Center for Global Studies on Culture and Society

"Market transparency and real estate investment"

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April 2019

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Abstract

This paper provides new empirical evidence about the important role of market transparency in international real estate investment. We apply the methodology adopted by Lieser and Groh (2014) to updated national panel data covering 44 countries from 2004 to 2016. The results suggest that countries with better accessibility to market information and higher enforceability of regulations have less information asymmetry and attract more inward real estate investment. Interestingly, the accounting quality of corporate governance is negatively correlated with investment, indicating the possibility that foreign investors enjoy high excess returns by investing in real estate in countries with poor accounting quality. We also find that the larger investment is caused by the higher growth rate of house prices and lower land productivity, implying that foreign investors seek regions with potential for future demand in the market. Because a large difference in market transparency among countries still exists, addressing information asymmetry in countries lacking transparency will promote efficiency in the global market of real estate investments.

1 Introduction

The improvement in the availability and comparability of data on developing countries over the past two decades has provided many valuable insights into global markets for not only investors but also researchers. Starting from La Porta et al. (1997), who demonstrated the significance of the relationship between the development of the financial market and the legal system, a number of studies on the role of legal systems in financial markets (La Porta et al., 1998, 2002; Graff, 2008) and in economic growth (Levine, 2005; Jappeli et al., 2005; Galindo and Micco, 2004) have accrued. A large number of such studies on the relationship between legal systems and economic growth have sought to understand how markets with diverse legal systems stimulate different types of investments from foreign investors. In particular, international real estate investment, accounting for a large portion of cross-border investment, can play a significant role in economic growth and urbanization in host countries through capital accumulation and efficient land use. Recent studies suggest the importance of the transparency of the real estate market in inward real estate investment (Adar et al., 2006; Eichholtz et al., 2011; Falkenbach, 2009; Fazanegan and Fereidouni, 2014; Fereidouni and Masron, 2013; Lieser and Groh, 2014; Schulte et al., 2005), while evidence on the relationship based on a sophisticated empirical analysis is scant. As mentioned in Levine (2005), the determinants of investment should be carefully examined considering various factors, such as legal, social, demographic and natural conditions, as well as endogenous factors inherent in each market.

This paper aims to investigate the role of market transparency in international real estate investment by utilizing country-level panel data to address such various factors and endogeneity issues. It is worth mentioning the literature that relates to our study. Eichholtz et al. (2011) analyze the performance, measured by Jensen's alpha, between internationally operating real estate companies and domestic real estate companies focusing on local markets, during 1996-2007. They find that international real estate companies underperform in the early period, while underperformance disappears with more transparent conditions in the later years. They argue that the improvement of the transparency of the real estate industry has recently equalized the conditions for foreign investors. Fereidouni and Masron (2013) and Lieser and Groh (2014) use panel data to examine the determinants of international real estate investment. Fereidouni and Masron (2013) use the corruption perceptions index provided by Transparency International as a proxy of market transparency and find that higher transparency is associated with greater investment. Lierser and Groh (2014) collect various socioeconomic and institutional variables

across countries covering the period between 2000 and 2009 and conduct an augmented random effect panel regression. They find several factors that may attract international real estate investment, namely, economic growth, rapid urbanization, compelling demographics, higher transparency in the legal framework, ease of administrative burdens and sociocultural challenges, and political stability. Other studies examine the relationship between market transparency and aggregate FDI (Drabek and Payne, 2002; Seyoum and Mnyak, 2009; Egger and Winner, 2003). Farzanegan and Fereidouni (2014) analyze panel data for 32 countries between 2004 and 2010 and find that the country fixed effects do not show a statistically significant relationship between market transparency and FDI inflows to the real estate sector.

This paper brings new empirical evidence to the literature by focusing primarily on the role of market transparency in determining the volume of inward real estate investment, using updated country-level panel data covering 44 countries from 2004 to 2016. We follow the methodology taken by Lieser and Groh (2014) and introduce new explanatory variables, such as interest rate, house price growth, land productivity and market transparency indices, in our analysis. Key variables are the market transparency indices that are provided for this research by JLL and LaSalle Investment Management, a world consultancy company specializing in property services and investment management. This paper differs from other studies using the transparency index by JLL and LaSalle Investment Management (Eichholtze et al. 2011; Farzanegan and Fereidouni, 2014; Newell, 2016; Sharp, 2013) in that we use an updated transparency index constructing panel data with a longer time dimension, utilize multiple transparency indices instead of just an aggregate index to examine how the investment is attributed to different aspects of market transparency, and employ the augmented panel data method (or "correlated random effects approach" as in Wooldridge (2015)) for intra- and international investigations of the determinants of the investment.

The estimation result suggests that countries with higher market transparency receive more investment from foreign countries than countries with lower market transparency, with other factors, such as economic size and growth, being constant. In particular, better accessibility to fundamental information on the real estate market and higher enforceability of real estate-related regulations are associated with greater inward investment. However, the accounting quality of corporate governance is negatively correlated with investment, implying that investors prefer investing in real estate in countries with poor accounting quality, which generates greater excess returns for real estate investment. We also find

3

that investment is positively correlated with higher house price growth and lower land productivity, which suggests the possibility that foreign investors seek regions with potential for future demand in the market.

The following section describes the data used in the analysis. Then, the empirical model and results are demonstrated. Finally, the last section draws the conclusions.

2　Data

We collected country-by-every-second-year unbalanced panel data of 44 countries, in the period from 2004 to 2016. In this subsection, we introduce three types of variables used in our analysis: 1) inward commercial real estate investment, 2) real estate market transparency indices, and 3) a set of control variables selected from those used in Lieser and Groh (2014) as explanatory variables.

2.1　Inward real estate investment

The data on the inward real estate investment were prepared by a real estate advisory company, Cushman & Wakefield (hereinafter, C&W). As mentioned in Lieser and Groh (2014), the data provided by C&W are considered the highest quality database on international real estate investment.[1] In particular, we use country-level panel data on inward commercial real estate investments as a dependent variable in our analysis. The same database was used in Lieser and Groh (2014), covering the period from 2000 to 2009.

Figure 1 shows the time trend of global inward real estate investment in US$ billion from 2004 to 2017.[2] The investment was increasing until the

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[1] Please refer to the C&W website (http://www.cushmanwakefield.com/en) for details on the company and the data of international real estate investment.

[2] Figure 1 was constructed in the following manner. In the following equation,

$$y_{it} = \psi_i + \rho_t + e_{it}$$

y_{it} is the natural logarithmic volume of investment toward country i in year t, ψ_i is an individual fixed effect of country i, ρ_t is a time fixed effect of year t, and e_{it} is the residuals. Let $\bar{y}_i$ refer to the time average of the logarithmic investment toward country i and $\bar{\bar{y}}$ be the average of the logarithmic investment across years and countries. Subtracting $\bar{y}_i$ from and adding $\bar{\bar{y}}$ to y_{it} yields the following equation:

$$y_{it} - \bar{y}_i + \bar{\bar{y}} = \bar{\bar{\psi}} + \rho_t + \widetilde{e_{it}}$$

where $\bar{\bar{\psi}}$ is the average of country fixed effects and $\widetilde{e_{it}} = e_{it} - \bar{e}_i + \bar{\bar{e}}$. In figure 1, the exponentials of OLS estimates of $\bar{\bar{\psi}} + \rho_t$ of the equation, i.e., $\exp(\hat{\bar{\bar{\psi}}} + \hat{\rho}_t)$, were plotted over time as a solid line, with dashed lines representing 95% significance intervals calculated based on standard deviations.

start of the rapid decline due to financial crisis, and then it gradually increased, reaching almost the level prior to the crisis by 2015.

<<insert Figure 1 here>>

2.2 Real estate market transparency index

The data on real estate market transparency are provided by JLL and LaSalle Investment Management, a world leading property consultancy company specializing in property services and investment management.[3] In 2016, JLL published a report on the 9th edition of the Global Real Estate Transparency Indices (GRETI), which measures the real estate market transparency in different countries and is constructed based on a survey of 139 constituent factors.[4] We were provided the biennial panel data from 2004 to 2016 of the *composite score*, which is a comprehensive evaluation of real estate market transparency, and 13 transparency subindices ([1] *Direct property indices*, [2] *Listed real estate securities*, [3] *Unlisted fund indices*, [4] *Valuations*, [5] *Fundamental data*, [6] *Financial disclosure*, [7] *Corporate governance*, [8] *Regulation*, [9] *Land and property registration*, [10] *Eminent domain*, [11] *Real estate debt information*, [12] *Sales transactions*, and [13] *Occupier services*). Table A2 in Appendix 2 lists 139 factors composing the 13 indices.

Figure 2 shows the time trends of 14 transparency indices (*Composite score* + 13 subindices). Each index is a continuum scale ranging from 1 to 5, with a lower value indicating a higher transparency. As shown in the figures, market transparency has been improved in almost all aspects, except that [9] *Land and property registration* and [10] *Eminent domain* became less transparent from 2012 to 2014, and [11] *Real estate debt information* became less transparent after the financial crisis. These indices refer to degrees of transparency, not strictness of regulations or difficulties of transactional procedures. Therefore, a higher score of [8] *Regulation*, for instance, indicates lower transparency in and/or weaker enforceability of regulation, not a tighter control on regulation.

<<insert Figure 2 here>>

The combination of these two data sets on investment and market transparency generates unbalanced panel data of 44 countries for a maximum of 7 periods

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[3] Please refer to the JLL website (https://www.us.jll.com/en) for details on the company and the data of the transparency indices.

[4] The latest version of GRETI, published in 2018, is based on 186 factors with an additional index, Sustainability.

(biennial from 2006 to 2014).[5] Figure 3 shows scatter plots of real estate investments against market transparency across countries, where the vertical axis is the time-average real estate investment in logarithmic value and the horizontal axis is the time-average market transparency *Composite score*. We can observe a clear negative correlation between these variables: the lower the *Composite score* (i.e., the more transparent the real estate market in a country), the greater the real estate investment is toward the country. Since the volume of real estate investment is not determined solely by market transparency, we need to consider various factors, such as economic size and regulatory strictness, to extract a partial correlation between investment and market transparency.

<<insert Figure 3 here>>

2.3 Other explanatory variables

The selection of control variables is based on Lieser and Groh (2014). We first excluded variables of constituent factors comprising the JLL transparency indices and then collected as many other variables listed in Lieser and Groh (2014) as possible. However, we were not able to collect all desired variables due to limitations of data accessibility. To retain sufficient numbers of observations in our analysis, we selected two sets of control variables. One set of variables, denoted by Xa, incudes those that are available between 2004 and 2016 for more than 85% of the 44 countries. The other set of variables, denoted by Xb, includes variables that are available from 2004 to 2016 for more than 80% of 43 countries.

We also gathered three additional variables not used in Lieser and Groh (2014) that are expected to influence the inward real estate investment: namely, (1) interest rates, (2) house price growth rates, and (3) value added in the service sector per urban land area. (1) The interest rate is expected to be negatively correlated with the volume of real estate investment because a higher interest rate yields a greater amount repaid when making a loan to purchase real estate. However, as the investment is often financed in investors' countries, the interest rate in a host country may not have a significant impact on the cross-border investment. Although long-term interest rates may have been more appropriate to capture the impact on the investment, the number of countries for which the data were available was not sufficient, and thus, the money market interest rates were used. (2) The expectation of house price growth may increase the inward investment because the demand for goods/services expands with the number

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[5] Basic statistics of real estate investments, *Composite score*, and number of observations by country are described in Table A1 in Appendix 1.

of higher-income consumers in the region and because the appreciation of invested real estate asset value increases collateral value to make further investments. (3) Lastly, the value added of the service sector per urban land area indicates the land productivity of the service sector. The direction of the effect of land productivity on investment is ambiguous. On the one hand, foreign investors may prefer investing in commercial real estate in profitable regions, while on the other hand, some investors may strategically invest in regions that still have room for higher profitability in the future.

The basic statistics of real estate investments, market transparency indices, explanatory variables, **Xa**, selected from Lieser and Groh (2014), and the three additional variables are shown in Table 1.

<center><<insert Table 1 here>></center>

3 Empirical analysis

3.1 Estimation model

As with Lieser and Groh (2014), the following augmented panel regression model will be estimated by random effect estimation:

$$y_{it} = u_i + \delta_t + \ddot{\mathbf{TI}}_{it}\boldsymbol{\alpha}^W + \overline{\mathbf{TI}}_i\boldsymbol{\alpha}^B + \ddot{\mathbf{X}}_{it}\boldsymbol{\beta}^W + \overline{\mathbf{X}}_i\boldsymbol{\beta}^B + \varepsilon_{it}$$

where y_{it} is the natural logarithmic value of the annual inward commercial real estate investment to country i from the rest of the world in year t; u_i is country i's unobservable fixed effect; δ_t is a year-time fixed effect, **TI** is a vector of market transparency indices; **X** is a vector of control variables that may affect the investment[6]; and ε_{it} is an error term. $\overline{\mathbf{TI}}_i$ and $\overline{\mathbf{X}}_i$ are the averages of $\mathbf{TI}_{it}$ and $\mathbf{X}_{it}$ for country i over time, that is, $\overline{\mathbf{TI}}_i \equiv \sum_t \mathbf{TI}_{it}/T_i$ and $\overline{\mathbf{X}}_i \equiv \sum_t \mathbf{X}_{it}/T_i$, where T_i is the number of years for which the data for country i are available. $\ddot{\mathbf{TI}}_{it}$ and $\ddot{\mathbf{X}}_{it}$ indicate within-transformed variables, that is, $\ddot{\mathbf{TI}}_{it} \equiv (\mathbf{TI}_{it} - \overline{\mathbf{TI}}_i)$ and $\ddot{\mathbf{X}}_{it} \equiv (\mathbf{X}_{it} - \overline{\mathbf{X}}_i)$.

Here, $\boldsymbol{\alpha}^W$ and $\boldsymbol{\beta}^W$ are within estimators indicating how changes in the independent variables over time affect the investment within a country. On the other hand, $\boldsymbol{\alpha}^B$ and $\boldsymbol{\beta}^B$ are between estimators indicating

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[6] Lieser and Groh (2014) constructed six indices, each of which was composed of four to six row variables, and used them as explanatory variables to estimate the investment equation. On the other hand, we use all available row variables along with transparency indices, for the main purpose of this paper is to examine the relationship between the market transparency and the volume of investment.

cross-border correlations due to differences in the levels of variables and investments across countries.[7]

3.2 Estimation results

We first look at the estimation results that use the *Composite score* with two sets of variables, **Xa** and **Xb,** as explanatory variables (Table 2); then, the two sets along with three additional variables are added separately (Table 3). Lastly, the result using 13 transparency subindices is described (Table 4).

Table 2 describes the results using *Composite score* as an indicator for market transparency. The first two columns show the within estimates and between estimates of a model using **Xa** as control variables. The between estimate of the *Composite score* is −1.331, which is statistically significant at the 1% level, implying that a country with a one-point higher time-average *Composite score* is associated with a lower investment by approximately 74% $(= e^{-1.331} - 1)$ with other factors, such as GDP, urban population, and FDI net flows, being constant. On the other hand, the within estimate of the *Composite score* is not statistically significant. These results suggest the possibility that countries that had a head start on facilitating a transparent market were immune to foreign competition and enjoyed a significant increase in inward investment (and/or that countries that enjoyed large inward investments from the early period continuously engaged in facilitating transparency in the market), which makes the between estimate statistically significant, while the marginal gain from improving market transparency diminished since the market transparencies in global real estate markets were gradually leveled, resulting in the nonsignificance of the within estimate in the sample period of 2004−2016. This explanation is in line with Farzanegan and Fereidouni (2014), who show that the within effect of transparency on FDI inflows to the real estate sector is statistically nonsignificant, and with Eichholtz et al. (2011), who show that the excess returns between international and domestic real estate companies disappear in the later years of their study period.

<center><<insert Table 2 here>></center>

Among the control variables in **Xa**, the between estimates show a positive sign for GDP, real GDP growth, urban population, telecommunication and FDI net flows and negative signs for GDP per capita and unemployment rate. The only within estimate showing a significant sign is the unemployment rate.

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[7] Please refer to, for instance, Wooldridge (2015) and Mundlak (1978) for further explanations on the augmented panel regression model.

<center>8</center>

The last two columns in Table 2 show the results using **Xb,** which contains variables regarding costs/difficulties of purchasing, registering, starting and ending investment procedures in addition to **Xa**. Although these cost-related variables are not constituent factors of the *Composite score*, the market transparency can be correlated with these variables, which could affect the coefficients for the *Composite score*. As shown in the estimation result, the between estimate of the *Composite score* is -0.868, whose absolute value is smaller than that of the previous estimation without using cost-related variables. This implies that the *Composite score* is positively correlated with the cost-related variables, attenuating the coefficient of the *Composite score*. The estimation results of both models assure the positive relationship between the volume of inward investment and market transparency across countries.

Now, we include additional variables: (1) interest rate, (2) house price growth rate and (3) service-sector value added per urban land area. Because of data limitations, we run three regressions using each of additional variables separately along with **Xa** and the *Composite score* as explanatory variables to retain sufficient numbers of observations. Table 3 shows the estimation results of the coefficients for the *Composite score* and additional variables. The results of the coefficients for **Xa** are omitted from the table. (1) In general, the interest rate is expected to have a negative correlation with investment. However, the coefficients are not statistically significant. This may be attributed to the fact that investors finance cross-board investments in their own countries to some extent, reducing the significance of the correlation between investment and interest rate in host countries. (2) Regarding house price growth, the within estimate is positive and significant at the 10% level. As the house price appreciates, investors increase investment, expecting future expansion of market demand and increase in the collateral values of real estate. (3) The value added of the service sector per land area can be interpreted as the land productivity of the service sector. The between estimate shows a negative sign at the 10% significance level. This implies the possibility that investors invest in countries with a greater potential for increasing demand in the market.

<<insert Table 3 here>>

Finally, Table 4 describes the estimation results using 13 transparency subindices as explanatory variables in place of the *Composite score*. We do not find any significant sign for the within estimates. The between estimates with significant signs in both regressions are [1] *Direct property indices*, [7] *Corporate governance*, and [8] *Regulation*.

9

<<insert Table 4 here>>

[1] *Direct property indices*, composed of six constituent factors,[8] measures the accessibility to fundamental information on the real estate market and performance in the targeted country. The positive estimated coefficient suggests that the higher accessibility to and transparency of the fundamental information on the real estate market in the targeted country reduces the information asymmetry between investees and investors across countries, resulting in large real estate investment toward the country.

[8] *Regulation*, composed of 13 factors,[9] measures the availability, enforceability and predictability of various real estate-related regulations in a country. The negative coefficient for *Regulation* suggests that a high transparency of such factors can reduce the uncertainty and risk of investment and thereby attract foreign investors.

[7] *Corporate governance*, composed of four factors,[10] reflects the audit quality of cooperate governance. Among the above three indices with significant signs, only *Corporate governance* shows a positive correlation with investment: the higher the index is (i.e., the lower the audit quality of corporate governance), the larger the investment, implying that investors prefer investing in real estate in countries where auditing standards are less strict. This interpretation is supported by the positive sign of [6] *Financial disclosure*,[11] the measure of accessibility and accountability to financial statements, indicating that a lack of accountability for financial statements is associated with a large inward investment. Edelstein et al. (2011) show that real estate security returns are negatively correlated with the quality of country-specific corporate

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[8] The six factors comprising *Direct property indices* include existence of a direct property index, reliability of the index and extent to which it is used as a benchmark of performance, type of index, length of national direct property level returns index time series, size of national institutional investment in the real estate market, and market coverage of the direct property index.

[9] The 13 factors comprising *Regulation* include extent to which the tax code is consistently applied for domestic / foreign investors, extent to which real estate tax rates are predictable for domestic / foreign investors, existence / predictability / enforcement of land use rules and zoning, existence / enforcement of building codes and safety standards for buildings, simplicity of key regulations in contract law, efficiency of the legal process, and level of contract enforceability for domestic / foreign investors.

[10] The four factors comprising *Corporate governance* include manager compensation and incentives, use of outside directors and international corporate governance best practice, alignment of interests and shareholder power, and free float share of the public real estate market.

[11] Factors comprising *Financial disclosure* include stringency of accounting standards, level of detail in / frequency of financial statements, and data disclosure by companies.

governance. Although poor corporate governance is expected to amplify information asymmetries and reduce investment, the increase in excess returns for real estate investment due to poor accounting quality may outweigh the issue of asymmetric information. Egger and Winner (2005) and Glass and Wu (2002) find positive relationships between corruption and FDI in host countries, suggesting that corruption may be beneficial by allowing circumvention of regulatory and administrative restrictions (Leff, 1964).

4 Conclusion

This paper investigates the role of market transparency in international real estate investment. By using updated country-level panel data covering 44 countries from 2004 to 2016, the empirical results confirm the positive relationship between market transparency and international investment. In particular, better accessibility to fundamental information on the real estate market and higher enforceability and predictability of real estate-related regulations are strongly associated with larger inward investment. These factors may attract foreign investors by reducing the asymmetric information between investees and investors across countries. However, we find a negative relationship between the accounting quality of corporate governance and investment. The increase in excess returns for real estate may outweigh the issue of information asymmetry that is generated when corporate governance lacks accountability in a targeted country. We also find that investment is positively correlated with higher house price growth and lower land productivity, which may reflect that foreign investors seek regions with potential for future demand in the market.

Overall, the coefficients for market transparency show significant signs only in terms of between estimates, not within estimates. This indicates that the countries with large inward real estate investment had facilitated market transparency from an early period that this study did not cover. These countries could have been immune to foreign competition and enjoyed large inward investments from the early period continuously engaged in facilitating transparency in the market, while the marginal gain from improving market transparency diminished since the market transparencies in global real estate markets were gradually leveled. That said, there is still a significant gap among countries in terms of market transparency, and leveling the gap is necessary to promote efficiency in the global market of real estate investment.

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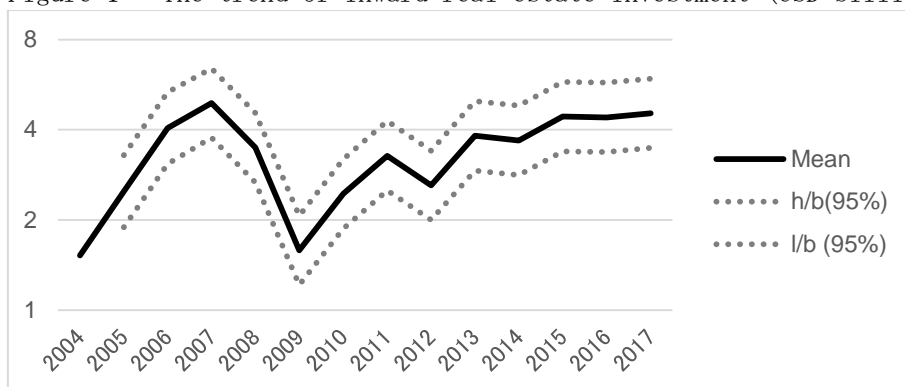Figure 1　The trend of inward real estate investment (USD billion)
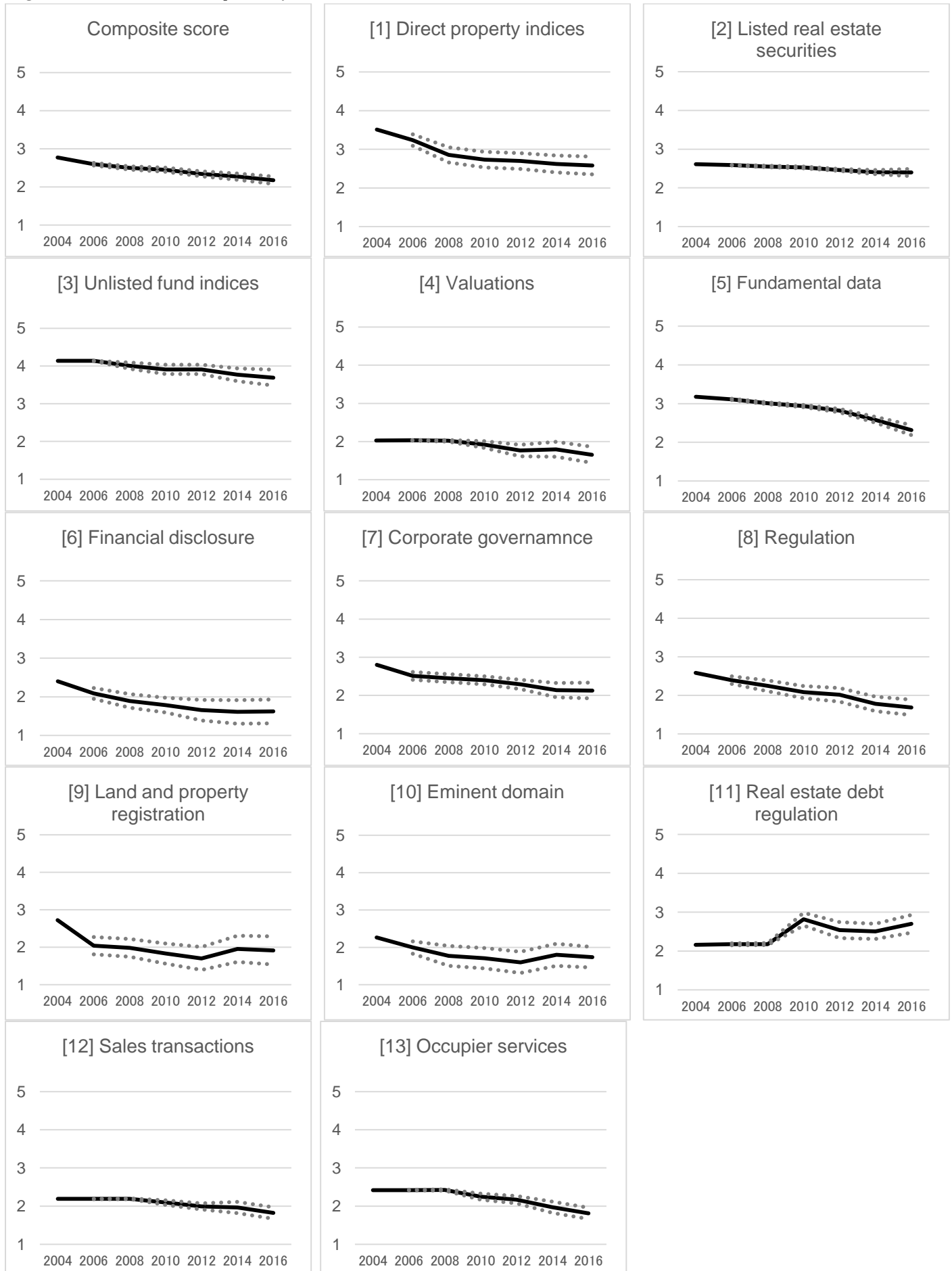
Figure 2　Market transparency indices

16

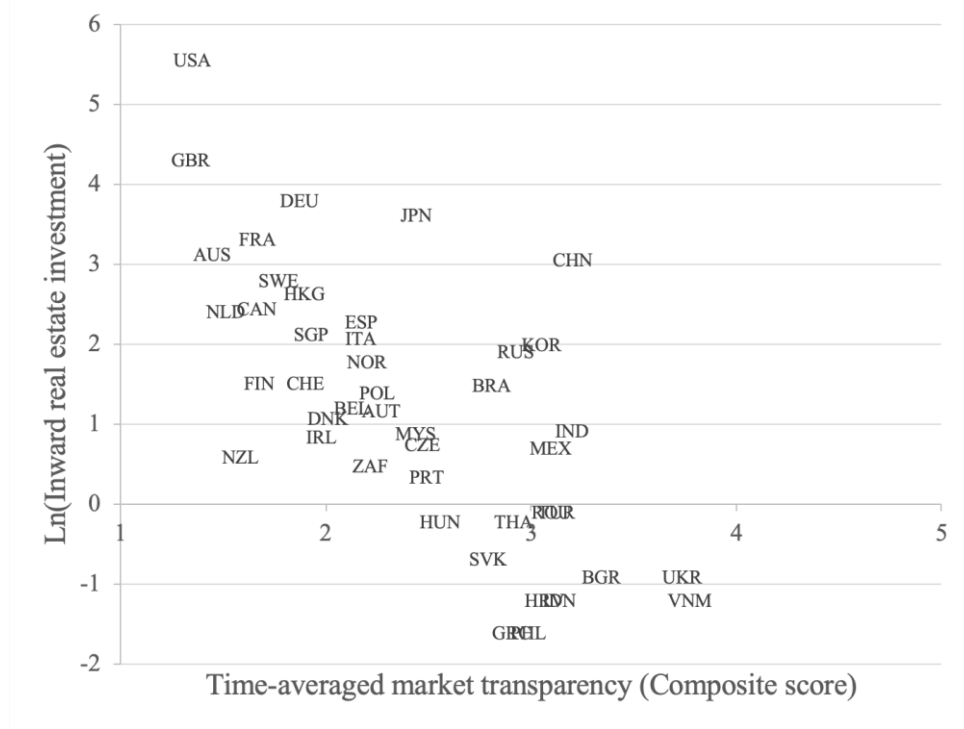Figure 3　Inward real estate investment versus market transparency

Table 1   Basic Statistics

Variables	Observation	Mean	SD
Inward commercial real estate investments (US$M)	273	15.80	46.10
JLL Transparency Index: Composite score	173	2.39	0.67
Real GDP (2010 US$B)	273	1.93	9.44
Real GDP per capita (2010 US$K)	273	0.98	0.94
Real GDP growth (%)	273	0.34	0.45
Unemployment rate (%)	273	7.43	4.65
CPI (consumer price index) growth (%)	273	3.28	3.38
Urban population (% of total population)	273	72.76	15.88
Telecommunication (Fixed telephone subscription per 100 people)	273	35.78	16.80
Domestic credit provided by banking sector (% of GDP)	273	128.67	64.75
FDI net flows (US$M)	273	39.70	68.89
Marginal corporate tax rate (%)	208	42.89	12.57
Profit and capital gains tax (%)	208	16.31	7.42
Cost of register property (% of warehouse value)	203	4.54	2.93
Procedures to register property (number)	203	5.44	2.33
Time needed to register property (days)	203	36.05	40.20
Procedures to start a business (number)	231	6.86	3.24
Time needed to start a business (days)	231	19.37	18.25
Cost of business start-up procedures (% of income per capita)	231	7.72	7.99
Minimum capital needed to start a business (% of income per capita)	231	26.12	50.88
Time needed to resolve insolvency (years)	231	2.07	1.39
Cost of resolving insolvency (% of estate)	231	11.24	8.40
Recovery rate (cents on a US$) recouped by creditors through insolvency	231	60.77	26.33
Political stability and absence of violence (indicator)	273	62.39	26.02
Interest rate (%, money market interest rate)	251	3.09	3.47
House price growth (% 2 year average)	186	17.70	23.92
Service sector value added per urban land area (US$B per sq. km)	240	30.16	59.52

Table 2　Estimation results with *Composite score*

	Control variables			
	Xa		**Xb**	
	Estimates			
	Within	Between	Within	Between
Ln(GDP)	0.657	0.084+	-0.465	0.131**
Ln(GDP per capita)	-0.156	-0.661**	-0.995	-0.692**
Real GDP growth	0.163	1.056*	0.213	1.502**
Unemployment rate	-0.044*	-0.048+	-0.057*	-0.006
CPI growth	-0.025	0.016	-0.018	-0.052
Urban population	-0.030	0.018*	-0.108+	0.031**
Telecommunication	0.007	0.020*	0.011	0.019**
Domestic credit provided by banking sector	-0.003	0.003	-0.003	0.002
FDI net flows	0.000	0.005*	0.000	0.002
Political stability and absence of violence	0.001	0.006	0.011	-0.014*
Marginal corporate tax rate			0.096**	0.019**
Profit and capital gains tax			-0.084*	0.019
Cost of register property			-0.070	-0.078**
Procedures to register property			-0.006	-0.243**
Time needed to register property			0.007**	0.010**
Procedures to start a business			-0.034	0.145**
Time needed to start a business			-0.010	-0.009
Cost of business start-up procedures			-0.001	-0.062**
Minimum capital needed to start a business			0.001	0.001
Time needed to resolve insolvency			0.068	-0.314**
Cost of resolving insolvency			0.014	-0.034**
Recovery rate from insolvency			0.019	-0.002
TI (*Composite Score*)	0.003	-1.331**	-0.240	-0.868**
Observations	273		203	
Number of countries	44		43	
Number of parameters	28		51	
R2 (within)	0.3458		0.4207	
R2 (between)	0.8420		0.9267	

** 0.01%, * 0.05%, + 0.1%, significant levels.

Table 3　Estimation results with additional variables

	Additional variable					
	Interest Rate		House Price growth (% 2 year average)		Ln(Service sector value added / area)	
Estimates						
	Within	Between	Within	Between	Within	Between
TI (*Composite*)	-0.032	-1.262**	-0.065	-1.239*	-0.363	-1.378**
	(0.346)	(0.288)	(0.446)	(0.563)	(0.355)	(0.357)
Additional var.	-0.025	0.014	0.018+	0.070	-1.794	-0.376+
	(0.025)	(0.038)	(0.005)	(0.040)	(1.201)	(0.213)
Control var.	**Xa**		**Xa**		**Xa**	
Observations	251		186		240	
# countries	41		32		40	
# parameters	30		30		30	
R2 (overall)	0.3557		0.4077		0.3429	
R2 (within)	0.8339		0.7884		0.8458	

** 0.01%, * 0.05%, + 0.1%, significant levels. Numbers in parentheses are robust standard errors. Coefficients for control variables, **Xa**, are not shown in the table.

Table 4　Estimation results with 13 transparency subindices

	Control variables			
	Xa		**Xb**	
	Estimators			
	Within	Between	Within	Between
Transparency Index (**TI**)				
[1] *Direct property indices*	-0.030	-0.690**	-0.028	-0.767**
[2] *Listed real estate securities*	-0.468	-0.611**	-0.052	-0.252
[3] *Unlisted fund indices*	-0.245	0.007	-0.114	0.036
[4] *Valuations*	0.116	0.127	0.105	0.539
[5] *Fundamentals data*	-0.291	-0.137	-0.078	-0.041
[6] *Financial disclosure*	0.077	0.405**	0.126	0.230
[7] *Corporate governance*	-0.137	0.870**	0.058	0.726**
[8] *Regulation*	0.121	-0.872**	-0.098	-1.605**
[9] *Land and property registration*	-0.06	-0.613**	0.001	0.339
[10] *Eminent domain*	0.020	0.521**	-0.117	-0.113
[11] *Real estate debt regulation*	0.171	-0.212+	0.131	-0.049
[12] *Sales transactions*	-0.177	0.195	-0.214	0.958**
[13] *Occupier services*	0.058	-0.178	-0.057	0.399
Observations	273		203	
# countries	44		43	
# parameters	52		75	
R2 (within)	0.3334		0.4652	
R2 (between)	0.9253		0.9772	

** 0.01%, * 0.05%, + 0.1%, significant levels. Coefficients of control variables, **Xa** and **Xb**, are not shown in the table.

Appendix 1.
Table A1. Basic statistics on investment and market transparency by countries

Country IOC	Observations	Commercial real estate investment (US$ B)		Market Transparency (*Composite score*)	
		Mean	SD	Mean	SD
AUS	7	22.7	9.2	1.44	0.11
AUT	7	3.2	1.2	2.27	0.13
BEL	7	3.3	1.2	2.13	0.19
BGR	5	0.4	0.4	3.34	0.23
BRA	7	4.4	1.8	2.81	0.29
CAN	3	11.5	3.3	1.66	0.06
CHE	7	4.5	2.7	1.90	0.16
CHN	6	21.1	12.4	3.20	0.34
CZE	7	2.1	1.2	2.47	0.29
DEU	7	44.3	23.3	1.87	0.13
DNK	6	2.9	1.4	2.01	0.13
ESP	7	9.7	5.2	2.17	0.17
FIN	7	4.5	2.1	1.67	0.07
FRA	7	27.4	7.6	1.67	0.20
GBR	7	73.8	27.5	1.34	0.07
GRC	7	0.2	0.2	2.90	0.21
HKG	7	13.9	4.4	1.89	0.08
HRV	5	0.3	0.3	3.07	0.17
HUN	7	0.8	0.4	2.56	0.28
IDN	4	0.3	0.2	3.14	0.30
IND	7	2.5	1.1	3.20	0.36
IRL	6	2.3	2.2	1.98	0.21
ITA	7	7.9	3.6	2.17	0.20
JPN	7	37.1	12.3	2.44	0.27
KOR	7	7.3	4.1	3.05	0.23
MEX	7	2.0	1.4	3.09	0.33
MYS	4	2.4	0.9	2.44	0.13
NLD	7	11.1	4.5	1.51	0.07
NOR	7	5.9	2.6	2.20	0.16
NZL	4	1.8	0.9	1.58	0.05
PHL	4	0.2	0.2	2.99	0.17
POL	7	4.0	1.6	2.25	0.30
PRT	7	1.4	0.9	2.49	0.26
ROU	7	0.9	0.6	3.10	0.52
RUS	5	6.7	2.4	2.92	0.09
SGP	7	8.3	2.1	1.93	0.12
SVK	5	0.5	0.3	2.79	0.27
SWE	7	16.3	3.8	1.77	0.08
THA	5	0.8	0.3	2.91	0.20
TUR	7	0.9	0.5	3.12	0.43
UKR	6	0.4	0.2	3.74	0.20
USA	7	257.7	121.8	1.35	0.07
VNM	4	0.3	0.1	3.77	0.19
ZAF	5	1.6	0.9	2.22	0.10

Appendix 2

Table A2. 13 transparency subindices and 139 constituent factors

Indices	Constituent Factors
[1] Direct Property Indices	Existence of Direct Property Index
	Reliability of the Index and Extent to which it is Used as a Benchmark of Performance
	Type of Index (Valuation Based vs. Notional)
	Length of Direct Property Level Returns Index Time Series
	Size of Institutional Invested Real Estate Market
	Market Coverage of Direct Property Index
[2] Listed Real Estate Securities Indices	Dominant Type of Listed Real Estate Securities (i.e. Long-term Holders of Real Estate vs. Homebuilders and Conglomerates)
	Use of Listed Real Estate Securities Data on the Real Estate Market
	Years Since the First Commercial Real Estate Company was Listed
	Value of Public Real Estate Companies as % of GDP
	Existence of a Domestic Listed Real Estate Index and Its Use as a Benchmark
	Existence of an International Listed Real Estate Index and Its Use as a Benchmark
	Length of Public Real Estate Index Time Series
[3] Private Real Estate Fund Indices	Existence of a Domestic Fund Index and Its Use as a Benchmark
	Existence of International Fund Index and Its Use as a Benchmark
	Length of Unlisted Fund Index Time Series
[4] Valuations	Independence and Quality of Third-Party Appraisals
	Use of Market-based Appraisal Approaches
	Competition in the Market for Valuation Services
	Frequency of Third-Party Real Estate Appraisals
[5] Market Fundamentals Data	Existence and Length of Time Series on Property Rents (Office, Retail, Industrial, Residential)
	Existence and Length of Time Series on Take-up/Absorption (Office, Retail, Industrial, Residential)
	Existence and Length of Time Series on Vacancy (Office, Retail, Industrial, Residential)
	Existence and Length of Time Series on Yields/Cap Rates (Office, Retail, Industrial, Residential, Hotels)
	Existence and Length of Time Series on Capital Values (Office, Retail, Industrial, Residential, Hotels)
	Existence and Length of Time Series on Investment Volumes (Office, Retail, Industrial, Residential, Hotels)
	Existence and Length of Time Series on Revenue per Available Room for Hotels
	Existence and Geographical Coverage of a Database of Individual Buildings (Office, Retail, Industrial, Residential, Hotels, Alternatives)
	Existence and Geographical Coverage of a Database of Leases (Office, Retail, Industrial, Residential, Hotels, Alternatives)
	Existence and Geographical Coverage of a Database of Property Transactions (Office, Retail, Industrial, Residential, Hotels, Alternatives)
	Proportional Coverage of Databases on Individual Buildings (Office, Retail, Industrial, Residential, Hotels, Alternatives)
	Proportional Coverage of Databases of Leases (Office, Retail, Industrial, Residential, Hotels, Alternatives)
	Proportional Coverage of Databases of Property Transactions (Office, Retail, Industrial, Residential, Hotels, Alternatives)
[6] Financial Disclosure	Stringency of Accounting Standards
	Level of Detail in Financial Statements
	Frequency of Financial Statements
	Availability of Financial Reports in English
[7] Corporate Governance	Manager Compensation and Incentives
	Use of Outside Directors and International Corporate Governance Best Practice
	Alignment of Interests / Shareholder Power
	Free Float Share of the Public Real Estate Market

Indices	Constituent Factors
[8] Regulation	Extent to which the Tax Code is Consistently Applied for Domestic Investors
	Extent to which Real Estate Tax Rates are Predictable for Domestic Investors
	Extent to which the Tax Code is Consistently Applied for Foreign Investors
	Extent to which Real Estate Tax Rates are Predictable for Foreign Investors
	Existence of Land Use Rules and Zoning
	Predictability of Changes in Land Use and Zoning
	Enforcement of Land Use Rules and Zoning
	Existence of Building Codes and Safety Standards for Buildings
	Enforcement of Building Codes and Safety Standards for Buildings
	Simplicity of Key Regulations in Contract Law
	Efficiency of the Legal Process
	Level of Contract Enforceability for Domestic Investors
	Level of Contract Enforceability for Foreign Investors
[9] Land and Property Registration	Existence of Land Registry
	Accessibility of Land Registry Records to Public
	Availability of Title Insurance
	Accuracy of Land Registry Records
	Completeness of Land Registry Records on Ownership
	Completeness of Public Records on Transaction Prices
	Completeness of Public Records on Liens and Easements
[10] Eminent Domain / Compulsory Purchase	Notice Period Given for Compulsory Purchase
	Fairness of Compensation to Owners in Compulsory Purchase
	Ability to Challenge Compulsory Purchase in Court of Law
[11] Real Estate Debt Information	Existence and Length of Time Series on Commercial Real Estate Debt Outstanding
	Existence and Length of Time Series on Maturities and Originations of Real Estate Loans
	Existence and Length of Time Series of Delinquency and Default Rates of Commercial Real Estate Loans
	Availability of Data on Loan-to-Value Ratios for Commercial Real Estate Loans
	Availability of Data on Margin Rates for Commercial Real Estate Loans
	Requirements for Lenders to Monitor Cash Flows and Collateral Value of Property with Loan Facilities
	Requirements for Lenders to Carry Out Real Estate Appraisals
	Penalties for Non-Compliance with Requirements
[12] Sales Transactions	Quality and Availability of Pre-Sale Information
	Fairness of the Bidding Process
	Confidentiality of the Bidding Process
	Professional and Ethical Standards of Property Agents
	Enforcement of Professional and Ethical Standards of Property Agents
[13] Occupier Services	Availability of Professional Third-Party Facilities and Project Management Companies
	Providers of Property Management Services Known to Occupiers
	Service Expectations for Property Management Clear to Occupiers
	Alignment of Occupier and Property Manager Interests
	Frequency of Service Charge Reconciliation
	Accuracy and Level of Detail in Service Charge Reports
	Ability for Tenants to Audit Landlord's Accounts and Challenge Discrepancies

Source: JLL