed among the institutional investors. In particular, this study investigates the following research questions:

- How are the investment networks formed via the real estate fund management?
- To what extent do international investors (especially those who lack local market exposure) join fund networks and establish their local advantages?

In order to quantify the systemic importance of individual market participants and the power distribution, we introduce a novel measurement of network centralities (see Methodology section for an illustration), in which the investment market is modelled as a transaction network. The improved measurements of investors' market connections and power distribution will shed light on the investment strategy design of international investors. Moreover, the network analysis method can be used as an effective monitoring tool for tracking the CRE market's performance and provides a visualisation of market dynamics. While international capital flows have made a significant contribution to the CRE market and more international investors act as key traders, the turmoil from specific systemic important counterparties can affect the CRE market stability, which can then spread to broader financial market system via the channels of markets and investors' global asset allocation. Therefore, understanding the market counterparties with heterogeneous backgrounds has implications for both individual participants and policy-makers in the capital market.

Our network analysis reveals important contributions of the international investors among the CRE fund in the UK and continental Europe. Although non-local investors are indirectly involved in real estate investment and act as a source of funding, the network pattern evolution shows international investors becoming more diversified. More fund managers from the emerging markets become crucial channels of bringing the international investors from their home countries into the UK CRE market. Their diversified needs contribute to market transaction activities and affect liquidity. Meanwhile, despite the shocks from 2016 Brexit referendum and global pandemic, the fund networks among the UK-target funds and the Europe-target funds remain resilient with substantial new funds established.

The rest of this document presents a literature review with theoretical background and description of concepts, followed by presentation of methodology and data. We then present the results around network visualisation and analysis.

² Studies in international business and strategic management discuss the collaborative decision-making with resource-base, agency and real option theories. See Surdu and Mellahi (2016) for a review.

2. BRIEF LITERATURE REVIEW

2.1. Local Advantage and Market Experience

Investors outside the host market, whether foreign or out-of-state investors located far from the host market and new entrants are generally assumed to have fewer bargaining advantages compared to domestic players. Adapting the definition from Zaheer (1995), the liability of *foreignness* covers three non-exclusive aspects, such as: the costs associated with spatial distance, the firm-specific costs that occurred as a result of the unfamiliarity with the local environment, and the costs or biases resulting from the host market and home market environments. Many studies focus on the information aspect, which states that when host market information is asymmetric, a remote distance will result in a higher search cost (Lambson et al., 2004; Ling et al., 2018). Moreover, the specific investment incentives of nonlocal investors or the *anchoring effect* may explain the price premium paid by the non-local group (Benjamin et al., 2008; Devaney and Scofield, 2017; Holmes and Xie, 2018).

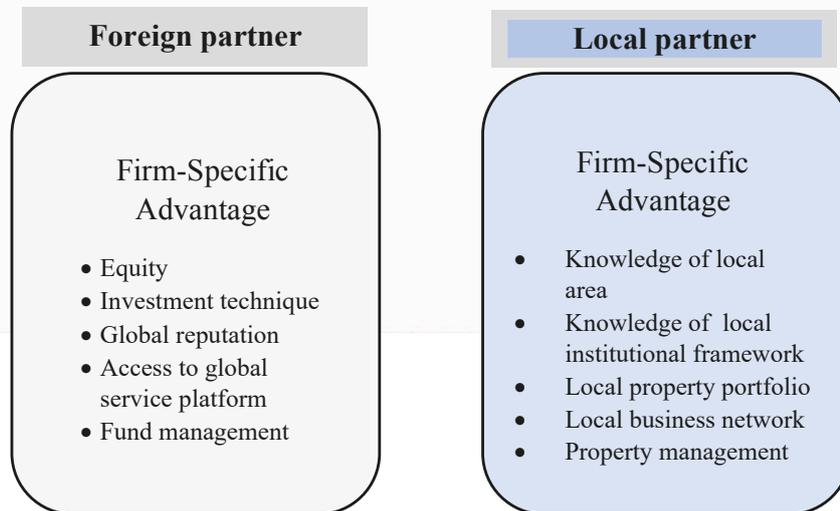
Nevertheless, market activity in the long term allows non-local investors to accumulate market experience to address any market information asymmetry and compensate for any bargaining disadvantages. This idea has also been examined in studies on international business strategies (Belderbos et al., 2011; Li et al., 2015). Therefore, studies have typically used the number of past deals that investors have conducted as a proxy for market experience (Lambson et al., 2004; Chinloy et al., 2013), but the evidence is mixed. Agarwal et al. (2018) use the accumulated number of purchases (Regular Learning Effect, RLE) and the acquisition number weighted by the time distance from the past acquisition to the current one (Weighted Learning Effect, WLE). They find the experiences from previous acquisitions help improve the information access of foreign investors; a 1% improvement in the market experience reduces pricing bias by 0.07% compared to the pricing bias of first-time buyers. Instead of gaining direct pricing benefit, Freybote and Gibler (2011) find that better market knowledge helps managers gain the trust of investors, which keeps business relations stable.

Thus, both local resource access and market experience help improve the bargaining power of the new-entry buyers. Agarwal et al. (2018) has shown that buyers can narrow the gap of unfamiliarity with the local market by accumulating business experience.

2.2. Strategic Alliance

A strategic alliance provides a *shortcut* for new investors to acquire resources or information in a host market. Both corporate finance and international business strategy studies shed light on this approach. Transaction cost, agency, resource-based, and institutional theories illustrate the motivation of strategic alliances (Hoskisson et al., 2000; Wright et al., 2005; Beamish and Lupton, 2009). These theories highlight the benefits of strategic alliances as sharing investment risks or costs, integrating complementary resources, and developing local-specific and firm-specific advantages.

Figure 1 Drivers of Forming Alliance in Real Estate Investment



See chapter 1 in Verbeke (2013) for detailed discussion on firm-specific advantage from an international business perspective.

Figure 1 illustrates the opportunities arising from the collaboration between foreign and host market investment partners using Verbeke's 7-concept model foundation (Verbeke, 2013). Local real estate investors are generally assumed to have an advantage in understanding and accessing investment opportunities in the local market, which means they will have more extensive investment choices in target locations. Also, investors that are well-established in a local market have better connections to local business networks and will have accumulated a better reputation and recognition in the market. In essence, these are location-bounded firm-specific-advantages (FSA) sought by foreign firms. The non-location-bounded FSA for a foreign investor might include, but is not restricted to, capital advantages. For a local partner that seeks global networking resources, foreign investors may provide advanced investment techniques (in market-timing or portfolio construction), access to networks in the global or home market, and an international reputation. The stability of the alliance relies on accessing market information and coordination of each partner's incentives. In a market with higher uncertainties, foreign investors may choose to ally with a local partner to access local investment opportunities and benefit from their network and reputation. In contrast, if the local market has lower costs for foreign investors accessing investment opportunities, they may not have strong preferences for partnering with local investors.

However, varying interests of partners within an alliance may trigger agency costs between the investment stakeholders. The incumbent partners may be concerned about the *free-riding* incentives of their collaborators or the collaborators' becoming competitors after acquiring their local or firm-specific advantages. The collaboration results in a fragile alliance (Inkpen and Beamish, 1997; Anderson and Jap, 2005; Nakamura, 2005). A strand of studies evaluates the impacts of agency costs and moral hazards. Cavagnaro et al. (2016) argue that though a limited partner is equipped with limited

control, institutional investors in a limited partnership can also select their general partners to protect their rights. If investors are sophisticated enough to anticipate the self-interest incentive of the manager or partner, they would consider the agency/information costs at the initial decision stage, which is consistent with the findings of Gallimore et al. (2006) that many projects are rejected at the initial stage.

Meanwhile, studies have also investigated the influence of REITs with different ownership and managerial structures on the asset-level difference. Pagliari (2015) adopts the real options theory³ to illustrate agency costs between the general partner and limited partner and the impact on the manager's tenant selections. Brockman et al. (2014) identify the performance gap of REIT portfolio cap rates based on pre- and post-1992 samples, as well as the impact of institutional ownership in REITs. Sun (2010) identifies the advantage of having an external manager for monitoring. The theoretical model suggests that REIT shareholders gain a monitoring advantage from the external structure if the monitoring power gap is large enough for an internal or external advisor.

Despite the findings from the established markets, most REITs in Asian markets adopt an external management structure and maintain close relations with their sponsors (usually as property development firms). Moss and Prima (2014) and Downs et al. (2016) show that developer-sponsors actually help S-REITs improve their performance. From the perspective of reducing information asymmetry, Cashman et al. (2014) also conclude that external advisors are a value-added factor for REITs that make international investments in markets with strong economic and legal asymmetries. However, Lecomte and Ooi (2013) find no significant relationship between the quality of corporate governance and corporate performance among externally managed S-REITs.

In general, collaborating with an informed partner expands access to the market. The principal–agency theory implies that agency costs can occur in this cooperation, as moral hazard arises with the managerial group taking advantage of project and market information asymmetry. Foreign investors, especially new entrants to the host market, could counteract any adverse selection by keeping full ownership of their investment. However, by offering the managerial group equity ownership, the managerial group's overinvestment incentive can be restrained. This implies that the choice of strategic alliance forms is not independent of one's bargaining power. Therefore, in the following section, we show the formation of networks and characterise their patterns.

3. EMPIRICAL ANALYSIS

3.1. Network Centrality Measurements⁴

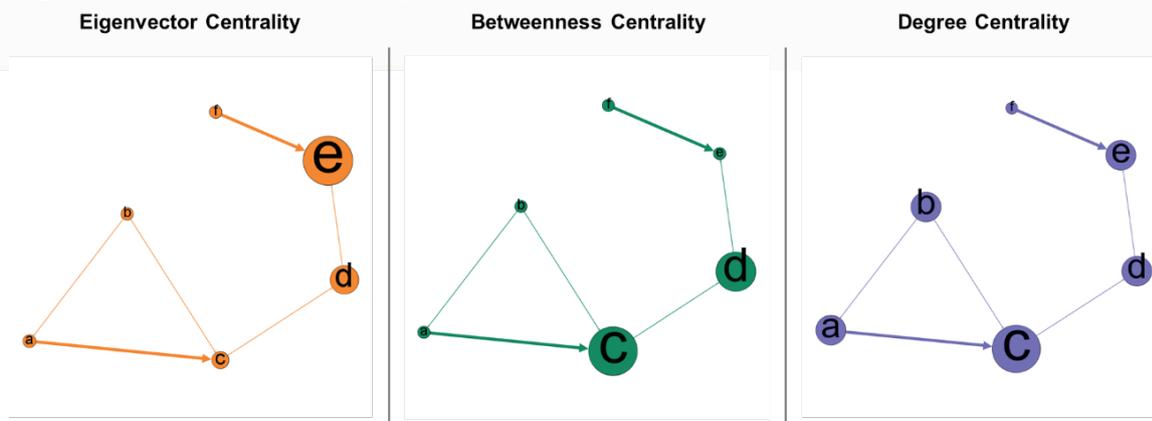
The network modelling is used to construct a dual-level model with the connections at the investors' and brokers' levels. Aside from the investor's experience, counted by past deals (*degree centrality*), the

³ The real options theory addresses uncertainty – i.e. risks involved and more importantly, on the implications of the risks. Investment decision in real assets can be viewed as an option i.e. one can exercise the option to invest now. Or, the investor can wait for more information and exercise the option later. However, if the investment cannot be reversed with a fixed cost, it can be viewed as the opportunity cost of investing now rather than waiting, which can be significant. The value of the option to invest or wait is directly related to uncertainty. The value of the option is critical as it can affect the overall value of the investment. There will be greater need for options to be evaluated if the uncertainty level is high.

⁴ This study follows the network centrality definitions in Jackson (2010; Ch.2.2.4).

network analysis introduces other proxies. For example, *betweenness centrality* measures the systemic importance of the counterparties by the time the participants are the crucial conduit in terms of transacting the assets (i.e., the node standing at the shortest paths connecting other nodes). *Eigenvector centrality* measures the importance of the participants by the importance of their transaction counterparties. A simplified graphic illustration of the different centrality measurements is shown in Figure 2, where the participants d and e are shown as more important nodes in the networks, even though both nodes are involved in the same number of deals as b.

Figure 2 Illustrated Centrality Measurement



* The network demonstrates the different centrality measurements. The five nodes stand for the transaction counterparties, and the directed edges represents the transaction direction and volume. Sizes of the node reflect the centrality levels with different criteria.

According to Jackson (2010), centrality captures a node's (or, a group of nodes) position in a network. The crucial position in a network can be defined in many ways depending on specific node characteristics. We show degree centrality, betweenness, and eigenvector centrality for comparison.

Degree centrality is a measure of how many connections one node has with other nodes, or how many transactions (or, how much transaction volume) one investor has been involved with during a period. In a directed network, degree centrality specifies the in-degree level (edge pointing-in) for acquiring assets and the out-degree level (edge reaching-out) for disposing of assets. A higher value implies that a node is linked with more counterpart nodes. In our empirical work, *degree centralities* are calculated for the foreign and UK investor groups to show how average (as measured by mean) they are and how different (as measured by standard deviation) they are from each other.

Betweenness is the proportion of the shortest route number that a node stands in between any two other nodes on all the routes in the network. When an investor stands in more number of shortest routes in the transaction network, it potentially helps the circulation of capital and asset turnover among market participants, i.e., fixing the structure hole (Burt, 2000) in the network. We compute the average *betweenness* of foreign and UK investors. If the average *betweenness* figure for foreign investor groups is higher, it would indicate that the foreign group acts as the *conduits* to allow more investors to keep the connections in the network, even if their direct connections (measured by the degree of centrality) remain limited.

Moreover, *eigenvector centrality* considers the position of a node by the centralities of its neighbours. Nodes are identified as crucial in the network if the linking nodes have high centralities. Under this measurement, the centrality of investors does not necessarily depend on the number or weight of their links, but on the influence of their transaction counterparties in the network. Real estate has a low trading frequency and a wide range of different types of assets. This makes it hard for investors to connect with each other because they have limited information and different types of assets. If an investor deals with several influential counterparties in the market (hence having high eigenvector centrality) in a given period, it is assumed to be a trustful counterparty by the other influential participants in the network. Table 1 below provides formula for the network structure indicators.

Table 1 Network Structure Indicators

Variable	Expression
	<i>(Market average of) Node Centralities</i>
Weighted in-degree centrality for <ul style="list-style-type: none"> All investor Foreign investor 	$K_{in} = \frac{\sum_{i=1}^n k_{in}(i)}{N}$ <p>k_{in} for the transaction volume (in £ million) between counterparties (the weighted edges). N for the number of counterparties (or foreign counterparties).</p>
Betweenness for <ul style="list-style-type: none"> All investor Foreign investor 	$B_{twn}(v) = \sum_{s \neq v \neq t} \frac{\rho_{s,t}(v)}{\rho_{s,t}}$ <p>v, s, and t stand for any of the three different nodes in graph G, and ρ stands for the number of shortest paths that between two of the nodes.</p>
Eigenvector Centrality <ul style="list-style-type: none"> All investor Foreign investor 	$x_v = \frac{1}{\lambda} \sum_{t \in M(v)} x_t = \frac{1}{\lambda} \sum_{t \in G} a_{v,t} x_t$
<u>Network Assortativities on</u> <ul style="list-style-type: none"> Degree Nationality Capital Group 	<p><i>Assor (and equivalent)</i></p> $= \begin{cases} \frac{1}{2N} \sum \left(A_{ij} - \frac{k_i k_j}{2N} \right) \delta(x_i x_j) & \text{if } x \text{ is discrete variable (Nationality, capital group)} \\ \frac{1}{2N} \sum \left(A_{ij} - \frac{k_i k_j}{2N} \right) x_i x_j & \text{if } x \text{ is continuous variable (degree)} \end{cases}$ <p>A_{ij} is the adjacency matrix of the network. x stands for the attributes of the nodes to be tested. When x is a discrete variable for the nodes i and j, the parameter $\delta(x_i x_j)$ is a Kronecker delta function that equals to 1 if the attributes of i and j are the same, otherwise it equals 0. When x is a continuous variable, the function calculates the production of x_i and x_j.</p>

The table lists the market network indicators adopted in the empirical study. While centrality is a proxy for individual nodes, the derivation produces the average centrality and standard error for the UK and foreign group and all investors. Both centralities and assortativity coefficients are derived with *Gephi*.

3.2 Data description

We use the investor panel of funds and the respective fund managers from Preqin Pro to build up the networks of investment engagement between market participants. We focus on the funds that target the European market (including the UK) from a selection of commercial real estate investors and investment managers. The investor-manager connections are proxied by the respective funds each investor contributes with capital. The sample for empirical work includes 1025 investors and 173 investment managers from 584 real estate funds. A total of 2961 investor-manager connections is identified. The vintage year of the funds included ranges from 1969 to 2021, which allows us to observe the strategy changes of the investors and the funds over a considerably long time span.

The connections between the investors and investment managers forms once a fund is established. In the meantime, we review the focus and style change caused by the new fund establishment in a different time period. We compare the funds that include the UK as part of the target market (UK-focus hereafter) to the funds that target the European countries (non-UK-focus hereafter).

Figure 3 exhibits the breakdown of the funds that were newly established in the time window. A high number of funds that target the European market has been established since 2000, and the average size of the assets under management has been increasing gradually. Core funds, together with value-added and opportunistic funds, dominate in number, but the average fund size is comparatively smaller in the UK compared with the non-UK ones. The UK market remains the key investment destination in Europe even after 2016, as over half of the new real estate funds have included the UK as their target market. However, this does not necessarily imply execution within the UK. Meanwhile, there are more new funds that target the UK markets in the debt fund, core-plus and value-add sectors, which reflects the changing investment motivations after the 2016 Brexit referendum. It also reflects the maturity of the alternative lending market, and most likely other trends too, which diverged from continental Europe. The average size of the UK-focused funds is smaller than the non-UK-focused funds, that may include multi-country funds. The difference between these two groups expands after Brexit, and the individual size differences within the groups (shown by the standard error) increase.

Figure 4 shows the distribution of the fund managers. The number of fund managers in the UK-focus and non-UK-focus funds is comparatively balanced, but the size changes of fund managers' average AuM show opposite directions. Fund manager composition shows various nationality backgrounds. The US and UK fund managers have dominated the fund management sector, while more fund managers from Asian countries are also taking management roles in the host market. Their participation is even more significant after 2016. The activity of a more diversified group is particularly important to the UK market. While European investors and funds have changed their strategies after the Brexit, more investors from Asia and other emerging countries have proactively started engaging with the UK market, partly driven by their long-term strategic decisions. Fund managers serve as the conduit for raising capital from investors and, according to the network pattern (Section 3.3), they seem to accomplish this most likely from the same country.

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A similar pattern is found among the fund investors. A significant proportion of investors still considers the UK as part of their target markets, though the size of assets under management is comparatively smaller. In the past, most fund investors who wanted to invest in the UK and Europe came from the western countries. However, in recent years, more Asian fund investors have shown interests. This echoes the fund manager participation and the long-term investment strategies of Asian and emerging market investors. In terms of the investor type, institutions such as pension funds and insurance companies are the dominant investors who participate in real estate investment indirectly via funds. There is no significant difference between the funds' targets in the UK or continental Europe.

Figure 3: Fund Breakdown



Figure 4: Fund Manager Breakdown

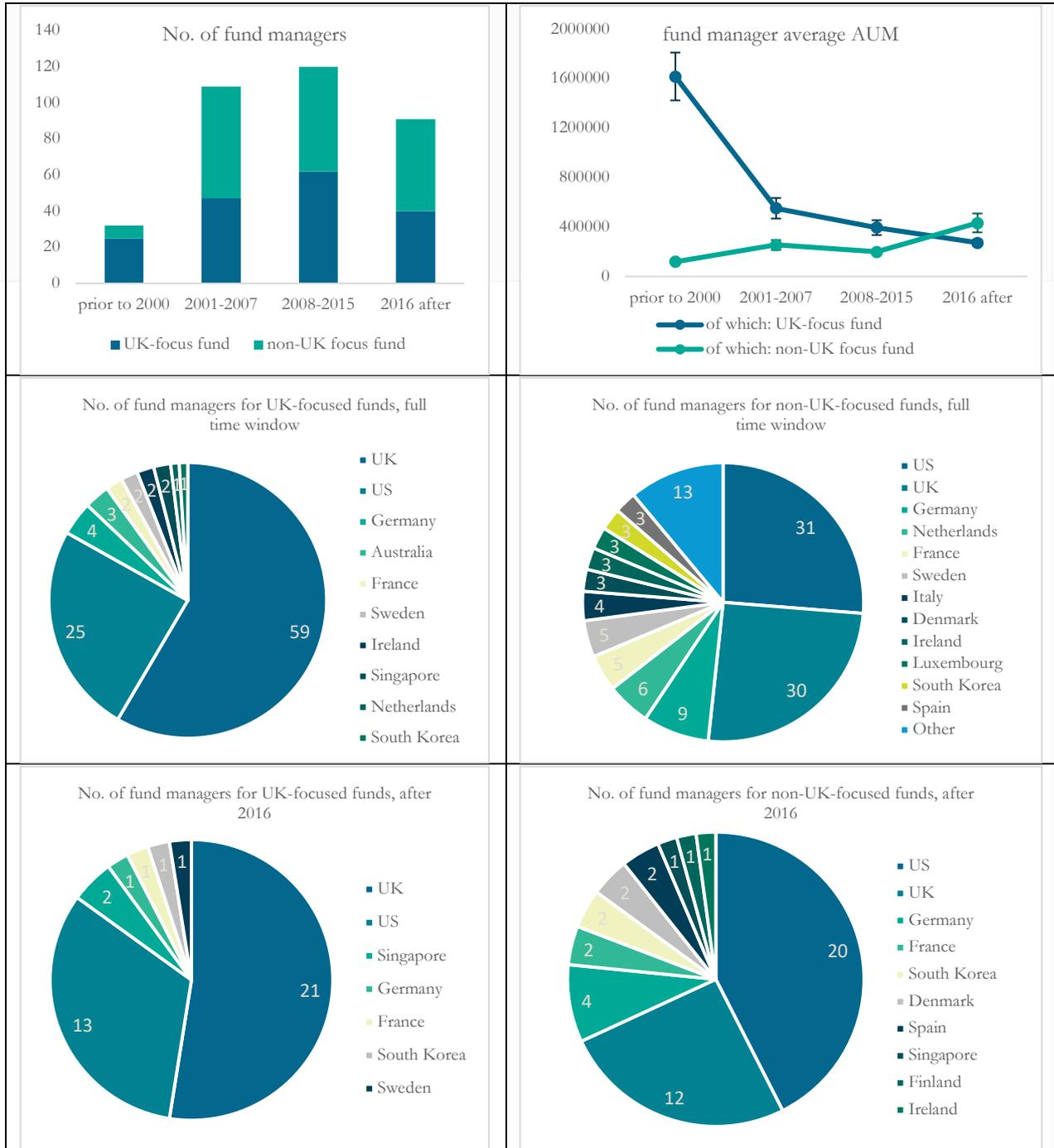


Table 2: Investor Breakdown By Investor Type

Investor Type	UK-focus fund	Investor Type	non-UK focus fund
Public Pension Fund	177	Public Pension Fund	160
Private Sector Pension Fund	161	Private Sector Pension Fund	162
Foundation	77	Foundation	85
Insurance Company	53	Insurance Company	66
Endowment Plan	66	Endowment Plan	47
Asset Manager	37	Asset Manager	34
Fund Manager	13	Fund Manager	19
Superannuation Scheme	13	Superannuation Scheme	14
Bank	10	Bank	14
Real Estate FoF Manager	11	Real Estate FoF Manager	12
Sovereign Wealth Fund	12	Sovereign Wealth Fund	9
Government Agency	6	Government Agency	10
Corporate Investor	9	Corporate Investor	6
Family Office	9	Family Office	6
Other	28	Other	19

after 2016

Investor Type	UK-focus fund	Investor Type	non-UK focus fund
Public Pension Fund	67	Public Pension Fund	74
Private Sector Pension Fund	29	Private Sector Pension Fund	29
Insurance Company	13	Insurance Company	19
Foundation	12	Foundation	11
Endowment Plan	9	Asset Manager	7
Asset Manager	5	Endowment Plan	5
Sovereign Wealth Fund	4	Government Agency	4
Corporate Investor	2	Real Estate FoF Manager	4
Family Office	2	Sovereign Wealth Fund	4
Government Agency	1	Real Estate Firm (Investor)	2
Real Estate FoF Manager	1	Bank	1
Investment Bank	1	Corporate Investor	1
Fund Manager	1	Investment Bank	1
Investment Trust	1	Other	1
Private Equity Firm (Investor)	1		
Superannuation Scheme	1		

3.3 Network Structure

As the CRE market has been experiencing significant fluctuations over the last two decades, driven by market and regulatory changes, we look at four different time periods to capture the evolution. First, we look at the market scenario prior to 2000, a time period marked by reasonably stable conditions for a number of years. Second, we consider 2001–2007, which saw a major uptick in international capital movement due to a significant run-up in market activity in both residential and commercial real estate. Third, we examine the aftermath of the Global Financial Crisis, i.e., 2008–2015. And finally, we consider the years 2016–2021, which have been marked by Brexit and initial period of the COVID-19 pandemic.

3.3.1 The Aggregated Fund Network Formation

Figure 5: Funds targeting Europe (incl. UK); Aggregated Data

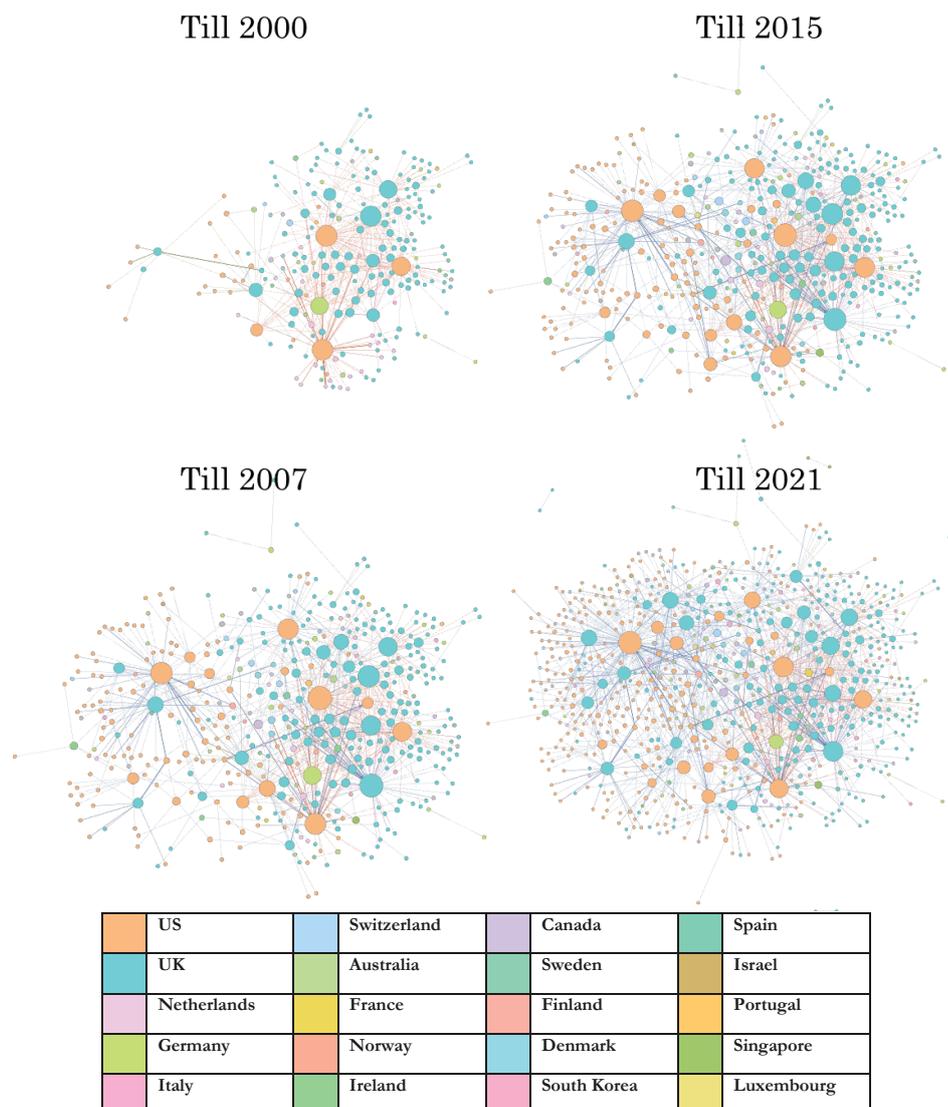
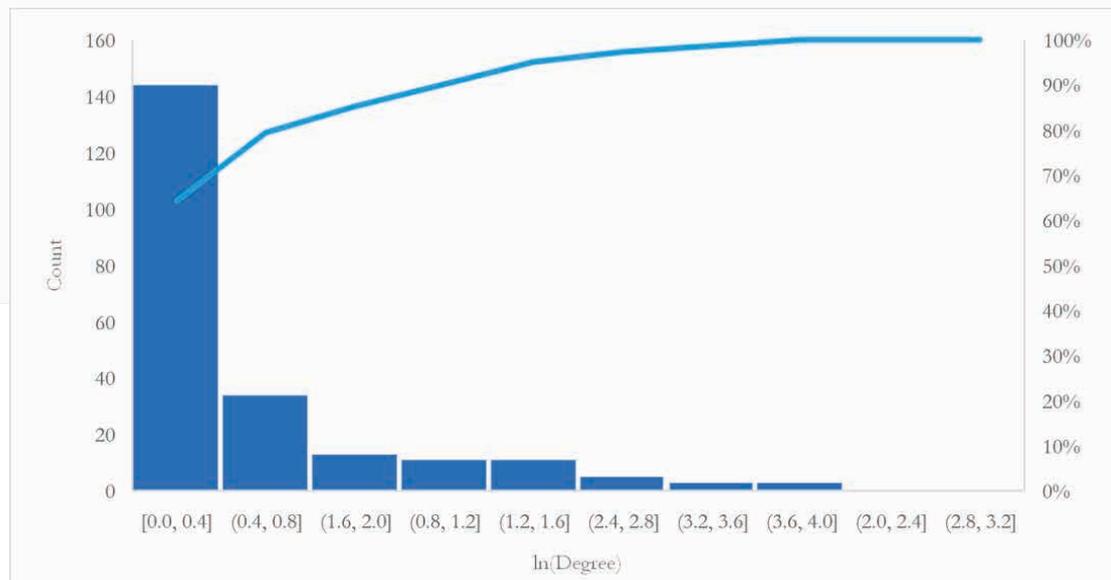


Figure 6: $\ln(\text{Degree})$ distributions, aggregated European (incl. UK) network



Note: The figure displays the distribution of $\ln(\text{total degree})$ in the fund investor network in the full-time window. The network includes the funds targeting both continental Europe and the UK.

Figure 5 maps out the investment panel connections (the edges) between the institutional investors and the fund managers (the nodes). The comparative sizes of the node measure the level of the total degree of each node, while the various colours identify their countries of origin. The networks include those funds targeting the continental European market and the UK market. Fund investment engagement becomes more active, as shown by an increasing number of investors and fund managers and, as a result, more connections.

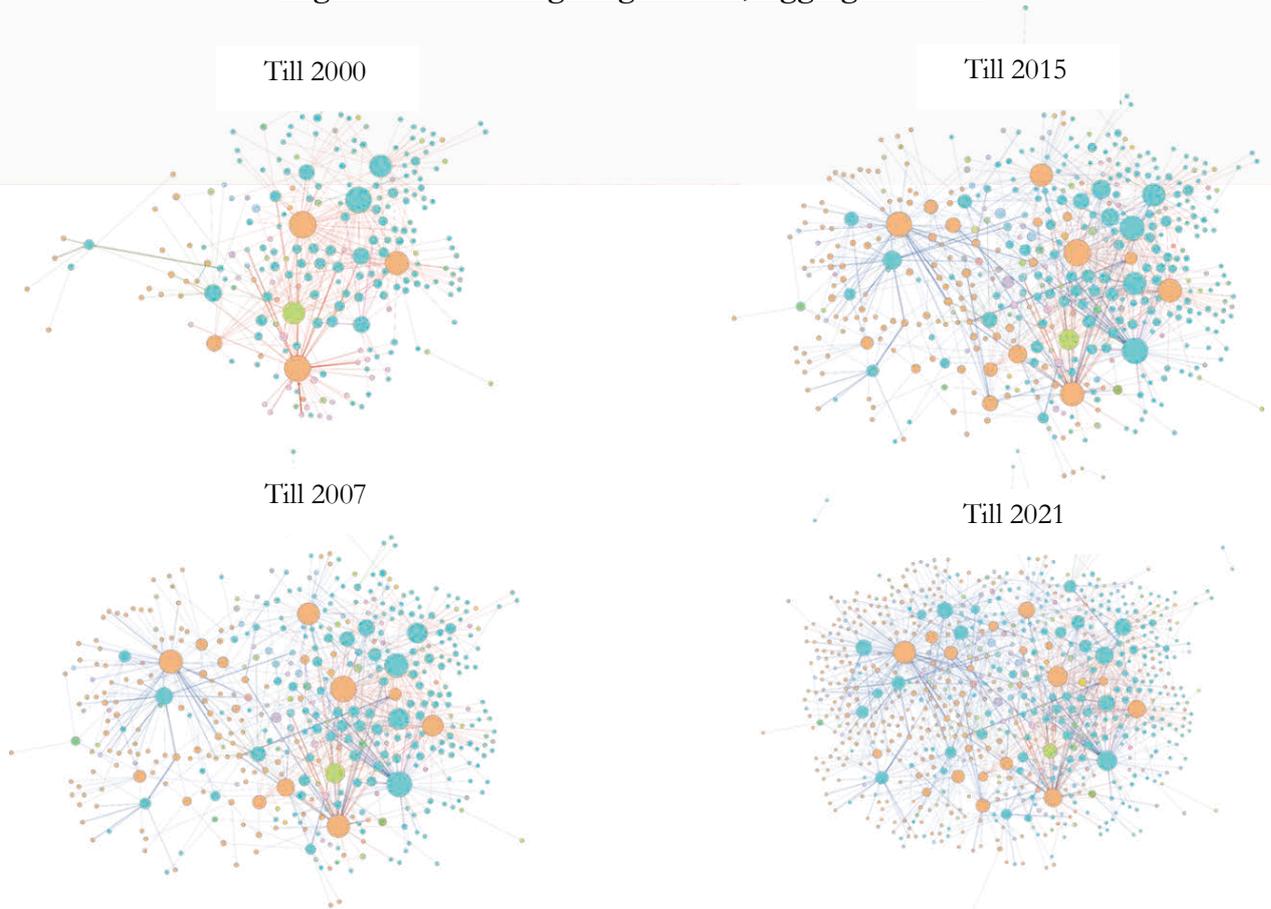
While the fund investors network constitutes an integrated cluster, in more recent years it has grown with more sub-networks and multiple centres within larger networks. The network becomes denser as more links have been established among a few larger investors, i.e., investors with a higher total degree. As displayed in Figure 6, the degree distribution has a tremendous higher number of nodes with a lower level of total degree, reflected as a fat tail on the other side of the higher total degrees, most of whom are the fund managers. This pattern shows a clear disassortative network structure between the investors and the fund managers. Though specific investors have more links with multiple fund managers, the number of connections remains limited, which may indicate concerns about fund management fees.

In terms of nationality clustering, the US (orange) and UK (aqua) fund managers are the key coordinators (the cores). However, investors' nationalities have diversified in recent years. Though still comparatively small in scale and number of funds managed, a few international investment managers have acted as the key nodes in raising funds from the foreign investors.

Figure 7 specifically focuses on the UK network. The UK market remains one of the key attractions for global institutional investors. In our sample, around half of the institutional investors have included the UK in their target market. The aggregated network structures between all-Europe and the UK are

quite similar, although some dissimilarities seemed to appear after 2016 (possibly, capturing the Brexit impact) – as further corroborated by the following charts. It remains to be seen whether such dissimilarities will become more prominent as the Brexit implementation is completed.

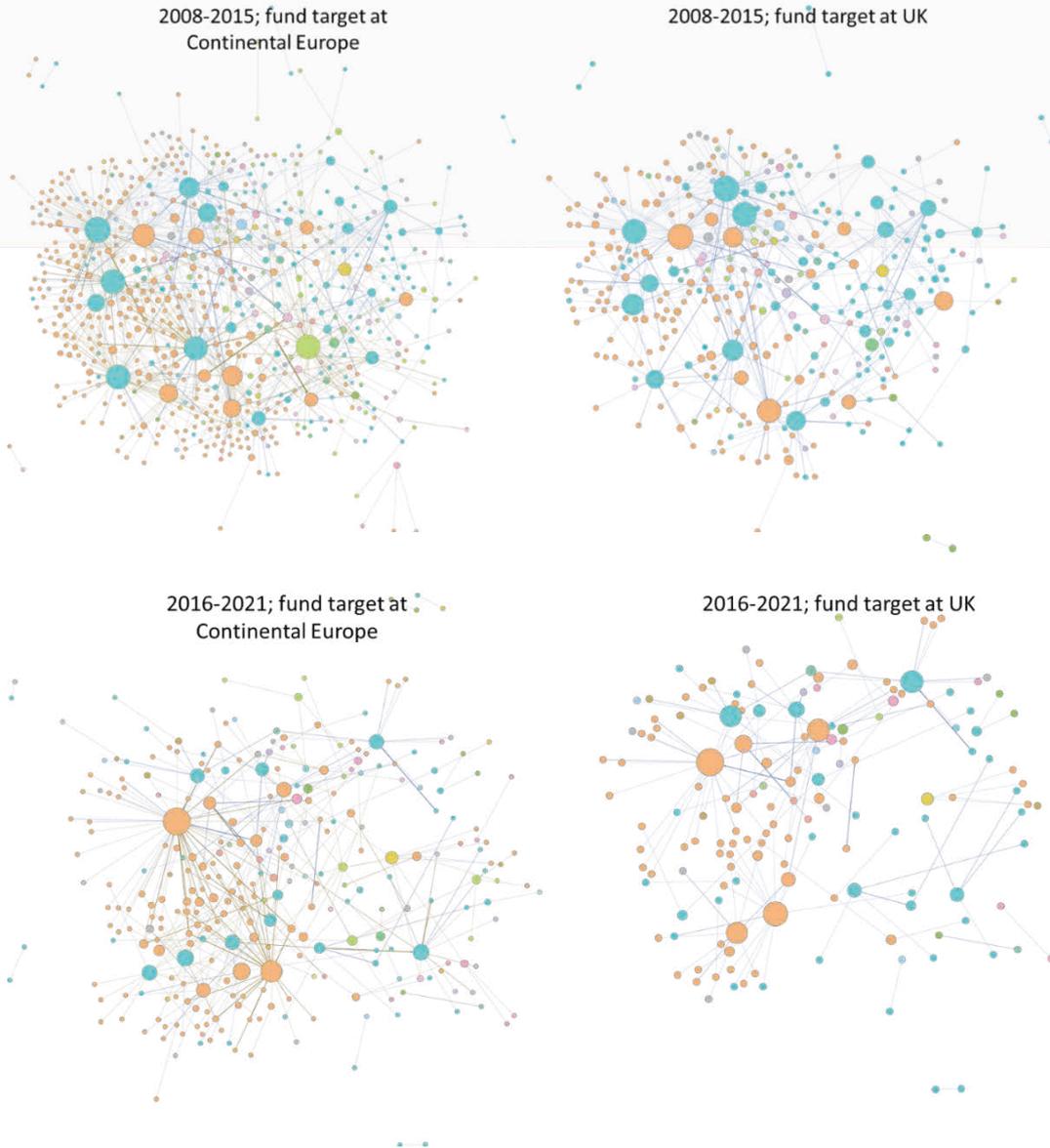
Figure 7: Funds targeting the UK; Aggregated data



	US		Switzerland		Canada		Spain
	UK		Australia		Sweden		Israel
	Netherlands		France		Finland		Portugal
	Germany		Norway		Denmark		Singapore
	Italy		Ireland		South Korea		Luxembourg

3.3.2 The Impacts of Brexit and the COVID-19 pandemic

Figure 8: Funds networks; Aggregated data



US	Switzerland	Canada	Spain
UK	Australia	Sweden	Israel
Netherlands	France	Finland	Portugal
Germany	Norway	Denmark	Singapore
Italy	Ireland	South Korea	Luxembourg

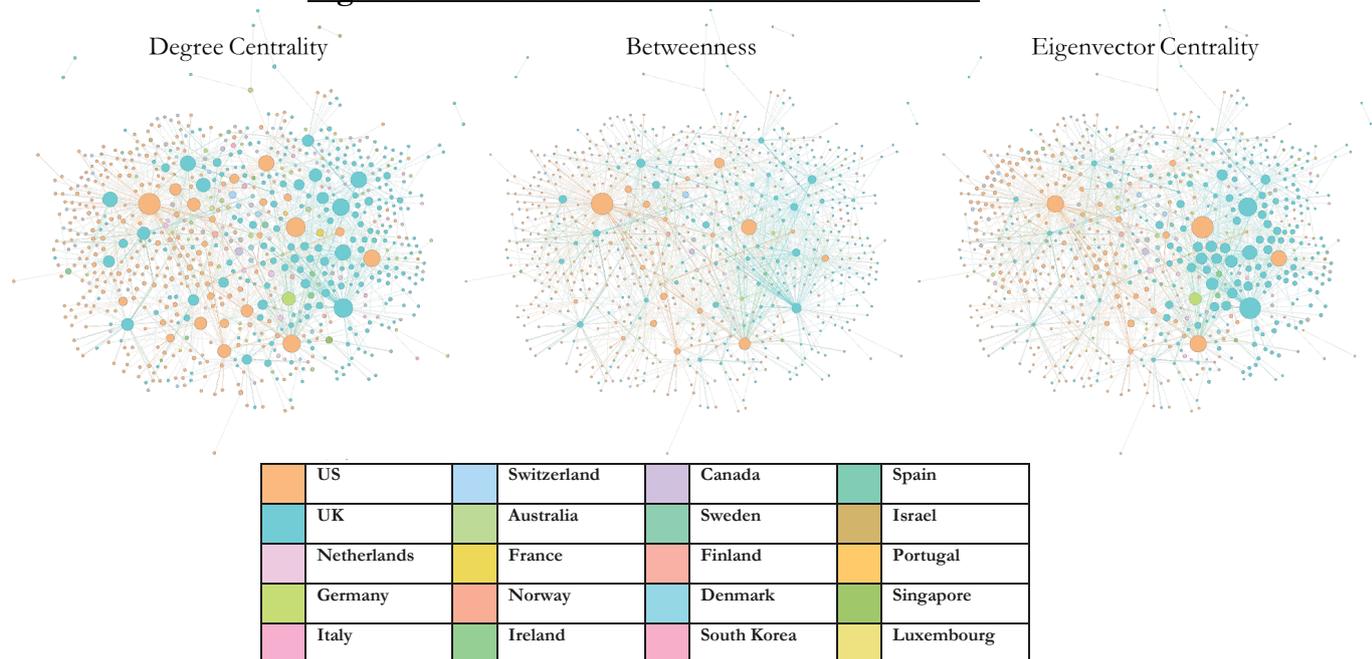
Inevitably, the 2016 Brexit referendum and the global pandemic in 2020 have profoundly impacted the CRE market structure and fund investment pattern in the UK and the wider European market. Figure 8 exhibits the periodic CRE fund formations before and after 2016. When the UK-focused

network is isolated, the UK network in 2016–2021 shows a significant decrease in the number of nodes compared to the period 2008–2015, as many investors exclude the UK from their target markets. The investment styles of the newer established funds may also tend to be more conservative with debt and core investment strategies. However, despite that the edge connections getting thinner, some core investors (shown as the bigger nodes) still take up the key/central positions in the networks.

The comparisons show a change in nationality diversity. With many European investors shifting their focus to continental Europe, there are significantly fewer European investors and investment managers in the UK-focused network. Compared to the fund networks that focus on the non-UK market, there are slightly fewer non-UK investors in the UK-focused fund networks. Nevertheless, the nationality is still quite diversified, with many participating as investors in the funds managed by UK and US fund managers. The number of UK fund managers has declined in the UK-focused networks. On the other hand, some Asian investors are proactive in raising or participating in the funds to invest in the UK CRE market.

3.3.3 Measuring Centralities of the International Investors

Figure 9: A Visualisation of Different Centralities



Note: the (comparative) sizes of the nodes in respective networks reflect the respective centrality levels.

The investors' diversity may contribute to a higher investment volume and with the superior connections with a wider range of investor partners, some international investors facilitate engaging with the other investor and maintain the connectedness of the investment network.

The networks in Figure 9 present different centralities of the nodes in the fund network that targets the UK market. Compared to the degree centralities, the betweenness centrality chart highlights the importance of those core ones in connecting the other investors. While most investors are assigned to one fund manager only, a few have established more sophisticated connections with several fund managers. These investors, shown by higher eigenvector centrality, might not be the most active in the fund market, but their move or (potential withdrawal of capital) would affect the balance of multiple funds managed by the fund managers, which may subsequently trigger systemic risk transmission.

4 CONCLUDING REMARKS

The ramifications of foreign real estate investors' strategy choices for the commercial real estate (CRE) market are examined in this study. Using a network framework, we quantify the investors' market linkages and characterise their influences. It is important to note that this study is based on a partial view of the market. However, the off-market deals, which typically do not involve brokers could achieve a lower/fair price relative to an on-market deal as often being the reason for off-market transactions, which are not captured here.

The property fund networks show the pattern of the investors' group formation in the UK. The UK market still retains the most mature professional practices and transparent market environment in the world. With the economy recovering from the pandemic, the UK CRE market should remain attractive to international investors. More importantly, an increasing number of international investors (especially fund managers) have become the core nodes in the network. The centrality comparisons show that those international institutions either introduce more investors into the UK market via the fund or share important connections with other market participants. The compacting connections may bring in or ensure resilience of the CRE fund network even during the financial shocks e.g. Global Financial Crisis, Brexit and the recent financial turmoil due to Covid-19 pandemic. However, more international cores in a network can also make the CRE market more vulnerable to systemic risks in the global capital markets.

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